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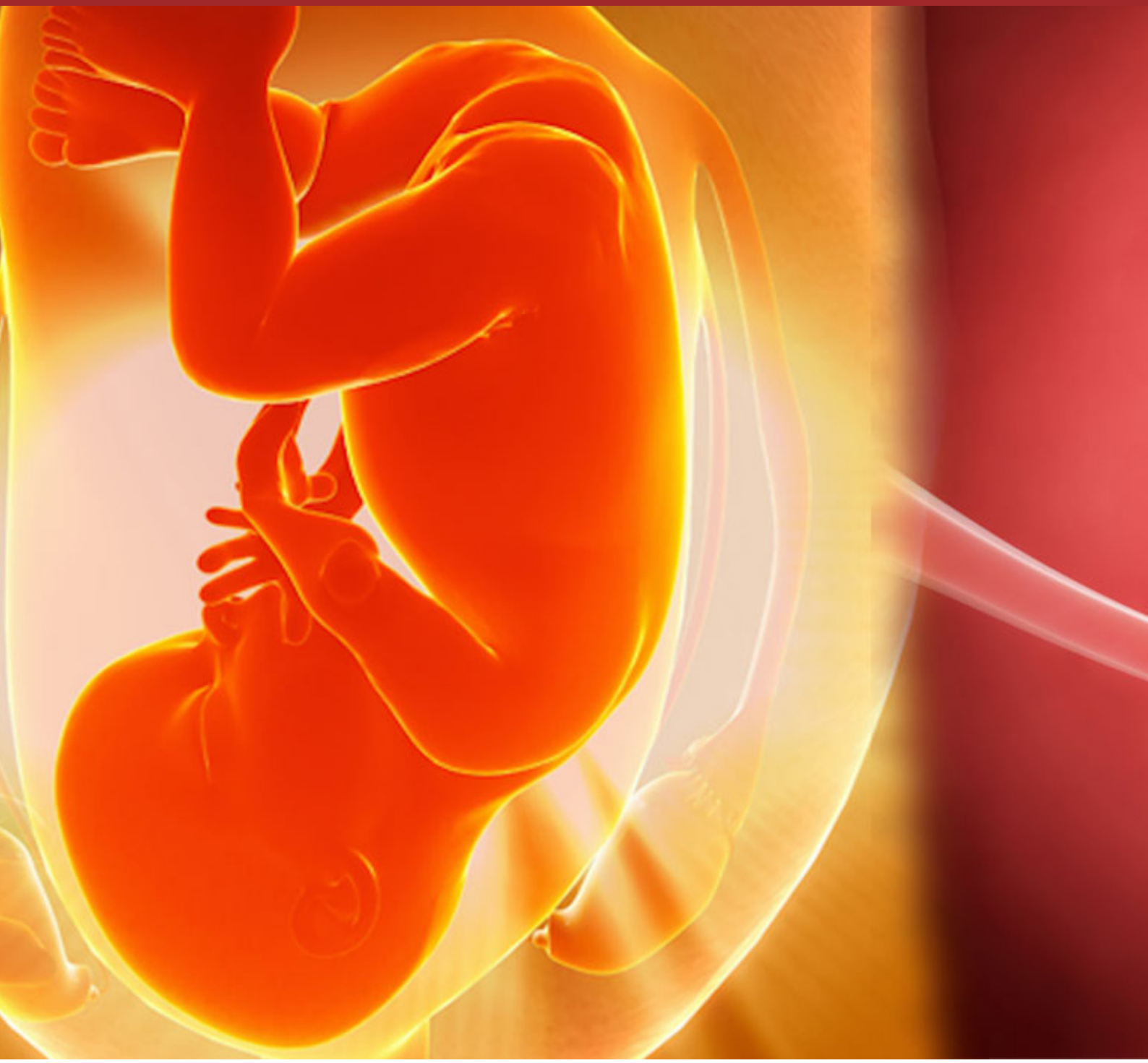

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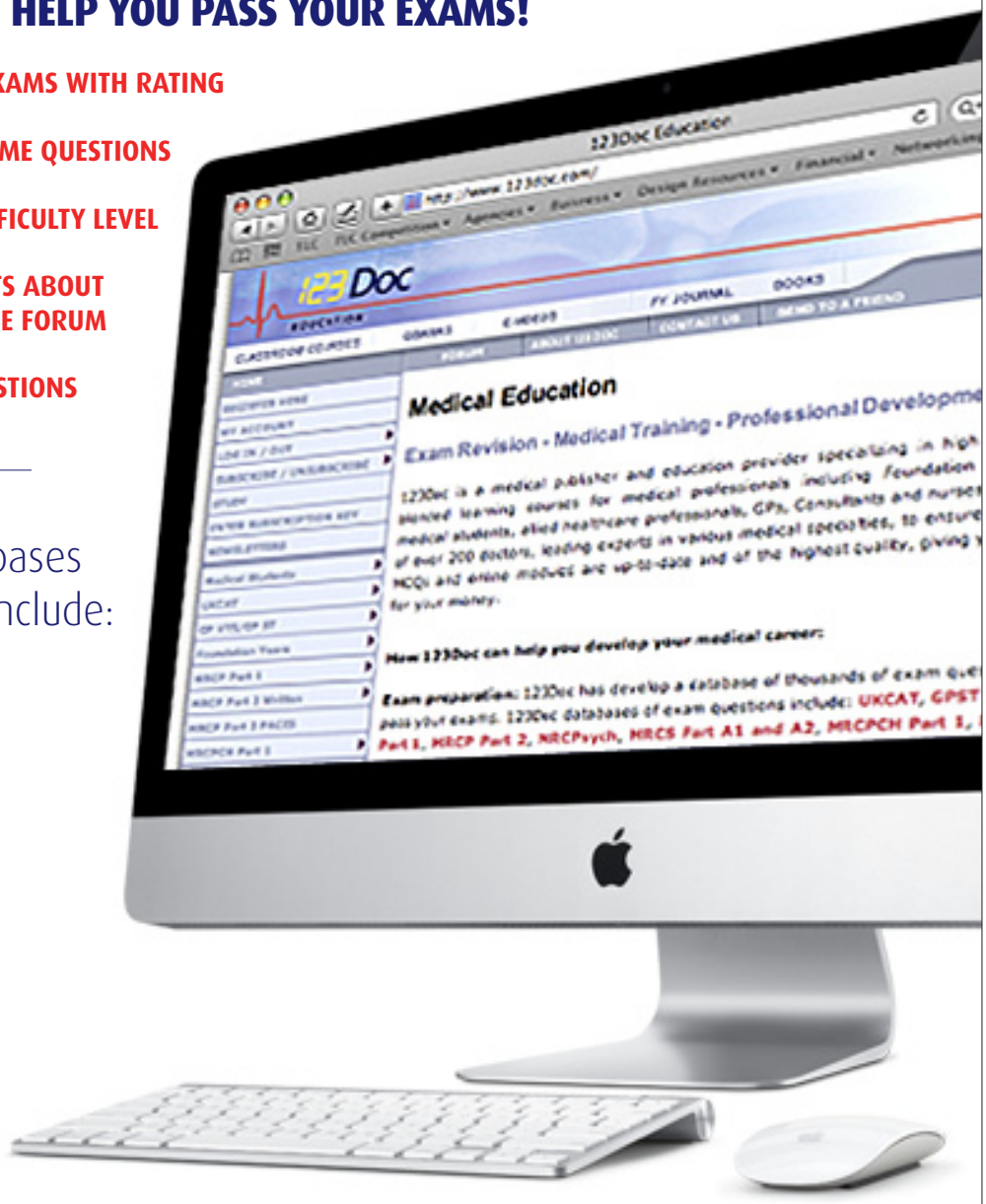

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FOUNDATION YEARS JOURNAL 2017

Volume 11

Foundation years journal

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A REVIEW OF THE GUIDELINES FOR MANAGEMENT OF GESTATIONAL WEIGHT GAIN: EXPLORING THE MATERNAL & FOETAL RISKS OF EXCESS GESTATIONAL WEIGHT GAIN & EVALUATING POSSIBLE INTERVENTIONS

C Grimminger, S Narayanan

Abstract

Excessive weight gain during pregnancy is becoming increasingly common in western culture, and it is associated with multiple maternal and foetal risks. Currently, no evidence-based UK guidelines exist on the management of gestational weight gain (GWG). The Institute of Medicine released guidelines on the management of GWG in 1990, and an update in 2009. These guidelines provide recommendations for GWG dependant on pre-pregnancy BMI.

The Centre for Maternal and Child Enquiries created a joint guideline with the Royal College of Obstetrics and Gynaecology for managing obesity in pregnancy. The guideline advises that obese women are weighed regularly, informed of the antenatal and postnatal risks, and offered techniques for managing weight in pregnancy. Research shows that education-based patient interventions focussing on diet and exercise can improve adherence to GWG guidelines. Therefore it is essential to establish local protocols that encourage all women to be healthier during pregnancy.

Guidelines state that a multi-professional approach is beneficial, and all members of the team must take responsibility for patient care. Obstetrics and Gynaecology clinicians are advised to assume the wider role of "women's health care physicians" in order to improve outcomes. Further research is required for the development of specific guidelines on gestational weight gain and interventions during pregnancy.

Risks of excess gestational weight gain

Excessive weight gain during pregnancy is becoming increasingly common in developing countries such as the UK and USA (1). It is imperative that pregnant women gain the recommended amount of weight throughout the course of their pregnancy, as excess gestational weight gain (GWG) is associated with adverse outcomes for both mother and baby. Women with GWG above the recommended range have an increased risk of developing gestational diabetes mellitus, large for gestational age babies, pregnancy-related hypertension and complications during labour and delivery, such as needing a caesarean section (2).

These women are also more likely to retain their weight in the postpartum period (3). As a result, the probability of being overweight or obese in subsequent pregnancies is increased. The offspring is at risk of increased body mass index (BMI) during childhood, adolescence and early adulthood. (2) Furthermore, pregnant women who have a higher BMI are less likely to initiate breast-feeding or they breast-feed for a shorter period of time. This can reduce or eliminate the benefits that breast-feeding has on the baby (4).

Guidelines

Currently, no evidence-based UK guidelines exist on the management of gestational weight gain. (3) The American Institute of Medicine (IOM) first released guidance on GWG in 1990 (1) and outlined the recommended GWG ranges for women with a low, normal or high BMI. These guidelines emphasised the increased risk of adverse outcomes for both mother and baby associated with excess GWG (5). It is essential that the guidelines and management protocols for these women are regularly reviewed.

The latest IOM guidelines for GWG were released in 2009 and evoked mixed opinions from clinicians (6). The guidelines state that women should be weighed at booking and have their booking BMI calculated, so that recommended weight gain can be formulated as a range for each category of pre-pregnancy BMI (Table 1) (7).

Pre-pregnancy BMI	BMI (kg/m²)	Total weight gain (lbs)	Rates of weight gain† 2nd and 3rd trimester (Mean range in lbs/week)
Underweight	<18.5	28-40	1 (1-1.3)
Normal weight	18.5-24.9	25-35	1 (0.8-1)
Overweight	25.0-29.9	15-25	0.6 (0.5-0.7)
Obese (including all classes)	≥30.0	11-20	0.5 (0.4-0.6)

Table 1: New recommendations for total and rate of weight gain during pregnancy, by pre-pregnancy BMI.

† Calculations assume a 0.5–2 kg (1.1–4.4 lbs) weight gain in the first trimester (based on Siega-Riz et al., 1994; Abrams et al., 1995; Carmichael et al., 1997

This guidance does not include the previous recommendations for specific populations, however additional tables specific to either singleton or twin pregnancies are provided. (6) As before, clinical evaluation of each pregnant woman is necessary in order to create specific recommendations; data from a variety of studies show that individualised care can assist women in gaining within these guidelines (8).

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Recommendations for Foundation Doctors

It is necessary for all healthcare professionals to promote the importance of appropriate gestational weight gain, as there are multiple associated adverse outcomes. Foundation doctors are selected to work in a variety of women's health placements, including clinics, wards or in a GP surgery. This allows opportunities for discussing diet and exercise with women before and during pregnancy, as well as with Midwives, Nurses and other clinicians. Research, audit, quality improvement and teaching are also a vital part of Foundation training, and improvement measures focussed on managing maternal weight gain could have a positive impact.

The boxes below outline maternal and neonatal risks of excess GWG, and provide advice about diet and exercise in pregnancy. However, further research is required in these areas in order to generate accurate and specific guidance for clinicians.

Risks to Mother:
- Gestational diabetes mellitus
- Weight retention
- Overweight or obese in future pregnancies
- Caesarean section delivery
- Pregnancy related hypertension

Risk to baby
- Large for gestational age
- Preterm birth

Advice about diet in pregnancy:
- Requirements increase by approx. 200Kcal/day in the 3rd trimester
- Refer to a Dietician if specific dietary advice required

Advice about exercise in pregnancy:
- Focus on "staying fit" rather than "getting fit"
- Avoid new or overly strenuous exercise regimes
- Pelvic floor exercises are important

As a foundation doctor you can:
- Contact your supervisor or department audit co-ordinator to get involved
- Discuss areas of improvement in the department with other team members, and consider starting a QI project
- Organise a teaching session on GWG and invite all healthcare professionals working in the department
- Consider implementing a dietary/exercise intervention

Table 1

Approximately half of all women of childbearing age in England are now either overweight or obese (9), and studies have shown that a large proportion of these women will gain too much weight during pregnancy (10). Therefore adherence to guidelines for overweight and obese women in pregnancy is a fundamental part of antenatal care. The CMACE and Royal College of Obstetricians and Gynaecologists (RCOG) joint guideline on the management of obesity in pregnancy was released in 2010 and offers specific advice for all women of childbearing age (11).

Clinicians must aim to target women before pregnancy, as women who conceive at a normal weight are more likely to have better obstetric outcomes. Comprehensive prenatal care is needed to help women reach this goal. (8) Primary care services are explicitly encouraged to regularly monitor weight, height and waist circumference of these women, alongside giving advice on weight and lifestyle. Pregnant women with a booking BMI in the overweight or obese category are advised to continue receiving nutritional advice with a view to weight reduction. (11)

Measuring Gestational Weight Gain

The IOM 1990 report calls for health care providers to adopt reliable methods for obtaining and recording national data on GWG, pre-pregnancy weight and height. It advises consistency when documenting GWG and monitoring weight gain over the course of the pregnancy. Weight measurement in a clinical setting is preferable to self-reported weights, and it is important to consider the type of scales used and the clothes worn by the patient. (1)

Recent studies report a lack of reliable weight measurements (12). As a result, data cannot be used to draw conclusions or formulate appropriate management plans. (1) Furthermore, inconsistent documentation of weight during pregnancy can impede further research, which is a vital part of creating evidence-based guidelines for pregnant women. Therefore, audit should be carried out in order to review the proportion of pregnant women who have a record of maternal height, weight and BMI in maternity hand-held and electronic notes. (11)

The most commonly used methods of calculating GWG are:

- *Net maternal weight gain = total weight gain – birth weight*
- *Total weight gain = final weight – initial weight*

  - Initial weight can be pre-pregnancy weight or initial weight at first prenatal visit.

  - Final weight can be weight at delivery or weight at last prenatal visit

- *Incremental weight gain = weight gain between two or more specified dates*

Net maternal weight gain is mostly used in specific research studies, and is less applicable to clinical situations, thus most guidelines do not refer to it. Calculating total weight gain is more time efficient, as it only requires two weights to be measured, and can be documented easily during the antenatal period (13). Taking a final weight measurement in the third trimester also allows a plan to be made for labour and delivery. (11)

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Incremental weight gain, on the other hand, requires a number of weight measurements taken at regular intervals. This method is considered by some to be more accurate as gestational age is taken into consideration. (13)

The IOM guidelines advise plotting cumulative weight gain sequentially on a weight gain chart, similar to a foetal growth chart, which displays a reference curve for recommended weight gain (Figures 1-4) (14). Many different charts are available to use and examples are provided in Appendix B of the IOM report (15). NICE recommends that "routine weighing during pregnancy should be confined to circumstances in which clinical management is likely to be influenced" (16). Nonetheless, it can be argued that women across all BMI categories could potentially gain excess weight during pregnancy. Detection of excess GWG in any woman is significant as it should trigger an intervention such as nutrition and exercise counselling.

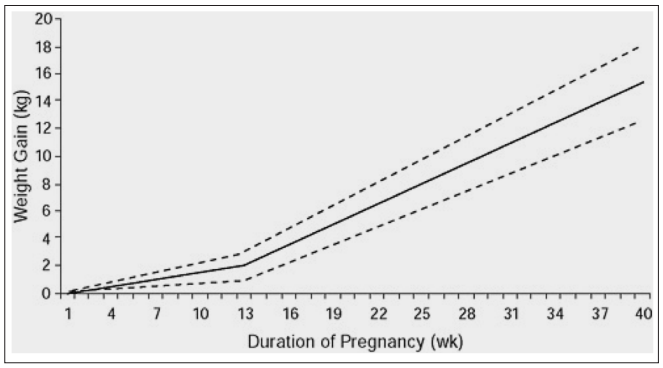

Figure 1: Recommended weight gain by week of pregnancy for underweight (BMI: <18.5 kg/m2) women (dashed lines represent range of weight gain)

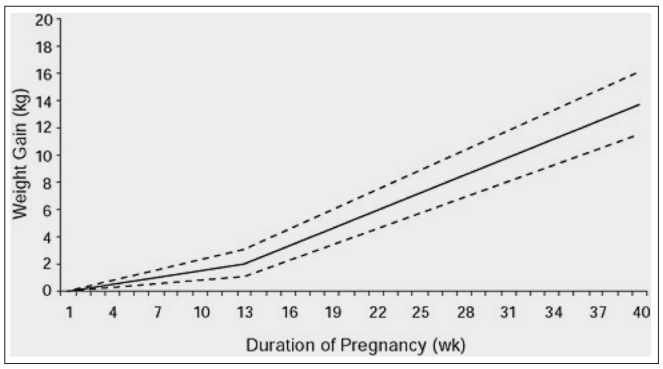

Figure 2: Recommended weight gain by week of pregnancy for normal weight (BMI: 18.5-24.9 kg/m2) women (dashed lines represent range of weight gain)

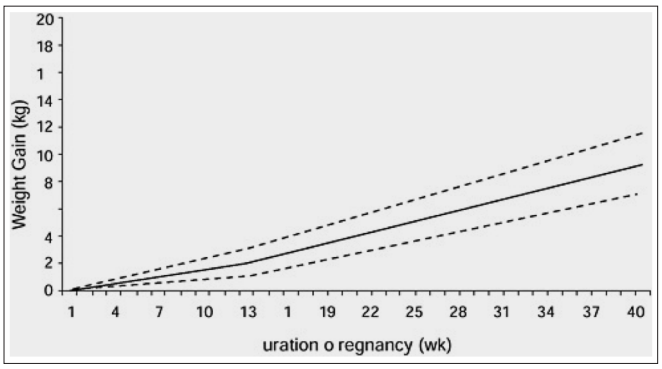

Figure 3: Recommended weight gain by week of pregnancy for overweight (BMI: 25-29.9 kg/m2) women (dashed lines represent range of weight gain)

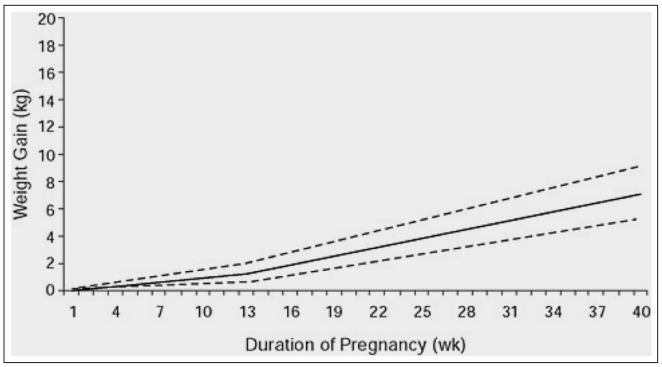

Figure 4: Recommended weight gain by week of pregnancy for obese (BMI: >30 kg/m2) women (dashed lines represent range of weight gain)

Interventions

Gestational weight gain is influenced by changes in maternal physiology and metabolism, along with placental metabolism (17). It is also affected by many other factors, including physiological, psychological, social, behavioural and cultural (18). Therefore, it is essential to consider all of the influences on GWG in order to create an effective intervention. Individual team members have a duty to consider and trial a range of practical solutions that prevent excess GWG. A variety of interventions exist that aim to improve adherence to the 2009 IOM GWG guidelines; however the research varies in reliability and accuracy.

The IOM guidelines and CMACE/RCOG joint guideline suggest that all women should receive counselling on diet and exercise before, during and after pregnancy. (7) It is important to note that dieting during pregnancy is not recommended as it may lead to foetal complications. (3) Since women are advised not to lose weight during pregnancy, interventions during pregnancy focus on helping women gain the recommended amount. (4) Pregnant women are then advised to lose weight after giving birth, which will in turn benefit future pregnancies. (3)

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Weight management programmes should identify and address concerns and barriers to change, and tailor advice accordingly. (3) Presently, interventions fall mainly into three categories; overweight and obese pregnant women are offered education on diet, exercise or a combination of both. Studies show that dietary interventions in pregnancy are the most effective at minimising GWG and improving obstetric outcomes (19). Dietary interventions include low glycaemic index, energy-restricted, diabetic, healthy eating, low carbohydrate and other diets. (5)

NICE guidelines instruct clinicians to dispel any myths about what and how much to eat during pregnancy. For example, it is not necessary for pregnant women to "eat for two". Energy requirements remain static in the first 6 months of pregnancy, increasing slightly in the last trimester by approximately 200 calories per day. Pregnant women should eat plenty of fibre-rich foods, and fruit and vegetables. Foods high in fat and sugar should be avoided, while watching portion sizes of meals and snacks, and how often they are eating. (3)

Nutritional monitoring has been shown to be effective in reducing maternal risk factors, as well as their GWG and post-partum weight retention (20). Regular weigh-ins and daily recording of dietary intake can encourage women to adhere to dietary changes. (8) In addition, a recent systematic review found that integrating goal-setting into a programme significantly reduces excess GWG. (4) The IOM provides a graph showing the difference between recommended GWG for pregnant women with a normal BMI compared to a BMI above thirty. This can be another useful tool for educating pregnant women. (7)

Analysis of intervention trials suggests that physical activity during pregnancy can be successful in controlling weight gain in pregnancy. (2) Hence, exercise-based interventions should be integrated into current practice, provided that any schemes are designed to guarantee patient safety. The core message for pregnant women is to avoid a sedentary lifestyle and stay fit, rather than get fit.

It is not advisable to start a new exercise regime during pregnancy, but recreational exercise such as brisk walking or swimming and strength conditioning is safe and beneficial. Crucially, studies on the effect of weight management interventions in pregnancy on maternal and foetal outcomes have shown that there is no evidence of harm as a result of the physical activity-based interventions in pregnancy (21). Still, more research is needed to establish safe guidelines. (5)

Educating healthcare professionals

Obesity, especially obesity in pregnancy, is a tricky subject to approach due to emotional, cultural and psychological elements. Many healthcare professionals can feel overwhelmed when faced with the challenge of tackling this issue. However this should not be an excuse to avoid taking responsibility, as all healthcare workers have a part to play.

The CMACE/RCOG joint guideline instructs all health professionals involved in the care of pregnant women to be educated about maternal nutrition and its impact on maternal, foetal and child health. (11) However, no formal training exists for health professionals regarding how to discuss the issue of obesity with pregnant women (12).

Research has been conducted to explore midwives' practice and views on GWG, and it highlights key opinions and attitudes. Most midwives viewed educating pregnant women about lifestyles and behaviour as a key part of their role (11). However, despite being deeply concerned about the physical and psychological health of these ladies, many midwives saw GWG as a low priority and not as a significant health issue for women.

A lack of education about the risks of excess GWG was evident following interviews with midwives. Many shared the belief that there was a lack of time and resources available to manage these women. The midwives were also concerned about the perceived negative impacts of dietary discussions or interventions. They assumed that such discussions may result in pregnant women taking drastic and unhealthy approaches to weight management (23). Midwives had varying personal attitudes to body weight, which influenced their ability to advise pregnant women on weight management (24).

Education on the subject of gestational weight gain is essential for both healthcare professionals and pregnant women. It is essential to remember that clinicians and midwives can have a significant effect on these ladies and their lifestyle. Any advice given to healthcare professionals would need to take into consideration the limited time available during consultations, communication skills required and any preconceptions or issues about embarrassment.

Considerations for future practice

Obstetrics and Gynaecology clinicians are advised to assume a larger role in the care of these women, to contribute to their overall picture of health, and to become "women's health care physicians". (8) It is therefore the duty of clinicians to be aware of the whole care pathway for pregnant women, and to ensure local policy is relevant and adapted to fit the needs of the population.

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This necessitates regular weight measurements being taken throughout pregnancy, calculation of GWG, and informing pregnant women of their advised weight gain range. Local teams should be encouraged to provide nutrition and lifestyle education for women before, during and after pregnancy. (7) All members of the healthcare team need to work closely together, including community healthcare workers, to provide individualised care for these ladies and encourage appropriate weight gain during their pregnancy.

There is a great need for further research, especially randomized trials, in order to determine the optimum weight gain during pregnancy for different BMI categories. (4,5,11) Formulating guidelines on gestational weight gain will continue to pose difficulties until further research can refine the recommendations, especially for women with high degrees of obesity. (6)

These recommendations are often challenging to put into practice, not least because of the stigma that surrounds obesity (25), but also due to a resistance to change that is commonly observed within teams in clinical practice (26). However, clinicians should not be deterred, as this is a global issue and can only be resolved if culture and practice are transformed. A revolutionized approach requires healthcare professionals to prioritise managing women's weight during pregnancy, ensure continuous professional and educational development in this area, maintain a non-judgmental attitude and be open to trialling new interventions.

Learning points

1. Updated guidelines for gestational weight gain were published by IOM and provide recommended weight gain ranges for each category of pre-pregnancy BMI.

2. Risks of excess GWG include gestational diabetes, LGA babies, pregnancy related hypertension, caesarean sections and post-partum weight retention.

3. Documentation and evaluation of women's weight throughout pregnancy is required to assess GWG.

4. Interventions involving educating pregnant women on diet and exercise have been proven to be successful in improving adherence to GWG guidelines and reducing excess GWG.

5. Every maternity team should aim to provide counselling for pregnant women on diet and exercise before, during and after pregnancy; local maternity units should aim to implement interventions and audit adherence to the IOM GWG guidelines.

6. The issue of weight management is challenging to approach, but it is the responsibility of all healthcare professionals.

7. More research is needed to develop detailed guidelines on gestational weight gain, as well as diet and exercise during pregnancy.

Multiple choice questions

1. What is the recommended weight gain range for a pregnant woman with a normal BMI?

a. 0-3kg

b. 3-6kg

c. 6-9kg

d. 9-12kg

e. 12-15kg

2. Research shows that gaining excess weight during pregnancy causes increased Maternal risk of:

a. Caesarean section

b. Post-partum weight retention

c. Gestational diabetes

d. Pregnancy related hypertension

e. All of the above

3. Energy requirements increase during pregnancy, and in the 3rd trimester women are advised to eat:

a. No extra calories/day

b. Between 100-200Kcal/day extra

c. 200kal/day extra

d. Between 300-500kcal/day extra

e. 500Kcal/day extra

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ABNORMAL BLEEDING FROM THE GENITAL TRACT IN WOMEN OF REPRODUCTIVE AGE GROUP - CERVICAL CANCER IN A YOUNG MOTHER

R Rajagopal, G Ofili

Abstract

Abnormal vaginal bleeding is a common gynaecological problem encountered in the reproductive age group. Pregnancy related and gynaecological causes both benign and malignant should be considered. Detailed history, thorough clinical examination and relevant investigations are crucial to aid in the diagnosis and plan appropriate management. It is very important to be open and honest with the patient and also sensitive to their feelings.

Mrs X is a 30year old para 2, presented to her General Practitioner six weeks after giving birth with a history of foul smelling vaginal discharge and heavy intermittent vaginal bleeding of one week duration. She had an uneventful normal vaginal delivery. Her GP attempted a speculum examination but due to the bleeding, the cervix could not be well visualised. A clinical diagnosis of endometritis was made by her GP and Mrs X was commenced on antibiotic therapy. She was also commenced on the combined oral contraceptive pill as she was not breast feeding. The clinical picture is suggestive of infective causes, however obstetric causes such as retained products of conception, gestational trophoblastic neoplasia and other gynaecological causes which could be benign or malignant would need to be excluded.

If symptoms such as foul smelling vaginal discharge and intermittent vaginal bleeding are encountered in the puerperal period it is common to think of obstetric causes. Perineal wound infection and endometritis could present with such symptoms. Retained products of conception in the form of a succenturiate lobe of placenta or retained membranes should be considered in the differential diagnosis. Ultrasound would aid in the diagnosis. Gestational trophoblastic neoplasia (GTN) should never be forgotten.

Gestational choriocarcinoma is the highly malignant form which can arise following a molar pregnancy or a nonmolar pregnancy irrespective of the outcome of the pregnancy (miscarriage/termination/preterm birth/term birth). It occurs in 1in 20,000 to 1 in 30,000 pregnancies and if left untreated could result in an adverse outcome. Placental site trophoblastic tumour arises from the placental implantation site and this is commonly seen after non molar pregnancies. Human chorionic gonadotropin would be sigificantly elevated in GTN and serum Beta HCG estimation would provide the clue to its diagnosis (1).

Gynaecological causes should also be considered. Cervical ectopy and cervical polyp usually present as intermittent and irregular vaginal bleeding and discharge and is easily detected on speculum examination. Cervical cancer presents as irregular bleeding (spontaneous or post coital), offensive vaginal discharge with or without pain. Early stage disease is only detected on microscopy whereas frankly invasive disease is obvious on speculum examination. Hard, friable and irregular cervix may be detected on bimanual pelvic examination.

Endometrial polyp and submucosal fibroid polyp (leiomyomatous polyp) when being extruded as a fibroid polyp can present with irregular bleeding and vaginal discharge. Endometrial cancer is common in women of perimenopausal and postmenopausal age group and presents as abnormal vaginal bleeding (2).

Sex cord stromal tumours (granulosa cell tumours, thecomas, sertoli cell tumours, sertoli leydig cell tumours) rarely present with abnormal bleeding as they secrete hormones. Epithelial ovarian tumours and germ cell tumours could also give rise to abnormal bleeding if there is involvement of the uterus or cervix. Clinical examination and radiological imaging is essential.

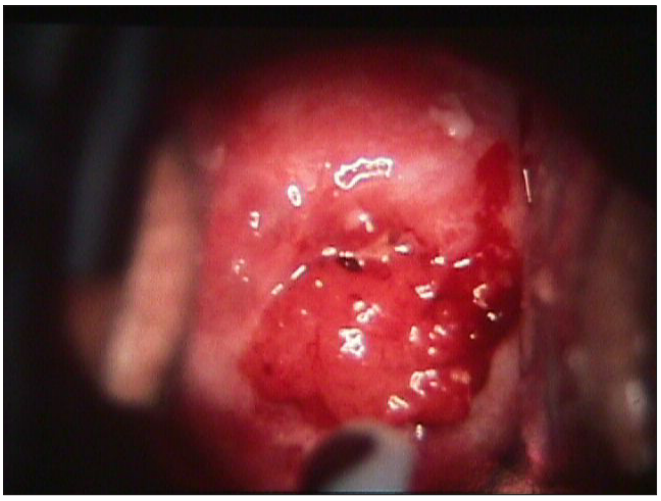
Six weeks later (twelve weeks postpartum) Mrs X attended her General Practitioner for her cervical smear which was rescheduled as she was pregnant when her routine cervical smear was due.

Examination by the practice nurse revealed an irregular appearance of the cervix and she was referred as an emergency to the gynaecological ward. The clinical picture was suggestive of cervical lesion which could be benign or malignant.

Detailed history including past obstetric, cervical smear, contraception, past medical, past surgical and drug allergy history is important to aid in the diagnosis. Thorough clinical examination is important to assist in establishing a diagnosis for planning further investigations.

Mrs X has had an uneventful past obstetric history (two normal deliveries of healthy babies), negative routine cervical smears but was recently diagnosed to have hypothyroidism. On examination in the gynaecological ward Mrs X had a BMI of 29. Pregnancy test was negative.

Speculum examination revealed an irregular friable growth on the cervix. Cervical punch biopsies were obtained and sent for urgent histological examination. Bimanual pelvic examination revealed a bulky, mobile uterus with tenderness in the posterior fornix. Vaginal walls, rectal mucosa and parametrium were not involved. Clinical diagnosis of carcinoma of the cervix stage I was made.



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Relevant investigations should be arranged based on clinical examination findings. Full blood count is important to exclude anaemia especially with the history of intermittent, irregular vaginal bleeding. Assessment of liver and renal functions are important so as to arrange further investigations and management. Mrs X had normal blood count, liver and renal function tests and a MRI pelvis with contrast was arranged on an urgent basis. She was informed that her management would be based on the recommendations of the multidisciplinary team (MDT).

