123 Doc EDUCATION

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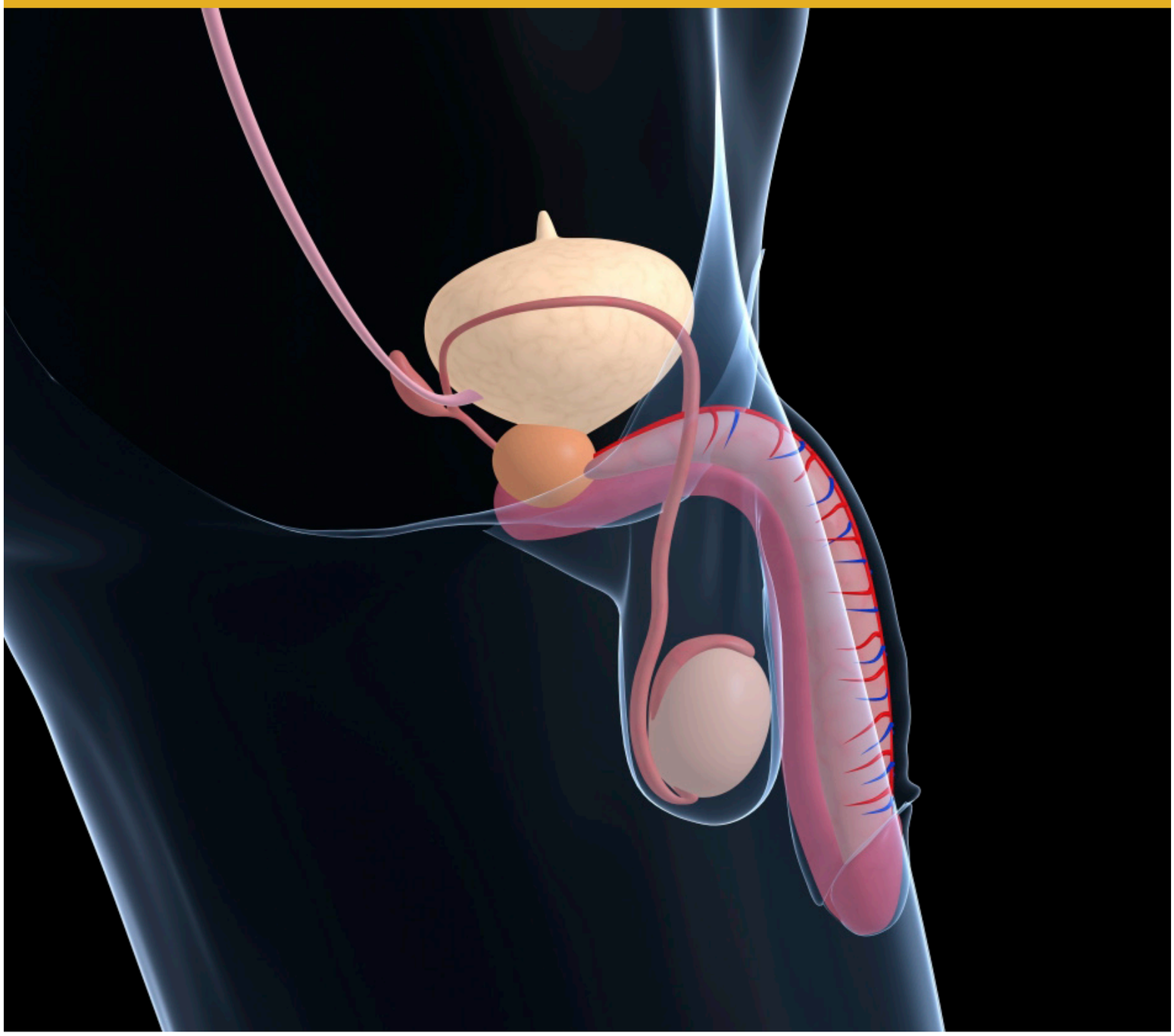
Volume 3, Issue 5: Urology



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Volume 3, Issue 5

Foundation Years Journal

Foundation Years Journal is an international peer-viewed journal which seeks to be the pre-eminent journal in the field of patient safety and clinical practice for Foundation Years' doctors and educators. The Journal welcomes papers on any aspect of health care and medical education which will be of benefit to doctors in the Foundation training grade in the UK or international equivalents.

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Volume 3, Issue 5: Urology

Foundation Years Journal is the ONLY journal for Foundation Years doctors and educators, specifically written according to the MMC curriculum. It focuses on one or two medical specialties per month, each issue delivers practical and informative articles tailored to the needs of junior doctors. The Journal closely follows the Foundation Years syllabus to provide the best educational value for junior doctors. In addition to good clinical and acute care articles, assessment questions give junior doctors the chance to gauge their learning.The answers will be published in the next issue, but 123Doc will advance answers to clinical tutor subscribers so they can engage their students in the learning process. Each issue provides comprehensive clinical cases for trainees as well as practical teaching assessments for educators. Readers will benefit from:

- **MMC CURRICULAR-BASED CONTENT** to enhance understanding of the core competencies required from future leading doctors.
- **FOCUS ON SPECIALTY-SPECIFIC CLINICAL CASES** each month to form broad subject coverage.
- **ADDITIONAL IN-DEPTH** good clinical and acute care articles aligned with the case-based discussion assessments.
- **TRAINING GUIDE FOR FOUNDATION YEAR (FY)** educators with proposed clinical cases for teaching sessions.
- **PRACTICAL & INFORMATIVE** articles written by senior doctors & consultants.
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Aim and scope

The Foundation Years Journal is published by 123doc and is aimed at doctors in Foundation Training programmes, their educational and clinical supervisors, as well as medical students and other doctors (particularly international medical graduates) who intend to start Foundation training in the United Kingdom.

Journal sections

The Journal has been redesigned and various sections have been introduced to map the Journal more closely to the Foundation programme curriculum. You can view the curriculum from **http://www.foundationprogramme.nhs.uk/pages/home/training-and-assessment**.

The sections are the following:

1. Good Clinical Care (syllabus section 1)
This section deals with various aspects of patient management including history, examination, diagnosis, record keeping, safe prescribing and reflective practice. Articles could also refer to other aspects of care including time management, decision-making, patient safety, infection control, clinical governance, nutrition, health promotion, patient education, public health and ethical and legal issues.

2. Good Medical Practice (syllabus section 2)
Articles could be on learning, research, evidence-based guidelines and audit.