Cervical cancer is the second most common cancer affecting women worldwide but the incidence in developed countries has come down due to the introduction of the cervical cancer screening programme. It commonly affects women within the reproductive age group (3). Persistent infection with oncogenic types of human papilloma virus (HPV 16 &18) is said to play a role but 15 other genotypes have also been identified to play a role in the development of cervical cancer.

Smoking has been shown to be associated with persistence of the HPV infection. The squamo columnar junction (the site where the stratified squamous epithelium of the ectocervix meets the columnar epithelium of the endocervix) is the site of origin of most preinvasive and invasive squamous cell neoplasia. Cancer of the cervix has a defined premalignant stage known as cervical intraepithelial neoplasia (CIN) which when identified and treated could prevent the progression to cervical cancer.

Studies have shown that progression from CIN to cervical cancer could take more than 10years. This long natural history gives us the window of opportunity to identify high risk women with our systematic population based screening programme for eligible women.

Mrs X was given the clinical diagnosis of cervical cancer in a sensitive manner. She was angry that there was a delay in the diagnosis as the GP had not examined her thoroughly in the first instance.

She questioned how she would develop cervical cancer with normal cervical smears in the past?

Why was she not tested for the high risk virus which is associated with cervical cancer?

She was apprehensive that she was not receiving immediate treatment but instead has been asked to await MDT discussion for a management plan.

Remaining calm and being a good listener is crucial when delivering bad news. As Mrs X had pointed out, the disease could have been diagnosed when she initially presented to her GP six weeks post partum but unfortunately cancer of the cervix was not suspected in view of previous normal smears.

It was explained to Mrs X that there is no perfect test to detect cervical cancer with 100% sensitivity and that cervical cancer screening programme has a sensitivity of 60% to 80%. At present HPV virus is tested only in smears showing low grade abnormality and in smears following treatment for CIN (test of cure) (4). The role of the Managed Clinical Networks (MCN) in the management of cancers is to ensure uniformity of care and avoid variations in an effort to improve survival rates.

Squamous cell carcinoma of the cervix is the commonest type reported in 70% to 80% of cases followed by adenocarcinoma in 10% to 15% and other rare types are small cell carcinoma, clear cell carcinoma, neuroendocrine carcinoma and glassy cell carcinoma (5). Staging of the disease is done to aid management. Radiological assessment of the tumour extension and nodal status is important.

MRI is preferred over CT due to better assessment of tumour extension (6). The FIGO staging (International Federation of Gynaecology and Obstetrics) is followed and the disease is categorised into four stages. Stage 1 where the disease is confined to the cervix and is further classified into Stage1A (disease identified on microscopy), Stage IB (disease visible on examination), stage II where upper third of the vaginal wall is involved, Stage III where lower third of the vaginal wall is involved and stage IV where disease has spread to adjacent organs. (For a detailed description of the staging please refer **http://www.cancerresearchuk.org/about-cancer/type/cervical-cancer/treatment/cervical-cancer-stages).**

Mrs X was diagnosed with poorly differentiated squamous cell carcinoma. MRI pelvis revealed 6cms cervical mass involving the posterior lip of the cervix with suspicious nodes in the right obturator region and a high right common iliac node. Following review by the MDT positron emission tomography (PET) scan and chemoradiotherapy was recommended. PET scan did not show any distant metastases. Following three cycles of chemotherapy (cisplatin and paclitaxel) chemoradiotherapy and brachytherapy was planned.

Treatment for early invasive cancer (tumour less than 4cms) is either by surgery or radiotherapy as they have similar efficacy. Surgical options available are simple or radical hysterectomy or conisation or trachelectomy as fertility sparing alternative to hysterectomy in young patients. For locally advanced cancer chemoradiotherapy is recommended. The cure rates for early stage disease is 80% to 95% and for stage 3 disease it is 60% (3,7). Following completion of therapy follow up is organised on a regular basis for the next five years. Most recurrences occur within 2 to 3 years after primary treatment and carry a poor prognosis.

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Multiple Choice Questions (True or False)

1. During the puerperal period the following can cause abnormal vaginal bleeding

a) Endometritis
b) Gestational trophopblastic neoplasia
c) Cervical ectopy
d) Carcinoma of the cervix
d) Carcinoma of the vagina

2. Epidemiology and Natural history of cervical cancer

a) Commonest female cancer worldwide
b) Affects any age group
c) Could be inherited
d) Has a precancerous stage
e) Progression from precancerous stage to cervical cancer takes less than a year

3. Cervical Cancer screening programme

a) Every woman over the age of 25 is invited for a cervical smear every two years
b) Has 98% sensitivity in the detection of cervical cancer
c) Women with any abnormality on cervical smear
are referred immediately for colposcopy
d) After subtotal hysterectomy cervical smear is still required
e) The programme has had little impact on the incidence of cervical cancer

4. Human Papilloma Virus (HPV)

a) Is a RNA virus
b) HPV 16 & 18 are associated with cervical cancer
c) The first cervical smear from a woman is tested for HPV
d) Smoking has no role in HPV infection
e) HPV vaccination is part of NHS childhood vaccination programme

5. Cancer of the cervix

a) Adeno carcinoma is the commonest type
b) Early stage disease is only diagnosed on microscopy
c) Staging of the disease is by clinical and histological examination
d) Fertility sparing surgery has a role in the management
e) Advanced disease is treated by chemoradiotherapy

Answers

1. Answer: (a) True, (b) True (C) True (d) True (e) False

Explanation: Puerperium is the six-week period following childbirth. During the puerperal period, infection of the decidualised endometrium could present as irregular vaginal bleeding and also as secondary postpartum haemorrhage. Gestational trophoblastic neoplasia can arise following any pregnancy irrespective of the outcome of the pregnancy and is much more common in Asian women.

Cervical ectopy is a benign condition where the columnar epithelium is visualised beyond the external os, extending on to the vaginal portion of the cervix. The columnar epithelium which is yet to undergo squamous metaplasia and transformation to stratified squamous epithelium is friable and bleeds easily. Carcinoma of the cervix presents as irregular vaginal bleeding and is common in women of reproductive age group whereas carcinoma of the vagina is common in the postmenopausal age group.

2. Answer: (a) False, (b) False, (c) False, (d) True, (e) False

Explanation: Cancer of the cervix is the second most common female cancer worldwide and occurs In women of reproductive age group. Cervical cancer is not a hereditary cancer. Cancer of the cervix has a long premalignant stage called cervical intraepithelial neoplasia (CIN) which commonly arises from the transformation zone. CIN is categorised as CINI, CINII and CIN III. It Is observed that 50% of CIN1 can undergo spontaneous resolution. Progression from CIN to cancer of the cervix could take more than 10 years.

3. Answer: (a) False, (b) False, (c) False, (d) True, (e) False

Explanation: Cervical cancer screening programme was introduced in the UK in the 1980's and after 1988 screening service was computerised with the generation of the call and recall invitations. It is a population based screening programme. All women between aged 25 to 64 years are invited for cervical screening. Between 25 to 50 years of age the screening interval is three years and after 50 years of age it is once in 5 years. Adequate samples with no abnormal cells are classified as negative.

There is 61 to 84% reduction in the risk of developing cervical cancer over the 3 to 5 year interval following negative cervical cytology. Women with cervical smear classified as high grade dyskaryosis are referred immediately for colposcopy. If the low grade abnormality persists on repeat testing then these women are referred for colposcopy. As the cervix is left in situ following subtotal hysterectomy the woman would still be in the screening programme. The effectiveness of the cancer screening programme has resulted in the decreased incidence of cervical cancer in developed countries.

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4. Answer: (a) False, (b)True, (c)False, (d)False, (e)True

Explanation: HPV is a DNA virus. HPV16 & 18 are considered as high risk oncogenic type. Other genotypes have also been associated with cervical cancer. HPV testing is performed on cervical smears with borderline abnormality and low grade dyskaryosis. HPV testing is also performed on cervical smears following treatment for CIN. Smoking has been shown to be associated with the persistence of HPV infection. HPV vaccination is part of NHS childhood vaccination programme. All girls aged 12 to 13 years are offered HPV vaccination.

5. Answer: (a)False, (b)True, (c)False, (d)True, (e)True

Explanation: About 3,000 cases of cancer cervix are diagnosed every year in the UK. Squamous cell carcinoma is the commonest type reported in 70% to 80% of cases. Early stage disease (stage 1A1 and stage 1A2) is diagnosed only on microscopy. Staging of the disease is by clinical, histological and radiological examination. Early stage disease is treated by surgery or radiotherapy. Women who are yet to complete their family are offered fertility sparing surgery in the form of conisation/trachelectomy instead of hysterectomy. Advanced disease is treated by chemoradiotherapy.

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APPROACH TO DIAGNOSIS & MANAGEMENT OF OVARIAN HYPERSTIMULATION SYNDROME

M Noble, K Reddy

Abstract

Ovarian Hyperstimulation Syndrome (OHSS) is an iatrogenic complication of Assisted Reproductive treatment, (ART) which uses drugs to increase the number of oocytes during treatment. In some women, the ovarian response exceeds that aimed for and results in a clinical condition with a specific pathophysiology called OHSS. In most cases OHSS is self-limiting and requires supportive management and monitoring while awaiting resolution. Women with more severe OHSS may require inpatient treatment to manage the symptoms and reduce the risk of further complications.

Often women with OHSS present to clinicians who are not fertility specialists or who do not undertake assisted conception. The case study presented here is a common case scenario encountered not only by clinicians who provide ART, but also junior doctors who look after women in an emergency or gynaecology department. The key principles of OHSS management are early recognition and the prompt assessment and treatment of women with moderate or severe OHSS. The discussion covers the important aspects of prevention, history taking, physical examination, appropriate investigations and management of OHSS.

Case History

A 22-year-old nulliparous woman attended the fertility clinic with a 3-year history of secondary subfertility. She was fit and healthy, had a normal BMI with no significant medical history. She was on 25 micrograms of thyroxine for underactive thyroid. Fertility investigations revealed tubal factor and polycystic ovaries as the main cause of subfertility. Based on tubal factor, she was referred to the IVF unit for assisted conception treatment.

She went through a standard protocol with a low dose (112.5iu) of gonadotropin stimulation (Follicle stimulating hormone) for 12 days. Her oestradiol level rapidly rose from 4800pmol on day 9 to 24,114pmol on day 12 (ideal level to be around >/= 5000pmol). In addition, there were more than 18 mature follicles noted before hCG (Human Chorionic Gonadotrophin) trigger.

At this stage, as she felt well with minimal abdominal discomfort the decision was made to go ahead with oocyte recovery and to freeze all embryos. To dampen the effect of OHSS, Cabergoline was also prescribed for seven days. Three days following oocyte recovery, she presented to the emergency department with increasing abdominal distension, nausea and vomiting, diarrhoea and breathlessness.

General observations were normal. Abdominal examination revealed a distended abdomen confirming with ascites. Blood investigations revealed slightly raised haematocrit at 0.45% and reduced albumin. Pelvic and abdominal ultrasound revealed large stimulated ovaries of 8cm and moderate ascites.

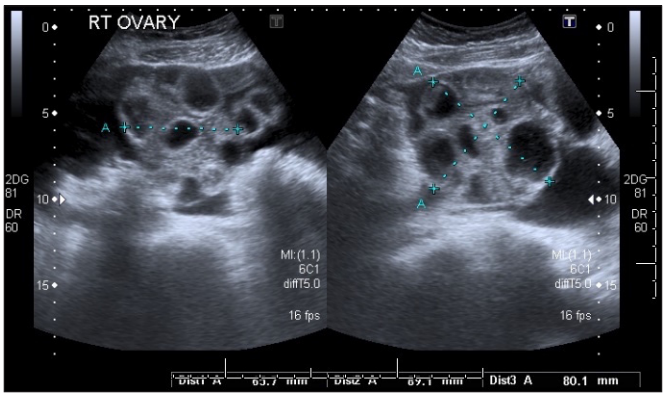

Figure 1: Ultrasound scan demonstrating the multiple ovarian follicles present in OHSS

She was admitted to the gynaecology ward and reviewed by the fertility team. With a diagnosis of moderate OHSS, treatment was initiated as per agreed local OHSS protocol. She required supportive management and was discharged home after five days with her symptoms resolving. She was subsequently reviewed on an outpatient basis in the IVF unit with complete resolution of her symptoms two weeks later. She will undergo a frozen embryo transfer at a later date.

Discussion

OHSS is an acute systemic inflammatory disorder caused by the release of vasoactive products from hyperstimulated ovaries. It is the most common serious complication of stimulation of the ovaries during assisted reproductive treatment. The incidence of OHSS appears to vary considerably according to the type of assisted reproductive cycle and the stimulation regimen used. The moderate form of OHSS is thought to complicate around 3-6% of IVF patients with severe OHSS reported in 0.1- 2% (1).

This case illustrates: (1) The need to identify risk factors and to implement preventative strategies. (2) A good outcome with supportive treatment of moderate OHSS. (3) The importance of prompt recognition of the deteriorating patient with clinical signs suggestive of OHSS. (4) The need to follow an agreed local protocol and coordinate treatment with the fertility team responsible for the patient.

Pathophysiology

The pathological features of OHSS primarily relate to the shift of intravascular fluid into third space compartments. In normal physiology the negative feedback mechanisms of the hypothalamic-pituitary-ovarian axis limit the number of oocytes recruited to each ovulatory cycle. This culminates in ovulation of a single dominant follicle in response to the mid cycle surge of luteinising hormone (LH).

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However, in assisted reproduction the administration of exogenous gonadotrophins interrupts this negative feedback loop and leads to the development of a greater number of follicles. The final step in this process is the administration of exogenous hCG or recombinant LH to promote oocyte maturation. It is this step that causes luteinisation of ovarian granulosa cells and appears crucial to development of OHSS (2,3).

A weight of evidence highlights vascular endothelial growth factor (VEGF) as a central mediator in the development of OHSS (4,5,6,7,8). High levels of VEGF from hyperstimulated ovarian granulosa cells appear to increase capillary permeability (9). This leads to a massive fluid shift from the intravascular to third space compartments causing primarily ascites, but in the most severe cases pleural and pericardial effusions and adult respiratory distress syndrome (ARDS).

The fluid shift in OHSS is associated with haemoconcentration and a consequential prothrombotic state, which can lead to thromboembolic events. Mortality is a rare but reported consequence as a result of multiple organ failure, haemorrhage from ovarian rupture or thrombosis.

Prevention of OHSS

Identifying and being aware of risk factors as shown in Table 1 will allow clinicians to plan strategies that reduce the incidence of OHSS (10,11,12).

- Young age
- Polycystic ovarian syndrome
- Previous OHSS
- Pre-treatment AMH >47pmol/L (Anti Mullerian Hormone)
- Number of follicles (>18 over 11mm diameter)
- Rapidly raising serum oestradiol concentration
- Number of oocytes retrieved in IVF cycle
- Exposure to hCG as luteal support
- Pregnancy (increases risk, duration and severity of OHSS)

Table 1: Risk Factors for OHSS.

Primary prevention strategies are focused on individualised treatment regimes. There is good evidence to support the use of ovarian stimulation protocols using GnRH antagonists along with the use of a GnRH agonist to trigger oocyte maturation prior to oocyte retrieval in order to reduce the risk of OHSS (13,14). Secondary prevention involves monitoring excess response to drugs during stimulation with the aim of preventing progression to OHSS.

Some of the secondary prevention strategies are:

- *Coasting: This is a common strategy whereby the stimulation is stopped until oestradiol levels normalise. The hCG trigger is then administered followed by oocyte recovery. Doubt prevails over whether this method is effective as D'Angelo et al., in their Cochrane Review, identified 4 RCTs which highlighted that there was no difference in the incidence of moderate and severe OHSS with coasting (15).*

- *Cryopreservation of embryos and transfer in a subsequent cycle to avoid the endogenous hCG associated with pregnancy.*

- *Cycle cancellation and withholding hCG trigger.*

- *Adjuvant therapy such as Cabergoline. This is a dopamine antagonist, which prevents increase in VEGF through its antiangiogenic properties and has been demonstrated to reduce the risk of moderate OHSS (16).*

The reported case history highlights the use of some of these secondary prevention strategies.

Classification of OHSS

The diagnosis of moderate OHSS illustrated in this case is based on the widely utilised RCOG classification system of severity as outlined in table 2 (12). Depending on the time of onset OHSS has been classified into early onset and late onset (17). Early onset OHSS occurs within three to seven days after the administration of exogenous hCG and late onset OHSS is caused by a pregnancy related increase in endogenous hCG level and occurs 10 or more days after.

Category	Features
Mild OHSS	Abdominal bloating Mild abdominal pain Ovarian size usually <8cm
Moderate OHSS	Moderate abdominal pain Nausea +/- vomiting Ultrasound evidence of ascites Ovarian size usually 8-12cm
Severe OHSS	Clinical ascites (+/- hydrothorax) Oliguria (<300ml/day or <30ml/hour) Haematocrit>0.45 Hyponatraemia (sodium<135 mmol/l) Hypo-osmolality (osmolality<282mOsm/kg) Hyperkalaemia (potassium> 5 mmol/l) Hypoproteinaemia (serum albumin <35g/l) Ovarian size usually >12cm
Critical OHSS	Tense ascites/ large hydrothorax Haematocrit>0.55 White cell count > 25 000/ml Oliguria/anuria Thromboembolism Acute respiratory distress syndrome

Table 2: Classification.

APPROACH TO DIAGNOSIS & MANAGEMENT OF OVARIAN HYPERSTIMULATION SYNDROME

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History & Examination

Whereas symptoms and signs of OHSS in a patient who underwent ART are obvious as abbreviated in table 3, it is important to rule out other serious conditions that may present in a similar manner. These include pelvic infection, appendicitis, ovarian torsion, ovarian cyst rupture, bowel perforation and ectopic pregnancy (18). Table 4 adapted from the RCOG guidance on OHSS summarises the investigation of women with suspected OHSS (12).

Investigations

- Full blood count incl. haematocrit (haemoconcentration)
- C-reactive protein (gives an indication of severity)
- Urea and electrolytes (Hyponatraemia and hyperkalaemia)
- Serum osmolality (hypo-osmolality)
- Liver function tests (elevated enzymes and reduced albumin)
- Coagulation profile (elevate fibrinogen and reduced antithrombin)
- hCG (this may be raised as a result of the ovulation induction or pregnancy)
- Ultrasound scan (to assess ovarian size, free fluid and likelihood of torsion)

Other tests that may be indicated

- Arterial blood gas
- D-dimer
- Electrocardiogram
- Echocardiogram
- Chest X-ray
- CTPA

Table 3.

Investigations

- Full blood count incl. haematocrit (haemoconcentration)
- C-reactive protein (gives an indication of severity)
- Urea and electrolytes (Hyponatraemia and hyperkalaemia)
- Serum osmolality (hypo-osmolality)
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Other tests that may be indicated

- Arterial blood gas
- D-dimer
- Electrocardiogram
- Echocardiogram
- Chest X-ray
- CTPA

Table 4: Investigations.

Management

As illustrated in our case, the management of suspected OHSS should be undertaken in close coordination with the fertility team responsible for the patient's care to promote clinical continuity and allow the fertility unit to meet it's legal requirements.

Management of OHSS is supportive with the mainstay of management being adequate analgesia, thromboprophylaxis and close monitoring of fluid balance and electrolytes to track clinical progress. Women with mild or moderate OHSS can be managed as an outpatient.

Worsening symptoms such as increasing abdominal girth and weight gain, shortness of breath, oliguria with a positive fluid balance and increasing haematocrit should prompt more urgent review, inpatient admission and occasionally intensive care input (19).

Paracetamol and opiates should be given for analgesia. However, non-steroidal anti-inflammatories should be avoided, as they may compromise renal function (19). Thromboprophylaxis is essential to prevent venous and arterial thromboembolism.

Management of fluid balance in OHSS can be particularly challenging especially in the presence of nausea and vomiting. Initial advice regarding fluid intake is to drink to thirst. There are no trials indicating the optimum regimen for fluid balance, but the oral route with concomitant antiemetics is preferable. Crystalloids are useful for the initial correction of dehydration in women who are unable to maintain adequate oral intake. Intravenous colloids are reserved for severe cases of OHSS and where large volumes of ascites are drained.

Ultrasound-guided paracentesis is only considered in the most severe cases where there is respiratory compromise or severe abdominal distension and pain due to ascites. Paracentesis has also been demonstrated to improve renal function. In one study of 19 women with OHSS there was a significant reduction in renal artery resistance and a rise in urine output following drainage of 2000ml of ascites (20).

In the presented case, supportive management of fluid balance, adequate analgesia and thromboprophylaxis was all that was required for symptom resolution. Appropriate implementation of primary and secondary prevention strategies halted the progression to severe OHSS.

In summary, although OHSS is rare it is a potentially fatal iatrogenic complication of fertility treatment. Appropriate preventive measures, prompt diagnosis and effective management of this self-limiting condition is essential to avoid significant morbidity and mortality in otherwise healthy young women.

APPROACH TO DIAGNOSIS & MANAGEMENT OF OVARIAN HYPERSTIMULATION SYNDROME

M Noble, K Reddy

Test Yourself

1. Which of the following statement is true in relation to the pathophysiology of ovarian hyperstimulation syndrome (OHSS)

a) The administration of exogeneous hCG to promote ovulation does not play a role in the development of OHSS.

b) VEGF released from the granulosa cells of the stimulated follicles is the central mediator in the cause of OHSS.

c) Severe cases present with fluid shift into the intravascular compartment.

d) Thrombosis in OHSS patients typically affects only the veins of the lower leg.

e) Women with PCOS have a reduced the risk of developing OHSS.

2. When a patient is diagnosed with suspected OHSS, their management is likely to:

a) Always need inpatient admission for monitoring.

b) See symptom relief within 7 to 10 days if a pregnancy occur.

c) Need anti-inflammatories for adequate analgesia

d) Always need vigorous intravenous colloid therapy on admission.

e) Include ascitic tap if urine output does not improve despite rehydration.

3. Which of the following are symptoms of OHSS?

a) Breathlessness

b) Abdominal distension/pain

c) Nausea & vomiting

d) Reduced urine output

e) All of the above

4. Which of the following is a primary risk factor for the development of OHSS?

a) rapidly raising oestradiol levels

b) more than 18 11mmfollicles

c) young age and polycystic ovarian syndrome

d) pregnancy

e) use of hCG for luteal support

5. A 33year old nulliparous woman undergoing IVF treatment presented to the emergency department with worsening abdominal distension and vomiting over a week. Investigations revealed raised haematocrit of 0.50, oliguria of less than 10mls/hour, low serum albumin of 23g/l.

Examination revealed clinical ascites and dehydration. No evidence of thrombosis or pleural effusion. Ovarian size on ultrasound measured 12cms. Based on the RCOG classification of severity, what is the likely diagnosis?

a) Late OHSS

b) moderate OHSS

c) early OHSS

d) severe OHSS

e) critical OHSS

Answers

1. B

VEGF (vascular endothelial growth factor) plays a major role in the pathophysiology of OHSS. This is linked to the use of exogenous and endogenous hCG. Increased vascular permeability leads to shift of fluid from the intravascular compartment to third spaces.

Women with polycystic ovaries are at high risk of developing this syndrome. OHSS leads to haemoconcentration and hence are at increased risk of venous and arterial thrombosis in arms, legs and neck veins.

APPROACH TO DIAGNOSIS & MANAGEMENT OF OVARIAN HYPERSTIMULATION SYNDROME

M Noble, K Reddy

2. E

Ascitic tap is indicated if urine output doesn't improve in spite of rehydration to improve renal function. Depending on the severity, mild and some moderate OHSS patients can be managed on an outpatient basis.

Drinking to thirst is the best way to rehydrate. Intravenous colloids are reserved for severe cases of OHSS. Pregnancy makes symptoms worse due to increasing endogenous hCG. Anti-inflammatories should be avoided as it compromises renal function.

3. E

All the symptoms mentioned are characteristic of OHSS.

4. C

Young women and PCOS are the main primary risk factors for the development of OHSS. The remaining are secondary risk factors once IVF treatment is initiated.

5. D

Based on worsening laboratory values and signs of ascites with enlarges ovaries, the diagnosis is severe OHSS. Evidence of thrombosis, ARDS, pleural effusion will lead on to critical OHSS. Early and late onset OHSS is based on the time of onset of the condition and not the severity.

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CASE HISTORY OF AGGRESSIVE ANGIOMYXOMA

C Allen, A Knox

Abstract

A case of a 33 year old woman presenting with a vaginal mass. Deemed benign this mass was surgically resected and found to be an Aggressive Angiomyxoma. Discussed are the differential diagnosis, background, assessment and management of this rare, benign but locally aggressive soft tissue tumour of the genital tract.

Case History

A 33 year old Para 1 presented to the Gynaecology outpatient department with a vaginal bulge, with an associated increase in symptoms following menstruation. Pelvic examination revealed a mass arising from the anterior vaginal wall that was closely related to the bladder neck. To exclude a urethral diverticulum and to further clarify the size and nature of the mass we organised a Magnetic Resonance Image (MRI).

MRI demonstrated a "sausage" shaped area of high T2 signal extending over 5cm in length. The case was discussed at the regional Multidisciplinary Team Meeting (MDM) and a decision for surgical excision was recommended. The procedure involved excision of vaginal mucosa with the underlying mass. The procedure was uncomplicated and she was discharged the same day. Histological examination demonstrated an ill-defined mass with no capsule and expansion of the subepithelial tissue by a myxoid/oedematous stroma containing many thick and thin walled blood vessels.

The mass extended to the deep margins of the specimen. This unusual tumour was referred to the regional pathology service for a second opinion and was confirmed as an aggressive angiomyxoma. At her six-week gynaecology clinic review examination revealed an area of thickening to the right of her scar. Following further discussion at the regional MDM it has been recommended to commence long term GnRH analogue therapy, however, as the patient is currently aiming for pregnancy this will be delayed in the short- to mid-term.

Discussion

Vaginal masses are a relatively common presenting complaint and the differential diagnosis is dependent on the exact location of the mass in question. The differential diagnosis of anterior vaginal wall masses includes Skene's Duct Cyst, Urethral Diverticulum, ectopic ureterocele, Gartner's Duct Cyst, Mullerian duct cyst, leiomyoma, other benign mesenchymal lesion (including aggressive angiomyxoma), Condyloma Acuminatum, vaginal inclusion cyst, endometriosis, vaginal wall prolapses and malignancy of the vagina, vulva, cervix or urethra.

Aggressive angiomyxoma despite its name is considered a benign condition, relatively newly described in 1983 (1) there are several case reports and series in the literature. While more common in females it has been reported in men, with an approximate ratio of 6:1. It has been designated a benign condition because it is highly unlikely to metastasize, there has only been two documented cases in the literature of metastasis (2).

Due to its tendency to be locally invasive and its propensity for recurrence it has been denoted as aggressive. Histologically it is characterised by a tumour of sparse cellularity, with ovoid, spindles or stellate type cells in a mystic stroma. There is a characteristic mixture of thick walled muscular and thin walled capillary-like vessels which helps differentiate it from other pathologies (3). It has been found that these tumours have a rearrangment of chromosome 12 resulting in aberrant expression of HMGA (2) (High-Mobility Group A2) gene, which can therefore be used immunohistochemically as a marker for this variety of tumour (3).

Assessment of a patient presenting with a vaginal wall lesion should begin with a complete history to assess the onset, rate of growth, associated pain, bleeding and discharge. Depending on the nature of the mass other symptoms such as urinary incontinence, weight loss, smear history and obstetric history, etc. may be relevant. Physical examination must include an assessment of the masses size, shape, surface, consistency, are its edges defined, exact location, attachment to surrounding structures and its mobility.

Following the clinical examination, a working diagnosis should be established, and further investigations such as imaging or examination under anaesthesia arranged. In this case, given the cyclical variation and proximity to the bladder neck further assessment of the mass was undertaken in the form of an MRI.

The use of MRI is especially useful in imaging of soft tissue pathologies and is able to accurately assess if a mass is originating from the urinary tract or due to another pathology. The MRI findings were of a mass of high T2 signal intensity, in keeping with the histological findings. Tissues with high water content show up as T2 hyperintense and T1 hypointense, while tissues with high fat content are T1 hyperintense and T2 hypointense (4).

The literature describes these lesions as having a variable appearance on CT, but on MRI there can be seen a 'swirled appearance', following the use of intravenous contrast, which appears to be characteristic of this tumour (5).

While other soft tissue lesions' appearance on MRI will depend on the nature of the constituent tissue, for example lipomas will be bright on T1 weighted images. While in contrast, cervical carcinoma will have an intermediate signal on T2 weighted images, not showing as high a signal intensity as aggressive angiomyxoma

As with any unusual mass or any lesion suspicious for malignancy discussion within the multi-disciplinary team is always advisable. In this case following discussion at a regional MDM meeting it was felt this mass was benign and could be appropriately managed in a District General Hospital.

CASE HISTORY OF AGGRESSIVE ANGIOMYXOMA

C Allen, A Knox

When planning the removal of any mass the aim should ideally be to remove it completely and intact, with appropriate surgical margins for the suspected pathology, while minimising the damage to surrounding structures. In the case of an aggressive angiomyxoma however, this can prove difficult as it has no capsule and the lesion can often extend beyond the borders perceived at the time of surgery, when assessed histologically.

The risk of recurrence does not appear to be significantly improved by clear surgical margins (6), perhaps due to its propensity for unencapsulated growth and aiming for complete surgical excision in some cases has been associated with an increased surgical morbidity, especially in the case of large tumours. Thus, the aims of surgery should be to minimise the overall tumour size while at the same time reducing the surgical damage to the surrounding tissues.

As the risk of recurrence can be as high as 50% long term follow-up of these patients is necessary to identify any recurrence and then arrange treatment. Recurrences have been found after more than 10 years following initial surgery (7). Assessment of recurrence will be on the grounds of clinical recurrence and or imaging as there are no known biomarkers for this disease as with many cancers.

Therefore, repeated physical examination at intervals will be required, and if symptoms of a mass develop with no physical signs an MRI will need to be performed as these tumours can invade deeply, with one case being partially excised via an approach through the buttock (8).

These tumours have been successfully treated with GnRH analogues. The success of this approach lies in the fact that these tumours develop in specific tissues localised to the genital tract, are hormone receptor positive for oestrogen and progesterone, and have a peak incidence in the reproductive years. GnRH analogues cause pituitary suppression and reduction of gonadotrophins with a subsequent reduction in ovarian sex steroid production.

This has been associated with a reduction in the size of a recurrent mass (9). However, GnRH analogues are not without downsides and long term use without HRT add-back therapy is associated with reduction in bone mineral density. Also by its very nature this type of medication is inherently incompatible with natural fertility and therefore cannot be used in those patients wishing to conceive. Therefore, a balanced discussion with the patient regarding her fertility needs and use of medical therapy to try to reduce the risk of recurrence must be undertaken prior to the commencement of therapy.

There are several cases of aggressive angiomyxoma reported during pregnancy, at least two cases have shown definite tumour growth during the antenatal period. In one case a patient with a previously resected angiomyxoma with known recurrence of the tumour became pregnant while planning for further surgery. This tumour did not grow rapidly during the pregnancy; in fact, it did not even manage to double in size and showed regression when followed up post-partum (10).

In a second more recent case a newly diagnosed aggressive angiomyxoma was found to weigh 18kg at the time of excision with onset of symptoms one month prior to admission, this patient was reported to have a subsequent uneventful pregnancy (11). As there is limited information published about the behaviour of this variety of tumour in the literature counselling patients with regard to future pregnancy is difficult. It is reassuring that a well-documented case showed no significant growth during pregnancy but must be viewed with caution given the counterpoint of the rapidly enlarging lesion in the second case.

Regarding the treatment of these tumours by chemotherapy and radiotherapy. These tumours show low levels of mitotic activity; hence it is believed that these tumours are unlikely to respond to either of these treatment modalities. However, there are reported cases in the literature of radiotherapy being used in recurrent tumours (12,13) but due to the low numbers it is not yet possible to infer that radiotherapy is a viable non-surgical approach to treatment.

Tamoxifen has been used in an attempt to manage a recurrent tumour but unfortunately continued to grow while on treatment (13), potentially excluding this form of treatment, and of note, the same paper presented two cases who had radiotherapy prior to excision with no significant reduction in tumour size.

In summary, aggressive angiomyxoma is a rare soft tissue lesion that presents in the genital region, predominantly found in women in their 3rd to 4th decade, often they are diagnosed post-operatively when the specimen has been analysed histologically.

Following on from histological diagnosis, if suspected clinically or if there are pre-operative concerns regarding proximity of the surrounding structure these masses should be imaged using MRI, as they have a characteristic appearance. These lesions are often larger than appears clinically and imaging can ensure adequate resection has taken place or allow for the most appropriate surgical approach to be made.

CASE HISTORY OF AGGRESSIVE ANGIOMYXOMA

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Long term there is a significant chance of recurrence, whether or not the initial mass was completely excised. Treatment with long term GnRH analogues may be of benefit to reduce the risk of recurrence, but other adjuvant therapies are not thought to be or have not been shown to be effective.