3. Training and Teaching (syllabus section 3)

4. Professionalism in Practice (syllabus sections 4, 5 and 6)
This section includes relationship with patients, communication skills, working with colleagues, probity, professional behavior and personal health.

5. Patient Management (syllabus section 7)
Articles should be focused on the recognition and management of the acutely ill patients, core skills in relation to acute illness, resuscitation, management of the "take", discharge planning, selection and interpretation of investigations.

6. Practical Procedures (syllabus section 8)

7. Test Yourself
The intention is to provide a vehicle whereby trainees and educational supervisors can present original and review articles mapped against the Foundation curriculum.

Submission of manuscript

All articles submitted to the Journal must comply with these instructions. Failure to do so will result in return of the manuscript and possible delay in publication.

Manuscripts must be submitted exclusively by email (see detailed instructions below). Manuscripts should be written in English of a sufficiently high standard that is intelligible to the professional reader who is not a specialist in the particular field. Where contributions are judged as acceptable for publication, the Editor or the Publisher reserve the right to modify the manuscripts to improve communication between author and reader. Authors whose native language is not English are strongly recommended to have their submissions checked by a person knowledgeable of the language. If extensive alterations are required, the manuscript will be returned to the author for revision.

Covering letter

The manuscript must be accompanied by a covering letter bearing the corresponding author's signature. Papers are accepted for publication in the Journal on the understanding that the content has not been published or is being considered for publication elsewhere. This must be stated in the covering letter. If authors submit manuscripts relating to original research in the field of education, the corresponding author must state that the protocol for the research project has been approved by a suitably constituted Ethics Committee and that it conforms to the provisions of the Declaration of Helsinki (as revised in Edinburgh 2000), available at **http://www.wma.net/e/policy/b3.htm**. All investigations involving human subjects must include a statement that the subject gave informed consent and patient anonymity should be preserved.

The covering letter must contain an acknowledgement that all authors have contributed significantly and that all authors are in agreement with the content of the manuscript.

Authors should declare any financial support or relationships that may give rise to a conflict of interest.

Submitting a manuscript

Manuscripts should be submitted by email to **(agnes@123doc.com)**. We do not accept manuscripts submitted by post. Corresponding authors must supply an email address as all correspondence will be by email. Authors should use double spacing when submitting their manuscript. Two files or documents should be supplied: the covering letter and manuscript. The covering letter should mention the title, authors, their contribution, provenance, journal section where their work is to be considered (see above) and any conflict of interests. Please supply the files in Word 2003 format.

Figures should be supplied as a separate file, with the figure number incorporated in the file name. High-resolution figures (at least 300 d.p.i.) saved as jpeg files should be submitted.

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Manuscript style

Unless otherwise stated manuscripts should follow the style of the Vancouver agreement detailed in the International Committee of Medical Journal Editors' revised "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication", as presented at **http://www.ICMJE.org/**.

Abbreviations

Abbreviations should be used sparingly to facilitate reading the article by reducing repetition of long, technical terms. Initially you must use the word in full, followed by the abbreviation in parentheses. Thereafter use the abbreviation only.

Units

All measurements must be given in SI or SI-derived units.

Trade names

Drugs should be referred to by their generic names, rather than brand names.

References

All articles must be referenced appropriately. To reference the Journal please use the following abbreviation FYJ-123Doc. (The Vancouver system of referencing should be used and some examples are given below).

References should be cited using superscript Arabic numerals in the order in which they appear. If cited in tables or figure legends, number according to the first identification of the table or figure in the text.

In the reference list, the references should be numbered and listed in order of appearance in the text. Cite the names of all authors, when seven or more list the first three followed by et al. Names of journals should be abbreviated in the style used in Index Medicus, and be in italic font. Reference to unpublished data and personal communications should appear in the text only.

References should be listed in the following forms:

Journal article

Vassallo M, Vignaraja R, Sharma JC, et al. The Impact of Changing Practice on fall Prevention in a Rehabilitative Hospital. The Hospital Injury Prevention (HIP) Study. *J Am Geriatr Soc 2004,* 52:335-9. Book Azeem T, Vassallo M, SamaniNJ. *Rapid review of ECG interpretation.* London UK: Manson Publishing 2005.

Chapter in a book

Martin GM. Biological mechanisms of ageing. In: J Grimley Evans, T Franklin Williams (eds), Oxford Textbook of Geriatric Medicine, 1st edn. New York: Oxford University Press 1992, 41-48.

Journal article on the internet

British Geriatrics Society position paper. Dementia ethical issues **http://www.bgs.org.uk/Publications/Position%20Papers/psn_dementia_ethics.html**.

Tables

Tables should be self-contained and complement, but not duplicate, information contained in the text. Number tables consecutively in the text in Arabic numerals. Table should be double-spaced and vertical lines should not be used to separate columns. Column headings should be brief, with units of measurement in parentheses; all abbreviations must be defined in footnotes. Footnote symbols: †, ‡, §, should be used (in that order) and *, **, *** should be reserved for P-values. The table and its legend/footnotes should be understandable without reference to the text.

Line figures

Line figures should be sharp, black and white graphs or diagrams, drawn professionally or with a computer graphics package. Lettering must be included and should be sized to be no larger than the Journal text.

Colour figures

We encourage authors to submit colour figures and graphics that facilitate the comprehension of the article.

Figure legends

Type figure legends on a separate page. Legends should be concise but comprehensive - the figure and its legend must be understandable without reference to the text. Include definitions of any symbols used and define/explain all abbreviations and units of measurement. The Journal accepts the following types of articles (as title please):

Case Based Discussion

These are mainly intended for inclusion in sections 1 and 5 as highlighted above and should be about 1000-1500 words long. The CBD can focus on various aspect of patient care such as presentation, treatment or prescribing. The articles should include areas that are evaluated in the case based discussion assessment tool of the foundation programme .

The manuscript should be set out in the following sections:

- Abstract: this should refer to salient points from the case being presented together with a mention of what aspects are being discussed.
- Case History: this relates to the initial presentation and should include the clinical setting, clinical problem, investigations and treatment. The history section should also include an ongoing update (e.g. 2 days later, a week later, etc.) of patient progress and management.
- Discussion: this section should include a critical analysis of patient management in relation to clinical assessment, investigations, differential diagnosis, treatment, follow-up, professionalism and clinical judgement. The discussion should also include a discussion about the ongoing management issues and decisions. It is important to note that the case based discussion is not a review of a particular condition.
- Two best of 5 MCQs to be included in the Test Yourself section, with answers and detailed teaching notes explaining the answers. The answers only are NOT sufficient and it should be kept in mind when writing the teaching notes that the reader may take the test questions independently from reading the article.