There is a lack of evidence regarding the behaviour of these tumours in a subsequent pregnancy and the risk of recurrence due to their likely hormonal control must be discussed with the patient. Overall, however, these tumours are rarely malignant, and although have a high chance of recurrence the prognosis for the patient is generally good.

Single best answer Questions

1) Aggressive angiomyxoma is

a) A soft tissue tumour charcterised by a myxoid stroma and thin walled capillary like vessels

b) Is unecapsulated and therefore often extends beyond the clinical margins of the tumour

c) A soft tissue tumour with a high malignant potential

d) Has a male to female ratio of approximately 6:1

e) Is not limited to a specific region of the body

2) Benign lesions of the female genital tract include

a) Endometreosis

b) Bartholin's gland cyst

c) Condyloma Acuminatum

d) Aggressive angiomyxoma

e) All of the above

3) When requesting an MRI, the following are not absolute contra-indications to having this type of imaging

a) The mirena intra-uterine system

b) Implanted Sacral Nerve Stimulator

c) Intracranial Metal clips

d) Metal fragments within the eye

e) Cardiac Pacemaker

4) When assessing a T2 weighted image of the female pelvis, the following will not show high intensity signal

a) Bladder

b) Aggressive angiomyxoma

c) Pyosalpinx

d) Ovarian Fibroma

e) Ovarian mucinous cystadenoma

5) Gonadotrophin releasing hormone anologues (GnRH Anologues)

a) Cause hypothalamic suppression of the hypothalamic-pituitary-ovarian axis

b) Are used for permenantly suppressing ovarian function

c) Reduce circulating oestrogen and progesterone through suppression of pituitary FSH and LH release

d) Have no adverse effects if used long term in isolation

e) Are not used in the treatment of prostate cancer

CASE HISTORY OF AGGRESSIVE ANGIOMYXOMA

C Allen, A Knox

Single best answer question answers

1) Answer b

It is a tumour with a myxoid stroma with thick and thin walled vessels, it is very rarely malignant, is limited to the lower genital tract and is predominantly found in women

2) Answer e

All of the above are benign lesions found in the lower gentital tract

3) Answer b

The Mirena intra-uterine system contains no metallic components and is therefore safe for MRI

4) Answer d

Areas of high water content, inflammation, infection and haemorrhage will have high T2 signal intensity, while very dense tissues will have lower T2 intensity, like an ovarian fibroma

5) Answer c

GnRH anologues cause suppression of pituitary FSH and LH secretion by saturation of GnRH receptors, this causes an initial flare in the levels of FSH and LH but then due to stores being exhausted causes an overall suppression in the levels of these hormones.

As a result ovarian function is suppressed and levels of oestrodiol and progesterone. Long term suppression of ovarian function leads to an increased risk of osteoporosis and therefore if used for more than six months add-back HRT is recommended. The effects of this medication are reversible once they have been cleared from the body.

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CERVICAL INTRAEPITHELIAL NEOPLASIA 2 - TO TREAT OR NOT TO TREAT

SMY Chiu, D Lyons

Abstract

This case study relates to the journey of patient following an abnormal smear, a relatively common scenario worldwide.

This highlights the importance of understanding the natural history of the human papilloma virus and development of a premalignant lesion for clinicians in particular General Practice, Obstetricians and Gynaecologists. Topics covered include screening programmes, diagnosis and subsequent management - whether taking a more conservative approach is an option. These factors contribute to significantly reducing the incidence and mortality of cervical cancer.

Case History

Miss BK a 26 year old, PARA 1 + 0, Afro-Caribbean student. She attended her GP for the first time for a routine cervical smear. She is normally fit and healthy with no previous background medical or surgical history. She is currently taking oral contraception and smokes 15 cigarettes per day. She denies any unusual bleeding or discharge. A few weeks later she returns back to her GP who explains she has borderline changes with high risk HPV and was referred for colposcopy.

Colposcopic examination was adequate, with a type 1 transformation zone – the colposcopic opinion was that of a medium sized low grade lesion. A cervical biopsy was reported as CIN 2. Results were discussed with patient taking into account her age and desire to have more children, a more conservative approach was chosen. She was re-colposcoped 6 months later, which showed a low grade medium sized lesion CIN 1-2. She did not attend the next 6 months follow-up colposcopy. On her third colposcopy rescheduled 3 months later, a low grade medium sized CIN 2 lesion was found and following discussion Miss BK chose to have treatment.

She underwent a loop excision under local anaesthetic and histology was CIN 1 with clear margins. Follow-up cytology and HPV testing following treatment were negative and patient was returned back to routine cervical screening.

Discussion

Human Papilloma Virus

Human papilloma virus (HPV) is one of the most common causes of a sexually transmitted disease in both men and women worldwide with a lifetime risk of 80%. In the majority of patients infected with HPV is transient and most will resolve spontaneously in 18 months.

Persistent infection in women with high risk HPV leads to cervical intraepithelial neoplasia (CIN), accounting for ~10% of patients initially infected. With persistent infection, HPV integrates into the patient's DNA causing malignant transformation. This results in overexpression of HPV oncogenes E6 and E7 which leads to in the loss of tumour suppressor gene p53 and Rb respectively.

This ultimately leads to uncontrolled cell division initially manifested as CIN which may lead to cervical cancer. It is widely accepted that the majority of cervical cancer is caused by HPV 16 and 18, accounting for approximately 70% of cases (1,2).

Additional risk factors include: immunosuppression, age of first sexual intercourse, life time number of sexual partners, other sexually transmitted diseases, use of oral contraception and parity. Smoking, through its effect on Langherhan cells in the cervix tends to decrease clearance of HPV (3).

Cervical Screening

NHS Cervical Screening Programme (NHSCSP) aims to reduce the incidence and mortality of cervical cancer through the detection and treatment of high grade precancerous lesions. Cervical cytology test involves sampling cervical epithelial cells at the transformation zone. This is offered to all women between the ages of 25–64 using liquid based cytology (LBC) (table 1) (4,5).

Following NHSCSP introduction the number of cervical cancer diagnosed has halved when comparing 1988 with 2005 figures (16 per 100,000 to 8 per 100,000, respectively). Mortality from cervical cancer has significantly reduced in England from 1,027 in 2000 to 742 in 2012 (5).

Age	Screening frequency
<24.5	No invitation
24.5	First invitation
25 – 49	Every 3 years
50-64	Every 5 years
>64	Invitation as required for women who have had recent abnormal tests. Women who have not had an adequate screening test reported since age 50 may be screened on request.

Table 1: NHS Cervical Screening Programme (4)

CERVICAL INTRAEPITHELIAL NEOPLASIA 2 - TO TREAT OR NOT TO TREAT

SMY Chiu, D Lyons

Managing Abnormal Results

The majority of cervical cytology tests are normal accounting for 93.5%, with the remaining 6.5% reported abnormal and 2.3% with inadequate samples. Persistent infection with high risk HPV can lead to abnormal cytological changes of the squamous epithelial cells. This is known as dyskaryosis which can be classified as low grade (incorporating the previously named mild dyskaryosis and borderline with HPV features) and high grade favours moderate and severe according to the following findings (image 1) (5):

1. Change to cell size

2. Change in nuclear:cytoplasmic ratio

3. Variation in size of cells

4. Variation in shape of cells

5. Change to the chromatin pattern

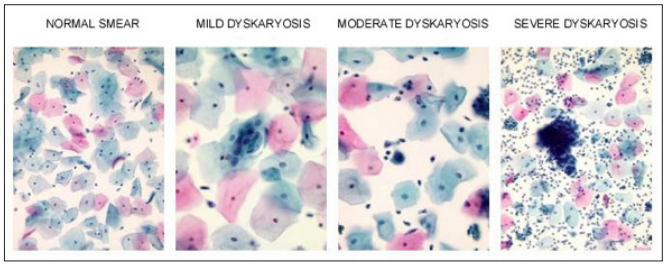

Image 1: Cytological progression of cervical epithelial abnormalities.

The laboratory will test cervical cytology samples for high risk HPV in women with borderline or low grade dyskaryosis called HPV triage (5,6):

1. If positive patient will be referred to colposcopy within 6/8 weeks.

2. If negative patient can return back to routine screening programme.

Women with moderate or high grade dyskaryosis or if invasive cancer or glandular neoplasia suspected patient should be referred to colposcopy within 2 weeks under the 2 week wait cancer rules (4).

Colposcopy

Cervix is assessed in detail using a colposcope to identify abnormal changes which may indicate CIN or cervical cancer. Acetic acid (3% or 5%) is initially applied to cervix to identify areas of abnormality. A well demarcated dense, opaque, acetowhite area is one of the most important hallmarks for cervical neoplasia (image 2). Iodine solution is next applied, normal tissue take up the deep brown stain, further confirming areas of abnormality. The colposcopist may choose to confirm abnormality by performing a punch biopsy (5).

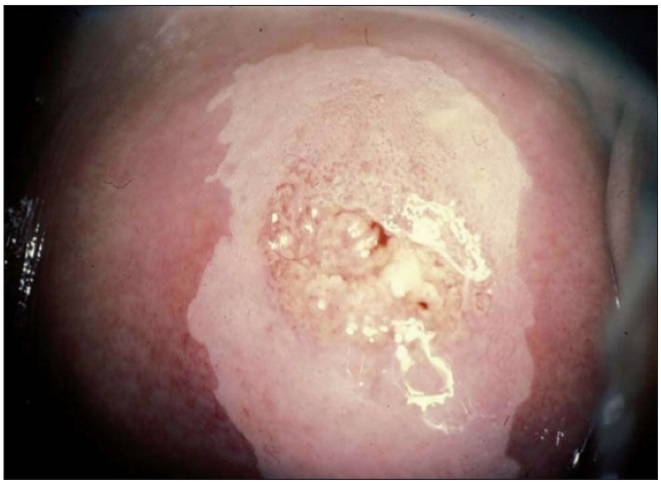

Image 2: Colposcopy of CIN 2 following acetic acid application.

What Is Cervical Intraepithelial Neoplasia?

This is a pre-malignant lesion characterised by changes to cervical squamous epithelial cells at the transformation zone. This may exist at any one of three stages: CIN 1, CIN 2 or CIN 3. If left untreated, CIN 2 or CIN 3 (collectively referred to as CIN 2+) can progress to cervical cancer. It is estimated that approximately 1-2% of women have CIN 2+ each year (6).

CIN is a histological diagnosis and is graded depending on the depth of cellular changes into the surface of the cervix (table 2) (image 3) (4):

Cervical intraepithelial neoplasia grade	Degree of surface layer of cervix affected
CIN 1	One third
CIN 2	Two thirds
CIN 3	Full thickness

Table 2: Cervical intraepithelial grading (5).

CERVICAL INTRAEPITHELIAL NEOPLASIA 2 - TO TREAT OR NOT TO TREAT

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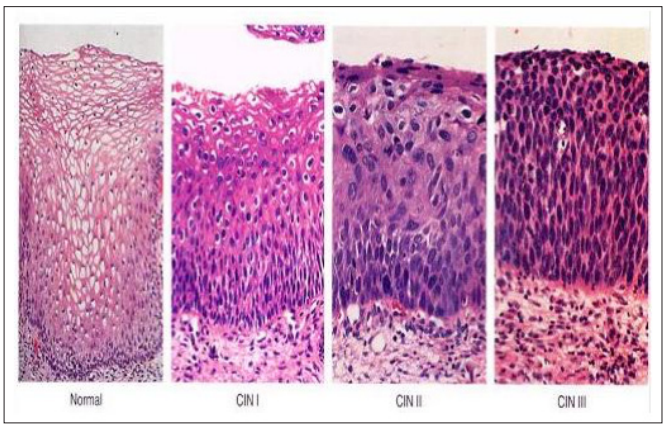

Image 3: Histology of normal cervical epithelium and cervical intraepithelial neoplasia.

Management Of Cervical Intraepithelial Neoplasia

Although the majority of women are infected with high risk HPV during their lifetime, only a small proportion of them develop cervical cancer. This indicates cervical cancer is a rare complication of a very common HPV infection. As a consequence extensive studies have examined the risk of CIN progressing to cervical cancer. Most CIN 1 lesions are associated with benign HPV replication and >50% will regress spontaneously over 22 months (7). In view of high regression rate and low progression rate (~1%), it is recommended CIN 1 should be managed conservatively (6).

In contrast, CIN 3 is considered a true precancerous lesion with a small proportion of patients regressing and a significant potential to progress accounting for >12% (8). It is advised that all CIN 3 should be treated in view of the high risk of developing an invasive lesion within 12 months (rate 0.4% – 4%) (6,9).

However, the biologic behaviour of CIN 2 remains a controversial topic. CIN 2 regresses between 17% – 54% of cases, a proportion will persist (~35%) with the remaining either progressing to CIN 3 or cervical cancer (8,10).

Recent studies have considered a more conservative approach in management of CIN 2 in younger women under the age of 25. As with CIN 1, multiple studies have shown CIN 2 in adolescent to behave like low grade lesions with a higher regression rate (9,11). Fuchs et al, observed 39% of young women with untreated CIN 2 regressed to normal, with 92% showing ≤ CIN 1 after 3 years. However, treated CIN 2 had a significantly lower risk of recurrence than untreated women and the long term efficacy of conservative management remains unclear (11). Currently, there are no studies in conservative management of CIN 2 in women over the age of 25.

	Regress	Persist	Progress to CIN 3	Progress to invasion
CIN 1	57%	32%	11%	1%
CIN 2	43%	35%	22%	5%
CIN 3	32%	56%		>12%

Table 3: Natural progression of CIN (8).

Following the inception of NHSCSP has led to a drastically reduced incidence of cervical cancer. However, there are some major drawbacks including poor compliance, low performance cytology, over treatment of women with CIN and the costs of complications associated with this (12). In addition, considerations of the patient's age, parity, co-morbidities, previous smear history, symptoms (unusual bleeding/discharge), future conception, previous non-attendance and ultimately patient's wishes must be taken into account before treatment. Thus, it is advised to discuss the benefits and risk of treatment of CIN 2 + with the patient (table 4).

Benefits	Risks
More accurate	Over-treatment
Reduce the risk of cervical cancer	Cost of over treatment
Reduce cost of follow up visits	Possible premature delivery
Non-compliance	Patient concerns

Table 4: Risk and benefits of treatment of cervical intraepithelial neoplasia.

Current practice involves:

1. Recognise CIN 2 +

2. Treat and eradicate precancerous cells in CIN 2 + when appropriate

3. Prevent development of cervical cancer

4. Return patient back to normal cytology

5. Provide reassurance to women

CERVICAL INTRAEPITHELIAL NEOPLASIA 2 - TO TREAT OR NOT TO TREAT

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Most colposcopy units in UK would offer treatment to patients with CIN 2 on histology and in some units an experienced colposcopist may wish to 'see and treat' without histological confirmation. This treatment consists of the removal of the transformation zone. This is the area between the new and old squamo-columnar junction of cervix where most lesions are sited which enhances the elimination of HPV in women.

Treatment offered include: loop excision of the transformation zone (LLETZ), cryocautery (not recommended for high grade abnormalities, due to increased risk of recurrence), knife cone biopsy, needle excision of transformation zone (NETZ) and laser ablation/ excision (4). LLETZ is the most common treatment for CIN 2 +, however there is increasing evidence that resultant excisional procedure is associated with preterm labour and may be associated with increased perinatal mortality (12).

After treatment, women are monitored by cervical cytology and HPV testing between 6 and 8 months. Patients with abnormal smears and are high risk HPV positive should be offered further colposcopic examination (4,13). Treatment does not provide 100% cure rate and previous studies have observed a 5 - 15% treatment failure despite close cytological follow-up (14).

Conclusions

Management of CIN 2 involves the consideration of multiple factors as described above, most importantly age, parity, future conception, non-compliance and patient's wishes. Discussion with the patient is essential in conveying the benefits and risk of treatment and stressing the importance of follow-up in women who are considering a more conservative approach.

Studies in the conservative management of CIN 2 suggest that 'watch and wait' can be option particularly in young nulliparous women. However, closer monitoring of these patients is warranted in the prevention of further progression and should be discussed at a multidisciplinary meeting.

5 MCQ'S

1. What is the lifetime risk of HPV? Choose one answer.

a. 50%
b. 90%
c. 40%
d. 80%
e. 60%

2. What scenario are women over the age of 64 offered cervical cytology test? Choose one answer.

a. Patient's wishes
b. Recent abnormal cervical cytology result
c. No adequate screening test reported since the age of 50
d. Women over the age 64 are part the NHSCSP and are offered cervical smear every 10 years
e. Answers a, b and c

3. Treatment options for high grade abnormalities. Choose one answer that is false.

a. Knife cone biopsy
b. Cryocautery
c. NETZ
d. LLETZ
e. Laser ablation

4. How is cervical intraepithelial neoplasia diagnosed definitively? Choose one answer.

a. Cervical speculum examination
b. Cervical cytology test
c. Histology on cervical biopsy
d. Bimanual vaginal examination
e. Colposcopy

5. What features should be considered in women diagnosed with CIN 2 prior to treatment? Choose one answer.

a. Parity
b. Life time number of sexual partners
c. Poor compliance
d. Future plans for conception
e. Answers a, c and d

Answers

1. Teaching: Answer D.

HPV is one of the most common causes of a sexually transmitted disease in both men and women worldwide with a lifetime risk of 80%. In the majority of patients infected with HPV is transient and most will resolve spontaneously. Persistent infection in women with high risk HPV leads to CIN and HPV integrates into the patient's DNA causing malignant transformation.

This ultimately leads to uncontrolled cell division initially manifested as CIN which may lead to cervical cancer. It is widely accepted that the majority of cervical cancer is caused by HPV 16 and 18, accounting for ~70% of cases.

2. Teaching: Answer E.

NHSCSP offers cervical screening in women over the age of 64 who have had recent abnormal tests. Women who have not had an adequate screening test reported since age 50 may be screened on request. The prevalence of CIN3 and invasive cancer in well screened women over the age of 50 is low compared with women in the population as a whole.

CERVICAL INTRAEPITHELIAL NEOPLASIA 2 - TO TREAT OR NOT TO TREAT

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Majority of women diagnosed with invasive cancer after the age of 50 have not participated fully in the cervical screening programme. Thus, it is expected that screening previously poorly screened women over the age of 65 would result in a reduction in the subsequent rate of cervical cancer (4).

3. Teaching: Answer B.

Most colposcopy units in UK would offer treatment to patients with high grade abnormality on histology and in some units an experienced colposcopist may wish to 'see and treat' without histological confirmation. This treatment consists of the removal of the transformation zone.

This is the area between the new and old squamo-columnar junction of cervix where most lesions are sited which enhances the elimination of HPV in women. Treatment offered include: LLETZ, knife cone biopsy, NETZ and laser ablation/excision. Cryocautery is not recommended for high grade abnormalities, due to increased risk of recurrence.

4. Teaching: Answer C.

CIN is a pre-malignant lesion characterised by changes to cervical squamous epithelial cells at the transformation zone. CIN is a histological diagnosis following a punch biopsy during colposcopy and is graded depending on the depth of cellular changes into the surface of the cervix. If left untreated, CIN2+ can progress to cervical cancer. It is estimated that approximately 1-2% of women have CIN2+ each year.

5. Teaching: Answer E

Recent studies have considered a more conservative approach in management of CIN2 in young women. In addition, considerations of the patient's age, parity, co-morbidities, previous smear history, symptoms (unusual bleeding/ discharge), future conception, previous non-attendance and ultimately patient's wishes must be taken into account before treatment.

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EPILEPSY IN PREGNANCY

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Abstract

Epilepsy is the most common serious neurological disorder in pregnancy affecting 0.6% of pregnant women in the UK. For the mother it carries an approximately ten-fold increased risk of death in pregnancy compared to pregnant women without epilepsy (1 in 1,000).(1) For the fetus, exposure to antiepileptic drugs confers a significantly increased risk of major congenital malformation, increased incidence of cognitive impairment and an increased risk of intrauterine growth restriction.

Care of women with epilepsy should involve robust preconception, antenatal, intrapartum and postpartum care from a multidisciplinary team of obstetricians, neurologists, specialist nurses and midwives qualified in the care of women with epilepsy. Sadly the maternal death rate from epilepsy has failed to decrease for many years and fragmented care has been highlighted as a contributory factor. (2) The authors present an evidence based temporal approach to the care of women with epilepsy who wish to become pregnant, throughout pregnancy and in the puerperium.

Preconception & Antenatal Care

Women of reproductive age with epilepsy should be counselled regarding the implications of the disease on pregnancy. Up to a third of women will experience an increase in seizure frequency during the pregnancy.(3)

Data examined from the MMBRACE-UK (Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK) raises the probability that pregnancy for women with epilepsy carries an increased risk of death. (1) The commonest cause of death of women with epilepsy in pregnancy is sudden unexpected death in epilepsy (SUDEP) which is presumed to be a terminal seizure. Other seizure related causes of death are drowning, electrocution, traumatic injury and status epilepticus.(2)

Sudden unexpected death in epilepsy (SUDEP) 'Sudden, unexpected, witnessed or unwitnessed, non-traumatic and nondrowning death in a patient with epilepsy, with or without evidence for a seizure, and excluding documented status epilepticus, where the autopsy examination does not reveal a toxicological or anatomical cause of death.'(4)

Preconception counselling should involve shared decision making regarding risks to both the mother and the fetus by a qualified clinician. Fetal risks including: congenital malformation; cognitive impairment; neonatal abstinence syndrome; haemorrhagic disease of the newborn and inheritance of epilepsy should be balanced against risk of poor disease control.

Contrary to previous thinking, infants of women with epilepsy not exposed to antiepileptic drugs (AEDs) have a risk of congenital anomaly similar to that of the general population.(5) Fetuses exposed to AEDs have a higher risk of congenital anomaly with the highest risk of congenital anomaly coming with polytherapy at high drug doses.(3)

Consideration could be given to stopping/reducing AEDs prior to pregnancy if women have been seizure free for 2 years. The risk of breakthrough seizures should be discussed, particularly if the woman drives, as she would need to relinquish her licence. Attempts to withdraw from AEDs during pregnancy are not recommended due to the increased risk of status epilepticus, fetal demise and SUDEP.

AEDs are broadly grouped into those that induce liver enzymes and those that do not. Liver enzyme inducing drugs interact with the cytochrome p450 group of enzymes which increase hepatic clearance of steroid hormones and reduce efficacy of several types of contraceptive. Enzyme inducing AEDs may induce both neonatal and maternal coagulopathies via the same hepatic pathways. Theoretically maternal administration of Vitamin K from 36 weeks reduces risk of haemorrhagic disease of the newborn though the benefit of this common practice has not been shown in randomised controlled trials.

Antiepileptic drug	% rate of major congenital malformation	95% Confidence Interval	Associated congenital anomalies
Sodium valproate	10.7	(8.16-13.29)	Neural tube defect, facial cleft, hypospadias, Cardiac anomalies
Carbamazepine <400mg/day	3.4	(1.11-7.71)	Cleft palate, Neural tube defects, Cardiac anomalies
Lamotrigine <300mg/day	2	(1.19-3.24)	Various
Phenytoin	3.7	(1.3-10.2)	Cardiac malformations, cleft palate
Levetiracetam	0.7	(0.19-2.51)	Various
Polytherapy	5.6	(3.54-8.56	Various
No AEDs	3.5*	(1.8-6.8)	Various
Women without epilepsy	2.3	(1.46-3.1)	Various

Table 1: Incidence of major congenital malformation with antiepileptic monotherapy and associated congenital anomalies (6,7,8,9)

**Shown to be 2.8% (p= 0.02) in larger Finnish prospective cohort study (10)*

Lamotrigine (which is not an enzyme inducer) levels are decreased by up to 70% in pregnancy due to a combination of haemodilution and by high levels of circulating oestrogens which induce enzymes responsible for its clearance.(11)

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Strategies to accommodate this include:

a) Biochemical monitoring of lamotrigine levels

b) Empirically increasing doses of lamotrigine once pregnant

c) Increasing doses of lamotrigine as breakthrough seizures occur

No clear evidence currently supports one of these strategies as superior to the others currently.

In utero exposure to sodium valproate is associated with a significantly lower IQ, verbal ability, memory and executive function at 6 years old than comparative groups of children exposed in utero to other antiepileptic drugs, or offspring of unmedicated women with epilepsy.(12) The particular association of sodium valproate and cognitive impairment should be considered prior to pregnancy with a view to controlling the disease with a different drug.

Women may be advised that the risk of inheritance of epilepsy is 4% if only one parent is affected rising to 15% if both parents are affected.(13) The key intervention for women with epilepsy in the antenatal period is careful counselling and advice to continue the lowest efficacious dose of the most appropriate antiepileptic medication as recommended by an epilepsy specialist.

Women with epilepsy are at risk of folate deficiency and are known to have a higher incidence of neural tube defects. Supplementation of 5mg folic acid daily, from three months preconceptually until at least the end of the first trimester, is thought theoretically to reduce this risk, and should be recommended, though randomised controlled trials have failed to demonstrate this effect. Risk of neural tube defect remains a risk in this population, therefore all women should be offered a mid-trimester fetal anomaly scan in keeping with the NHS Fetal Anomaly Screening Programme offering detection rates of greater than 94%.

Women should receive general advice throughout the pregnancy regarding safety strategies for making themselves and their babies safe in the event of a seizure. This includes advising pregnant women with epilepsy not to bathe or sleep alone, advice regarding first aid measures for friends/relatives and advice to reduce the risk of neonatal injury due to trauma from unexpected seizures. In particular avoidance of bathing the infant alone, using shallow baths, nursing the infant on the floor and avoiding use of raised changing tables will all reduce risk of injury and these strategies should be reaffirmed postnatally.

Epileptic seizures may present for the first time in pregnancy and careful consideration of the differential diagnosis for seizures in pregnancy should be considered and appropriately excluded.

Disease	History	Signs	Investigations
Eclampsia	Pregnant Preceeding headache Visual disturbance Epigastric pain	Proteinuria Raised blood pressure Hyperreflexia	**Raised urine protein:creatinine ratio** **Potentially:** • **low platelets** • **elevated liver enzymes**
Epilepsy	Previous history of trauma Family history of epilepsy		**EEG**
Infection e.g. (Meningitis, encephalitis, abscess, malaria)	Neck stiffness Headache	Fever	**CT scan** **Lumbar puncture** **Raised inflammatory markers**
Metabolic e.g. (Substance withdrawal, drug toxicity, hypoglycaemia, hyper/hyponatraemia, hypocalcaemia.	Sweating Hunger Known diabetes No recurrence of fits after biochemical abnormality treated.		**Capillary blood glucose** **Serum biochemistry**
Pseudoseizure	Occurs in front of an audience Eyes closed during episode		**Normal EEG during episode** **Normal CT scan**
Severe hypoxia	Preceeding insult	Cyanosis Tachypnoea	**ABG** **O_2 saturations**
Space-occupying lesion	Morning headache	Papilloedema	**CT** **MRI**
Vascular e.g. (Venous sinus thrombosis, thrombotic thrombocytopaenic purpura, cerebral infarction, subarachnoid haemorrhage, hypertensive encephalopathy)	Thunderclap headache	Focal neurology	**CT** **MRI Venogram** **Angiography**

Table 2: Differential diagnosis of seizures in pregnancy.

Intrapartum Care

Women with epilepsy should be advised to deliver in a unit with facilities for maternal and neonatal resuscitation. One-to-one midwifery care should be ensured with close attention to management and avoidance of seizure precipitants such as pain, hyperventilation, stress, dehydration and reduced intake/absorption of AEDs.

Seizures during labour are uncommon and are best controlled with benzodiazepines (Intravenous lorazepam, rectal diazepam). Use of pethidine for labour analgesia is a known seizure precipitant and should be avoided.

Epilepsy alone is neither an indication for elective Caesarean Section nor planned induction of labour. Women with epilepsy can be advised that the risk of seizure in labour is low at 3.5%.(14) Generalised seizures in labour are an indication for continuous electronic fetal monitoring due to the risk of fetal hypoxia associated with maternal hypoxia and/or a hypertonic uterus.(15)

Increasingly use of water for analgesia in labour is used in the general population. Individualised plans should be made for women with epilepsy requesting water birth, taking into account the small potential risk of drowning and their likelihood of seizure in labour.

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Postnatal Care

Infants born to women taking enzyme inducing AEDs should be offered intramuscular or oral Vitamin K to prevent haemorrhagic disease of the newborn.

Antiepileptic drugs are drugs of dependence and infants exposed to these in utero have a higher incidence of neonatal abstinence syndrome. This may present as hypoglycaemia, poor feeding or jitteriness and infants should be observed for this.

Women with epilepsy including those taking antiepileptic drugs should be encouraged to breastfeed. All AEDs reach breastmilk and therefore breastfeeding may reduce the severity of any neonatal withdrawal. Breastfed babies born to epileptic mothers taking antiepileptic medication are not shown to have poor cognitive outcome compared to those who are artificially fed (16), in fact psychomotor outcomes are improved in breastfed babies compared with the artificially fed group (17).

A medication review should take place potnatally if antiepileptic drug dosages were increased in the pregnancy. AEDs may cause toxicity postnatally secondary to reduction in renal and hepatic clearance along with correction of haemodilution as the physiology reverts to normal.

Though absolute risk of seizures postnatally is low(5), it is higher than in pregnancy and methods to reduce seizure deterioration such as management of tiredness, stress and pain should be attempted.

A postnatal contraception plan should be made such that unplanned pregnancy is avoided. Factors to be taken into consideration include: any other contraindications to contraceptives (e.g. smoking, obesity); which type (if any) antiepileptic drug she is taking; whether she is breastfeeding and which method is most convenient for her. Enzyme inducing antiepileptic drugs have the ability to affect the steroid hormone bioavailability in hormonal contraceptives hence the Faculty of Sexual and Reproductive Healthcare produce detailed guidance regarding contraceptive use in epilepsy.

UKMEC	Definition of category
1	No restriction for use of this method
2	The method can generally be used but more careful follow up may be required
3	Use is not usually recommended unless other methods are unavailable/unacceptable
4	Method poses an unacceptable health risk – do not use

Table 3: UK medical eligibility criteria for contraceptive use (UKMEC) criteria.

Drug Class/Condition	COCP	POP	Progestogen Implant	Progestogen Injection	LNG IUD	Copper IUD
Enzyme inducers e.g. Phenytoin, Phenobarbitone, Carbamazepine	3	3	2	DMPA 1 Norethisterone 2	1	1
Non- enzyme inducers e.g. Benzodiazepines, Levetiracetam, Gabapentin, Sodium valproate	1	1	1	1	1	1
*Lamotrigine	3	1	1	1	1	1
Breastfeeding						
<6 weeks	4	1	1	2	Within 48 hours -1	
6 weeks- 6 months	2	1	1	1	After 4 weeks - 1	

Table 4: UKMEC classifications of postpartum contraceptive choices for women with epilepsy.

*COCP = Combined oral contraceptive pil, POP = Progestogen Only Pill, LNG = Levonorgestrel Intrauterine device (IUD), DMPA = Depot medroxyprogesterone acetate. *High oestrogen levels cause increased hepatic clearance of Lamotrigine.*

Best of Five Questions

1) Preconception Care of women with epilepsy should include:

a) Advice to take 400mcg of folic acid daily from 3 months pre-conceptually until the end of the first trimester.
b) Assessment by an epilepsy specialist to ensure the lowest effective dose of the most appropriate antiepileptic drug.
c) Advice to avoid pregnancy due to the increased risk of maternal death.
d) Cessation of all antiepileptic drugs to reduce the risk of congenital fetal anomaly.
e) Switching to sodium valproate as the antiepileptic drug of choice for pregnancy.

2) Women with epilepsy do not have a higher maternal mortality rate due to:

a) Traumatic injury
b) Status epilepticus
c) Thrombosis
d) Drowning
e) SUDEP

3) Regarding antiepileptic drugs which of the following is false:

a) Sodium valproate carries higher risks of cognitive impairment in offspring.
b) Gabapentin is associated with neonatal withdrawal.
c) Enzyme inducing drugs are rarely used nowadays.
d) Monotherapy rather than multiple agents is preferable.
e) Phenytoin does not interact with the combined oral contraceptive pill.

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4) Regarding mode and timing of delivery:

a) Women with epilepsy should be offered elective Caesarean Section to avoid the 'stress of labour'.
b) All women with epilepsy should have continuous electronic fetal monitoring.
c) A planned induction of labour will enable better potential seizure control.
d) Women should be advised that the risk of seizure in labour is low.
e) Stopping antiepileptic drugs is advisable to reduce fetal exposure.

5) Postnatally, which of the following statements is true:

a) Women taking antiepileptic drugs should be advised not to breastfeed.
b) Women should receive strategies to reduce the risk of accidental injury to the baby in the event of a seizure.
c) The woman is eligible to use any contraceptive method she wishes.
d) Women can safely sleep alone.
e) Women with epilepsy should not be left alone with their babies.

Answers & Explanations

1) Preconception care of women with epilepsy should involve recommending 5mg of folic acid daily and continuance of the most appropriate lowest efficacious dose of AED.
2) Women with epilepsy do not have a higher maternal mortality rate due to thrombosis.
3) Phenytoin is an enzyme inducer and interacts with the combined oral contraceptive pill.
4) Women should be advised that the risk of seizure is low, therefore not an indication for either induction of labour or Caesarean section.
5) Women should receive strategies to reduce the risk of accidental injury to the baby in the event of a seizure.

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DIABETIC KETOACIDOSIS IN PREGNANCY: CHALLENGES IN DIAGNOSIS & TREATMENT DURING PREGNANCY

S Aggarwal, L Verghese, K Upadhyay

Abstract

Diabetic Ketoacidosis (DKA) is a serious complication of pregnancy in diabetic women particularly with type 1 diabetes mellitus. A high index of suspicion is required as the symptoms of pregnancy can mask the diagnosis. DKA tends to occur at lower glucose levels in pregnancy and can also progress more rapidly than in non-pregnant women.

We describe a typical case of DKA in a pregnant woman who presented with abdominal pain and vomiting for 24 hours. An emergency Caesarean section was performed due to placental abruption Post-operatively she developed DKA. Delayed diagnosis in pregnancy can affect both mother and fetus with devastating consequences. We describe the typical features of DKA in pregnancy to provide an insight into the diagnosis, based on symptoms and biochemical parameters along with the crucial steps involved in management, highlighting the precautions in management during pregnancy.

Case vignette

A 26 year-old primigravida with type 1 Diabetes Mellitus presented at 34 weeks gestation with severe vomiting and abdominal pain. She had a history of poorly controlled sugars throughout her pregnancy and was attending the joint obstetric diabetic antenatal clinic every 2 weeks to have her insulin dose sequentially increased. On admission to labour ward, she was very distressed and could not keep still due to continuous abdominal pain, making it difficult to monitor the fetus with a a cardiotocograph.

Her abdomen was tender on palpation with no relaxation between uterine contractions. On vaginal examination, the os was 3cm dilated with intact membranes. She could not tolerate speculum examination due to pain. Blood sugar was 19mmol/l and urine dispstick showed no ketones and 2+ blood..

Although initial plan was to stabilize sugars under sliding scale insulin the plan was changed due to prolonged fetal bradycardia of 90/minute noted using portable ultrasound. In view of fetal distress and sustained abdominal pain, a presumed diagnosis of placental abruption was made. Due to the urgency of the clinical situation,priority was given to immediate delivery of baby.

An emergency Caesarean section was performed under general anaesthesia. Retroplacental clots were found intraoperatively confirming the diagnosis of a concealed Placental Abruption. A 2.8kg male baby was born, with low APGAR scores of 4 & 8 at 1 & 5 minutes. The cord blood arterial and venous gases indicated metabolic acidosis with a pH of 6.83 & 6.93 with base excess of -21.1 and -20.4 respectively. The baby was transferred directly to neonatal intensive care.

The patient felt unwell post-operatively. Her blood glucose was 22.9 mmol/l. On direct questioning, the patient said that she could not tolerate food due to severe vomiting and had skipped taking her regular insulin for 24 hours. Her initial arterial blood gases revealed: pH 7.29, PCO_2 =2.93 kPa, PO2 =13.04 kPa, HCO3 = 10.5, Glucose= 22.9mmol/l, Ketones= 6.3. Eight units of Actrapid were given immediately and she was transferred to the high dependency unit (HDU) for stabilisation using the diabetic ketoacidosis (DKA) protocol.

In HDU, a venous blood gas showed: pH 7.37, Ketones 3.7, HCO3 15.0. The hospital DKA protocol was started with fluids and insulin infused as per blood glucose and ketone levels. (See Table 1 in discussion section).

From that evening, her normal insulin doses were resumed, which were Novorapid 10, 16 and 18 units before meals and Levemir 16 units at night. Two days later having stabilised her sugars, she was discharged with a diabetes clinic follow-up in 3-4 months.The baby was discharged ten days later and is doing well.

Discussion

Pathophysiology of DKA

The basic pathophysiology of DKA is given in FIgure 1. The treatment essentially involves reversing this process.

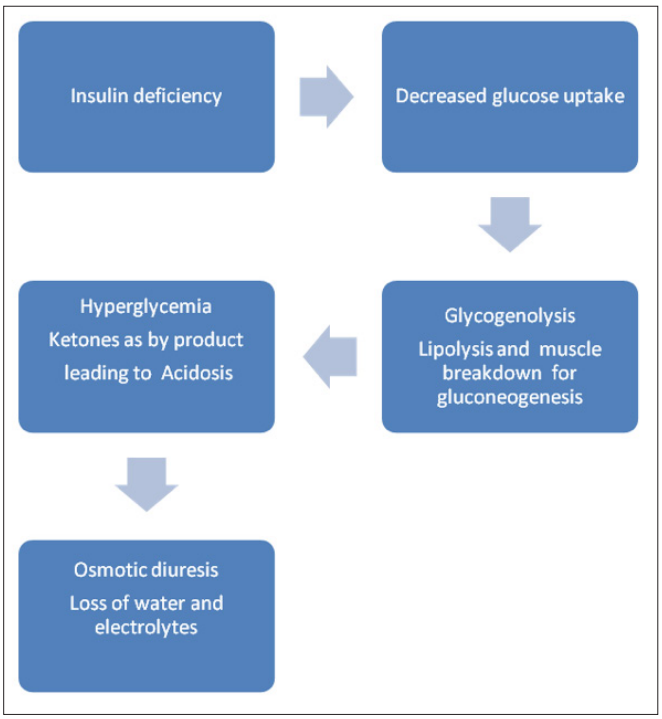

Figure 1: Pathophysiology of Diabetic Ketoacidosis.

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Clinical assessment

Patient felt unwell post operatively, DKA was suspected because she had skipped her regular insulin for 24 hours. Common symptoms of DKA are nausea, vomiting, polyuria, polydipsia, abdominal pain, blurred vision and muscle weakness. Notice how hyperemesis and fatigue can be present in normal pregnancy as well. Signs of DKA are hyperventilation, signs of dehydration like dry mucous membranes, sinus tachycardia, hypotension, Kussmaul slow rhythmic respirations, fruity breath and change in sensorium or coma.(1, 2)

Investigations

The essential investigations for DKA are blood sugar levels, blood & urine ketones, arterial blood gases, full blood count, electrolytes, renal function tests. The following values are diagnostic for DKA.(3)

Plasma glucose greater than 11 -Hyperglycaemia

Arterial PH less than 7.30 -Acidosis

Low serum bicarbonate <15mmol/L.-Metabolic acidosis

Anion gap greater than 12 meq/l

Elevated base deficit

Positive serum > 3.0 mmol /urine ketones 2+ -Ketonemia and ketonuria

Falsely normal potassium level might be present.

Elevated serum blood urea nitrogen and creatinine

may be present in acute renal failure

Differential diagnosis

Other causes of metabolic acidosis can cause a similar clinical picture:(1)

- *Sepsis*
- *Overdose of aspirin or alcohol*
- *Hyperosmolar hyperglycaemic state*
- *Acute pancreatitis*
- *Acute abdomen*

Precipitating factors for DKA in pregnancy(1, 4)

- Vomiting with poor food intake

Use of beta mimetic drugs for tocolysis

Infection

Poor treatment compliance

Steroid use in pregnancy for fetal lung maturation

Treatment

Diabetic Ketoacidosis in pregnancy is an obstetric and medical emergency and therefore requires prompt and aggressive treatment in a specialised care unit. The principles of management of DKA during pregnancy are the same as that in a non-pregnant state, at least in the first two hours.

They should be admitted to HDU and treatment should consist of oxygen supplementation, aggressive hydration, intravenous insulin therapy, correction of acidosis and abnormal electrolytes, correction of underlying pathology and intensive monitoring of maternal and fetal response to the treatment. (See Table 1)

Immediate management upon diagnosis	Subsequent management (60 Minutes to 6 hours)
Action 1: *Commence 0.9% sodium chloride infusion.* Give 500ml of 0.9% sodium chloride solution over 10 to 15 minutes. Once SBP above 90mmHg, give 1000 ml 0.9% sodium chloride over next 60 minutes. Addition of potassium likely to be required in second litre of fluid. ***Action 2 :*** *Insulin – Commence fixed rate intravenous insulin infusion* 0.1 unit/kg/hour based on estimate of weight If patient usually takes long acting insulin analogue e.g. Levemir then continue at usual dose and time.	***Action 1:*** *Reassess Patient (vital signs)* Blood gas for pH, bicarbonate and potassium at 60 minutes, 2 hours and 2 hourly thereafter. ***Action 2 :*** *Continue fluid replacements via infusion pump* Once blood glucose <14mmol/L, add 10% glucose to run alongside 0.9% saline Replace potassium as required

Table 1: Immediate and early management of DKA.

Fluid Replacement

Initial fluid replacement is first accomplished with normal saline. In patients with DKA, the fluid deficit is typically 100ml/kg of body weight which is 6-10L based on maternal weight. It is important to replace 75% of the fluid deficit during the first 24 hours of treatment and the rest should be completed within 48 hours.(3)

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0.9% normal saline(NS) is administered at the rate of 1-2 L/h for 1-2 hours. Once this is completed, NS is administered at a rate of 250-500ml/h and continued until glucose values are less than 11mmol/l.

Once glucose levels approaches 12mmol/l , add intravenous solution of 5% dextrose and decrease the insulin infusion.

The patient response to treatment is monitored through arterial blood gas monitoring, serum ketones, electrolytes, glucose and anion gap every 1-3 hours.

Metabolic treatment targets(3)

The recommended targets are:

- *Reduction of the blood ketone concentration by 0.5mmol/L/hour*
- *Increase the venous bicarbonate by 3.0mmol/L/hour*
- *Reduce capillary blood glucose by 3.0mmol/L/hour*
- *Maintain potassium between 4.0 and 5.5mmol/L*

Key management Issues in pregnancy

After the initial fluid replacement in the first two hours, care should be taken not to overload pregnant women with intravenous fluids causing pulmonary edema. Limit intravenous fluids to 250-500mls/hour. The titration of fluids should be individualised by the intensivist, taking into account the ketone levels on the blood gas, urine output and blood glucose.

Antenatally these women should be placed in left lateral position with a wedge to prevent aorto-caval compression.

DKA does not necessitate immediate delivery.(1) Continuous fetal monitoring is important during resuscitation. Correction of maternal metabolic abnormalities should be given priority first, because both the maternal and the fetal condition will improve once stabilised and pregnancy can be prolonged closer to 37 weeks gestation. (Please note that in the case discussed earlier, the fetus was delivered due to placental abruption and fetal bradycardia, not due to DKA which was a late diagnosis postoperatively.)

Postnatally, the women are also at high risk of thromboembolism due to severe dehydration and immobility, in addition to the hypercoaguable state of pregnancy. Thromboembolic graduated stockings and prophylactic low molecular weight heparin should be given.

Neonatal monitoring of blood sugars and timely feeds is required to prevent and correct neonatal hypoglycemia as well as monitoring and treatment of electrolyte imbalances.

Insulin Therapy

Correction of hyperglycaemia is best achieved with intravenous short acting insulin. A fixed rate intravenous insulin infusion (FRIII) calculated on 0.1 units/ per kilogram body weight is recommended.(3)

Correction of Electrolytes

Correction of electrolytes particular hypokalemia is very important. To prevent fatal arrhythmias, it is important to keep serum potassium between 4-5mEq/l. This is accomplished by intravenous administration of potassium chloride.(5) Phosphorus and magnesium should also be monitored and replaced.

Conclusions

A high index of suspicion for diabetic ketoacidosis is required while investigating unwell pregnant women with diabetes. Due to the difference in pregnancy physiology, a multidisciplinary approach involving the maternal medicine obstetrician, medical endocrinology specialist, obstetrics anaethesiologist and specialist diabetes nurse is required to prevent both natural and iatrogenic maternal and fetal morbidity and mortality during treatment of DKA.

Questions

1)A primigravida with Type 1 diabetes at 33 weeks gestation is admitted in labour ward at 8.00 am with threatened preterm labour . Fetal assessment on cardiotocograph is normal but she has palpable contractions 3-4 in 10 minutes on abdominal examination . To administer a course of steroids under tocolytic cover,which tocolytic drug can be used in a diabetic woman?

1. Terbutaline
2. Ritodrine
3. Nifedipine
4. Salbutamol
5. Syntometrine

2)A 23 year old , primigravida 34 weeks pregnant woman is admitted to hospital complaining of abdominal pain and vomiting . She is a known Type 1 diabetic and skipped her insulin for the last 24 hours as she had been vomiting . On examination she is tachycardic, disoriented and has shallow breathing.Her capillary blood glucose is 15mmol/l. Which of the following arterial blood gases confirm the diagnosis of Ketoacidosis?

1) PH= 7.29, PCO_2 = 2.9 KPa, PO_2 = 13.04KPa, HCO_3 = 10.5, Blood Ketones = 6.3.
2) PH =7.23, PCO_2 = 7.2 KPa, PO_2 = 10.2 KPa, HCO_3 = 21.2, Blood ketones = 1.5.
3) PH= 7.36, PCO_2 = 5.6 KPa, PO_2 = 13.2 KPa, HCO_3 = 26mmol/l, Ketones = 2
4) PH= 7.52, $PCO2_2$ = 6.0 KPa, PO_2 = 12.0 KPa, HCO_3 = 17, Ketones = 0.5.
5) PH=7.48, PCO_2 = 2.6 KPa, PO_2 = 14.5 KPa , HCO_3 = 28, Ketones = 0.2

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Answers

1. Answer is option 3.

Nifedipine is the preferred tocolytic.It is a calcium channel blocker.It does not cause hyperglycaemia. Side effects of headache and flushing are seen.

Atosiban is another tocolytic which can be used.It is an oxytocin receptor antagonist but it is expensive.

Options 1, 2 and 4 are Beta agonists and should not be used.They can cause hyperglycemia.

Option 5 is not a tocolytic.

Steroids administered to a pregnant diabetic woman predispose her to hyperglycaemia . So it is always important to monitor blood sugars of women while they are having steroids. Blood glucose target should be between 4-8mmol/l .If uncontrolled she should be put on sliding scale regimen of insulin.

Steroids are administered to aid fetal lung maturity along with other benefits such as reducing the risk of intraventricular hemorrhage and necrotizing enterocolitis.The most beneficial effect is seen if given within 48 hrs to one week of delivery.Tocolytics are given to buy time for steroids to act or to transfer a patient to a hospital unit with a preterm neonatal facilities.

2. Answer is option 1 as it is the only one which shows the picture of Metabolic acidosis. For diagnosis of Diabetes Ketoacidosis, these are the important criteria:

a) Capillary blood glucose over 11 mmol/L or known Diabetes mellitus.

b) Blood ketones above 3 mmol/ L or urine ketones ++ or more.

c) Venous PH less than 7.3 or bicarbonate below 15 mmol/L.

Any patient with Diabetes Ketoacidosis should be transfer to HDU for stabilisation using the diabetes ketoacidosis protocol.

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HYPERTENSIVE DISORDERS IN PREGNANCY

R Harrison, N Singh

Abstract

Hypertensive disorders in pregnancy are a major cause of maternal and neonatal morbidity and mortality (1). Most notably pre-eclampsia (also called pre-eclamptic toxaemia or PET), a multi-system disorder, is associated with life-threatening complications. A confidential enquiry into maternal deaths (2011-13) reported that 6 out of 214 were related to pre-eclampsia and eclampsia (2). As obesity becomes more prevalent and women choose to defer pregnancy to later on in reproductive life, the incidence of hypertension in pregnancy is rising (3).

This article guides the junior doctor through the assessment, investigation and management of a pregnant patient with hypertension.

Definitions

NICE defines hypertension in pregnancy as blood pressure ≥140/≥90 mmHg and sub classifies it into four groups (see table 1) (4). Severity is then stratified as follows:

- *Mild- 140-149/90-99 mmHg*
- *Moderate- 150-159/100-109 mmHg*
- *Severe- ≥160/≥110 mmHg (4)*

Subclass	Definition
Chronic Hypertension	Any hypertension that presents prior to pregnancy or before 20 weeks gestation or if the women is already taking antihypertensives at booking.
Gestational Hypertension	Hypertension of new onset presenting after 20 weeks without significant proteinuria.
Pre-eclampsia	Hypertension of new onset presenting after 20 weeks with significant proteinuria.
Severe pre-eclampsia	Pre-eclampsia with severe hypertension and/or with symptoms and/or biochemical and/or haematological impairment.

Table 1: NICE sub classification of hypertensive disorders of pregnancy (4)

Case History

A 35 year old, 33 week pregnant woman was referred to antenatal day assessment unit by her community midwife due to a blood pressure reading of 159/91mmHg. She had protein (1+) on a urine dipstick and a booking BMI of 28. She was Gravida 5 Para 4. Her first baby was delivered by an emergency caesarean section at 34 weeks, due to severe pre-eclampsia. She had three subsequent normal vaginal deliveries.

What further information would you enquire about in the patients history?

Symptoms

Symptoms present late in severe pre-eclampsia and indicate organ dysfunction (1). They include headaches (particularly frontal), visual disturbances, epigastric pain, nausea/vomiting, as well as peripheral and facial swelling (5). This patient presented with a headache, visual disturbances and epigastric pain.

Risk Factors

Pre-eclampsia community guidelines (PRECOG) set out recommendations for healthcare professionals in community to risk stratify for pre-eclampsia and refer those identified as high risk for obstetric input (6). NICE defines risk factors associated with the development of pre-eclampsia and divides them into 'high' and 'moderate' (see table 2) (7).

High Risk Factors	Moderate Risk Factors
Hypertensive disease in a previous pregnancy	First pregnancy
Chronic kidney disease	Aged 40 years or older
Autoimmune disease, such as Systemic Lupus Erythematosus or Antiphospholipid Syndrome	Pregnancy interval of more than 10 years
Type 1 or type 2 diabetes	Body Mass Index of 35 kg/m^2 or over at first visit
Chronic hypertension	Family history of pre-eclampsia
	Multiple pregnancies

Table 2: Risk Factors for Pre-eclampsia (7)

Those with one 'high risk factor' or two or more 'moderate risk factors' are deemed at increased risk for pre-eclampsia. To reduce the risk these women should be offered 75mg aspirin once daily from 12 weeks until delivery (7). This patient was risk stratified as 'high risk' due to previous pre-eclampsia and commenced on 75mg aspirin.

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What signs would you look for on examination to identify severity?

Although pedal oedema is more common in mild/moderate pre-eclampsia, facial or abdominal wall oedema can be obvious in severe cases. Examination of respiratory and cardiovascular system should be carried out as these patients are at risk of pulmonary oedema (1).

Patients may also have hyperreflexia, clonus, epigastric/right upper quadrant tenderness (8). An ophthalmic examination should be carried out to assess for hypertensive retinopathy (9).

In addition, an antenatal examination is fundamental, specifically measuring symphysis-fundal height to identify intrauterine fetal growth restriction (5). On examination this patient had facial oedema, mild peripheral oedema, normal reflexes and no clonus.

What investigations would you carry out?

This patient's automated reagent-strip reading showed 1+ protein. More accurate assessment of proteinuria would be via the use of spot protein:creatinine ratio (uPCR) or estimation of 24 hour urine protein excretion, although the latter is cumbersome and rarely used (4,10). This patient's uPCR came back raised at 220 mg/mmol (>30mg/mmol indicates significant proteinuria).

Blood investigation should include full blood count, liver function tests, electrolytes, urate and clotting studies (4). Abnormalities in these results can indicate progression to Haemolysis, Elevated liver enzymes, Low platelets (HELLP) syndrome, a complication of severe pre-eclampsia (11). Blood investigations were normal for this patient (table 3).

Electrolytes	Liver Function Tests	Full Blood Count	Serum urate
Na 137 mmol/L	Bilirubin 4 umol/L	WCC 11.3 10*9/L	242 umol/L
K 4.0 mmol/L	AST 23 u/L	Hb 110 g/L	
Urea 2.7 mmol/L	Alk Phosphatase 107 u/L	Platelets 224 10*9/L	
Creatinine 72 umol/L	Albumin 34 g/L		

Table 3: Blood results taken from the patient on admission.

This highlights that the presentation of pre-eclampsia can vary from patient to patient and one should not be falsely reassured by normal blood results in such high risk symptomatic cases.

Remember to monitor the fetus

This patient was immediately placed on cardiotocography (CTG) to assess fetal wellbeing, which was normal. An urgent ultrasound scan (USS) was also arranged. Unfortunately, this showed fetal growth restriction, the growth plotting below the 5th centile with normal liquor volume and normal doppler.

How would you proceed in managing this woman?

In cases of severe pre-eclampsia, multidisciplinary input is vital. Immediate control of blood pressure must be the priority. Severe hypertension increases the risk of cerebral haemorrhage, eclampsia and placental abruption (1). Blood pressure over 150/100 mmHg should be treated. The first line antihypertensive is oral labetalol. Alternatives include oral nifedipine and methyldopa (4).

This patient was admitted to hospital and given two 10mg doses of nifedipine (modified-release), due to beta-blockers (such as labetalol) being contraindicated because of a history of asthma. NICE recommends admission for all women at diagnosis of pre-eclampsia (4).

When would you consider outpatient monitoring in pre-eclampsia?

Regular monitoring (2 -3 times/week) in a day assessment unit, after discussing with senior obstetrician, may be possible in stable mild/moderate pre-eclampsia, under 37 weeks gestation (4).

Serious complications

Severe pre-eclampsia can result in HELLP syndrome. In addition eclampsia is a life-threatening complication characterised by generalised tonic-clonic seizures (11). Women with severe pre-eclampsia may require high-dependency care, intravenous antihypertensives and IV magnesium sulphate (4).

This patient did not require high-dependency care input as her blood investigations remained normal and symptoms of pre-eclampsia stabilised.

When would you consider delivery?

Definitive management of pre-eclampsia is delivery of the placenta (1). NICE recommends 'birth within 24–48 hours for women who have pre-eclampsia with mild or moderate hypertension after 37+0 weeks' (4). In addition, it is recommended to 'offer birth to women who have pre-eclampsia with mild or moderate hypertension at 34+0 to 36+6 weeks depending on maternal and fetal condition, risk factors and availability of neonatal intensive care' (4). Multidisciplinary input from a senior obstetrician, anaesthetist and neonatologist is vital in planning such deliveries (4).

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This patient was monitored in a hospital setting as her blood pressure was difficult to control, despite multiple antihypertensives (Nifedipine, Labetalol and Methyldopa), she was symptomatic and an ultrasound scan showed evidence of fetal growth restriction (< 5th centile).

The relative risks of a continuing pregnancy to the mother were weighed up against the risks associated with prematurity, such as respiratory distress syndrome and cerebral haemorrhage. To reduce these risks two doses of corticosteroids were given. The consultant obstetrician decision was made to manage her expectantly until 34 weeks and then to induce labour. Unfortunately, this failed and the baby was delivered by a caesarean section.

Conclusion

The progression of hypertension in pregnancy to preeclmapsia is a potentially serious complication. For this reason it is essential that women presenting with hypertension are managed promptly and appropriately, with thorough investigation and treatment, alongside maternal and fetal monitoring.

Test Yourself Questions

1. Symptoms of severe Pre-eclampsia include:

a. Diarrhoea, chest pain and cough

b. Frontal headache, epigastric pain, facial swelling

c. Abdominal pain, pruritus, rashes

d. Constipation, vomiting and muscle cramps

e. Bruising, blurred vision and nausea

2. Antihypertensive treatment should be initiated in women with a blood pressure of:

a. <110/75 mmHg

b. >130/85 mmHg

c. >150/100 mmHg

d. >160/110 mmHg

e. >140/90 mmHg

3. You are a Foundation Year 2 doctor working in maternity triage. A lady presents with a blood pressure of 162/104 mmHg. What would your initial management be?

a. STAT dose of Enalapril 5mg

b. STAT dose of Labetalol 200mg

c. Discharge home, no treatment required

d. Admit for observation

e. Discharge home with oral labetalol

4. Which of the following patient is at high risk of pre-eclampsia

a. 35 year old, Gravida 2 Para1, BMI- 28 with a history of asthma

b. 42 year old, Primigravida, BMI – 36 with no medical problems

c. 38 year old, Gravida 3 Para 2, history of epilepsy

d. 32 year old, Gravida 2 Para 1, BMI 23

e. 25 year old, Gravida 3 Para 2, twin pregnancy

5. What is the curative treatment for pre-eclampsia?

a. Delivery of the placenta

b. Magnesium sulphate

c. IV hydralazine

d. IV labetalol

e. Oral nifedipine

HYPERTENSIVE DISORDERS IN PREGNANCY

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Answers

(1) B

Symptoms present late in severe pre-eclampsia and can include headaches, epigastric pain and facial swelling.

(2) C

NICE recommends treating maternal blood pressure >150/90 mmHg (4).

(3) B

Labetalol is first line of treatment for hypertension in pregnancy (4). ACE inhibitors, such as enalapril are contraindicated in pregnancy (1). Although this lady does need to be admitted, the initial priority should be lowering her blood pressure.

(4) B

This patient has 3 risk factors for pre-eclampsia which puts her in very high risk category- She is a primigravida with age> 40 and BMI>35

(5) A

The definitive treatment for pre-eclampsia is delivery. Magnesium sulphate, IV hydralazine, IV labetalol and oral nifedipine act only to stabilise the patient's condition.

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LEARNING FROM A DIAGNOSTIC ERROR: ULIPRISTAL FOR FIBROIDS

K Bhatia, SB Husnoo, MY Husnoo

Abstract

Ulipristal acetate (Esmya) is an effective treatment for uterine fibroid related menstrual symptoms, with good safety record when used preoperatively for short term. It is now licensed for long term intermittent use, as an alternative to surgery. (1,2)

With this new indication as a medical treatment, it is important to monitor and report on longer term safety profile. We report an interesting case with an unusual complication, which led to significant diagnostic error with delay in appropriate management.

The main focus of this paper is to highlight various aspects of Good medical practise in recognising, managing and reporting a new drug-induced complication. It also focuses on the importance of patient information at every stage with transparency and promoting lessons learnt from Reflections, conducted in this case as a Case Review in our specialty audit meeting.

The Case

Mrs X, 42 year old lady, presented with heavy, irregular and prolonged periods for 4 months. She was anaemic with haemoglobin of 98 g/l and on examination, her uterus was bulky. Pelvic ultrasound showed an enlarged uterus with multiple fibroids largest measuring 28mm.

Outpatient hysteroscopy revealed a 2cm type 1 submucous fibroid arising from the left lateral wall with thickened endometrium; pipelle endometrial biopsy was reported as normal. She was offered hysteroscopic resection but opted for trial of medical treatment with Esmya. She was prescribed Esmya 5mg daily x 12 weeks, to start with. Her family was complete and was advised to continue with condoms for contraception.

At the three months' review, she was amenorrhoeic and wished to continue with intermittent medical treatment. Second course of Esmya was prescribed for another 12 weeks, to be commenced after two withdrawal bleeding. At the next review, she complained of increasing lower abdominal discomfort and intermittent bleeding for three weeks after completion of the second course of Esmya.

Ultrasound scan showed an enlarged uterus with three large cystic cavities, each containing echoes mistaken for foetal poles measuring 8, 9 and 11 mm respectively. No foetal heart pulsations were noted and the findings were reported as consistent with 'a failing triplet pregnancy'. See Figure 1.

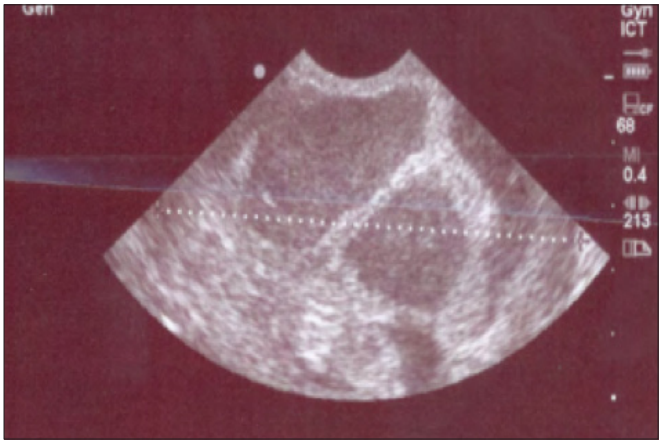
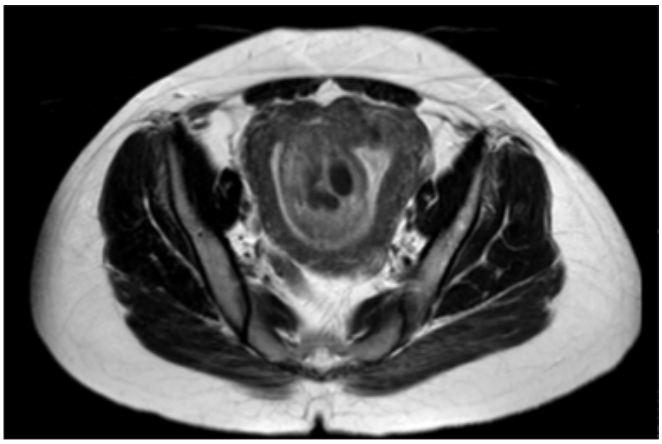


Figure 1: Transvaginal ultrasound scan showing 3 distinct cystic spaces, each containing echo, mistaken for fetal poles.

Pregnancy test was negative but because of the typical appearance on ultrasound and on-going bleeding / pain, likelihood of a failing pregnancy was explained and a surgical evacuation of uterus was performed as an emergency with no other suspicion. Histology report however showed 'multiple haemorrhagic tissues with no obvious chorionic villi, vesicles or foetal parts.'

She was therefore recalled and explained about the diagnostic / management errors with sincere apologies. Her bleeding was still on-going and this was partially controlled with norethisterone 5mg thrice a day. An outpatient hysteroscopy confirmed a large pedunculated fibroid filling the uterine cavity. Figure 2 shows the MRI images.



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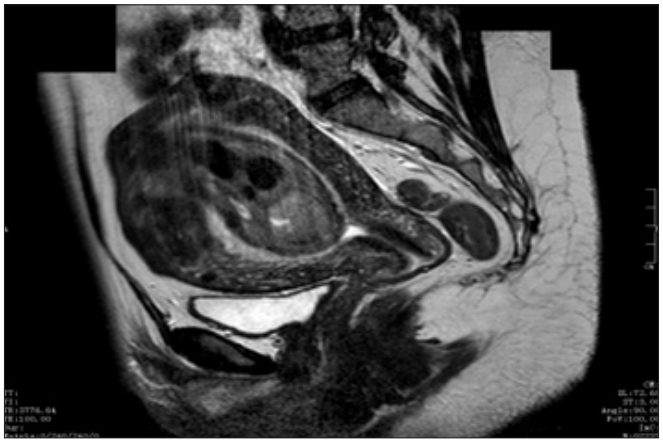

Figure 2: MRI Uterus - Axial / Sagittal view showing cystic spaces within a large intra-cavitary fibroid.

MRI confirmed multiple small fibroids within the myometrium, with a 10 cm degenerating fibroid filling the uterine cavity; no obvious sarcomatous changes were noted. Decision was therefore made for hysterectomy rather than hysteroscopic resection. A total abdominal hysterectomy was performed as an emergency procedure to control on going bleeding.

The histology was reported as follows:

"...pedunculated fibroid measuring 110 x 70 x 50 mm with extensive haemorrhagic and cystic degeneration covered by a thick layer of haemorrhagic clot"

There was no evidence of malignancy and the endometrium was atrophic with some decidual changes in keeping with progesterone effects.

The MHRA Yellow card for suspected adverse drug reaction was completed and the incident was also reported to the pharmaceutical company. Figures 3 is taken from the British National Formulary and shows the Yellow Card to be filled in cases of suspected adverse drug reactions.

BNF

In Confidence

YellowCard It's easiest to report online at yellowcard.mhra.gov.uk

COMMISSION ON HUMAN MEDICINES (CHM)

MHRA

SUSPECTED ADVERSE DRUG REACTIONS

If you suspect an adverse reaction may be related to one or more drugs/vaccines/complementary remedies, please complete this Yellow Card. See 'Adverse reactions to drugs' section in BNF or yellowcard.mhra.gov.uk for guidance. Do not be put off reporting because some details are not known.

PATIENT DETAILS Patient Initials:_____ Sex: M / F Ethnicity:_____ Weight if known (kg):_____

Age (at time of reaction):_____ Identification number (e.g. Your Practice or Hospital Ref):_____

SUSPECTED DRUG(S)/VACCINE(S)

Drug/Vaccine (Brand if known) Batch Route Dosage Date started Date stopped Prescribed for

SUSPECTED REACTION(S) Please describe the reaction(s) and any treatment given:

Outcome
Recovered
Recovering
Continuing
Other

Date reaction(s) started:_____ Date reaction(s) stopped:_____

Do you consider the reactions to be serious? Yes / No

If yes, please indicate why the reaction is considered to be serious (please tick all that apply):

Patient died due to reaction
Life threatening
Congenital abnormality
Involved or prolonged inpatient hospitalisation
Involved persistent or significant disability or incapacity
Medically significant; please give details:_____

It's easiest to report online at yellowcard.mhra.gov.uk

OTHER DRUG(S) (including self-medication and complementary remedies)

Did the patient take any other medicines/vaccines/complementary remedies in the last 3 months prior to the reaction? Yes / No

If yes, please give the following information if known:

Drug/Vaccine (Brand if known) Batch Route Dosage Date started Date stopped Prescribed for

Additional relevant information e.g. medical history, test results, known allergies, rechallenge (if performed), suspect drug interactions. For congenital abnormalities please state all other drugs taken during pregnancy and the last menstrual period.