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Authors writing a case based discussion should not write a short history and then write an article about the condition that the patient presented with. Such information can easily be obtained from a text book and is not the scope of Journal. Case based discusions written in this style will be returned to the author without being published.

Practical Procedures

Manuscripts on practical procedures should be about 1000–1500 words long. They should be set out in the following sections:

- History: this should describe the presentation of the patient and mention why or how the patient ended up needing the procedure.
- The procedure itself.

This should include:

- indications and contraindications
- explaining the procedure to the patient (including possible complications) and gaining informed consent for procedures
- preparing the required equipment, including a sterile field
- position the patient and give pre-medication/sedation or local anaesthesia as required and involving the anaesthetist where appropriate
- safely disposing of equipment, including sharps
- documenting the procedure, including labelling samples and giving instructions for monitoring and aftercare
- recording complications and the emergency management of such complications when appropriate.

Adequate pictures and diagrams need to be supplied in order to make the procedure as clear as possible.

Two best of 5 MCQs for inclusion in the test yourself section, including answers and detailed teaching notes. The answers only are NOT sufficient and it should be kept in mind when writing the teaching notes that the reader may take the test questions independently from reading the article.

Audit

Manuscripts, 1500–2000 words long, on audit are encouraged. The Journal will only publish high quality audit i.e. completed audit cycles or audits that have led to guideline development. Part 1 audits or surveys will not be accepted for publication.

Review Articles

We are interested in review articles on any aspect of the curriculum that is of relevance to our readership. They should be a maximum 3000 words long, 30 references, 250 word structured abstract, 4 tables OR figures.

We would consider reviews on any of the following:

- Good Medical Practice
- Teaching and Training
- Professionalism
- Medical reviews subject to prior discussion with the editorial team as to the appropriateness of the article

Shorter Reflective Practice Articles

We are always pleased to receive short pieces of a thoughtful nature that describes the personal or professional experiences of colleagues working with patients or their relatives. They should have a maximum of 1000 words. As suggested in the Foundation Programme Portfolio (Reflective Practice) these articles should describe:

- What made the experience memorable?
- How did it affect you?
- How did it affect the patient?
- How did it affect the team?
- What did you learn from the experience and what if anything would you do differently next time?

Some aspects to be considered in these articles are:
Communication with the patient, ethical issues, aspect of your works with colleagues, probity and honesty, personal health.

Research Papers

The Foundation Years Journal would welcome research articles on Medical Education. Other research papers would be considered if thought to be of interest to the readership of the Journal. Articles should be written using the following headings (title page, abstract, introduction, methods, results, discussion acknowledgements, references, tables, illustrations legends.). They should be of a maximum of 2500 words of text, plus abstract, 30 references, 3 tables or figures. Manuscripts including a structured abstracts should have a maximum of 250 words using the headings introduction, methods, results, conclusion. The title page should contain (i) the title of the paper; (ii) the full names of the authors; and (iii) the addresses of the institutions at which the work was carried out together with; (iv) the full postal and email address, plus facsimile and telephone numbers, of the author to whom correspondence about the manuscript should be sent.

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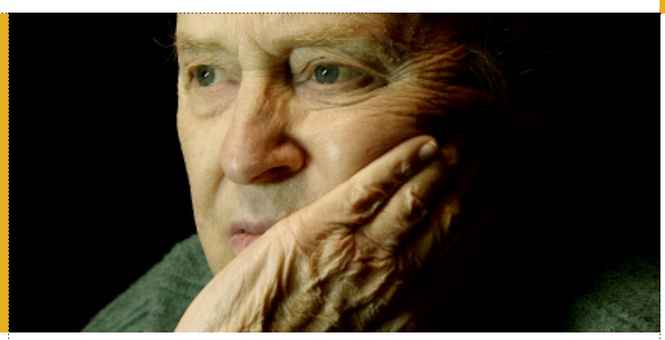
BLADDER OUTFLOW OBSTRUCTION

Gurmukh Sandhu, Matthew Morgan, Daniel Wilby and Shamim Khan

Mr X, a 54-year-old gentleman is referred by his GP to the urology FY2 on call with a 24-hour history of being unable to pass urine & increasing suprapubic abdominal pain. Good Clinical Care.



Case

Mr X, a 54-year-old gentleman is referred by his GP to the urology FY2 on call with a 24-hour history of being unable to pass urine and increasing suprapubic abdominal pain. A working diagnosis of acute urinary retention is made.

Introduction

The gentleman presents with acute urinary retention preceded by lower urinary tract symptoms (LUTS). LUTS are caused by bladder outflow obstruction (BOO) in up to 60% of cases. BOO is a common reason for admission to the urology ward, but the mechanisms of acute urinary retention in patients with BOO is complex.

Over a 5-year period, 1–3% of patients with BOO will develop acute urinary retention. The incidence of BOO increases with age and particularly affects men over the age of 80. It occurs throughout the age range in women[1]. Symptoms are classically obstructive or irritative in nature (Table 1), preferably referred to as voiding or storage symptoms[2]. In their study[3] Trueman et al. described 41% of men over the age of 50 as reporting symptoms regarded as being moderate to severe in nature. In one large European study involving men aged over 39, storage and voiding symptoms were self reported by 51% and 26% of men respectively.

Voiding (obstructive) symptoms	Storage (irritative) symptoms
Hesitancy	Frequency of micturition
Poor flow	Urgency
Intermittent flow	Nocturia
Post-micturition dribbling	Urge incontinence
Incomplete emptying	
Straining	

Table 1: Obstructive and irritative symptoms.

Although benign prostatic enlargement is the most common cause of bladder outflow obstruction, an awareness of other causes will ensure that an accurate diagnosis is made and the patient appropriately managed.

The causes can be divided into:

1. Congential – (urethral valves and congenital strictures)

2. Structural – (benign prostatic enlargement, prostate or gynaecological cancer, bladder neck stenosis, bladder calculi/clots and urethral stricture)

3. Functional – (bladder neck dyssynergia, neurological disease and drugs).

The age and sex of the patient will assist in eliminating the differential diagnoses along with a comprehensive history and examination.

How would you initially assess Mr X?

The initial assessment by history, examination and investigations should be aimed at confirming the presence, severity and aetiology of BOO.