Please list any medicines obtained from the internet:_____

REPORTER DETAILS

Name and Professional Address:_____

Postcode:_____ Tel No:_____

Email:_____

Speciality:_____

Signature:_____ Date:_____

CLINICIAN (if not the reporter)

Name and Professional Address:_____

Postcode:_____ Tel No:_____

Email:_____

Speciality:_____

Date:_____

Information on adverse drug reactions received by the MHRA can be downloaded at www.mhra.gov.uk/dapa

Stay up-to-date on the latest advice for the safe use of medicines with our monthly bulletin Drug Safety Update, at www.mhra.gov.uk/drugsafetyupdate

Please attach additional pages if necessary. Send to: FREEPOST YELLOW CARD (no other address details required)

Figure 3: Showing front / back of the Yellow card (taken from BNF).

At post hysterectomy follow up, she had recovered well. Patient and relatives were fully debriefed again with apologies for inconveniences suffered as a result. They were reassured that necessary actions had been taken to report it to the pharmaceutical company and MHRA, with educational reflections within the relevant departments. A detailed Case Review was presented in the Specialty Audit meeting which was also attended by representatives of the pharmaceutical company. The Case Review was also shared with Ultrasound department for educational update and reflection.

LEARNING FROM A DIAGNOSTIC ERROR: ULIPRISTAL FOR FIBROIDS

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Key Points In Responding To A Clinical Incident

- **Provide full explanation to patient and apologise for any inconvenience caused. In more serious cases, a formal Duty of Candour needs to be conducted**
- **Contribute and comply with local incident reporting system**
- **Promote wider learning from experience by presenting as Case review in departmental meetings**
- **Personal reflective learning exercise for all concerned**
- **Report any suspected adverse drug reaction using Yellow form**

Discussion

Diagnostic error refers to a diagnosis that is wrong, missed or delayed and it has potential to cause significant harm to patients. (3) It is known to occur in 5-15%, depending on the specialty and experience of the doctor. (4) In vast majority of cases the cause is multifactorial, presenting as a chain of events from combination of human factors and systems errors.

Foundation trainees are more likely to encounter this during their early stages of training when developing analytical skills and ability to make sound clinical judgements. Processes are in place to reduce mistakes from lack of knowledge (cognitive errors) with clinical guideline decision making tools and Clinical Risk Management procedures which now encourage learning from experience rather than blaming anyone. As part of life-long learning, it is therefore extremely important that doctors embrace the concept of reflective practice from very early on in their careers.

In this case the diagnostic error occurred due to lack of knowledge about side effects of a relatively new drug. Patient was completely amenorrhoeic whilst she was taking the medication and this is generally due to shrinkage of fibroids. Ulipristal is known to reduce the size of fibroids up to 50% after 2 courses. (5)

In this case, soon after completion of the second course there was sudden rebound increase in size of the submucous fibroid to 10cm (previously 2cm), resulting in ischemia causing unusual cystic degeneration. Interestingly, there was no such changes in the other fibroids within the myometrium. Literature does report irregular bleeding with Ulipristal rather than amenorrhoea in those who have submucous fibroids, unlike the presentation in this case. (6) It is now clear that generally submucous fibroids do not respond well to Ulipristal and are best resected hysteroscopically.

Reflective Learning - Components Of A Good Critical Reflection Include (9,10)

- **Linking past, present, and future experience**
- **Integrating cognitive and emotional experience**
- **Describe experience from multiple perspective**
- **Reframing the experience**
- **Stating the lessons learnt**
- **Planning for future learning or behaviour**

The diagnostic error led to an error in management as is usually the case and although no major harm was done, patient suffered inconvenience and unnecessary procedure. Ultrasound appearance of two distinct septum formation was due to strands of clot retraction within the fluid collection which is very often seen in haemorrhagic ovarian cysts.

However, being within the cavity of an enlarged uterus with echoes in each space mistaken for fetal poles, the diagnostic error is indeed easy to make in someone who was experiencing heavy bleeding and lower abdominal pains. Retrospectively, looking at the ultrasound images the appearances are more consistent with fibroid degeneration, especially with a negative pregnancy test. On wider reflection, it is also highly unlikely for all the three foetuses to demise at the same time.

LEARNING FROM A DIAGNOSTIC ERROR: ULIPRISTAL FOR FIBROIDS

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Conclusions

Ulipristal is an effective medical treatment for fibroid related bleeding and NICE has recently endorsed it although there is no reference to submucous fibroids (6). As a result, it is likely that more clinicians will prescribe this drug for long term. It is therefore important to increase awareness of unreported complication through publications and urge clinicians to be vigilant about other longer term side effects. This will allow better patient information and better guidance for clinicians when offering treatment choices.

As part of Good medical practise, it is our responsibility to report any suspected drug reactions that are not included in the drug information by completing the Yellow Form shown above. Effective management of diagnostic errors can avert complaints. The error was acknowledged openly in his case and apologies offered with prompt surgery to alleviate her discomfort. The practise of wider reflections with appropriate educational update will go a long way in increasing patient safety and improving quality of care.

Test Yourself MCQ Questions: Best Out Of Five

1. When managing diagnostic errors which of the following is not true?

a) As doctors we must take responsibility for all diagnostic errors

b) The method used most often in order to detect medical errors and adverse events is voluntary reporting

c) Adverse events are not always due to medical errors

d) Near miss incidents should be reported

e) Yellow Card is completed even if a medication is only suspected of causing the adverse reaction

2. Which of the statements on fibroids are not true?

a) One fibroid arises from mutation in a single smooth muscle cell (monoclonal)

b) They are less common after the menopause

c) Red degeneration of fibroid is a complication of pregnancy

d) Abdominal pain is a sign of fibroid degeneration

e) Women with symptomatic fibroids require hysterectomy

3. With regards to Ulipristal which statement is true?

a. Ulipristal is also currently used to treat endometriosis

b. Side effects such as headache and hot flushes are reported by 80% of patients

c. It modulates progesterone receptor activity without suppressing estradiol to postmenopausal levels

d. Induces histologic features in the endometrium termed Progesterone receptor modulator Associated Endometrial Changes (PAEC) which is pre-malignant

e. Ulipristal is administered as daily subcutaneous injection

4. You are the first on call and have been bleeped to see a patient who is 6 hours following abdominal hysterectomy for a fibroid uterus. Patient is restless with generalised abdominal pain, nauseous and has a tender distended abdomen with some guarding. Her blood pressure is 70/50 mm Hg with pulse rate of 110bpm and respiratory rate of 30 / minute. Which of the following action is not appropriate?

a) You are reassured that hypotension is due to epidural and prescribe stronger pain relief with plan to review one hour later

b) Bowel obstruction is unlikely and surgical opinion is not indicated

c) An immediate senior review is indicated to rule out postoperative intra-abdominal bleeding

d) Take urgent blood samples for full blood count and cross match 2 units of blood

e) Reassure patient, ensure patient is laid flat, give oxygen and increase iv fluids to correct hypotension

5. Which of the following statement is true about Reflective practice?

a. There is no need to discuss your reflection with your supervisor

b. Developing a structure for reflective practice improves the process

c. Discussing a difficult case with your senior over coffee break cannot be recorded as a Reflection

d. Reflective writing is a tick box exercise with no clear benefit in learning

e. Consultants do not have to do Reflective practice

LEARNING FROM A DIAGNOSTIC ERROR: ULIPRISTAL FOR FIBROIDS

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Answers

1. a) False

There are two types of apologies given to patients. An empathetic apology is when we apologise for a bad outcome, due to remorse over a failure to meet the patient's expectations, whereas a responsibility-accepting apology is offered to acknowledge the mistake made, whilst recognising that it triggered the bad outcome and thus accepting the responsibility.

Trigger lists for incidents with incident reporting and discussion in Risk management meetings aim to promote learning from experience rather than a blame culture. Adverse events may be due to medical errors, in which case they are preventable, or to factors that are not preventable.

Depending on what constituted the near miss, they may not need to be reported as extensively as an actual adverse medical event, but they still need to be reported, so that steps can be taken to prevent them from happening again. Even if the adverse reaction is suspected, a Yellow Card should still be filled.

2. e) False

Interestingly, fibroids are now known to be monoclonal in origin, arising from single point mutation in a smooth muscle cell. Fibroids are known to be dependent on oestrogen and progesterone, as they rarely appear before menarche and regress after menopause. Fibroids can undergo degeneration due to impairment of circulation and this can cause pain. Degenerative changes are considered to result from excessive growth that outmatches the blood supply, or mechanical compression of the feeder arteries.

The increase in the size of fibroid as a result of hyaline or cystic degeneration is presumed to result from accumulation of extracellular matrix. In pregnancy, this is typically termed as red degeneration. (7,8) Hysterectomy is a definitive treatment option for symptomatic fibroids in women with no desire for more children but should only be considered when other options have failed since it is major surgery with operative risks. Majority of women do not require hysterectomy since they tend to shrink after the menopause.

3. c) True

Ulipristal is an orally active drug. It modulates progesterone receptor activity without suppressing estradiol to postmenopausal levels and hence has advantage over GnRH analogues with less side effects when used for pre-operative shrinkage of fibroids.

It has an established role in emergency contraception and other clinical applications such as endometriosis are still in research phase. It is also known to induce a pattern of benign, non-physiological, non-proliferative, histologic features of the endometrium termed Progesterone receptor modulator Associated Endometrial Changes (PAEC).

4. a)

Postoperative intra-abdominal bleeding is the most likely diagnosis. Optimising pain relief and reviewing one hour later is a dangerous option in this case. As a Foundation trainee, you are expected to request a senior review immediately whilst you are taking bloods and stabilising the patient. Check urine output, drain output if present and check operation notes for estimated blood loss during surgery. Symptoms from bowel damage or obstruction usually more insidious, presenting after 12-24 hours of surgery.

5. b) True

Reflective practice is central to our clinical activities within the NHS and this is a mandatory part of appraisals for all, including consultants. A reflection shared is an idea redoubled. An educational supervisor is an ideal person to share your reflections with, but he or she should be trained in reflection. Discussion on any difficult case anywhere can be used recorded as a Reflection.

Short, structured reflective writing has been shown to improve reflective practice with clear sub headings. It is less likely that your ES will read your reflective writing if it feels like a long story. Foundation program directors should develop a standardised structure for reflective practice, to make the process easier and more understandable for trainees.

LEARNING FROM A DIAGNOSTIC ERROR: ULIPRISTAL FOR FIBROIDS

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LONG-TERM GYNAECOLOGICAL COMPLICATIONS OF CAESAREAN SECTION: CAESAREAN NICHE & SCAR ENDOMETRIOMA

K Bhatia, J Obaro, J Riches

Abstract

With rising caesarean section (CS) rates, there is growing concerns about long-term non-obstetric morbidity in women who have had caesarean sections. Obstetric complications such as uterine rupture and placenta accreta are well known, but over the last few years there is increasing publication on gynaecological morbidity associated with deficient uterine scar healing leading to development of a 'Caesarean niche'. (1,2) Endometriosis is also reported to be more common in women who have had caesarean sections due to direct implantation of endometrial tissue outside the uterus and in the surgical site, with development of endometrioma within the CS scar (3). Should obstetricians be held accountable for these iatrogenic complications?

We present two case reports highlighting two separate complications resulting directly from a previous caesarean delivery. Our aim is to encourage Good Medical Practice by increasing awareness of these long-term iatrogenic complications of CS, so that we can improve patient information. As part of lifelong learning for doctors, we need to embrace new knowledge proactively for the safety of our patients and look at current practise for preventative strategies.

Case 1 - 'Caesarean niche' complication: Infected pelvic hematoma with displaced MIRENA

28 year old woman was admitted as an emergency with four weeks history of lower abdominal pain and offensive brown discharge. She was known to have a Levonorgestrel intrauterine system (IUS, MIRENA) in situ. For 11 months with subsequent amenorrhoea. In the past, she has had five caesarean sections, all for vaginismus. On admission she was pyrexial (38.4°C) with a tender lower abdomen. Pelvic examination was not possible due to vaginismus but on self-examination, she was unable to feel the thread of the IUS. A high vaginal swab was obtained for microscopy and culture.

Serum inflammatory markers (WCC and CRP) were raised. A pelvic ultrasound (Figure 1) showed a ballooned lower segment containing blood, with the collection extending into the broad ligament and pouch of Douglas. IUS was seen in the collection. The upper half of the uterus was normal with a thin endometrium. Pregnancy test was negative.

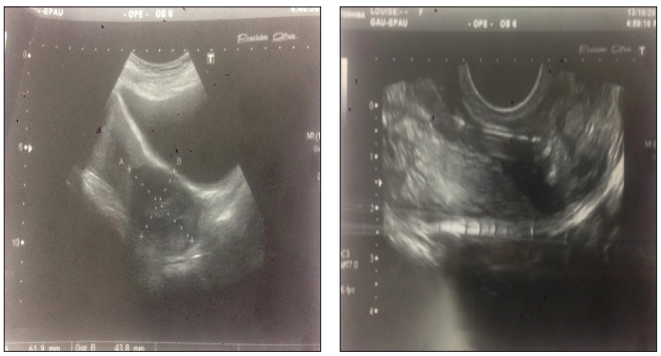

Figure 1: Pelvic Ultrasound showing collection in the lower segment of uterus / collection in pelvis outside uterus containing the IUS.

Management was started with Sepsis Six, initiated within the first hour as below:

- *Oxygen inhalation*
- *Fluid resuscitation*
- *Blood culture / vaginal swab*
- *I.V. Antibiotics (clindamycin and gentamicin)*
- *Blood tests for Lactate, FBC, CRP and biochemistry*
- *Monitoring of urine output / fluid balance*

The results of the Sepsis 6 investigations are as follows: Hb 112, WCC 15, Neutrophils 13, CRP 125, Lactate 1.8, U&E – Normal, LFTs – Normal. Blood cultures yielded no growth after 48 hours. The following day, she was apyrexial and a CT scan was requested to map the extent of the collection in the pelvis. This was to help decide on the least invasive route for drainage of the collection with retrieve of IUS .See Figure 2.

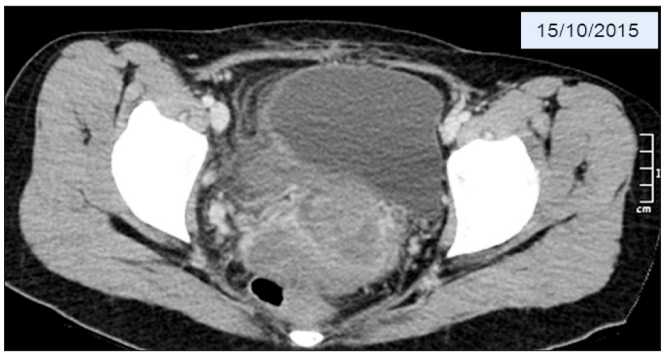

Figure 2: CT Scan showing pelvic collection in broad ligament on right side

The working diagnosis was ruptured caesarean niche / scar with infected pelvic collection. There were no clinical signs of active bleeding. Due to the complexity of the case with five previous caesarean sections and the need to conserve the uterus at her age, the case was discussed amongst other consultant colleagues to obtain a general consensus about how best to manage the case. Intravenous antibiotic was continued for another 24 hours and on the 3rd day, a decision was made to drain the collection hysteroscopically with retrieval of the IUS under direct vision. The patient was fully informed about the operative risks and also consented for laparoscopy if needed.

An indwelling catheter was inserted followed by a diagnostic hysteroscopy which confirmed abundant clots within a ballooned lower segment of the uterine cavity. The IUS was not seen. Gentle low pressure suction evacuation was then performed under ultrasound guidance to remove the clots from the lower segment and from the broad ligament. Ultrasound was performed by another consultant.

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The suction cannula (size 8) was first visualised in the lower segment and then gradually advanced into the pelvic collection, without any resistance; this confirmed the presence of a ruptured CS scar / niche on the right side. With commencement of suction evacuation, there was immediate reduction in the size of the broad ligament collection. A repeat hysteroscopy after suction evacuation now revealed the IUS lying in the lower segment and this was promptly retrieved with a hysteroscopic grasper under direct vision. Subsequent recovery was dramatic with oral antibiotics for a total of 10 days.

She was fully debriefed and counselled about life threatening implications of any future pregnancies with the need for a reliable contraception. She was advised three monthly depo provera injections for contraception to induce amenorrhoea, to prevent any spillage of menstrual blood into the pelvis through the ruptured CS scar / niche. This would avoid the need for a high risk hysterectomy. A repeat ultrasound scan at 3 months showed complete resolution of pelvic collection with ongoing amenorrhoea with depo provera.

Discussion

A 'niche' is diagnosed on transvaginal ultrasound or Gel/saline instillation sonohysterography (GIS)(1,2). Poor healing of uterine caesarean wound leads to development of a niche with deficient residual myometrium as shown in Figure 3.

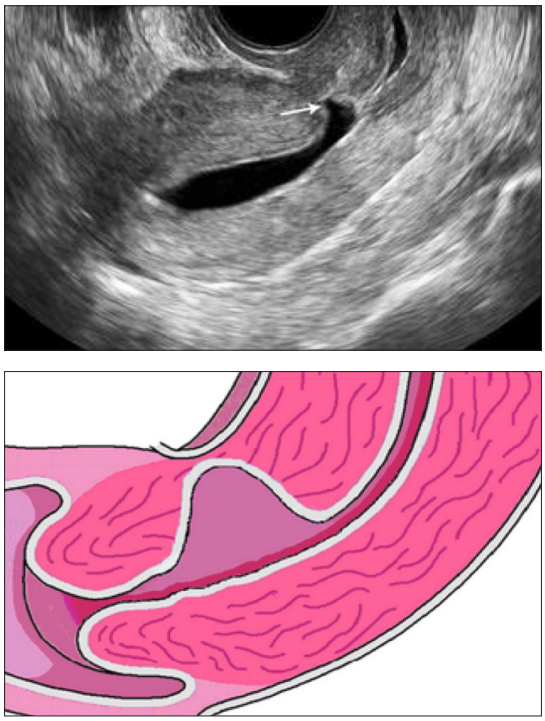

Figure 3: Caesarean niche in the lower segment of uterus with thin residual myometrium (ultrasound/ diagrammatic).

Gynaecological symptoms include abnormal bleeding particularly postmenstrual bleeding, pelvic pain, infertility, and caesarean scar ectopic pregnancy, as well as a potentially higher risk of complications during gynaecologic procedures such as uterine evacuation, hysterectomy, endometrial ablation, and insertion of an intrauterine device.(2)

Recent studies have reported presence of niche in 65% of patients after caesarean using GIS (gel instillation sonohysterography) and 50% on transvaginal ultrasound scan.(1) A third of women with caesarean niche have gynaecological symptoms for which currently there is no effective surgery and many require hysterectomy. (1, 2)

Our patient had five CS and the MIRENA was inserted blindly under sedation. Studies have confirmed that more the number of CS, the larger the niche with thinner residual myometrium. (4,5). It is difficult to say what triggered the rupture but it is possible that the IUS may have been accidentally inserted in the niche which gradually gave way and ruptured. IUS in a CS niche would still release relevant hormone, thin the endometrium and induce amenorrhoea as in this case. However, amenorrhoea does not confirm correct placement.

The priority in this case was to control sepsis by draining the collection and retrieving the IUS. Although laparoscopic surgery would have allowed repair of the ruptured site, surgery was deemed high risk particularly with underlying sepsis. This case exemplifies the importance of teamwork with appropriately trained peers in managing emerging complex cases associated with rising CS rates.

Furthermore, it highlights the importance of being extra vigilant with blind instrumentation in women with multiple CS. An ultrasound should be requested specifically to check for any Caesarean niche, especially in symptomatic patients. CS niches can be easily overlooked or underreported due to lack of awareness of their clinical significance and knowledge on ultrasound measurement of the niche. In this patient, CS niche / scar disruption was not reported on the ultrasound even after drainage of the pelvic collection.

IUS or IUCD should be inserted with high degree of caution in women with previous CS particularly those with two or more CS. Unfortunately there is no specific guidance on this from the Faculty of Family Planning and hence blind insertions will continue to happen in family planning setting. Within secondary care, insertion under hysteroscopic guidance will ensure correct placement although subsequent displacement into a significant niche is still a potential complication. Patients should therefore be appropriately informed.

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Case 2 - Caesarean Scar Endometrioma

A forty-two year old woman was seen in gynaecology outpatient clinic with 5 year of history of a lump near the left end of her Caesarean scar. This was becoming more painful especially around her periods. Her past obstetric history includes: 2 normal vaginal deliveries, 1 CS – 5 years ago, 1 first-trimester miscarriage and 1 termination of pregnancy.

Her menstrual cycle occurred every 28 days with bleeding for 5-6 days. On examination, there was a well circumscribed and flesh coloured lump, just above the left end of CS scar. This measured approximately 3x3cm, firm and tender on palpation. MRI scan showed a stellate lesion within the anterior abdominal wall on the left, suggestive of possible scar endometriosis with no intra-abdominal extension or communication. (See Figure 4)

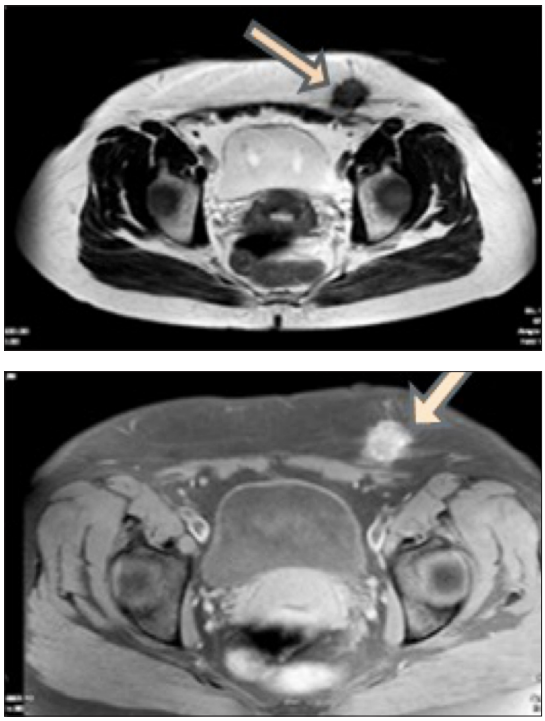

Figure 4: MRI T2 weighted image- low signal lesion in the anterior abdominal wall, isodense to muscle / T1fatsat (fat saturation) image: higher signal lesion in abdominal wall compared to muscle.

She subsequently underwent surgical excision of the lump which was located above the plane of rectus sheath. Histology revealed fibroadipose tissue with extensive endometriosis. The patient however did not attend the follow up appointment.

Discussion

Scar endometrioma refers to a lump or a nodule resulting from growth of endometrial tissue which has been implanted at the site of surgical incision. Over all incidence of Scar endometrioma is 1-2%.(6) The location of scar endometriosis often delays diagnosis, as it commonly presents to the surgeons first with differentials including as hernia, abscess, granuloma, haematoma or malignancy.(7) Imaging modalities for investigating this condition include Ultrasound, CT and MRI scans of which MRI is the most sensitive.(8) Diagnosis is usually confirmed on histology, following surgical excision of the lesion.

This patient's presentation was typical with cyclical pain in the lump which gradually increased in size. She did not have any other symptoms to suggest pelvic endometriosis. Diagnosis was suspected promptly and hence no delay in diagnosis. However, she suffered five years from this iatrogenic complication which could have been prevented. It is likely that her symptoms resolved after excision and hence failed to attend for follow up appointment.

As the pathophysiological process involves direct transfer of endometrial cells during surgery, we have looked at publications on potential pitfalls in current surgical practise relating to CS; main contributory factors include use of the same surgical materials (knife, needles) on both abdominal wall and uterus, indiscriminate implantation of endometrial tissue during/ after removal of the placenta, and non-closure of pelvic peritoneum. (3,8-10) Preventative strategies have been suggested, especially cautioning the current recommendation for non-closure of peritoneum. (9-11)

Conclusion

As part of Good Medical Practice we need to improve patient information about these long term iatrogenic complications of CS. We also need to embrace new knowledge proactively for the safety of our patients, in minimising harm and look at current practice for preventative strategies. There is a strong need for RCOG to critically re-appraise the technique of CS particularly uterine closure method and non-closure of parietal peritoneum, focus on potential ethical issues surrounding these iatrogenic complications and provide appropriate guidance.

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Test yourself Multiple Choice Questions: Select the Best of Five

1. A 30 year old woman is currently 22 weeks into her second pregnancy. She had an elective caesarean for breech presentation with her first pregnancy 2 years ago. When counselling a woman for vaginal birth after caesarean versus elective repeat caesarean, which of the following is NOT correct?

a) Success rates of planned VBAC is 72-75%.
b) Risk of transient respiratory morbidity in babies born by elective repeat caesarean is higher than VBAC.
c) Planned vaginal birth after caesarean (VBAC) is considered to be a safe option for majority of women with a single previous lower segment caesarean delivery.
d) Planned VBAC is associated with uterine rupture of 1%.
e) Risk of VBAC delivery related perinatal death is comparable to the risk for nulliparous women in labour.

2. What is the current caesarean section rate in England?

a) 15%
b) 20%
c) 25%
d) 30%
e) 18%

3. Recognised long term complications of Caesarean section include all except:

a) Endometriosis
b) Adhesion related problems and risks
c) Caesarean niche related abnormal bleeding
d) Dyspareunia
e) Pelvic organ prolapse

4. Clinical features associated with uterine scar rupture in labour include all except:

a) Abnormal vaginal bleeding
b) Change in abdominal contour and inability to pick up fetal heart rate at the old transducer site.
c) Abnormal CTG
d) Uterine hypercontractility
e) Acute onset scar tenderness

5. Differential diagnosis of a painful lump around caesarean scar include all except:

a) Femoral hernia
b) Abscess
c) Endometrioma
d) Haematoma
e) Malignancy.

Answers

1. d)

VBAC labour success rate pooled from literature is 72-75% but consideration should be given to counselling women using locally derived VBAC success rates depending on variation in healthcare provision and policies regarding induction for VBAC. Planned VBAC is considered to be a safe and appropriate mode of delivery for the majority of pregnant women with a single previous lower segment caesarean delivery.

This consensus is endorsed by evidence-based systematic reviews and RCOG. However, a review of the previous caesarean delivery records and current pregnancy is recommended to identify contraindications to VBAC. Approximate risk of uterine scar rupture is 0.5%, not 1%. When it occurs, it is associated with maternal morbidity and fetal morbidity/mortality

With regards to infant outcomes, risk of transient respiratory morbidity higher with ERCS (4-5% at 39 weeks , 6% at 38 weeks) as compared to VBAC (2–3%). The risk is reduced with antenatal corticosteroids which is advisable if <39 weeks, although there are concerns about potential long term side effects. Risk of VBAC delivery-related perinatal death is 4 per 10000 (0.04%). This is comparable to the risk for nulliparous women in labour.

2. c)

The overall caesarean delivery rate in England for 2012– 2013 was 25.5%. Majority were emergency (14.8%) rather than elective (10.7%) caesarean births. The caesarean delivery rates for Wales, Northern Ireland and Scotland in 2012–2013 were 27.5%, 29.8% and 27.3% respectively.

3. e)

Long term gynaecological complications are included in this paper; endometriosis and scar endometrioma occur due to direct implantation of endometrial tissue during caesarean. Poor healing of caesarean scar leading to development of caesarean niches occur in more than 50% and one third of these patients will experience abnormal uterine bleeding, dyspareunia and pelvic pain as included in this paper. CS reduces the risk of pelvic organ prolapse and urinary incontinence in comparison with number of vaginal births (dose– response effect) at least in the short term.

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4. d)

More than 90% of uterine rupture occur in labour during labour, peak incidence being at 4–5 cm cervical dilatation with around 18% occurring in the second stage of labour and 8% being identified post vaginal delivery. Abnormal cardiotocography (CTG) is the most consistent finding in uterine rupture and is present in 66–76% of these events. The diagnosis is made at emergency caesarean delivery or postpartum laparotomy.

The classic triad of a complete uterine rupture (pain, vaginal bleeding, fetal heart rate abnormalities) may present in less than 10% of cases. It is important to note that scar dehiscence may be asymptomatic in up to 48%. Generally, there is cessation of previously efficient uterine activity, with severe pain persisting between contractions. There is loss of station of the presenting part and hence change in abdominal contour with inability to pick up fetal heart rate at the old transducer site.

5. a)

Inguinal hernia or incisional hernias can occur in close proximity caesarean scar but not femoral hernia, which is located lower down in the groin. Scar endometrioma can be mistaken for hematoma, abscess or malignancy depending on the presentation. Careful history in a case of endometrioma will reflect some cyclical pattern although use of hormone contraception may complicate the picture. Malignant changes have also been reported in endometriomas.

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PELVIC EXAMINATION: WHY FOUNDATION DOCTORS DO IT BADLY, THE IMPACT ON WOMEN & HOW TO PERFORM IT CORRECTLY

A Snowdon, R Roberts

Abstract

Performing a gynaecological pelvic examination is something that all foundation doctors are likely to do at least once in their two years of work. Unfortunately, for many, it is the examination that they are least confident at performing. (1) This is particularly true for male doctors who are less likely to be exposed to this aspect of clinical examination through medical school. (2) This is concerning as pelvic examination can have a significant psychological impact on the women on whom it is performed. (3) This article discusses pelvic examination, the way it is taught, the impact on women, and shows how to perform it correctly.

Introduction

Pelvic examination is a physical assessment of the female pelvic organs, both externally and internally. A complete pelvic examination includes both speculum and bimanual examination. It is used to assess pain, bleeding, discharge and masses in women presenting with these symptoms. Asymptomatic women will also have their cervix examined using a speculum as part of their cervical smear test.

How Pelvic Examination is Taught

The most likely reason that foundation doctors struggle with pelvic examination is that is not well taught at medical school. In most medical schools it is taught using a combination of plastic models and real life patients.

- Models allow students to practise without worrying about the potential embarrassment associated with a real patient and without any time constraint. However, this is at the expense of being able to develop real life communication skills or to feel real anatomy, which is quite different to even the most advanced plastic models.

- Live patients introduce issues such as consent, and can create anxiety for the examining students and patients alike. However, they are the best way to get experience of both 'normality' and pathology.

These issues make pelvic examination difficult to teach to students, especially when using real life patients. Some women may volunteer as simulated patients, but often the examination will be taught in clinic or in theatre, and in the latter situation the patient is usually anaesthetised for surgery. In a survey of students in the University of Oklahoma in 2005, a large majority had reported carrying out examination on anaesthetised patients with 75% believing that these patients were not specifically consented prior to the procedure. (4) At the time it is likely that this was also common practice in UK medical schools – ethically this was a grave concern and could be classified as assault. (5)

This 'utilitarian' attitude to teaching, with the benefit of the student learning the examination (and subsequently being able to perform it on women in future) out-weighing issues related to consent, goes against current GMC ethical guidance as outlined in the Good Medical Practice booklet in the Duties of the Doctor section. (6) Such attitudes may, in the past, have contributed to the findings of studies which showed that being taught by non-medical staff who are trained in teaching pelvic examination gave better outcomes, particularly in relation to communication skills. (7,8)

Another issue in learning pelvic examination is what appears to be an increasing gender gap between male and female students. Obstetrics and gynaecology is becoming an increasingly female dominated specialty (9) with fewer male doctors choosing it as their career. There are thus fewer male role models teaching students at medical school and during foundation years. Male students report the highest amount of gender discrimination whilst on placement in the specialty compared to other specialties. (10)

Respect for the patient must be central to the teaching process. The patient should be made aware that a student or students will be present, and that they can refuse to see them or be examined by them. Student doctors should develop communication skills to get informed consent and to interact with patients in a confident manner.

Ultimately the patient should be seen as another teacher of the student and perhaps this is why the 'professional' patients who are trained in having this examination carried out on themselves have the best outcomes for learning. (11) Hopefully with this approach students will be better taught and carry these skills through to their foundation years.

Impact on Women

It is important that foundation doctors carry out pelvic examination as correctly and sensitively as possible. This is because pelvic examination, unlike most other forms of physical examination, can have a significant and potentially lifelong effect on the female patient.

Many women are apprehensive about the examination. Common sources of this anxiety include the fear of finding pathology, fear of pain, and the embarrassment of appearing undressed in front of strangers. (12) This examination is not well understood by some women, who may learn what happens on the Internet, often on websites or blogs that paint it in an overly negative light.

Doctors performing the examination rarely mention or warn about the physical sensations associated with the procedure. The uneasiness of the patient is influenced by a number of factors, and young women or nulligravid women are more likely to find pelvic examination distressing. A bad experience can lead to a reduced likelihood of the woman engaging with doctors in future and can reawaken past experiences of sexual trauma. (13)

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How to Perform Pelvic Examination Correctly

In order to understand how pelvic examination is carried out correctly we will discuss each step in detail.

Firstly it is important to have a good understanding of female pelvic anatomy and how the pelvic organs are positioned relative to each other.

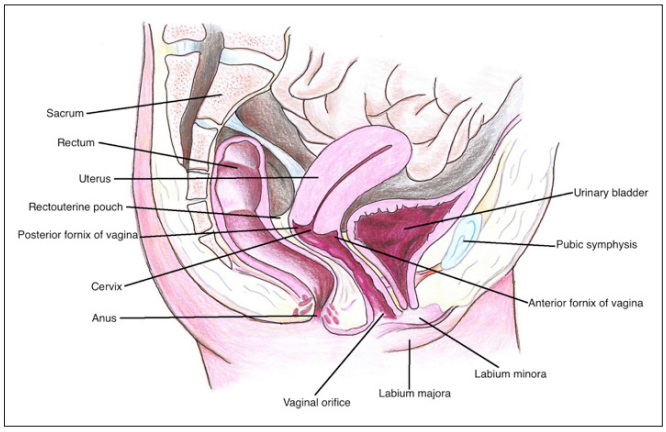

Figure 1: Female pelvic organs.

Discuss the examination with the woman. Explain why you are performing it and that it may be uncomfortable. In women who have experienced previous traumas or who have had bad experiences, it may be helpful to accommodate requests such as preference of a female examiner and to offer alternatives such as self-insertion of the speculum. (14)

Explain to the patient that a chaperone will be present and introduce them to the patient. The presence of a chaperone is considered essential for the examination and verbal consent should be obtained from the patient and recorded in the notes. Consent should be specific for the intended procedure such as bimanual or speculum examination (or both). (15)

Allow the patient to get undressed in private and provide them with a sheet or gown to protect their modesty until the examination is carried out. Position the woman in the lithotomy position using stirrups (Figure 2) or 'M' position (Figure 3). Women who are examined without stirrups may feel less vulnerable. 16 The patient should be exposed from the waist down, lying on their back. When not in stirrups the soles of the feet for the 'M' position should be placed flat on the couch 40-50cm apart.

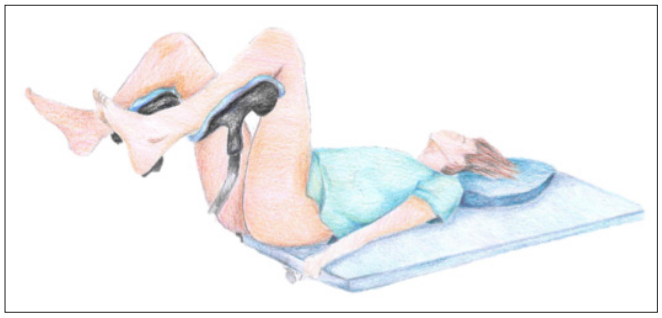

Figure 2: Lithotomy position with stirrups.

Wash your hands and put gloves on. Inspect the external anatomy (Figure 4); check the labia and clitoris for skin lesions and any obvious abnormalities such as a Bartholin's cyst (Figure 5).

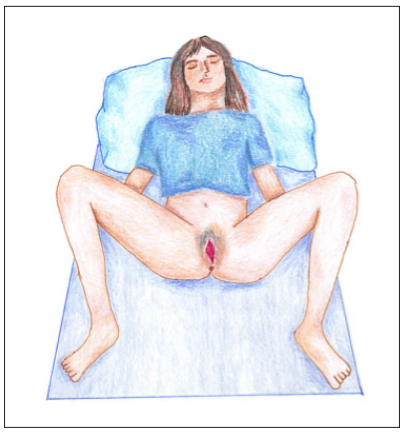

Figure 3: 'M' position.

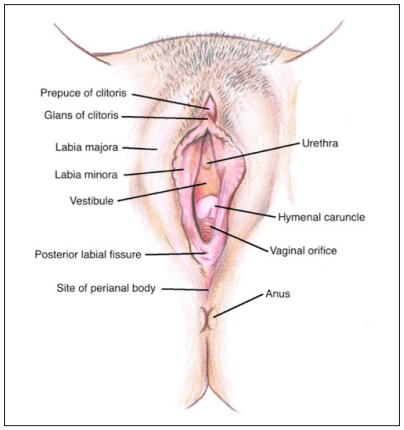

Figure 4: External female anatomy.

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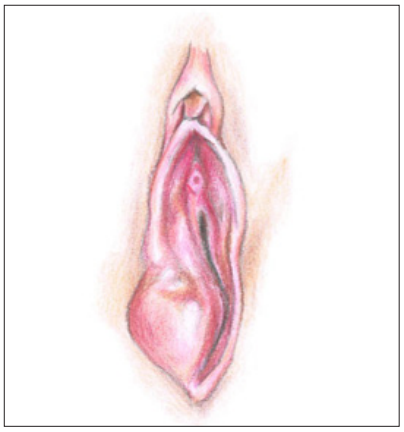

Figure 5: Batholin's cyst.

Due to the multicultural society we work in, foundation doctors may encounter women who have undergone female circumcision/female genital mutilation. (17) This is particularly prevalent in women from Sub-Saharan African countries and is typically performed on them at a young age. This can have a significant impact on these women's mental health, but can also physically affect pelvic examination by narrowing the vaginal opening (infibulation). Female genital mutilation is a serious criminal offense and must be reported to the police.

Explain to the patient that you now wish to perform the internal examination and describe what will occur. Also let her know that she can ask you to stop at any point. It can be helpful to ask if she has been examined before and whether there were any issues.

There may be occasions where only a bimanual examination or speculum examination is carried out, but commonly both are performed at the same time. If you wish to take swabs or perform a cervical smear the speculum examination should be performed first. It is also reasonable to begin with the speculum examination if the patient has been examined without difficulty in the past.

However, if this is her first examination, or previous ones were difficult or uncomfortable, it is better to first try introducing the tip of the right index finger into the introitus and check for capacity of the hymenal ring and for presence of vaginismus at the level of the levator muscles.

In the outpatient setting the cervix is usually examined using a bivalve Cusco speculum made from either Perspex or metal (Figure 6). There are no major studies comparing patient comfort between metal or plastic specula and both have disadvantages and advantages:

- Plastic specula are transparent and can allow better visualisation of the vaginal walls but they are single use and disposed off as clinical waste with the associated costs and environmental impact.

- Metal specula can be sterilised for reuse, but patients can find them cold if they are not warmed up, which can be done by running them under warm water.

There is little evidence to suggest that using water-soluble lubricant on the speculum alters the result of the examination or sampling such as the smear test. However, it can significantly improve the comfort for the woman (18), so it is advisable to apply a small amount of lubricant to the outside of the blades.

There is no right or wrong way to hold a speculum but we would recommend, holding it between the index & middle fingers as shown (Figure 6). This is a gentle looking grip which keeps the blades closed and allows easy rotation through 90°.

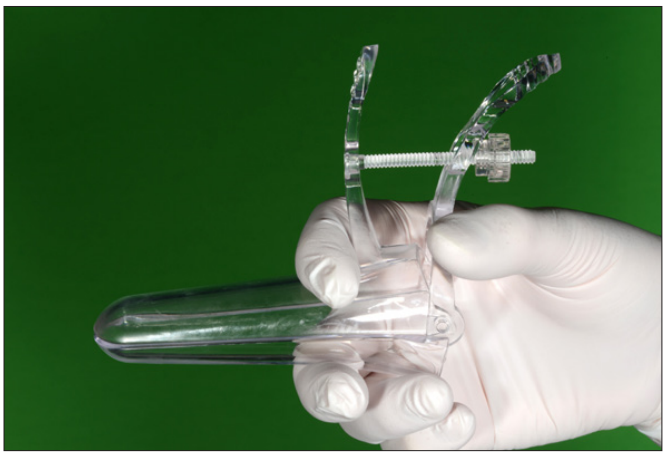

Figure 6: Perspex bivalve speculum and recommended grip.

Hold the speculum in your dominant hand with the blades closed and the handle pointing towards the right. This position aligns the blades vertically to allow insertion through the labia. Once the tip of the blades is in the introitus, the speculum should be rotated so the handle points upwards (Figure 7). Then advance the speculum into the vagina with a slight posterior tilt. After opening the blades and adjusting their position to visualise the cervix, the open position can be maintained with the retaining screw.

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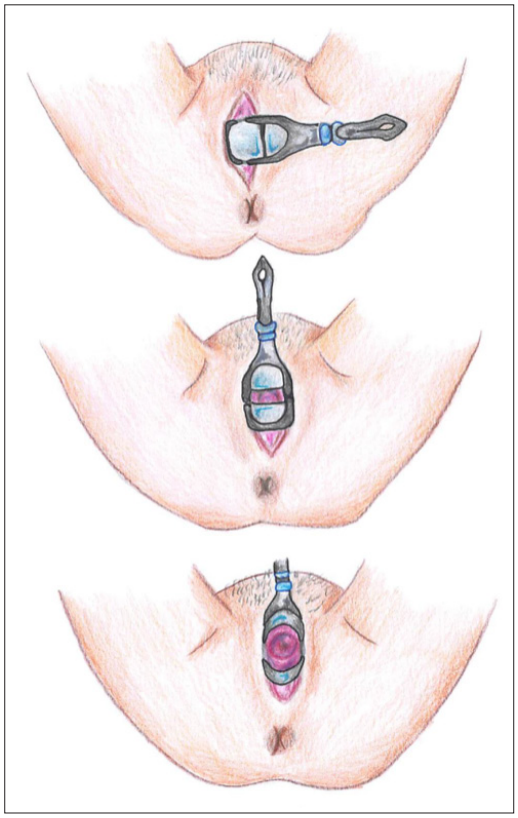

Figure 7: Speculum insertion and rotation.

Ensure the cervix is well illuminated with a light source. Check for any gross pathology (such as ectopy, cysts and polyps) and identify the transitional zone. A cervical smear can then be taken if required.

Release the screw and carefully move the speculum back from the vaginal fornixes before closing the blades and removing it with gentle traction.

After speculum examination, proceed with bimanual examination. Insert both middle and index finger, palpating the walls of the vagina as you advance and feeling for any masses or irregularities. It is sometimes easier to insert the fingers with the pulps facing down and then to rotate them through 180° once the introitus and pelvic floor muscles have been passed.

Palpate the cervix and assess for position, consistency, regularity and mobility. Try to feel if the cervical os is open or closed. Palpate the uterus by pressing down with the pulps of the fingers of your left hand about 4cm above the pubic symphysis whilst simultaneously pushing upward with your internal fingers to feel the uterus (Fig 8). Assess the position, size and shape of the uterus. It should feel about the size of a small orange but may be distorted by pathology such as fibroids.

Anteversion is the most common uterine position, and the anteverted uterus can usually be felt with the internal fingers in the anterior fornix and the fingers of the abdominal hand palpating the posterior uterine wall.

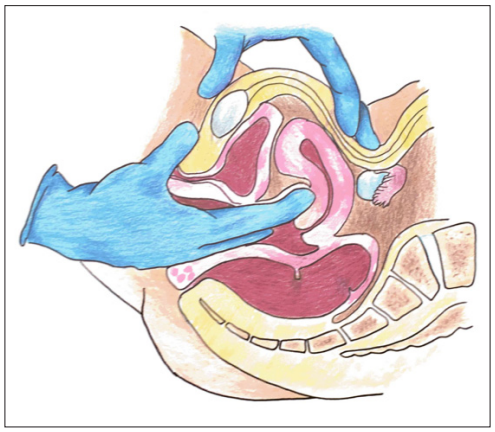

Figure 8: Feeling the anteverted uterus.

If in this position you slide both the internal and external fingers caudally they will slip over the fundus of the uterus enhancing your spatial awareness of the size of the uterus. If the uterus cannot be felt with the fingers in the anterior fornix, separate them and place one in each lateral fornix. If it still cannot be felt it is most likely to be axial or retroverted.

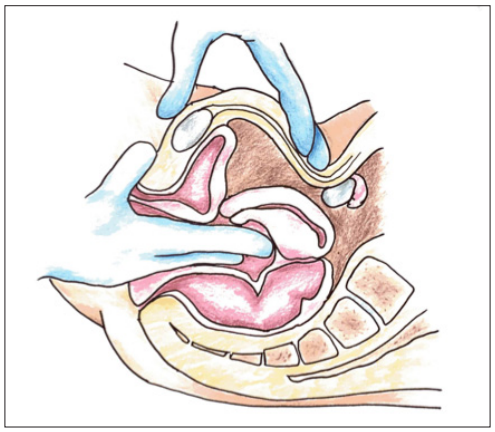

Figure 9: Trying to feel a retroverted uterus.

In order to feel the axial or retroverted uterus you need to place your internal fingers in the posterior fornix. The fundus of the uterus can then be felt by pushing down with the fingers of the external hand a few centimetres higher than for the anteverted uterus. The retroverted uterus cannot be palpated bimanually but the fingers in the posterior fornix will push against it and confirm that it is retroverted and determine whether it is fixed or mobile. The fixed retoverted uterus is often associated with pelvic pathology.

PELVIC EXAMINATION: WHY FOUNDATION DOCTORS DO IT BADLY, THE IMPACT ON WOMEN & HOW TO PERFORM IT CORRECTLY

A Snowdon, R Roberts

Feel for the right ovary by placing your internal fingers in the right fornix and pushing them upwards and laterally, whilst pressing with the pulps of the fingers of the left hand in the right iliac fossa. This manoeuvre should approximate the fingers of the internal and external hands. An enlarged ovary will be felt between the two hands; a normal ovary is not usually palpable. Do the opposite to feel for the left ovary. Note any tenderness or masses.

Withdraw fingers and inspect for discharge/blood and dispose of them in a clinical waste bin. Offer the patient a tissue and allow them time to get dressed in private. Decide if any further investigations such as urinalysis or imagine are required and discuss your findings with the patient.

Conclusion

Pelvic examination is challenging for patients, doctors and educators, but it is an important part of the clinical skills needed to be a competent foundation doctor. (19) It can be difficult to teach in medical school and, whilst the ethical issues of the past have largely been addressed, there are still some problems particularly for male students. We hope that this article will help to improve your technique and that with practice you will become a confident at performing pelvic examination.

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PID IN PREGNANCY

AY Goh, V Kay

Abstract

Pelvic Inflammatory Disease (PID) is a common condition that can lead to harmful long-term sequelae if not recognised and treated appropriately. It is uncommon in pregnancy but can lead to fetal complications. Treatment options in pregnancy can be limited and should only be given when the therapeutic benefit outweighs the risk to pregnancy and fetus.

This discussion covers important aspects of investigations, management and complications of the pregnant woman with PID and a confirmed STI.

Case History

A 19-year-old woman who was 9 weeks pregnant was referred from the local Sexual Health clinic to our Gynaecology ward with 3 weeks history of worsening nausea and vomiting. She had self-presented to the Sexual Health clinic five days earlier with abnormal vaginal discharge and right iliac fossa pain. Her chlamydia test has since returned positive.

Upon presentation, her vital signs were normal. Abdominal examination revealed a soft abdomen with minimal tenderness over the right iliac fossa. Vaginal examination elicited mild right adnexal tenderness with cervical excitation.

Urinalysis showed 1+ of ketones. A FBC revealed normal haemoglobin but raised WCC of 11.6x109/L. Urea, electrolytes and CRP were normal.

The clinical impression was of PID but it was vital to exclude an ectopic pregnancy. The woman was also suffering from nausea and vomiting in pregnancy (NVP).

Antibiotics were started promptly to treat her Chlamydia infection and suspected PID in pregnancy. A pelvic ultrasound scan revealed a viable intra-uterine pregnancy with no adnexal masses, making tubo-ovarian abscess unlikely. The patient was also commenced on intravenous fluids and anti-emetics to manage her NVP.

Following 48 hours of treatment, the patient showed clinical improvement and was able to tolerate oral intake. Due to a miscommunication, her intravenous antibiotics were converted to 14 days of oral Doxycycline and Metronidazole as per local protocol to treat PID in a non-pregnant woman. She was discharged the next day.

This drug error was identified when she attended a follow-up Sexual Health clinic review 7 days later. Her antibiotics were changed to the appropriate regime of Erythromycin and Metronidazole. A test of cure was negative. She was strongly advised to inform her partner in order for partner testing to be done.

During her in-patient stay, the patient was keen to explore the option of termination of pregnancy. However, she has since decided to continue with the pregnancy and is currently in her second trimester.

Discussion

PID is the result of ascending infection from the endocervix into the pelvis with Chlamydia and Gonorrhoea accounting for up to a quarter of cases (1). It is uncommon in pregnancy due to the presence of cervical mucous plug after 12 weeks gestation. Unfortunately, there are no definitive diagnostic criteria as the common clinical features such as lower abdominal pain, abnormal vaginal discharge/bleeding and dyspareunia lack sensitivity and specificity (1).

It is hence vital that clinicians maintain a high index of suspicion especially in the high risk group of the under 25s and women with multiple sexual partners. In this woman, it was almost fortuitous that she was symptomatic and self-presented to the Sexual Health clinic. Up to 70% of chlamydia infection in women are asymptomatic and this is not altered by pregnancy (2).

Differential diagnoses and investigations

With this woman's presenting feature of a unilateral adnexal pain in early pregnancy, it is crucial that one excludes the potentially life-threatening condition of ectopic pregnancy in the first instance by a pelvic ultrasound scan.

If she had presented earlier than 6 weeks gestation where confirmation of an intra-uterine pregnancy is difficult ultrasonically, serial serum hCG levels would be required with follow up arranged at the local Early Pregnancy Assessment Service. The differential diagnosis of acute appendicitis should also be raised and the appropriate inflammatory markers of white cell count and CRP requested. However, with a confirmed positive chlamydia test, it was more likely that her symptoms were secondary to PID.

Vital investigations for women with PID include a nucleic acid amplification tests (NAAT) swab obtained from the endocervix or a self-taken vulvovaginal swab. This is now the gold standard for chlamydia detection due to its high sensitivities and specifities (2). The endocervical NAAT swab is also used to detect gonorrhea. Other causative agents such as Gardnerella vaginalis, Trichomonas vaginalis and organisms of vaginal flora can be identified via a microbiology vaginal swab. A positive swab supports the diagnosis of PID but a negative test does not necessarily exclude PID. A raised CRP also supports the diagnosis but is non-specific (3).

A full STI screen other than Chlamydia and Gonorrhoea is warranted in this woman as early recognition and treatment can reduce complications in pregnancy. Screening of syphilis, HIV plus Hepatitis B is routinely offered to all pregnant women in the UK (4) but it is advisable to obtain these blood tests during this woman's in-patient stay for prompt results rather than await her booking appointment.

PID IN PREGNANCY

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Management

Due to the potential significant complications of PID, clinicians should have a high index of suspicion and low threshold to commence empirical antibiotics especially in the young population.

Antibiotic regimens to treat PID in the non-pregnant population are largely evidence based but none of these regimens are of proven safety in pregnancy. There is also paucity in data from clinical trials to recommend a specific regime but it is advisable to use parenteral therapy (1), especially in this case where NVP could affect oral therapy compliance.

The choice of antibiotics to treat PID in pregnancy should be guided by local antimicrobial resistance patterns and be one that is effective against chlamydia, gonorrhea and anaerobic infections. In our unit, we employ IV ceftriaxone, erythromycin and metronidazole with a step down oral regime to PO erythromycin and metronidazole.

The recommended outpatient regimen for the non-pregnant patient contains either doxycycline or ofloxacin (1), both of which should be avoided in pregnancy, as safer alternatives are often available. Effects on skeletal development with doxycycline use have been documented in the first trimester in animal studies and usage during the second or third trimester may cause discoloration of the child's teeth (5).

Ofloxacin has been showed to cause arthropathy in animal studies (5). In this case, the ward doctor who was asked prescribe her oral antibiotics was unaware of her pregnancy status. This forms an important learning point where knowledge of a patient's background is vital before prescribing any drugs. An incident report has since been raised for this near miss.

The patient was also given a stat dose of azithromycin to treat chlamydia infection. The use of azithromycin remains unlicensed in pregnancy, but the Centers for Disease Control and Prevention guidelines (7) recommends this as first line treatment for chlamydia in pregnancy. Majority of UK genitourinary medicine physicians would use Azithromycin for chlamydia in pregnancy (2).

Other alternatives include erythromycin and amoxicillin, which have similar efficacy but azithromycin showed significantly fewer adverse events and better compliance (8). As exemplified in this case, STIs in pregnancy should be managed in conjunction with genitourinary medicine physicians (2) who can lend their expertise especially in complex, resistant infections.

The successful management of PID in any woman is based on 5 Cs (Table 1). It is a duty of care of the clinician to provide an explanation of PID with its implications to the patient and reinforce this by giving clear written information such as a patient information leaflet. Strict drug compliance (especially as most oral regimens are 14 days long) with abstinence of sexual intercourse until both parties are tested/treated reduces the risk of treatment failure and re-infection.

Routine test of cure (TOC) for treated uncomplicated Chlamydia infection is no longer recommended, however this does not extend to the pregnant population. A TOC should be performed 5-6 weeks after treatment in a pregnant woman and repeat screening is recommended in the third trimester (2). This patient was appropriately brought back for a review in the sexual health clinic to ensure clinical improvement and that oral therapy compliance was not affected by NVP.

Counsel patient with regards to complications
Compliance to antibiotics
Come back for follow-up/ test of cure (in certain cases)
Contact tracing for confirmed STI
Cease sexual activity until the woman, and her partner(s), have completed treatment and follow-up.

Table 1: The 5 Cs of management of PID.

Should this woman had presented with sepsis due to PID, it would have been vital for sepsis six to be initiated immediately with prompt senior involvement. Disease progression of sepsis may be much more rapid than in the non-pregnant state (6) and such patients are at risk of increased morbidity plus mortality.

Due to the hypercoagulable state of pregnancy and dehydration secondary to NVP, this patient is at increased risk of venous thromboembolism during her hospitalisation. Compression stockings and prophylactic low molecular weight heparin were used to reduce this risk.

Complications of PID in pregnancy

In addition to maternal complications such as sepsis, chronic pelvic pain, future infertility and ectopic pregnancy, PID in pregnancy increases the risk of preterm delivery (9). Chlamydia infection in pregnancy can also lead to low birthweight (10). This patient should hence be monitored appropriately for signs of preterm labour and have serial growth scans in the third trimester to identify fetal growth restriction.

Neonatal acquisition during vaginal delivery in untreated chlamydia infections can result in complications such as ophthalmia neonatorum and chlamydia pneumonitis.

PID IN PREGNANCY

AY Goh, V Kay

Chlamydia screening in pregnancy

As mentioned, it was almost fortuitous that this patient was symptomatic to warrant a chlamydia test in pregnancy. In the UK, routine chlamydia screen in pregnancy is not recommended (4) as the cost effectiveness of universal screening in pregnancy is unproven.

However, one can argue that with the high prevalence of Chlamydia in the under 25s (Figure 1) coupled with the fact that untreated Chlamydia can lead to significant feto-maternal complications, screening in the under 25 pregnant woman would not be unreasonable. Furthermore, a large study in Australia, a country with similar chlamydia prevalence rates to the UK, showed that chlamydia screening in the pregnant 16-25 year olds was likely to be cost effective compared with no screening or selective screening (12).

In the UK, NICE recommends that healthcare professionals should inform pregnant women under age 25 of the high prevalence of chlamydia infection and provide details of their local National Chlamydia Screening Programme service (4).

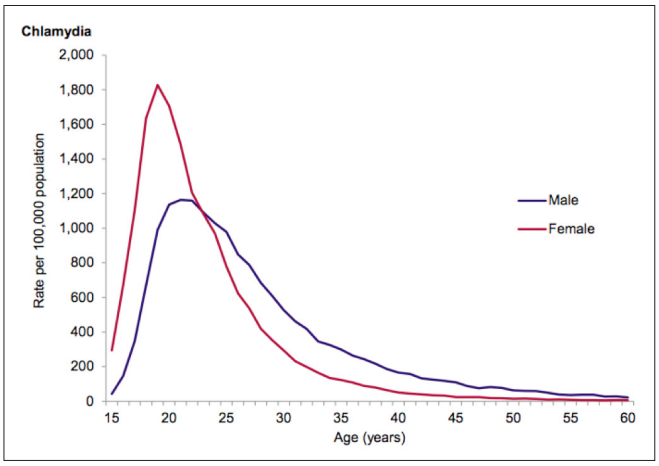

Figure 1: Rates of chlamydia infection diagnoses among people aged 15-60 years attending sexual health clinics by single year of age and gender, 2015, England (11).

Conclusion

Although uncommon, PID in pregnancy requires prompt recognition and treatment to reduce feto-maternal complications. Patient education of antibiotic compliance, sexual abstinence and contact tracing (in the event of a proven STI) is crucial. Safe prescribing especially in pregnancy is vital to avoid adverse effects. Follow-up of such patients during and after completion of treatment improves resolution of the condition.

MCQs (Best of five)

1. Which statement concerning PID in pregnancy is untrue?

A. PID in pregnancy can be asymptomatic.
B. It is uncommon in pregnancy due to the presence of cervical mucous plug after the first trimester.
C. Parenteral therapy is recommended for PID in pregnancy.
D. A positive NAAT or microbiology swab is required before commencing antibiotics for PID in pregnancy.
E. A NAAT endocervical swab is safe to be performed in pregnancy.

2. Which statement concerning chlamydia infection in pregnancy is untrue?

A. TOC is required 5-6 wks after treatment.
B. Repeat screening in the third trimester is recommended.
C. Chlamydia infection in pregnancy can be asymptomatic.
D. Azithromycin is unlicensed in pregnancy.
E. All pregnant women under 25 should be screen for chlamydia in accordance to NICE guidelines.

3. Which first line treatment should be used to treat chlamydia in pregnancy?

A. Amoxicillin.
B. Erythromycin.
C. Azithromycin.
D. Doxycycline.
E. Ofloxacin.

4. A 17-year-old female who is 8 weeks pregnant presents with offensive vaginal discharge and lower abdominal pain. She is rigoring with a temperature of 39oc and pulse of 108bpm. What is your immediate line of action?

A. Commence sepsis 6.
B. Obtain NAAT endocervical swab for chlamydia and gonorrhea.
C. Commence antibiotics of IV Ceftriaxone, Erythromycin and Metronidazole.
D. Refer her to genito-urinary medicine clinic.
E. Commence sepsis 6, get help, inform senior.

5. Which of the following does NOT form part of routine management for PID in pregnancy:

A. Ensure comprehensive STI screen of chlamydia, gonorrhea, HIV, syphilis, Hep B.
B. Partner notification is required but only if the patient consents to it.
C. Return for follow-up to monitor clinical improvement.
D. Abstinence from sexual intercourse until both patient and partner(s) are tested +/- treated.
E. Prophylactic antibiotics should be continued for the rest of pregnancy.

PID IN PREGNANCY

AY Goh, V Kay

Answers

1. D

A negative swab does not necessarily exclude PID. If there is a clinical suspicion, one should have a low threshold to commence empirical antibiotics.

2. E

Routine antenatal chlamydia screening is not currently offered in the UK.

3. C

Although unlicensed, Azithromycin is efficacious with the least side effects and best compliance to treat chlamydia in pregnancy.

4. E

Options A to D should all be carried out but Option E is the best immediate line of treatment as this patient can deteriorate rapidly and requires 'all hands on deck'!

5. E

There is no evidence for long-term prophylactic antibiotics in PID in pregnancy.

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PELVIC ORGAN PROLAPSE: DIAGNOSIS & MANAGEMENT

LGR Roberts, K Upadhyay

Abstract

During their lifetime, 1 in 5 women can expect to seek treatment for pelvic-organ prolapse (POP). It can be a distressing condition associated with significant bladder, bowel and sexual dysfunction; as well as psychological affects that are known to negatively impact on an individual's quality of life. This article gives an overview of the aetiology and risk factors associated with POP, how the diagnosis is made and summarises current management options for this common gynaecological condition.

	Established risk	Potential risk
Demographic	Age Obesity	Menopause
Reproductive	Parity Vaginal delivery	Instrumental delivery (forceps) Young age at first delivery Infant birthweight >4500 gms Levator Ani muscle injury
Genetic		Family History White Caucasian, Asian race Connective tissue disorders • Elhers Danhos Syndrome • Benign Joint Hypermobility Syndrome • Marfans Syndrome
Lifestyle		Smoking Occupation entailing heavy lifting
Surgical		Hysterectomy
Co-morbidities		Chronic constipation Chronic Obstructive Pulmonary Disease

Table 1. Risk factors for pelvic organ prolapse (8,9,10,11)

Learning Objectives

1. To gain an understanding of the aetiology and risk factors that predispose to this common clinical condition.

2. To have an understanding of the anatomy of pelvic-organ prolapse.

3. How to evaluate a patient's signs and symptoms and offer treatment that is tailored to meet the specific needs and expectations of individual patients.

4. To appreciate that conservative measures such as pelvic floor muscle training and pessaries are effective first line treatment options that should be considered prior to surgery.

Introduction

The word prolapse is derived from the Latin word 'prolapsus' meaning the sinking or falling down of an organ or part, especially the womb. Pelvic organ prolapse (POP) is a common condition which occurs when there is loss of support for pelvic structures including the uterus, bladder or bowel, with one or more of these organs descending into the vagina. Following childbirth it is estimated that 50% of women have some degree of anatomical prolapse. The prevalence increases with age, such that most older women will have some form of utero-vaginal descent. (1,2)

Despite such a high prevalence, only 10-20% of women with pelvic organ prolapse end up seeking treatment due to symptoms. (3,4) During her lifetime, a woman has a 12-19% chance of undergoing surgical treatment for POP. (5) Nearly 1 in 5 of all women on the waiting list for major gynaecological surgery in the UK are listed for some kind of prolapse surgery. (6,7,8)

Although not life-threatening, symptomatic prolapse can be associated with bladder, bowel and sexual dysfunction as well as psychological affects that often lead to a significant deterioration in quality of life. (9) The stigma associated with pelvic organ prolapse and associated urinary symptoms, together with the misguided belief that this is a natural consequence of childbirth or old age, has often meant that women may avoid or be reluctant to seek medical advice.

This article aims to highlight the common risk factors associated with POP, its severity in relation to the anatomical landmarks and the diagnosis and management of this common gynaecological condition.

Clinical Presentation

In the majority of cases women present with symptoms suggestive of pelvic-organ- prolapse and clinical examination will confirm the diagnosis. However, incidental presentation in asymptomatic women, undergoing vaginal examinations for other reasons, is not uncommon. The diagnosis of POP will usually be based on the history and examination, but further investigations may be needed to confirm the diagnosis, exclude other pathology or plan appropriate treatment.

History

Women may present with symptoms relating to the prolapse itself, such as the sensation of a 'bulge in' or "something hanging-out" of the vagina. They may also complain of symptoms related to bladder, bowel or sexual dysfunction (Table 2). The most common symptoms are typically a 'bulge' in the vagina, urinary incontinence, urgency and frequency or voiding dysfunction. Up to 1 in 3 women may complain of bladder and bowel problems such as voiding difficulties, constipation, problems with emptying the bowel or even fecal incontinence. (12) It is important to remember that symptoms of stress incontinence may be masked in the presence of a large anterior wall prolapse that alters the anatomical position of the vesico-urethral junction.

	Symptom	Sign
Vaginal	Sensation of mass/bulge Dragging sensation Pain Unable to hold onto a tampon	Mass seen at introitus
Urinary	Incontinence Urgency and frequency Feeling of incomplete voiding	Hypermobile bladder neck Demonstrable cough leak
Bowel	Urgency to defecate Foecal incontinence Straining to defecate Needing to digitate to empty rectum	Mass seen at introitus
Sexual	Dyspaerunia Difficulty with penetration	
Psychological	Altered body image Loss of libido Depression	

Table 2. Signs and symptoms of pelvic organ prolapse.

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In severe cases of uterine prolapse (where the cervix and uterus protrude beyond the introitus) there may be vaginal bleeding, ulceration and discharge. Many will have a range of symptoms and it is important to enquire specifically about bladder, bowel and sexual symptoms to elicit the full extent of the woman's problems. In addition to past surgical and medical history a review of current co-morbidities is also relevant, as is the individual's obstetric and gynaecological history.

Examination

The examination should include a general and abdominal assessment, together with a BMI measurement. A vaginal examination will establish the definitive diagnosis. Inspection alone may reveal a prolapse but further examination is needed to define the type and extent of the prolapse. This should include bimanual palpation to elicit any pelvic masses or pathology, the passing of a Cusco's speculum to visualize the cervix and vaginal walls and an examination in the left lateral position using a Sims speculum to allow assessment of the anterior, central/apical and posterior vaginal compartment in turn (Figure 1.).