History

The history should include questions regarding previous LUTS, urinary retention, treatment for any strictures, diagnosis of BPH or prostate cancer, urological operations (e.g. TURP/prostatectomy/urethrotomy), urinary tract infections (UTIs) or sexually transmitted infections (STIs) and previous catheterisations. Past medical history, in particular a history of diabetes, neurological disorders, urinary tract infections, chronic prostatitis, overactive bladder, drug history (diuretics, anticholinergics, antidepressants), and lifestyle factors, asking specifically about caffeine intake, alcohol consumption and excessive intake of liquids, particularly at night. All of these factors are equally important in the diagnosis and management of BOO.

This is his first such episode but has noticed progressively worsening urinary flow, increasing frequency, nocturia, hesitancy and having to strain harder to pass urine over the last year. His only significant past medical history is for hypertension. He takes no regular medication, he does not drink more than 2 cups of tea/coffee per day and drinks no alcohol.

BLADDER OUTFLOW OBSTRUCTION

Gurmukh Sandhu, Matthew Morgan, Daniel Wilby and Shamim Khan

A full physical examination should be carried out and should include a full set of baseline observations. Examination of the abdomen should include the external genitalia and a digital rectal examination (DRE) to assess the prostate.
Good Clinical Care.

International prostate symptom score (IPSS)

The severity of symptoms should be evaluated by using a validated and reliable questionnaire, the IPSS (Appendix 1) being the most commonly used. The questionnaire includes questions on incomplete bladder emptying, frequency, intermittency, urgency, weak stream, straining and nocturia. These seven questions are answered on a scale of 0 to 5 giving a total score out of 35.

- Score of 0 to 7 (mildly symptomatic)
- Score of 8 to 19 (moderately symptomatic)
- Score of 20 to 35 (severely symptomatic).

The questionnaire uses an additional question to assess the impact of these symptoms on the patients' quality of life.

Examination

A full physical examination should be carried out and should include a full set of baseline observations. Examination of the abdomen should include the external genitalia and a digital rectal examination (DRE) to assess the prostate. If there is uncertainty as to whether the bladder is palpable an ultrasound scanner may be useful to estimate residual volume.

Examination of Mr X. reveals heart rate 105, BP 145/90, oxygen saturation is 98% on room air, temperature 37.1°C. Tenderness in the suprapubic region was elicited and a large palpable bladder found with a volume of 928ml on the bladder scanner. Digital rectal examination (DRE) revealed a moderately enlarged, smooth, symmetrical prostate.

Investigations

Urinalysis should be performed and urine sent for culture to screen for a urinary tract infection. Urinary tract infections may indicate chronic retention or other underlying pathology and a cause should always be determined in males. Initial blood tests should include FBC, U&E, calcium and a group and save and clotting profile (if visible haematuria is present).

The renal profile is important in looking for renal impairment associated with high pressure urinary retention. This should also be suspected during the examination if a tense enlarged painful bladder is palpated.

Mr X. had a normal blood tests, urinalysis showed 2+ blood, 1+ leukocytes. An MSU was sent.

Management

The management of any patient admitted as an emergency should include ensuring the BLS protocols are adhered to, and any necessary resuscitation is initiated, e.g. in cases of urosepsis, trauma, etc.

In acute urinary retention, urethral catheterisation forms an important part of the initial management. Patients with a history of visible significant haematuria with clots prior to retention should have a 3-way catheter inserted to enable bladder irrigation. The presence of urethral strictures, trauma or advanced prostatic malignancy, or failed urethral catheterisation may necessitate suprapubic catheterisation. In this situation the case should be discussed with a senior member of the urology team before proceeding. A single dose of antibiotics (gentamicin or amikacin) may be indicated at the time of catheterisation, if there is evidence or suspicion of infection. It is vital that the residual volume is noted and clearly documented, as this governs further management of the patient. The patient should be monitored for a diuresis and managed appropriately with input from the renal physicians if required. Post decompression haematuria is common and can usually be treated conservatively.

It is important to realise AUR is not a diagnosis but a symptom that requires further investigation to establish the underlying cause, it is unsatisfactory to discharge a patient home without a diagnosis or follow-up arranged.

Mr X. was catheterised successfully using the aseptic technique with a residual of 950ml. He was admitted to the urology ward for further observations including baseline observations, hourly urine output and visual inspection for haematuria.

BLADDER OUTFLOW OBSTRUCTION

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Further assessment

Prostate specific antigen

Prostate specific antigen (PSA) is a glycoprotein produced by all types of prostate tissue. Prior to a PSA blood test a fully informed discussion should take place with the patient outlining the implications of a high result given it's low specificity (40%). A raised PSA might condemn the patient to further possibly unnecessary invasive investigations, and their inherent psychological and physical morbidity.

A blood specimen for PSA should be taken several weeks (4–6 weeks) after an episode of retention and catheterisation as these can increase the PSA levels and result in a falsely high reading. Other factors responsible for increasing PSA include:

Urinary tract infection

- Age
- Acute retention
- Catheterisation
- Recent instrumentation of the urethra
- Prostatitis
- Prostate cancer
- Prostate biopsy
- BPH.

DRE does not induce a rise in PSA. PSA should be interpreted alongside age specific reference values (Table 2)[4]. PSA density is derived from the PSA and gland volume and can take into account the higher PSA expected in men with an enlarged gland.

Age	Age-specific reference range (ng/ml)
<50	≤2.5
51 to 59	≤3.5
60 to 69	≤4.5
>70	≤6.5

Table 2: PSA age-specific reference range.

Flow rate measurement

Poor flow can be assessed objectively through the use of uroflowmetry (plotting of time versus flow rate) and may aid in the diagnosis of BOO.

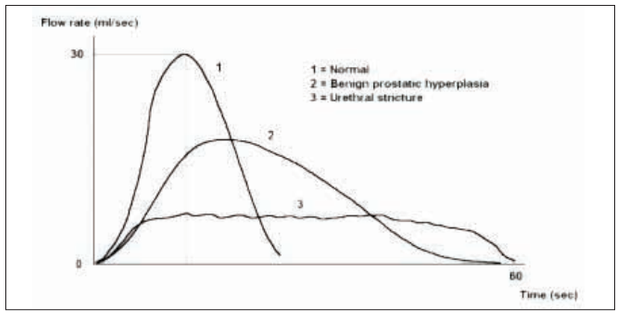

Diagram 1: Flow rate example using uroflowmetry.