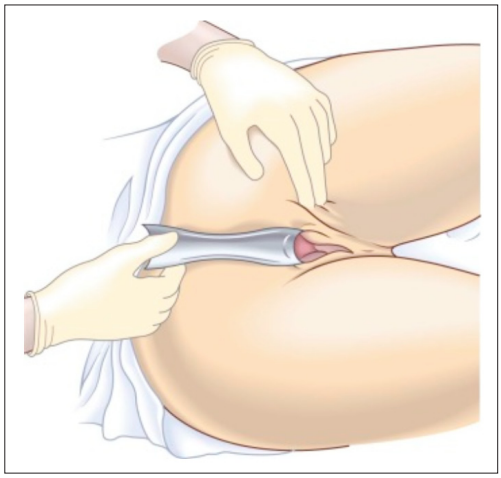

Figure 1. Examination in left lateral using a Sims speculum (image taken from Clinical Key)

Asking the woman to 'strain' or 'bear down' when the speculum is in place and as it is gently withdrawn, can help to demonstrate and gauge the degree of prolapse. The prolapse may be confined to a single vaginal area or may involve two or more compartments. Anterior vaginal wall prolapse may also involve the underlying bladder or urethra in the form of a cystocele or urethrocele.

Similarly, in the posterior compartment, underlying rectum or small bowel can protrude into the vagina, giving rise to a rectocele and enterocele respectively. Prolapse of the vaginal cuff after previous hysterectomy is known as vault prolapse. Complete eversion of the uterus and cervix beyond the introitus is known as procidentia (Table 3, Figure 2). A rectal examination may be indicated to investigate co-existing anal or rectal pathology.

DEFINITION	DESCRIPTION
Pelvic-organ-prolapse	The descent of one or more of the anterior vaginal wall, posterior vaginal wall, the uterus ,cervix or the apex of the vagina (vaginal vault or cuff scar after hysterectomy)
Uterine/cervical prolapse	Descent of the uterus or uterine cervix from its normal anatomical position.
Anterior vaginal wall/compartment prolapse	Descent of the anterior vaginal wall (compartment). Most commonly this represents bladder prolapse (cystocele).
Posterior vaginal wall/compartment prolapse	Descent of the posterior vaginal wall. Commonly, this would represent rectal protrusion into the vagina (rectocele). Higher stage posterior vaginal wall prolapse after prior hysterectomy will generally involve some vaginal vault (cuff scar) descent and possible small bowel herniation in the upper vagina (enterocele formation). Enterocele can also occur in the presence of an intact uterus.
Urinary urgency	A sudden, compelling desire to pass urine which is difficult to defer.
Urinary incontinence	The involuntary leakage of urine
Stress urinary incontinence	The involuntary leakage of urine on effort or exertion, or on sneezing or coughing.
Urge urinary incontinence (Detrusor overactivity)	The involuntary leakage of urine accompanied by or immediately preceded by urgency.
Hesitancy	Difficulty in initiating micturition resulting in a delay in the onset of voiding.
Straining	The muscular effort used to either initiate, maintain or improve the urinary stream.

Table 3(a): An International Urogynecological Association (IUGA)/The International Continence Society (ICS) Joint Report on the Terminology for Female Pelvic Organ Prolapse (POP) (29).

Anterior Compartment	Central Compartment	Posterior Compartment
Cystocele • involving bladder	Uterine prolapse • procidentia if complete uterine eversion	Rectocele • involves rectum
Uretherocele • involving urethra	Vault prolapsed • prolapse of vaginal cuff after hysterectomy	Enterocele • involves small bowel

Table 3(b).

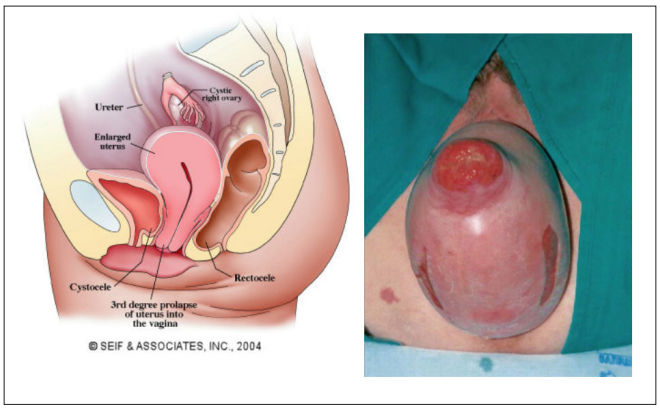

Figure 2. Anatomical depiction of pelvic organ prolapse and image of complete procidentia (images taken from Clinical Key).

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Over the years grading systems have been introduced which attempt to standardize definitions of the severity of a prolapse (Table 4b). The Pelvic Organ Prolapse – Quantification (POP-Q) system was introduced in 1996 and quantifies the degree of descent of each compartment in relation to the hymenal remnant. The degree of decent is measured in centimeters above or below the hymen and has proved highly reproducible. (13)

It is the only system that has gained international acceptance and is used consistently in the research setting. However, in day-to-day clinical practice the Baden Vaginal Profile (14) and Beecham Grading System (15) are also in use. These systems give a more subjective assessment of the degree of prolapse within each compartment in relation to the hymen and introitus respectively. (Table 4).

Vaginal Profile Baden and Walker 1972	Grading System Beecham 1980	Quantitative POP-Q ICS, AUGS, SGS, 1996
Grade 1		Stage I
Midplane of vagina	1st degree	
Grade 2		1 cm above hymen
Hymenal Ring		Stage II
	Introitus	
Grade 3		1 cm through hymen
	2nd degree	Stage III
Grade 4	3rd degree	Stage IV

Table 4(a): Grading systems for POP. (Modified from Chen and Ng 2007, 16)

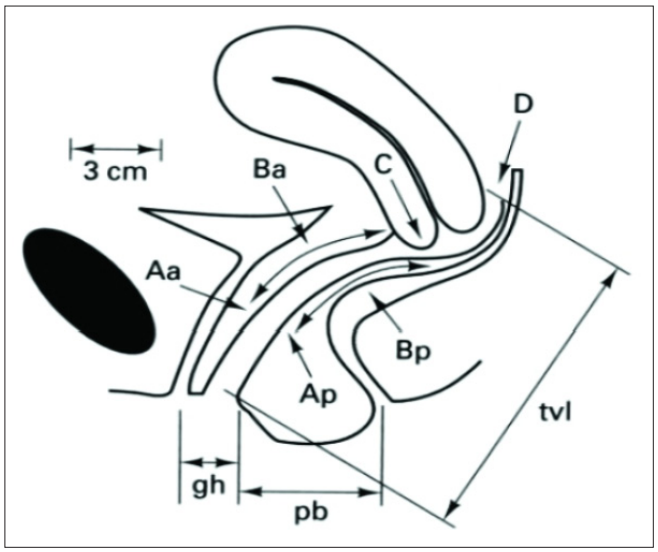

Table 4 (b): Explanation of POP-Q system. (29)

	Pelvic Organ Prolapse quantitative scoring system (POP-Q)
Aa	Arbitrary point on the anterior vaginal wall, measured 3 cm from the external urethral meatus -3 to +3 cm (-3 no prolapse)
Ba	The most dependent portion of anterior vagina. Value of -3 with no prolapse
C	Least supported portion of cervix or vaginal cuff if hysterectomy
D	Position of cul de sac. Not measured in hysterectomised women
Ap	Arbitrary point on the posterior vaginal wall, measured 3 cm from the hymen -3 to +3 cm
Bp	The most dependent portion of the posterior vagina. Value of -3 with no prolapse
TVL	Total vaginal length from hymen to the posterior fornix/apex after hysterectomy
GH	Genital hiatus from the midpoint of the external urethral meatus to the posterior midline of hymen
PB	Perineal body from posterior midline of hymen to midanal opening

Investigations

In many cases the history and examination alone are sufficient to make a diagnosis and plan further management. Additional investigations should be directed by the patient's symptoms and examination findings. Women with lower urinary tract symptoms should have urinalysis and urine culture if indicated. The presence of unexplained haematuria without urinary tract infection should prompt urgent urological referral. (17)

Urodynamic investigations should be considered if there is a history of urinary incontinence, in particular stress urinary incontinence, or symptoms of hesitancy, straining or a feeling of incomplete bladder emptying. Stress urinary incontinence may or may not be associated with prolapse. A large cystocele may mask symptoms of stress urinary incontinence, or may prevent complete emptying of the bladder leading to recurrent urinary tract infections.

Reduction of the cystocele with a pessary or swab prior to urodynamic investigations may help to predict bladder function following surgical correction as well as optimize the surgical procedure. A colorectal referral should be considered if there are significant or unusual bowel symptoms such as incontinence. Further investigations such as an endoanal ultrasound, defecating proctogram or anal manomatry may then be indicated. If there is a clinical suspicion of pelvic pathology a pelvic ultrasound, CT scan or MRI may be warranted. (18,19)

Management

It is recognized that only around 1 in 5 women with a prolapse on clinical examination are symptomatic. Furthermore, there is often poor correlation between symptom reporting and clinical findings. (3,18) This can pose challenges for successful management. There are a number of options for women seeking treatment for pelvic organ prolapse and the type of treatment undertaken is largely determined by patient choice.

Hence the management of pelvic organ prolapse needs to be individualized to meet the needs and expectations of each woman. The options for treatment are summarized in Table 5.

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Treatment	
Conservative	
• Lifestyle modifications o Weight loss o Stop smoking o Managing chronic chest conditions (eg COPD, asthma) o Limiting heavy weight lifting o Avoiding chronic constipation • Pelvic Floor Muscle Training	
Mechanical devices	
• Pessary	
Surgical	
Abdominal (open or key hole) • Hysterectomy • Sacral colpopexy/ hysteropexy • Vault suspending and uterosacral ligament plication	Vaginal • Hysterectomy • Anterior or posterior repair (colporrhaphy) • MaCall's culdoplasty • Manchester repair • Prespinous and sacrospinous fixation • Enterocele ligation • Le Fortes procedure/Colpocleisis • Perineal reconstruction

Table 5: Treatment options for pelvic organ prolapse [19,23].

In general, conservative or mechanical management are appropriate for women with milder degrees of prolapse, those whose families are incomplete, the frail or medically unfit for surgery or those who do not wish to have surgery. (19)

Pelvic organ prolapse is generally not a life threatening condition. Once other pathology has been excluded and reassurance given, a proportion of women will feel that further intervention is not appropriate for them. They should however be informed that the prolapse is unlikely to resolve spontaneously and mayworsen over time.

Conservative Measures

These fall in to two main categories: Lifestyle Modification and Pelvic Floor Muscle Training (PFMT).

Lifestyle modification is aimed at the reversible risk factors associated with pelvic organ prolapse and are summarized in Table 5. While this advice is often given alongside other conservative measures, it is worth noting that clinical evidence of benefit is lacking. (19)

The pelvic floor muscles provide structural support for the internal pelvic organs, (20) and training is aimed at strengthening these muscles. In addition to increasing support, PFMT also aims to reduce some of the bladder symptoms associated with prolapse, specifically urinary incontinence. (19) While a limited number of studies have clearly shown that PFMT can reduce the symptoms and severity of prolapse, its role in the prevention of prolapse is unclear.

Mechanical Measures

Mechanical measures for the treatment of utero-vaginal descent have been in use since ancient times. Pomegranate and astringent–soaked plugs are among the prototypes described by Hippocrates in the 5th Century BC. (21) Most pessaries in use today are made of plastic or silicone and come in a variety of shapes and sizes (Figure 3).

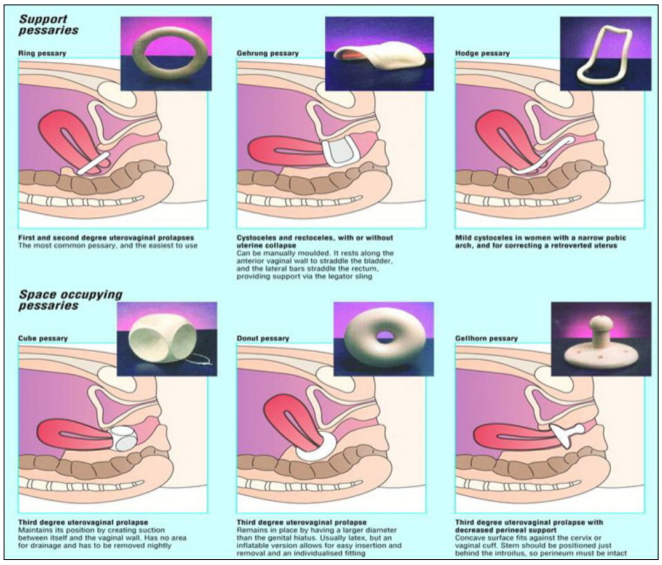

Figure 3: Types of pessary. Image taken from Clinical Key, Reeba O et al. The history and usage of the vaginal pessary: a review. Eur J Obs & Gynae and Reprod Bio 2011; 156: 125-30.

There are hardly any contraindications to using a pessary, so it is a treatment option for most women. They should, however, be avoided in the presence of active vaginal ulceration or infection, or known allergy to silicone and latex. (22)

There are two main types of pessary: support and space occupying. Both types aim to physically elevate the prolapse within the vagina to ease the symptoms. This may also help with related urinary and bowel problems. It can be a useful tool for simulating post-surgical conditions and in counselling patients prior to surgery, in particular where pain or urinary symptoms predominate. (22)

In general, support pessaries such as the ring pessary may be more suitable for minor degrees of prolapse, while the space-occupying gel horn, donut or cube pessaries may work better for more severe prolapse. Support pessaries do not need to be removed prior to intercourse; however most space occupying pessaries make intercourse impossible, which may be a limiting factor to their use.

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Once successfully fitted, pessaries require minimal care. Patients should be reviewed every 4-6 months, at which time the pessary should be removed and the vaginal epithelium inspected for any ulceration prior to replacement. Common side effects include vaginal discharge and odour. Rarer but more significant complications include vesicovaginal or rectovaginal fistula, and impaction. (22)

Surgical Treatment

Surgical intervention aims to correct the vaginal protrusion and restore normal anatomy, hoping for a concurrent improvement in associated bladder, bowel and sexual dysfunction. Table 5 summarises the most commonly performed surgical procedures for prolapse. The number of surgical treatments available would suggest that the best method has yet to be defined. (23)

The recurrence rates of prolapse are high. Approximately 1 in 3 women can expect to have further surgery following their primary procedure. (24) Understanding this risk is an important aspect of pre-operative counselling. The choice of operation, as with all management options for utero-vaginal prolapse, should be tailored to meet the needs and expectations of the individual, taking into account the recognised risks and benefits of the procedure. Corrective surgery may be confined to a single vaginal compartment or may entail several procedures to address prolapse in multiple compartments.

The standard procedure for repairing deficiencies in the anterior vaginal wall (cystocele/urethrocele) is an anterior repair or colporrhaphy. Posterior vaginal wall repair or colpoperineorrhaphy is the usual surgical treatment for a posterior defect (rectocele/enterocele). (25) In an attempt to reduce recurrence, the use of synthetic, absorbable or porcine mesh to augment the native tissue gained popularity throughout the last decade. Studies on mesh use have shown a reduced risk of recurrent prolapse but an improvement in patient satisfaction, quality of life or a reduction in the need for repeat surgery has not been demonstrated. (25)

Furthermore, concerns about the side effects associated with the use of mesh, in particular that of mesh erosion, led to an American FDA notification in 2011 which suggested that the use of mesh in all patients with POP may not improve outcome and may expose patients to greater risk. (26) Following this notification mesh products have been withdrawn from the market, numerous lawsuits have been brought against manufacturers and the regulating bodies of several countries have issued guidelines on the use and monitoring of mesh use. (27) In general, mesh use for correction of pelvic-organ-prolapse is now confined to specialist centres.

Surgical management of a central or apical prolapse will depend on whether the uterus and cervix are present. Traditionally, uterine decent is managed by hysterectomy, usually vaginal. If the prolapse is large many would argue that hysterectomy alone is not sufficient as recurrence is likely. In this situation a suspension procedure or a MaCall's culdoplasty to elevate the vault, can be done at the same time. (25, 27)

In women who wish to preserve the uterus, uterine suspension (hysteropexy) is possible, whereby the cervix and body of the uterus are attached to the sacrum with a synthetic mesh. This can be done laparoscopically or at an open procedure. In the case of vault prolapse following hysterectomy two approaches to corrective surgery are common: abdominal sacrocolpopexy (attaching the vault to the sacrum by synthetic mesh) and trans-vaginal sacrospinous fixation (attaching the vault to the ipsilateral sacrospinous ligament). Evidence suggests that abdominal surgery for vault prolapse is associated with lower rates of recurrence and less post operative dyspareunia. However, this is at the expense of a longer operating and recovery time. (23)

Conclusion

It may not be possible to prevent the development of pelvic organ prolapse completely due to its multifactorial etiology. However, certain precautions like good intrapartum management of labour, pelvic floor exercises, optimisation of body mass index and avoidance of factors which increase intra abdominal pressure may play a role in limiting the severity of the condition. Although, not a life threatening condition, it can seriously affect the quality of life of the patient, the correct diagnosis of the exact nature of prolapse is required for optimum management and treatment.

MCQs For POP Paper

1. Which of the following are risk factors for pelvic organ prolapse?

a) Hysterectomy
b) Obesity
c) Nulliparity
d) Caesarian Section
e) Crohns Disease

2. Are the following statements true or false?

a) Pelvic-organ-prolapse affects only 1% of the population?
b) Examination with a Simms speculum allows assessment of the anterior, central and posterior vaginal compartment?
c) Complete eversion of the uterus and beyond the introitus is known as a procidentia?
d) All women with a prolapse are symptomatic?
e) Hysterectomy is a surgical treatment for vault prolapse?

3. Which of the following are first line treatments in the management of a Grade 1 cystocele?

a) Hysterectomy
b) Weight loss
c) Ring Pessary
d) Anterior Repair
e) Pelvic floor muscle training

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Single Best Answer Questions

1. A 72 year old lady presents with a mass protruding from the vagina. On examination she has a grade 4 vault prolapse. She had hysterectomy at the age of 37 years for fibroids, followed by a second laparotomy and bilateral oophorectomy for a large ovarian cyst at the age of 63 years. She is a heavy smoker, suffers from COPD and ischaemic heart disease. She is married but not currently sexually active. What is you preferred treatment option?

a) Reassure that prolapse is not a life-threatening condition.
b) Lifestyle modification advice and referral for supervised pelvic floor muscle training.
c) Abdominal sacrocolpopexy.
d) Vaginal pessary.
e) Colpocleiesis.

2. A 35 year old lady presents 12 weeks after the birth of her first child. She had a forceps delivery with an episiotomy. She complains of a sensation of a lump in the vagina and occasional stress incontinence.

On examination the perineum is well healed, she has grade 1 cervical decent and posterior wall prolapse. Her BMI is 39. She is very distressed by her symptoms. What is your initial advice?

a) Reassure that things should improve with time.
b) Referral for urodynamic bladder investigations.
c) Advice on weight loss and referral for supervised pelvic floor muscle training.
d) Manchester repair.
e) Vaginal hysterectomy and posterior repair.

3. A 65 year old lady presents with a 2 month history of vaginal spotting, she denies any symptoms of prolapse. On examination the vulae and vagina are atrophic.

There is a prolapse of the cervix and anterior vaginal wall that is visible at the introitus on straining, the overlying skin is indurated and erythematous. Bimanual examination reveals a small uterus with no adnexal masses felt. What is your initial management?

a) A short course of topical oestrogen.
b) Urgent referral for pelvic USS.
c) Referral for supervised pelvic floor muscle training.
d) Consideration of vaginal pessary.
e) Vaginal hysterectomy and anterior repair.

MCQs For POP Paper Answers

1. Which of the following are risk factors for pelvic organ prolapse?

a) True b) True c) False d) False e) False

2. Are the following statements true or false?

a) False b) True c) True d) False e) False

3. Which of the following are first line treatments in the management of a Grade 1 cystocele?

a) False b) True c) False d) False e) True

Single Best Questions Answers

1. Answer: d

A vaginal pessary is the most appropriate treatment option. Lifestyle modifications and supervised pelvic floor muscle training, whilst important, are unlikely to provide symptomatic relief with this degree of prolapse.

Abdominal surgery is likely to be difficult given her previous surgical history and her medical co-morbidities pose an increased anaesthetic risk. If the pessary fails, or is unacceptable to the patient, then surgical options can be considered following an anaesthetic assessment.

Colopcleiesis (obliteration of the vagina) can be performed under local anaesthetic if a general anaesthetic is deemed too high a risk.

2. Answer: c

Conservative measures should be tried in the first instance. A trial of supervised pelvic floor muscle training could help with both the prolapse symptoms and her stress urinary incontinence. If symptoms persist then referral to a urogynaecologist for further assessment and urodynamic investigations would be warranted.

3. Answer: b

Post-menopausal bleeding requires urgent investigation to exclude endometrial malignancy. Whilst the spotting may be due to atrophy and trauma, which would benefit from topical oestrogen, it should not be assumed that this is the cause of the bleeding.

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RECOGNISING CAUSES OF ANTEPARTUM HAEMORRHAGE

EV Woon, B Browne, M Koh, S Gull

Learning Objectives

1. To recognise the different causes of antepartum haemorrhage.

2. To assess and initiate management of antepartum haemorrhage.

3. To identify patients presenting with antepartum haemorrhage requiring urgent intervention.

Introduction

Antepartum haemorrhage (APH) complicates between 3 to 5% of pregnancies (1). It is defined as bleeding from the genital tract from 24 weeks of gestation until delivery of the baby. The causes for APH are varied, including local and systemic causes (Table 1). APH can lead to severe consequences if not managed correctly. Maternal complications can be life-threatening and include hypovolaemic shock, renal tubular necrosis, disseminated intravascular coagulopathy, post-partum haemorrhage and anaemia.

Fetal complications include fetal hypoxia, prematurity, fetal growth restriction (FGR) in chronic cases, and fetal death. Minor bleeding is defined as less than 50 ml that has settled; major bleeding is 50-1000 ml with no sign of clinical shock; massive haemorrhage is blood loss >1000 mL and/or signs of clinical shock(2). This article describes four causes in order to consider how to distinguish the possible cause and manage appropriately.

In Utero : • Placenta praevia • Placental abruption • Uterine rupture • Vasa praevia
Lower Genital Tract : • Cervical ectropion • Cervicitis • Cervical cancer • Cervical polyp • Trauma to vagina or cervix
Systemic : • Coagulopathy (e.g. Von Willebrand Factor deficiency) • Iatrogenic causes (e.g. anticoagulants)
Others : • Undetermined • Show (Mucous plug)

Table 1: Causes of APH.

Case Study 1

A 23-year-old patient with four previous spontaneous vaginal deliveries presents at 35 weeks of pregnancy with sudden onset of severe generalised abdominal pain radiating to the back with minimal vaginal bleeding. She has not felt any fetal movement in the past 24 hours. Her antenatal notes reveal a history of smoking and cocaine use in pregnancy, and poor adherence to antenatal follow-ups.

On examination, she is hypotensive and tachycardic but apyrexial. Her abdomen was rigid, with a tender and woody hard uterus. CTG, started 20 minutes ago, shows non-reassuring features, including late decelerations and loss of baseline variability.

What is the likely diagnosis and how will you manage the patient?

This patient showed signs of placental abruption with suspected foetal compromise. Resuscitation was commenced and following cervical examination to assess for suitability of vaginal delivery, which was not appropriate, the mother was brought to theatre for an emergency Caesarean Section. Coagulation studies prior to, and after delivery were normal. Baby was delivered in a poor condition with blood clots in the uterus and placenta partially detached.

Placental Abruption

Placental abruption, which complicates 0.5-1% (3) of pregnancies, is defined as premature separation of normally sited placenta from the uterine wall due to bleeding which begins in the decidua basalis(4). Bleeding can extend into the myometrium which will eventually weaken and rupture the uterus due to increased uterine pressure during contractions. This is termed the Couvelaire uterus. There are two types of placental abruption; concealed (20%), where no bleeding is seen externally and revealed (80%).

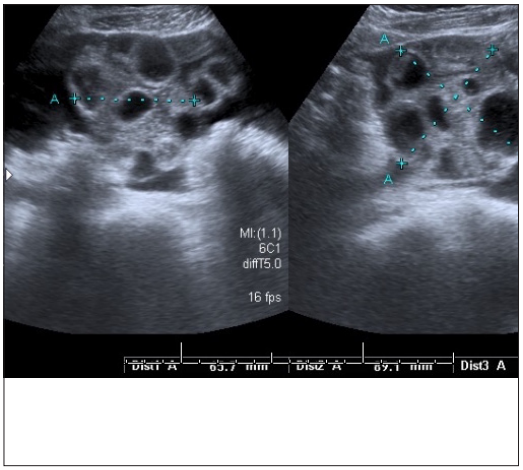

Figure 1: Placental Abruption (Hidden).

Risk factors for placental abruption include previous abruption, tobacco use, cocaine and amphetamine misuse, maternal thrombophilia (e.g. factor V Leiden) and pre-eclampsia. Other associated risk factors include chorioamnionitis, multiple pregnancy, fibroids, social deprivation, trauma (road traffic accident or iatrogenic), raised alpha Fetal protein with no fetal abnormality, disturbed placentation (e.g. fetal growth restriction, oligohydramnios, fetal abnormalities, abnormal umbilical arterial doppler), sudden uterine decompression after membrane rupture in polyhydramnios, advanced maternal age, multiparity, low BMI, assisted reproduction, premature rupture of membranes and 1st trimester bleeding.

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Diagnosis of placental abruption is usually made clinically. Ultrasound findings may be nonspecific. The patient may present with vaginal bleeding which may be concealed or revealed. There is usually severe and constant abdominal or back pain. Uterine contractions may be present if the abruption occurred in the context of preterm labour. On examination, a tender uterus which is classically described as rigid and woody hard is palpable with or without contractions.

Cervical examination should be carried out, to assess for suitability for vaginal delivery. Fetal heart rate is usually abnormal. In severe cases, the patient can sometimes present with hypovolaemic shock or disseminated intravascular coagulopathy with non-clotting vaginal bleeding, bleeding from drip sites and bruising. Venous blood should be taken for full blood count, cross match and clotting studies. In the postpartum period, placental abruption is associated with poor contractions and contributes to postpartum haemorrhage.

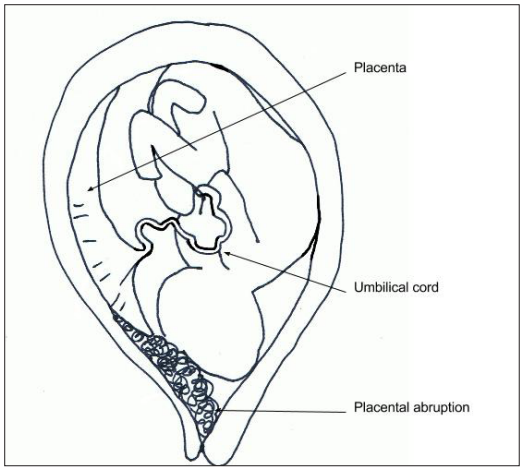


Figure 2: Placental Abruption (revealed).

Case study 2

A 24 year old patient with two previous Caesarean Sections presents at 34 weeks with fresh red PV bleeding which started two hours ago. It filled up the whole toilet bowl and soaked one big pad. She does not report abdominal pain, discomfort or contractions. Unfortunately, she was not booked in this hospital and has forgotten to bring her handheld notes, hence her antenatal history is not immediately available.

On examination, she is haemodynamically stable. Abdomen is soft, uterus is non tender. It was difficult to assess the presenting part and lie of the fetus. On speculum examination, there is a large clot in the vagina but no further active bleeding is seen. Os is closed and cervix appears normal. Fetal heart rate has been monitored for 30 minutes, which is normal.

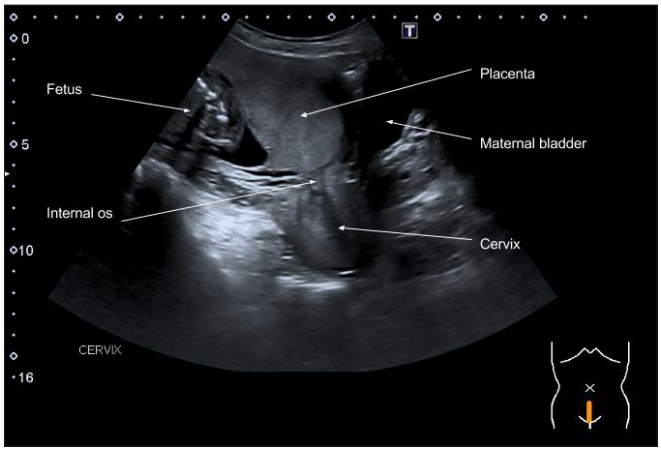


Figure 3: Placenta Praevia Identified at 20w gestation.

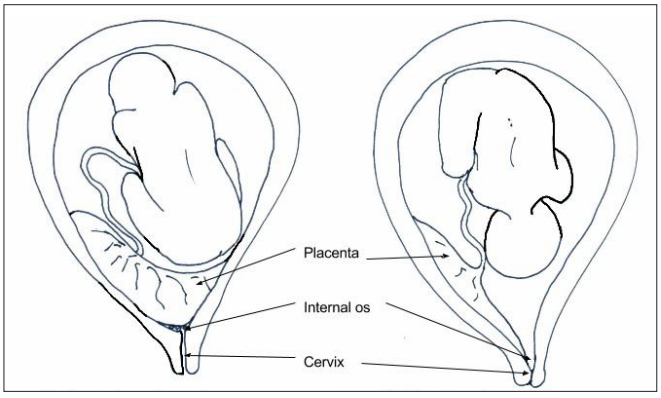
What is the likely diagnosis and how will you manage this patient?

IV access was obtained and G&S, FBC was done. There was suspicion of placenta praevia, hence patient had a bedside ultrasound scan which revealed a low lying placenta, covering the cervical os with the fetal head above the placenta. She was admitted for observation, given steroid injections. Her bleeding completely settled and further scan showed good fetal growth. She was delivered at 37 weeks by Caesarean Section.

Placenta Praevia

Placenta praevia occurs when the placenta is inserted wholly or partly in the lower segment of the uterus. Symptomatic placenta praevia happens in 0.4 to 0.8% of pregnancies(4). Recent RCOG guidelines defined placenta praevia as major if the placenta overlies the internal cervical os and minor if the leading edge of the placenta is in the lower uterine segment but not covering the os(5).

Figure 4



a) Major placenta praevia **b) Minor placenta praevia**

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Risk factors for placenta praevia include previous Caesarean section, advanced maternal age, multiparity, previous termination of pregnancy, previous placenta praevia, multiple pregnancy, smoking, deficiency of endometrium due to uterine scar, endometritis, previous manual removal of placenta, history of curettage, submucous fibroid, and assisted reproduction.

This patient classically presents with painless APH. The APH may be provoked by sexual intercourse or onset of labour. Clinical signs include a high presenting part, abnormal fetal lie, and the uterus may be soft or contracting if patient is in labour. Digital vaginal examination is contraindicated but speculum examination can be performed to assess if there is active bleeding and to exclude local causes.

Routine ultrasound scan at 20/40 will characterise the placental location and if placenta praevia is suspected, follow up imaging at 32 and 36 weeks is recommended to enable planning for third trimester management. Patients who have had previous uterine surgery are at increased risk of placenta praevia, which may be morbidly adherent.

Case Study 3

A 40 year old mother who has had one previous Caesarean section presents at 36 weeks of pregnancy with acute onset of severe lower abdominal pain, reduced fetal movement and minor per vaginam bleeding. She had a growth scan at 32 weeks which showed normal growth of the fetus.

The placenta was posterior and not low lying. The patient was haemodynamically stable. Examination was limited due to high BMI but her abdomen was generally tender. Speculum revealed a long and closed cervix and no evidence of active bleeding. CTG has been commenced for 20 minutes and fetal heart rate trace was classified as suspicious. On tocograph, no well-defined contractions were seen but uterus was clearly irritable.

What is the likely diagnosis and how will you manage the patient?

The patient was given strong analgesia but her pain worsened and became continuous. IV access was obtained and FBC and G&S was taken. The CTG did not improve despite conservative measures with IV fluids and left lateral position. There was suspicion of uterine rupture and she was taken to theatre for an emergency Caesarean Section. During the surgery, a partially dehisced uterine scar was found. The baby was delivered in good condition.

Uterine Rupture

Uterine rupture is defined as full thickness loss of integrity of uterine wall and visceral peritoneum(4). Of note, it is different from uterine scar dehiscence which does not involve visceral peritoneum and the fetus remains inside the uterine cavity.

Risk factors for uterine rupture include previous caesarean section (1 in 200 planned vaginal birth after caesarean section) (6), previous uterine surgery (e.g. myomectomy), induction and augmentation of labour in previous caesarean section, or multiparous women in labour (0.5 to 2 in 10000) (4). Rapid diagnosis is important as perinatal mortality from uterine rupture is high.

Clinical presentation includes vaginal bleeding, abdominal pain which is usually described as a tearing pain, and hypovolaemic shock in severe cases. Signs include loss of station of presenting part, diminished uterine contractions, abnormal fetal heart rate and tenderness of uterine scar. Haematuria may be noticed.

Case study 4

A 27 year old nulliparous lady, presents at 24 weeks gestation with fresh PV bleeding after sexual intercourse. Earlier in pregnancy, she had a few episodes of PV spotting. There was no abdominal pain and she was otherwise well. She had a cervical smear test 2 years ago which was normal.

What is the likely diagnosis and how will you manage the patient?

Speculum examination revealed a polyp. She was referred to colposcopy clinic at the end of pregnancy for further investigations where the polyp was removed and sent for histology.

Local Causes of Bleeding

Frequently, APH can be attributed to local causes of the lower genital tract. This may include cervical polyps, cervicitis, trauma, and rarely carcinoma of the cervix. It is worth thinking about possible infection and checking cervical screening history. Cervical cytology and colposcopy are not contraindicated in pregnancy.

Management

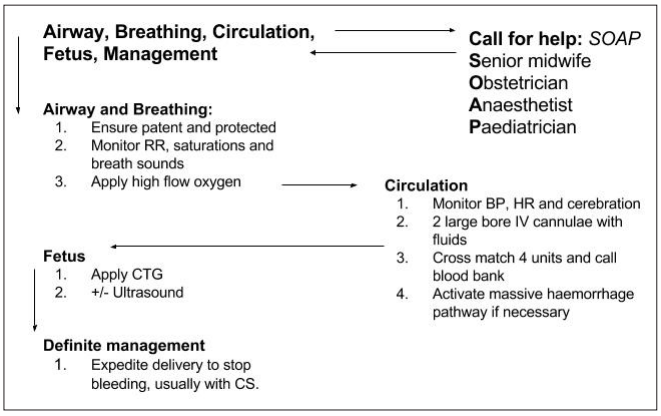

Figure 5: Algorithm for Management of Major APH (Blood loss >1000 ml or shock).

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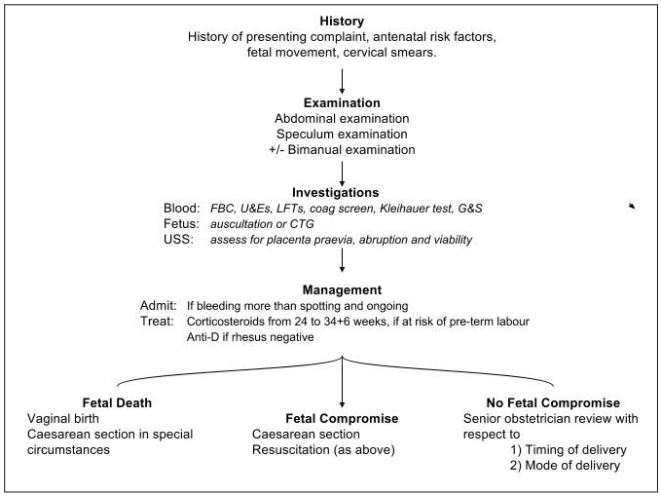

Figure 6: Algorithm for Management of APH without maternal compromise.

Conclusion

In many cases, the cause of antepartum haemorrhage cannot be found and this most likely represents a minor degree of placental abruption. One should be aware of this, especially when the patient presents with "heavy" or "recurrent" show. These patients should be offered higher levels of surveillance during pregnancy, as APH is associated with increased perinatal mortality(2). There should also be awareness of increased prevalence of placenta praevia and accreta in view of increasing rates of Caesarean Section.

The main expectations for a foundation year doctor encountering a patient with APH is to recognise the different and potentially life threatening causes. The ability to take a good clinical history and perform clinical examination, including abdominal palpation and speculum examination is essential for the assessing clinician. One should also be familiar with the local hospital system for activating major haemorrhage protocol in severe cases. It is prudent to ask for senior advice and involve the multidisciplinary team as early as possible for such cases. Good management includes good teamwork.

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SHOULDER DYSTOCIA

K MacLeod, A Roberts, S McCaughie

Abstract

A 36-year-old primiparous woman had a delivery complicated by shoulder dystocia requiring fracture of fetal clavicle. This case study focuses on the management of shoulder dystocia and the recent ethical and legal changes in consent practice brought out by the Montgomery ruling.

Case History

A 36-year-old primiparous woman was induced at 40 weeks for symphysis pubis dysfunction. She had received routine antenatal care prior to this and the only scan finding of note was the identification of a large for gestational age baby, on a customised growth chart, at 38+5 weeks gestation. During her labour, fetal monitoring became abnormal and warranted fetal blood sampling.

Fetal blood sampling was undertaken three times, all results were normal and labour progress was closely monitored. She was diagnosed with failure to progress in the second stage of labour and was taken to theatre for trial of instrumental delivery as the fetal head was at the level of the maternal ischial spines. The baby's head was delivered by forceps in the direct occipito posterior position. Shoulder dystocia was anticipated as restitution of the head was not observed and a succession of manoeuvres were tried to achieve delivery of the baby.

This initially began with placing the woman's legs in the McRobert's position, followed by suprapubic pressure and then entry manoeuvres, which failed to achieve delivery. The obstetrician then proceeded to fracture the clavicle and delivered the baby. The baby was taken to the awaiting neonatal team. He weighed 4.2 kg plotting over the 90th centile for gestation and was born in poor condition. Post-delivery the patient suffered a postpartum haemorrhage.

Discussion

All patients should be counselled and informed on their individualised risks fully prior to consenting for induction of labour.

As per NICE guidelines, healthcare professionals should explain the following points to women being offered induction of labour (1):

- *The reasons for induction being offered*
- *When, where and how induction could be carried out*
- *The arrangements for support and pain relief (recognising that women are likely to find induced labour more painful than spontaneous labour)*
- *The alternative options if the woman chooses not to have induction of labour*
- *The risks and benefits of induction of labour in specific circumstances and the proposed induction methods*
- *That induction may not be successful and what the woman's options would be*

Alternatives in this case would have included waiting for spontaneous labour to occur or a caesarean section. Caesarean section is has its own set of risks to mother and baby including bleeding, infection, venous thromboembolism, damage to internal organs and fetal laceration. Current national guidance, in the absence of any other indications, is that induction of labour should not be carried out simply because a healthcare professional suspects a baby is large for gestational age(1).

A recent study has suggested that early induction of labour for suspected fetal macrosomia may reduce the incidence of shoulder dystocia (2). Risks and benefits of early induction and longer term data on maternal and neonatal outcomes need to be sought.

Second stage (which commences when the cervix is 10cm dilated) caesarean section is associated with significantly higher morbidity and mortality than when the procedure is elective or performed in the first stage of labour. This is in part due to the fetal head being lower in the maternal pelvis in the second stage of labour. Where an instrumental delivery may have a higher risk of failure it should be conducted in theatre where immediate recourse caesarean section is available.

Factors which increase the risk of failure include maternal body mass index over 30, estimated fetal weight over 4kg, occipito posterior position and mid cavity deliveries (3). This is called a 'trial of instrumental delivery' and would involve spinal or epidural anaesthesia that is adequate for a caesarean section, prior to repeat vaginal assessment and evaluation for instrumental delivery. Instrumental deliveries and in particular instrumental deliveries carried out in theatre have a higher risk of shoulder dystocia (3). This case also highlights the importance of carrying out instrumental delivery in an appropriate setting.

Shoulder dystocia occurs when the fetal head has been delivered but one of the shoulders becomes stuck behind the mother's pubic bone, delaying the birth of the body. This complication affects 1 in 200 deliveries and can cause significant maternal morbidity and neonatal morbidity and mortality (4). Most cases are unpredictable, but there are associated risk factors which may highlight the possibility of shoulder dystocia. (4,5). Risk factors should be documented in the notes, especially if they are multiple.

Risk Factors

Pre- labour

- *Previous shoulder dystocia - risk 10 fold higher than general population*
- *Macrosomia >4.5 kilograms*
- *Diabetes mellitus*
- *Maternal BMI >30*
- *Induction of labour*
- *Post term delivery*

Intrapartum

- *Prolonged first stage of labour*
- *Prolonged second stage of labour*
- *Oxytocin augmentation*
- *Instrumental delivery*

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There are some early warning signs of shoulder dystocia, these include 'head bobbing' (when the head comes towards the introitus during pushing but retracts between contractions), the 'turtle' sign (when the delivered head retracts and is tightly pulled back against the perineum) and failure of restitution (spontaneous realignment of the fetal head with the fetal shoulders)(4).

Shoulder dystocia is an obstetric emergency. Delivery units run regular training sessions to rehearse management. The HELPERR mnemonic is a useful aid to standardise management. Whilst the order of these steps is not prescriptive, it gives staff a frame of reference which can be invaluable in a stressful situation. All manoeuvres aim to expedite delivery by either reducing the biacromial diameter (distance between the outermost parts of the fetal shoulders) or flattening the lumbosacral curve (6).

HELPERR mnemonic from Advanced Life Support in Obstetrics (6)

H - Call for Help
E - Evaluate for Episiotomy
L - Legs- McRoberts Manoeuvre
P - External pressure
E - Enter: rotational manoeuvres
R - Remove the posterior arm
R - Roll the patient onto all fours.

When calling for help; this includes the most senior obstetrician available, a paediatric team, anaesthetist and senior midwifery staff and ancillary staff as available.

McRoberts' manoeuvre is achieved by hyperflexing the hips with thighs abducted and external rotated. The bed should be flat and legs should not be in lithotomy poles. This position increases the functional size of the bony pelvis by flattening the lumbosacral curve (6). 80% of shoulder dystocia can be resolved with this step (4).

Suprapubic pressure aims to decrease the biacromial diameter of the fetus through putting pressure on the posterior aspect of the impacted shoulder abdominally (6). This is performed by an assistant applying pressure on the posterior aspect of the anterior shoulder from the side of the bed where the fetal back is. A continuous or rocking motion can be used.

There are also rotational manoeuvres that can resolve shoulder dystocia. This involves performing a vaginal examination to apply pressure on various parts of the fetal anatomy to reduce biacromal diameter and expedite delivery (6). Rotational movements include Rubin II's manoeuvre, Wood's screw manoeuvre and Reverse wood screw manoeuvre (4).

Another manoeuvre, which can be considered if all others have failed, is deliberately fracturing the clavicle. This reduces the biacromial diameter to enable delivery of the body. Most fractured clavicles heal well with no long-term complications (5). One of or a combination of these manoeuvres resolves most shoulder dystocia.

In a very small number of cases (<1%), additional manoeuvres are required. These manoeuvres are a last resort, with a high risk of maternal morbidity and neonatal morbidity and mortality. Possible options are Zanvanelli manoeuvre and Symphisiotomy.(4)

Maternal complications (5)

- Incidence of postpartum haemorrhage - 11%
- 3.8% risk of third and fourth-degree perineal tears
- Vaginal lacerations
- Cervical tears
- Bladder rupture
- Uterine rupture
- Symphysial separation
- Sacroiliac joint dislocation
- Lateral femoral cutaneous neuropathy

Fetal Complications

There can be significant perinatal morbidity and mortality associated with shoulder dystocia, even with appropriate management. The incidence remains unchanged by the number or type of manoeuvres required to effect delivery (5). Brachial Plexus injury is the most common complication, occurring in approximately 4-16% of deliveries. Many are transient, but 10% result in permanent damage (6).

The neonate can suffer from fractured clavicle or humerus;(4) most heal with no long term complications or deformities. A serious complication is umbilical cord compression if the cord becomes trapped against the mother's pelvis. This can lead to hypoxia, possible cerebral palsy or death in less than 0.1% of babies (5). Rarely, intracranial haemorrhage and cervical spine injury may also occur (4).

Ethical Dilemma

Montgomery v Lanarkshire was a high profile legal case of a shoulder dystocia, that highlighted the issues around maternal choice.

Nadine Montgomery, an insulin diabetic mother, gave birth to her son at a gestation of 38+5 weeks via forceps on 1 October 1999 at Bellshill Maternity Hospital, Lanarkshire. As a result of shoulder dystocia the umbilical cord was compressed during delivery and her baby was born with cerebral palsy and permanent brachial plexus injury.

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Mrs Montgomery was seeking damages on behalf of her son. She attributed those injuries to negligence. She argued she should have been informed of a 9-10% risk of shoulder dystocia in diabetic mothers. Her defence also argued there was failure to perform a caesarean section in response to an abnormal fetal heart rate trace and suspected and her being large for gestational age (7).

The supreme court ruled Mrs Montgomery was entitled to recover damages on behalf of her son (7) and overturned the decision from the Scottish courts which had based its decision on case law from the Bolam V Friern Hospital Management Committee [1957] 1 WLR 583 (8).

This case changed the law by ruling doctors must ensure their patients are aware of any "material risks" of any treatments they offer and of the availability of any reasonable alternatives or variants, to allow them to make an informed decision.

The courts stated that a risk could be labelled as "material" by identifying whether, in light of the facts of each individual situation, "a reasonable person in the patient's position would be likely to attach significance to it" or "the doctor is or should reasonably be aware that the particular patient would be likely to attach significance to it." (7)

The judgement stated that doctors can no longer rely on the support of a responsible body of medical opinion (The Bolam test- 1957(8)) in deciding what information they should provide to patients. This judgment aligns the law with guidance from the General Medical Council on informed consent.

Conclusion

In conclusion, all patients should be counselled and informed on their individualised risks fully prior to consenting for induction of labour. Shoulder dystocia is known to be associated with induction of labour. Shoulder dystocia is an obstetric emergency that is often unanticipated and needs to be managed promptly. Regular simulation training using recognised mnemonics highlights the importance of shoulder dystocia and ultimately reduces maternal and neonatal morbidity and mortality.

Simulation training can result in improved operator technique and reduced incidence of brachial plexus injuries (9). Despite shoulder dystocia being one of the most serious obstetric complications, most are deliverable using basic manoeuvres with <1% needing additional more complex manoeuvres out with the remit of regular skills and drills teaching (5). The Montgomery ruling has changed medical practice as a whole and all clinicians should consider what a reasonable person would be likely to attach significance to in his or her day-to-day practice.

MCQs

1. Which is not associated with shoulder dystocia?

a. Diabetes
b. Low BMI
c. Postdates pregnancies
d. Slow progress in labour
e. Instrumental delivery

2. Which manoeuvre reduces the biacromial diameter to facilitate delivery in a case of shoulder dystocia?

a. Episiotomy
b. McRoberts' manoeuvre
c. Suprapubic pressure
d. All-fours position

3. Which statement regarding shoulder dystocia is true?

a. Shoulder dystocia complicates 50% of deliveries.
b. Shoulder dystocia never occurs in babies weighing less than 4kg.
c. Previous shoulder dystocia is not predictive of shoulder dystocia in a future pregnancy.
d. Shoulder dystocia has a high chance of causing long term neonatal morbidity and mortality.
e. In most cases of shoulder dystocia, McRoberts' manoeuvre achieves delivery.

4. What is the commonest maternal complication in shoulder dystocia?

a. Post-partum haemorrhage
b. Bladder rupture
c. Uterine rupture
d. Lateral femoral cutaneous neuropathy

5. Shoulder dystocia is preventable by?

a. Regular antenatal scanning to estimate fetal weight
b. Caesarean section
c. Instrumental delivery
d. Induction of labour

SHOULDER DYSTOCIA

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Answers

1. Answer b)

High BMI, not low BMI is associated with shoulder dystocia

2. Answer c)

Suprapubic pressure reduced biacromial diameter to facilitate delivery. Episiotomy improves access to allow more room for manoeuvres whilst McRoberts' position straightens the sacrum relative to the lumbar vertebrae and all-fours position increases the anteroposterior diameter of the inlet.

3. Answer e)

In at least 80% of cases, delivery is achieved by McRoberts' manoeuvre. Shoulder dystocia occurs in less than 1% of deliveries and can occur at any fetal weight. Previous shoulder dystocia increase the risk of shoulder dystocia in a future pregnancy. Although shoulder dystocia can cause significant neonatal morbidity and mortality, hypozia, cerebral palsy and death occurs in less than 0.1% of babies.

4. Answer a)

Post-partum haemorrhage is the most common maternal complication in shoulder dystocia with 11% of women suffering a blood loss of over 500mls.

5. Answer b)

Caesarean section is the only way to prevent shoulder dystocia. Estimation of fetal weight antenatally is notoriously inaccurate and many cases of average weight babies have shoulder dystocia. Induction of labour and instrumental.

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FETAL SCALP BLOOD SAMPLING

AD Jakes, M Ali, J Lloyd

Introduction

Fetal blood sampling (FBS) is a procedure where a small amount of fetal blood (30-50 µl) is taken for pH and lactate measurement. It was first described in 1963 to detect fetal asphyxia, and the technique has changed very little over the years.

It is now commonly used as an adjunct to fetal cardiotocography (CTG), to establish whether a pathological trace is due to intra-partum hypoxia or acidosis. This can aid the obstetrician in the decision as to whether there is a need to expedite the birth to reduce the risk of perinatal death, hypoxic ischaemic encephalopathy and cerebral palsy.

What is a CTG

Fetal cardiotocography, also known as electronic fetal monitoring, is the electronic tracing of the fetal heart rate and maternal uterine contractions.

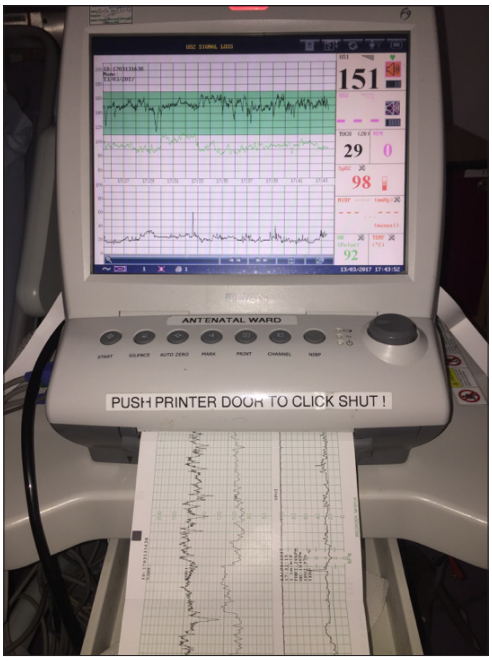

Figure 1: CTG machine and trace.

A CTG can be used antenatally to assess fetal well-being, or during the intrapartum period to detect fetal distress or hypoxia. There are four aspects of CTG interpretation:

- *Baseline fetal heart rate – average heart rate over 10 minutes*
- *Baseline variability – variation of heart rate from one beat to the next*
- *Accelerations – an increase in heart rate of 15 bpm for 15 seconds*

(if present they are reassuring, but their absence is not indicative of fetal acidosis)

- *Decelerations – a decrease in heart rate of 15 bpm for 15 seconds*

Decelerations can be further defined as:

- *Early – begin with the onset of contraction and resolves by the end of a contraction. They are not a cause of concern and are a response to fetal head compression.*
- *Variable – Can occur at anytime and are thought to be due to cord compression. Variable decelerations can be associated with or without concerning characteristics: lasting more than 60 seconds, reduced baseline variability within the deceleration, failure to return to baseline or biphasic (W) shape.*
- *Late – Start within or after a contraction and are still present at the end of a contraction. They are a sign of fetal hypoxia.*

The features of a CTG can be characterised as reassuring, non-reassuring and abnormal. Table 1 summarises these features.

Description	Baseline (beats/ minute)	Variability (beats/ minute)	Decelerations
Reassuring	110 to 160	5 to 25	- None or early decelerations - Variable decelerations with no concerning characteristics for <90 minutes
Non-reassuring	100 to 109 OR 161 to 180	<5 for 30 to 50 minutes OR >25 for 15 to 25 minutes	- Variable decelerations with no concerning characteristics for >90 minutes - Variable decelerations with any concerning characteristics in up to 50% of contractions for >30 minutes -Variable decelerations with any concerning characteristics in >50% of contractions for <30 minutes - Late decelerations in >50% of contractions for <30 minutes, with no maternal or fetal clinical risk factors such as vaginal bleeding or significant meconium
Abnormal	<100 OR >108	<5 for more than 50 minutes OR >25 for more than 25 minutes OR Sinusoidal	- Variable decelerations with any concerning characteristics in >50% of contractions for 30 minutes* - Late decelerations for 30 minutes* - Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more.

Table 1: CTG interpretation and management - adapted from the NICE guidelines (1)

**or less if there are any maternal or fetal clinical risk factors.*

CTG and FBS

The overall interpretation of the CTG can be classified into normal, suspicious or pathological. Table 2 summarises this classification.

Category	Features	Management
Normal	All features are reassuring	Continue CTG
Suspicious	1 non-reassuring feature AND 2 reassuring features	Correct any underlying causes Conservative measures: intravenous fluids and adopt alternative position
Pathological	1 abnormal feature OR 2 non-reassuring features	Senior review Exclude acute events Offer fetal scalp stimulation Consider FBS Consider expediting the birth

Table 2: FBS result interpretation (2)

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CTG monitoring alone has a high sensitivity but low specificity for detecting fetal hypoxia (2). Therefore hypoxia can be reliably excluded if the CTG trace is normal and labour can be allowed to continue without intervention.

The low specificity with regards to CTG monitoring means a high false positive rate for fetal hypoxia and subsequent cerebral palsy - resulting in unnecessary interventions such as caesarean section and instrumental delivery (2).

The introduction of FBS aimed to address the issue of low specificity with CTG monitoring through direct measurement of fetal pH and lactate. Fetal blood sampling is considered to reduce the rate of caesarean sections for presumed fetal distress by identifying truly hypoxic fetuses as well as allowing for earlier intervention for fetuses at risk of compromise. It is now recommended by the National Institute for Health and Care Excellence (NICE) and has become standard practice in the UK.

Indications

Indications for FBS include a pathological CTG and suspected acidosis in labour. It is performed by an obstetrician on the labour ward.

Contraindications

Contraindications to FBS are:

- *Acute fetal compromise (prolonged deceleration or bradycardia)*
- *Cord prolapse*
- *Suspected placental abruption*
- *Suspected uterine rupture*

All of which should lead to immediate delivery of the fetus.

A FBS should not be performed:

- *Prior to 34 weeks gestation as there is a risk of excessive bleeding and cerebrospinal fluid leakage resulting from accidental dural puncture via the anterior fontanelle.*
- *In the presence of suspected fetal bleeding disorders such as haemophilia and thrombocytopenia.*
- *Face and brow presentations*
- *in the presence of a maternal infection such as chorioamnionitis or in patients where there is a risk of maternal-to-fetal transmission such as HIV, hepatitis or active herpes simplex. However, HIV and viral hepatitis are only relative contraindications if viral load is deemed to be sufficiently controlled.*
- *Immediately after a prolonged deceleration to prevent a false positive result.*

Complications

Complications of a FBS include a superficial laceration on the fetal scalp, which may haemorrhage or lead to infection. The sampling site should be examined post-partum. There is also the risk of failing to obtain a fetal blood sample.

Pre-requisites for FBS Procedure

It is vital that a thorough clinical history is taken to determine:

- *The current gestation of the labouring woman*
- *Parity*
- *Previous obstetric complications*
- *Maternal medical conditions or viral infections*
- *The onset of labour and progress*

The most recent CTG trace should be examined to confirm the indication for FBS. The presence of meconium or maternal pyrexia/sepsis should be documented.

Abdominal and vaginal examination prior to the procedure is essential to determine:

- *The position of the fetus*
- *The station of the presenting part*
- *Cervical dilatation (which must be >3cm)*
- *Rupture of amniotic membranes*

Continuous CTG should be in place throughout. If there is hyperstimulation (i.e. >5 contractions over 10 minutes) oxytocic infusions should be stopped and the CTG observed for improvement prior to doing an FBS.

Fetal scalp stimulation can be used during vaginal examination for reassurance. If there is an acceleration in fetal heart rate during stimulation, this should be regarded as a sign that the fetus is healthy. An FBS should be performed if the CTG continues to be pathological (4).

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Procedure

The procedure should be explained to the patient, including the possible results and subsequent outcomes. Verbal consent must be gained prior to the procedure and documented in the medical notes.

The timing of the FBS should be clearly marked on the CTG trace to correlate with the medical notes. The patient should be made aware that the procedure could be uncomfortable. The woman's midwife is vital to support the woman and help with the procedure. A second assistant is needed to also run the samples taken to minimise delay in analysis.

Ensure that the instruments are to hand and that the blood gas machine is functioning and calibrated. The procedure itself is performed aseptically and therefore a sterile field must be established. The following steps describe the process of taking an FBS.

1. Ideally the woman should be placed in the left-lateral position, with her right leg supported and abducted. However, this may not be practical and patient preference may dictate that the lithotomy position is more appropriate.

2. Clean and drape the area around the perineum to provide a sterile field.

3. Introduce the lubricated amnioscope (Figure 2) and light source to visualise the fetal scalp against the cervix.

Figure 2: Amnioscope and FBS kit.

4. Clean the fetal scalp with a cotton wool ball dipped in sterile water. Then spray the scalp with ethyl chloride to produce a reactive hyperaemia.

5. Apply a thin film of petroleum jelly with a dental roll to increase surface tension on the fetal scalp; this encourages the formation of sizeable droplets of blood.

6. Insert a guarded blade into the scalp to the full depth and a make a 2mm laceration. Do not stroke the blade across the scalp as this may produce a lesion that is too large.

7. Using the capillary tube, collect the blood droplets - at least two separate samples should be obtained to ensure reliability of results. The second may be taken while the first is being analysed by an assistant.

8. Apply pressure to the fetal scalp with cotton wool if any bleeding is evident and reposition the mother.

Common causes of sample failure are blood clotting within the capillary tube, insufficient blood sample obtained, air bubbles inside the capillary tube, or failure of blood gas analyser calibration. In addition, obtaining a sufficient FBS for analysis is highly operator and experience dependent. The scalp blade and any used sample tubes should be disposed of safely into the sharps bin.

The Royal College of Obstetricians and Gynaecologists (RCOG) suggest that paired umbilical cord arterial and venous blood gas samples should be performed for all caesarean sections or instrumental births in which fetal compromise is an indication for birth.

Consideration should also be given to the measurement of cord blood gases following all births in which there have been concerns about the fetal heart rate trace.(5) However, it is common practice to analyse cord blood in all women who have had an FBS during labour (6).

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Interpreting results

The results can be categorised into three outcomes; normal, borderline and abnormal using either pH or lactate. Table 3 summaries the possible FBS results and suggested action. The threshold pH for adverse neurological outcomes is 7.1 (7).

pH	Lactate	Interpretation	Action
≥7.25	≤4.1 mmol/L	Normal	Repeat FBS no more than 60 minutes later if the CTG remains abnormal, or sooner if there are further abnormalities
7.21 – 7.24	4.2 – 4.8 mmol/L	Borderline	Repeated FBS no more than 30 minutes later if the CTG remains abnormal, or sooner if there are further abnormalities
≤7.20	≥4.9 mmol/L	Abnormal	Consider urgent delivery by emergency caesarean section or an instrumental delivery

Table 3: FBS result interpretation (2)

A repeat FBS should be interpreted taking into account the previous results, the rate of progress in labour and the clinical features of the woman and baby. The time needed to take a FBS should also be taken into account when planning repeat sampling (30-40 minutes)(5).

If the CTG and second FBS remains unchanged, further samples may be deferred unless additional non-reassuring or abnormal features are seen on the CTG. Discussion with a consultant obstetrician is required if a third FBS is indicated.

Occasionally, it may not be possible to obtain a FBS. In this case, if there is no improvement in the CTG, the birth should be expedited.

Conclusion

A FBS can be used as an adjunct to fetal CTG to establish whether an abnormal trace is due to intra-partum hypoxia or acidosis. This can aid the obstetrician in the decision as to whether to expedite the birth. It is associated with a reduction in operative and instrumental deliveries when compared to continuous CTG alone.

Test Yourself Section

1. A 32-year-old woman is 39+5 weeks pregnant. She is 6cm dilated and showing variable decelerations with concerning characteristics in >50% of contractions for more than 30 minutes on the fetal CTG. A fetal scalp blood sample is taken and the pH is 7.23. What is the next appropriate action?

a) Emergency caesarean section

b) Repeat fetal scalp blood sample in 2 hours if CTG remains abnormal

c) Repeat fetal scalp blood sample in 1 hour if CTG remains abnormal

d) Repeat fetal scalp blood sample in 30 minutes

e) Reassure and review in 4 hours

2. Which option is a contraindication to fetal scalp blood sampling?

a) Gestation of 36 weeks

b) Maternal coeliac disease

c) Cephalic presentation

d) Repeat variable decelerations for over 30 minutes

e) Maternal autoimmune thrombocytopenia

Answers

1. Answer d)

Repeat fetal scalp blood sample in 30 minutes

Description: The pH is 7.23, which is a borderline result (between 7.20 and 7.25). The RCOG guidelines suggest repeating the FBS in 30 minutes.

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2. Answer e)

Maternal autoimmune thrombocytopenia

Description: A FBS is contraindicated when there is maternal autoimmune thrombocytopenia as this may lead to antibodies crossing the placenta and affecting the fetal platelet count. This in turn could lead to catastrophic bleeding from the fetal scalp if the platelet count is low.

Regarding the other options: A FBS is contraindicated in gestations below 34 weeks, not 36 weeks. Maternal coeliac disease does not increase the risk of fetal bleeding disorders. Cephalic presentation (head first) is a normal fetal presentation at term. Repeat variable deceleration on the CTG for over 30 minutes is an indication for FBS.

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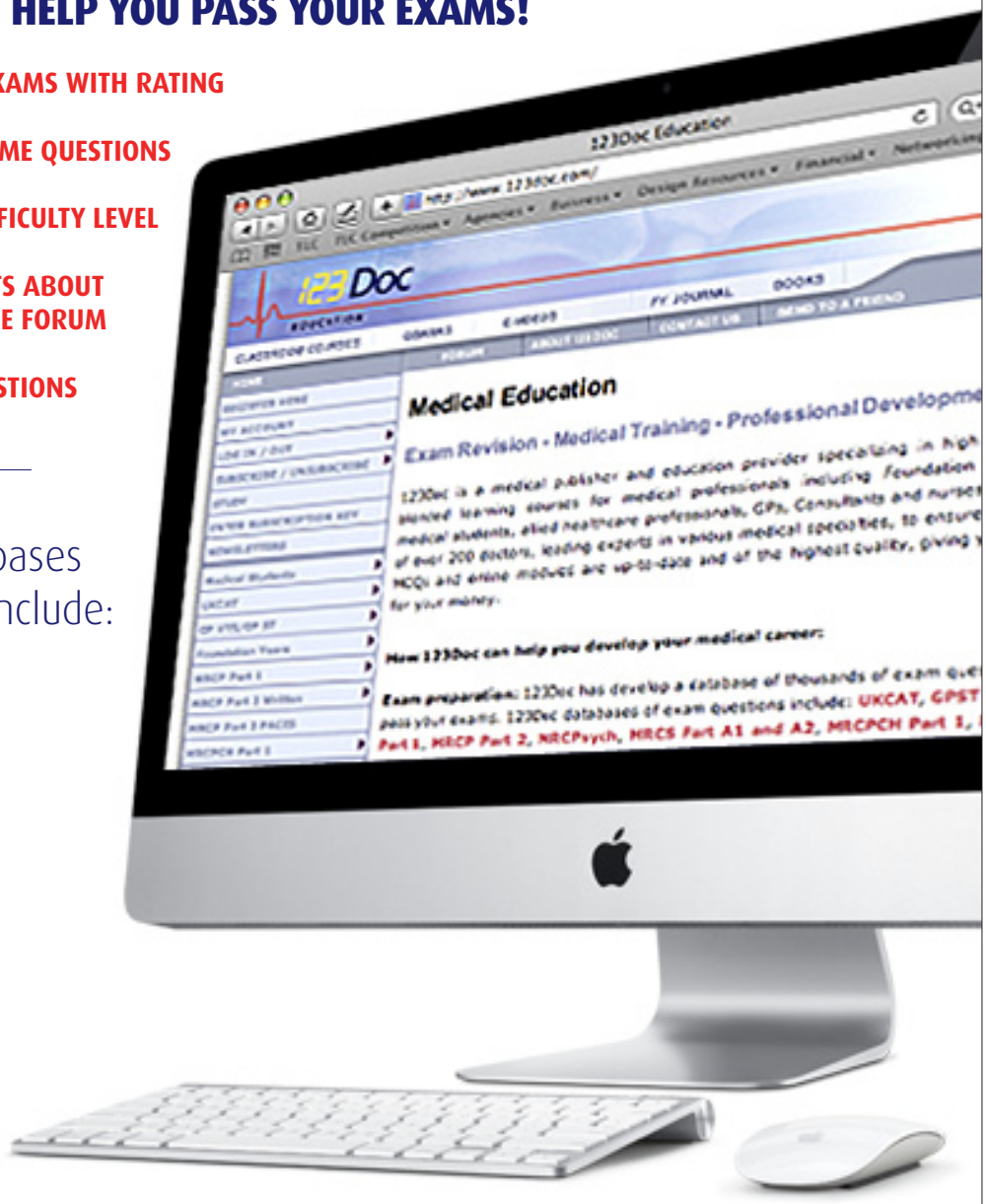

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