The shape of the normal curve is unimodal and there are no artefacts from abdominal straining or intermittency of stream, the high maximal flow rate is achieved in a short period of time and the bladder is emptied quickly. The flow rate suggestive of BPH shows a longer time to reach the lower maximal flow rate and a prolonged emptying time. The flow rate illustrating a urethral stricture shows a reduced peak flow rate and a typical plateau phase. One of the most useful measurements is the Qmax, which refers to the maximal flow rate achieved. Approximately 90% of men with a Qmax <10ml have BOO[5] but it is important to know that the initial bladder volume (minimum 150ml) affects the Qmax such that two serial flow measurements should be taken to ensure the void is representative. A measurement of the post-void residual volume should also be taken as this will impact on further management.

Bladder pressure studies/urodynamics

This is accepted as the gold standard for diagnosing BOO[6]. There are essentially two parts to the formal bladder pressure study, the filling stage and the voiding stage, these can be used to differentiate between bladder overactivity/underactivity and bladder outflow obstruction. The high detrusor pressure and high outlet resistance help to confirm a diagnosis of bladder outflow obstruction.

Ultrasound

A transabdominal ultrasound is indicated in patients with urinary retention and renal impairment to rule out hydronephrosis and gives accurate estimation of post-void residual. It may also be used to assess clot burden in those patients suspected of having clot retention and occasionally may show unexpected pathologies. A full bladder will allow a more optimal window for looking at the bladder for clots, stones and tumours than a collapsed catheterised bladder. A transrectal ultrasound can be used to accurately assess the volume of the prostate gland and look for any focal nodularity.

CT IVU/urogram

Imaging of the upper tract should be considered in patients presenting with lower urinary tract symptoms and one of the following features:

- Recurrent UTI
- Urolithiasis
- Previous urinary tract surgery
- History of urothelial malignancy
- Haematuria.

BLADDER OUTFLOW OBSTRUCTION

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Treatment options

This will depend on the cause of the bladder outflow obstruction. However, there are a number of measures which should be considered in all patients with evidence of bladder outflow obstruction. These can be divided into medical and surgical treatments.

Medical

In the context of lower urinary tract symptoms caused by uncomplicated BPH and moderate LUTS:

Use of alpha-blockers

Alpha-blockers (such as tamsulosin and alfuzosin) act on the smooth muscle of the bladder neck and prostate. They can result in a rapid improvement of symptoms and have been shown to increase urinary flow rate by about 30–40% . In those with BPH the medical therapy of prostatic symptoms (MTOPs) trial has shown that the combination of a 5-alpha reductase inhibitor (such as finasteride or dutasteride) and alpha-blockers are more effective in treating the symptoms of BPH than an alpha-blocker alone[8].

A significant proportion of men experience some side effects of alpha-blockers including retrograde ejaculation (8%), dizziness (6%), asthenia (5%), headache (2%) and postural hypotension (1%)[9].

Use of 5-alpha reductase inhibitors

5-alpha reductase inhibitors act by preventing the conversion of testosterone into the more active form of testosterone, dihydrotestosterone, necessary for the development and progression of BPH. Disappointingly 5-alpha reductase inhibitors take about 3 to 6 months to have any clinical effect on symptoms through reduction in gland volume and vascularity. There is no evidence that they are beneficial in men with small prostate glands (<40cc).

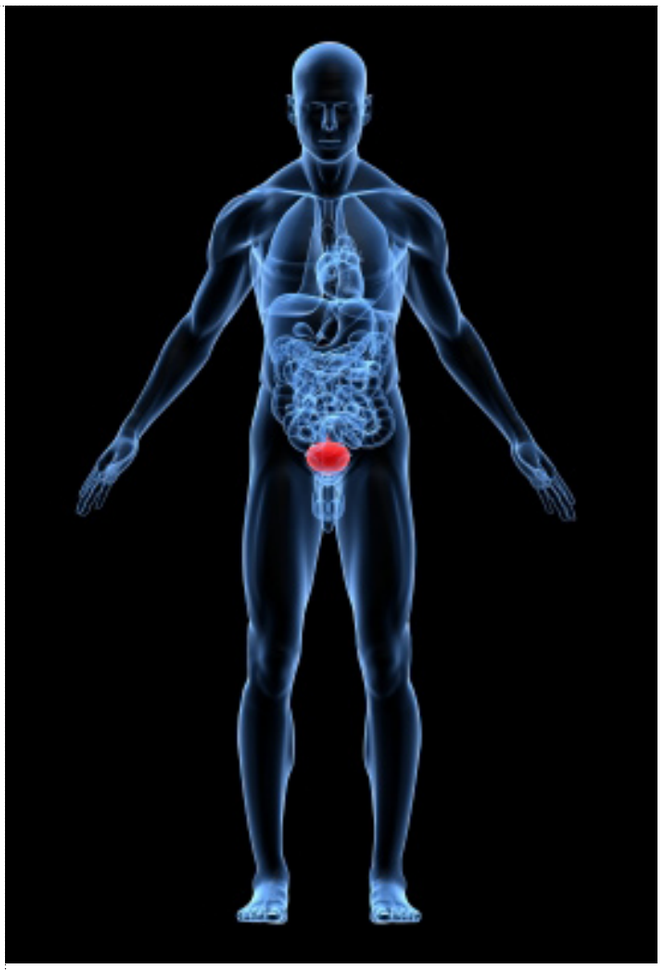
These drugs have been shown to reduce the risk of urinary retention[10], increase urinary flow rate[11] and reduce the frequency of haematuria[12]. Side effects aren't as common as those experienced with alpha-blockers, however, they are usually related to sexual function.

Use of anti-cholinergics

These drugs tend to be used in patients with irritative LUTS, in combination with alpha-blockers when outflow obstruction is of moderate severity but patients' quality of life is affected predominantly by the irritative symptoms. There is a risk of developing AUR while taking anti-cholinergics, however, this risk is very low[13].

Trial without a catheter (TWOC) in patients presenting with AUR due to BPH

A TWOC should be undertaken in patients in whom a cause for AUR is established. This should be considered in patients with no or only moderate symptoms prior to retention, with residual volumes less than 800ml and no evidence of hydronephrosis or renal impairment. The use of alpha-blockers has been shown to increase the rate of successful TWOC[14] in patients with retention due to BPH. At the time of TWOC the patient's voided volumes should be recorded on three occasions and the post-void residuals recorded after each void. Recatheterisation should be carried out if there is painful retention, rising residual volume measurements or deteriorating renal function.



Surgical

Transurethral resection of the prostate (TURP)

TURP is one of the most common urological procedures carried out in the UK. It is a highly successful procedure performed when medical management for LUTS fails, in recurrent AUR, high pressure retention, recurrent UTIs secondary to BPE or haematuria secondary to BPE. TURP has success rates quoted of up to 90%, patients followed-up over an 8-year period have shown a repeat endourological intervention rate of 14.7%.[15] It has largely replaced open prostatectomy as the gold standard treatment for BPH due to the shorter operating time and hospital stay, cost-effectiveness and fewer complications. Complications of TURP include bleeding (2/4.8%) requiring a blood transfusion), urinary tract infection, retrograde ejaculation and TUR syndrome (rare).

Other surgical techniques

There are many new techniques currently being trialled in a number of different centres. These include Holmium Laser Enucleation/Ablation of the Prostate (HoLEP/HoLAP), Green light photoselective vaporisation of the prostate (PVP), and bipolar TURP and open enucleation in cases of large glands.

BLADDER OUTFLOW OBSTRUCTION

Gurmukh Sandhu, Matthew Morgan, Daniel Wilby and Shamim Khan

Causes of bladder outflow obstruction

Benign prostatic hyperplasia (BPH)

BPH is a very common problem in men, with 50% aged 65, and 90% men aged 85 being diagnosed. The most common presentation of BPH is LUTS, they may be either obstructive or irritative as previously discussed.

Urethral stricture

Urethral strictures affect approximately 1 in 10,000 men aged 25 increasing to 1 in every 1,000 men by the age of 65[16]. In the UK, common causes include inflammation (urethritis), trauma and idiopathic. The inflammatory causes include non-specific urethritis and balanitis xerotica obliterans (BXO), while the majority of traumatic cases are iatragenic through instrumentation. Accidents, like falling astride something and pelvic fracture-related injuries, remain significant.

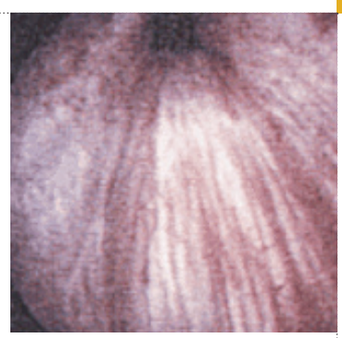
Patients present with poor stream and a feeling of incomplete emptying but a urethral stricture may be diagnosed incidentally as part of the investigation for other symptoms. Part of the investigation of urethral strictures includes uroflowmetry, which classically shows the characteristic patterns described above. Experts in the field of urethral strictures recommend that a urethrogram be performed to demonstrate the site and length of the stricture. Ideally an ultrasound scan to assess hydronephrosis as well as assessing bladder wall thickness and residual volume should be carried out.

Patients with flow rates of greater than 10ml/sec without features of incomplete emptying, bladder wall thickening and are not subject to recurrent UTIs can be managed conservatively. Lower flow rates are associated with troublesome symptoms associated with reduced flow, incomplete empting and include bladder wall thickening and recurrent UTIs. Patients with low flow rates and are not affected by these symptoms may elect to be conservatively managed but the long-term prognosis and risks should be discussed.

Visual internal urethrotomy and urethral dilatation remain the most commonly used methods of initially managing strictures. Urethral dilation uses progressively larger dilators to stretch or disrupt the stricture and can be performed in a clinic setting using local anaesthesia. Internal urethrotomy is carried out under direct vision using regional or general anaesthesia for most of the strictures. Both methods have been shown to be equally effective and can cure up to 50% of short bulbar urethral strictures as initial management. Strictures requiring further treatment are associated with poor outcomes and can be complicated by sepsis and haemorrhage. Alternative temporising measures include laser internal urethrotomy and intermittent clean self catheterisation. The only curative option is a urethroplasty. The exact nature of the urethroplasty will depend on the location, length and complexity of the stricture.

Picture 1: A retrograde urethrogram illustrating an uncomplicated short urethral stricture.

Bladder neck dyssynergia



Bladder neck dyssynergia is characterised by incomplete opening of the bladder neck during micturition and the majority of cases occur in middle-aged men. The condition is diagnosed on urodynamic studies showing trapping of contrast in the prostatic urethra. As the bladder neck contains smooth muscle susceptible to alpha adrenergic blockade, alpha-blockers are an appropriate management option particularly in men who wish to maintain fertility. Surgical options such as bladder neck incision can be associated with retrograde ejaculation.

Picture 2: Bladder neck obstruction seen on cystoscopy.

Posterior urethral valves (PUV) are the most common cause for congenital obstruction in the lower urinary tract of men, with an incidence rate of 1 in 4,000. Most cases are diagnosed prenatally by routine prenatal ultrasound techniques classically showing bilateral hydronephrosis and a distended thickened bladder. Amniotic fluid volume and bright renal parenchyma are indicators of severity. Post-natally, a micturating cystourethrogram is the gold standard investigation where PUV are suspected. It will show a dilated posterior urethra with a narrowing at the site of the urethral valves. Initial management involves urinary drainage, measurement of renal function and antibiotics. Once stable, the valves are ablated endoscopically. A check cystoscopy, MAG-3 renogram and ultrasound scan should be performed at 3 months.

Syringoceles and surgery for hypospadias are other causes of bladder outflow in the very young.

Neurological disease

A wide spectrum of neurological conditions can result in bladder outflow obstruction, including multiple sclerosis, Parkinson's disease, motor neuron disease. The first presentation of any of these could be to the urologist with LUTs or AUR.

Drugs

Drugs that can precipitate urinary retention include anti-cholinergics, alcohol, tricyclic antidepressants and antihistamines. The withdrawal of these drugs is the initial and most effective method of management.

BLADDER OUTFLOW OBSTRUCTION

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Multiple Choice Question – True/False

1. The following are likely to cause a rise in PSA:

a. Prostatitis.
b. DRE.
c. Catheterisation.
d. Sexual intercourse.
e. Defaecation.

2. Which of the following medications would be of use in treating a patient with diagnosed BOO and BPH with obstructive symptoms:

a. Doxazosin.
b. Propranolol.
c. Finasteride.
d. Solifenacin.
e. Tamsulosin.

3. Complications of short term urethral catheterisation include:

a. Bleeding.
b. Infection.
c. Bladder Perforation.
d. Increased future risk of cancer.
e. Urinary Incontinence.

4. Causes of urethral stricture include:

a. Trauma.
b. Sexually transmitted infection.
c. Iatrogenic.
d. Drugs.
e. Congenital.

Single best answer

1. What is the most common cause of Bladder Outflow Obstruction in women?

a. Urethral stricture.
b. Drugs.
c. Fowlers syndrome.
d. Iatrogenic.
e. Urethral diverticulum.

2. A 67-year-old patient presents to A&E with severe lower abdominal pain unable to pass urine and a 2-day history of visible and significant haematuria with clots. What is the first treatment option that should be administered?

a. Renal ultrasound to confirm the diagnosis of clot retention.
b. Urethral catheterisation with a 3-way catheter and bladder irrigation.
c. Check the FBC for his haemoglobin level.
d. Give analgesia.
e. Refer to urology for urgent review.

3. What is the current surgical treatment of choice for BPH refractory to medical treatment?

a. Transurethral incision of prostate.
b. Holmium laser enucleation of prostate.
c. Transurethral resection of prostate.
d. Open prostatectomy.
e. Robotic assisted prostatectomy.

4. A 75-year-old gentleman previously fit and well, presented to A&E with acute painful urinary retention. He was subsequently found to have high pressure urinary retention. After catheterisation he continued to produce 500ml/hour of urine for the next 5 hours. His observations are stable, except a BP of 90/60 at 5 hours post catheterisation. What is the treatment method of choice:

a. Observe on the ward and monitor baseline observations and hourly urine output.
b. Administer intravenous fluids carefully monitoring fluid balance and electrolytes.
c. Invasive monitoring and ICU admission for aggressive fluid management.
d. Discharge home with a catheter as no current medical issues with a TWOC arranged for 1 week.
e. TWOC on the ward as AUR has been treated and he is no longer in pain.

BLADDER OUTFLOW OBSTRUCTION

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Answers

True/False Questions

1. T, F, T, F, F
2. T, F, T, F, T
3. T, T, F, F, F
4. T, T, T, F, T

Single best answer questions

1. d
2. b
3. c
4. b

Teaching points

MCQ 1

Prostate specific antigen (PSA) is a glycoprotein produced by all types of prostate tissue. It can be increased by age, acute retention, catheterisation, recent instrumentation of the urethra, prostatitis, prostate cancer, prostate biopsy and benign prostatic hypertrophy (BPH). Performing a digital rectal examination (DRE) does not increase the PSA. PSA should be interpreted alongside age specific reference values (Table 2)[17]. PSA density is derived from the PSA and gland volume and can take into account the higher PSA expected in men with an enlarged gland.

MCQ 2

Alpha-blockers (such as tamsulosin and doxazosin) act on the smooth muscle of the bladder neck and prostate. They can result in a rapid improvement of symptoms and have been shown to increase urinary flow rate by about 30–40%[18]. A significant proportion of men experience some side effects of alpha-blockers including retrograde ejaculation (8%), dizziness (6%), asthenia (5%), headache (2%) and postural hypotension (1%)[19].

In those with BPH the medical therapy of prostatic symptoms (MTOPs) trial has shown that the combination of a 5-alpha reductase inhibitor (such as finasteride or dutasteride) and alpha-blocker are more effective in treating the symptoms of BPH than an alpha-blocker alone[20].

5-alpha reductase inhibitors act by preventing the conversion of testosterone into the more active form of testosterone, dihydrotestosterone, necessary for the development and progression of BPH. Disappointingly 5-alpha reductase inhibitors take about 3 to 6 months to have any clinical effect on symptoms through reduction in gland volume and vascularity. There is no evidence that they are beneficial in men with small prostate glands (<40cc). These drugs have been shown to reduce the risk of urinary retention[21], increase urinary flow rate[22] and reduce the frequency of haematuria[23]. Side effects aren't as common as those experienced with alpha-blockers, however, they are usually related to sexual function.

Anti-cholinergics, such as solifenacic, tend to be used in patients with irritative LUTS, in combination with alpha-blockers when outflow obstruction is of moderate severity but patients' quality of life is affected predominantly by the irritative symptoms.

MCQ 3

Short-term catheters are commonly used in urinary retention and where there is a need to monitor urine output accurately. The procedure should be carried out using an aseptic technique. If there is any great difficulty in catheterisation then senior help should be sought in order to minimise urethral trauma. Complications of short-term urinary catheterisation include urethral trauma leading to bleeding, creation of false passages, infection of the urinary tract and urosepsis. Long-term catheterisation increases risk of bladder stones and bladder cancer.

MCQ 4

In the UK common causes of urethral stricture disease include inflammation (urethritis), trauma, congenital and idiopathic. The inflammatory causes include non-specific urethritis and balanitis xerotica obliterans (BXO), while the majority of traumatic cases are iatragenic through instrumentation. Accidents like fall astride and pelvic fracture-related injuries remain significant.

SBA 1

The diagnosis of BOO in women is often a clinical diagnosis that is made by taking into account the history, physical examination, imaging of the lower urinary tract and urodynamic pressure-flow parameters. Iatrogenic causes leading to obstructive conditions including urethral stricture, postsurgical obstruction are the most common cause but primary bladder neck obstruction, pelvic organ prolapse and neurogenic causes remain important.

SBA 2

The patient appears to be in urinary retention. This should be confirmed by palpating for a bladder or if available a bladder scanner should be used to estimate the volume of urine in the bladder. Urinary catheterisation will provide great symptomatic relief. A 3-way catheter should be used to allow irrigation of the bladder as this episode of retention may be secondary to clots. The patient should subsequently be assessed to investigate the cause of haematuria and a referral to the urology team should be made.

SBA 3

Transurethral resection of the prostate (TURP) is a highly successful procedure performed when medical management for LUTS fails, in recurrent AUR, high pressure retention or recurrent UTIs secondary to BPE or haematuria secondary to BPE. TURP has success rates quoted of up to 90%, patients followed up over an 8-year period have shown a repeat endourological intervention rate of 14.7%[24]. It has largely replaced open prostatectomy as the gold standard treatment for BPH due to the shorter operating time and hospital stay, cost-effectiveness and fewer complications. There are many new techniques currently being trialled in a number of different centres. These include Holmium Laser Enucleation/Ablation of the Prostate (HoLEP/HoLAP), Green light photoselective vaporisation of the prostate (PVP), and bipolar TURP and open enucleation in cases of large glands. However, TURP remains the most preferred option given its success and extensive evidence base.

BLADDER OUTFLOW OBSTRUCTION

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SBA 4

Post-obstructive diuresis is defined as high urine output exceeding 0.5L per hour that often occurs after the obstruction is relieved. This happens particularly in patients with chronic obstruction. Frequent monitoring of the fluid balance and electrolytes is the key to avoiding dehydration, hypotension, electrolyte abnormalities and perpetuation of diuresis by over hydration. In the first 24 hours, urine output should be checked hourly. If it is over 200 ml/hour, then 80% of the hourly output should be replaced intravenously with 0.9% saline. Replacement of electrolytes, for example, potassium and magnesium, may be necessary and should be guided by the levels.

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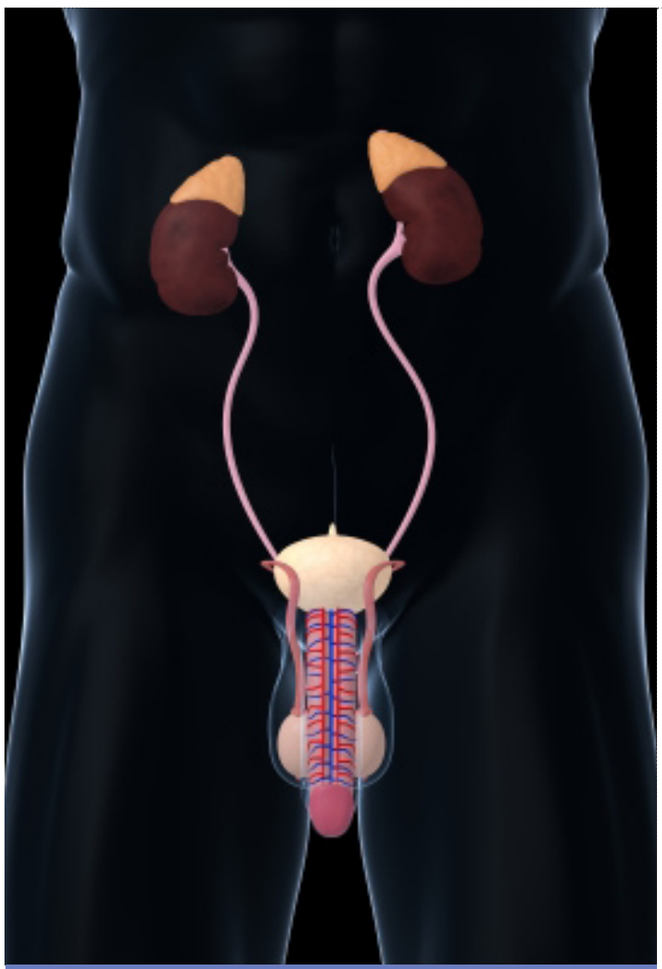
LONG-TERM URETHRAL CATHETERISATION

Ramachandran Vaidyanathan and Barry Hayden Maraj



A 68-year-old patient recently had spinal trauma and is undergoing rehabilitation. He is experiencing recurrent urinary tract infections. His bowel functions are also impaired and require regular laxatives.
Practical Procedures.

A 68-year-old patient recently had spinal trauma and is undergoing rehabilitation. He is experiencing recurrent urinary tract infections. His bowel functions are also impaired and require regular laxatives. He has paraplegia below the level of T10.

Why is he getting recurrent UTI?

Spinal trauma has affected the autonomic nerve supply to his bladder and sphincter complex. He is getting infections, as he may not be emptying his bladder.

What are the options available to him?

Although UTI should be treated promptly with appropriate screening urinalysis even in asymptomatic patients with SCI, adequate bladder drainage should be ensured to prevent recurrent UTIs. This is more relevant in suprasacral spinal injury as they can develop Detrusor Sphincter Dysenergia and hence risk the possibility of upper tract damage leading to renal failure.

Options of bladder drainage include clean intermittent self-catheterisation or long-term urethral catheter.

What is CISC ("clean intermittent self catheterisation")? Who are the suitable candidates?

A well-motivated patient with good manual dexterity can be taught to self-catheterise in a clean way using a Lofric catheter. Catheters come prelubricated and contact with water on the surface provides lubricant action to facilitate smooth catheterisation. It should be performed under the supervision of a nurse specialist until they master the technique.

What is the risk of infection with CISC?

Bacteriuria is acquired at the rate of 1–1.5% per catheter. Hence almost all patients would have bacteriuria by end of 1 month.

What is the priority in this patient?

Aim of treatment is to evaluate any new lower tract symptoms including recurrent UTI.

Tests includes MSU, USS KUB with post-void residual scans. Estimation of renal function and specialist investigation may include urodynamics.

Goal of treatment is to ensure good bladder emptying, preserve renal function, improve function of the bladder and overall to improve quality of life.

What is long-term urinary catheterisation?

Bladder drainage with indwelling catheter for duration more than 30 days.

What would you explain to the patient about the procedure?

We should explain the need and method of catheterisation to the patient. We should alternate options like CISC, operation if feasible. We should also explain about the risks including infection, urethral pain, bleeding and stone formation.

LONG-TERM URETHRAL CATHETERISATION

Ramachandran Vaidyanathan and Barry Hayden Maraj

What is the technique of Urethral catheterisation?

Patient should have a comprehensive explanation about the procedure and verbal consent should be obtained. Size and type of catheter should be determined for the purpose. For example, a 3-way catheter for patients with clot retention. Catheter material should be inert (Silastic) for long-term catheterisation.

A catheter trolley should be available with all the equipment as required. The procedure should be performed with sterile precautions and prophylactic antibiotics should be administered for the selected patients as per hospital guidelines. In this patient prophylactic antibiotic is recommended. Other groups might include patients with prostheses and those that are immunocompromised.

One hand technique should be used for catheterisation. One hand is used to clean and hold the penis/labia while the other hand is used to hold the catheter in an aseptic manner. The urethra is well lubricated with local anaesthetic jelly having warned that it may sting.

Plunger should be advanced gently to deliver lubricant as sudden expulsion could result in bulbar urethral injury. Wait 1–2 minutes for the local anaesthetic to act. The urethral catheter is advanced carefully by holding the penis vertically until bulbar urethra is reached. Then penis can be held facing the patient's feet to facilitate easy negotiation through the prostatic urethra. The catheter should be advanced up to the Y junction and then wait until urine is seen coming through the catheter before inflating the balloon. The catheter is now connected to a urometer/urobag ensuring that it remains a closed drainage system.

What should you do if there is no urine coming?

If there is any resistance in placing the catheter, one must abandon the procedure and seek senior help. Resistance may imply a urethral stricture. One can gently retry using a smaller diameter catheter.

With experience aspiration using 50ml bladder syringe can be attempted. Even in cases of anuria one can expect to see at least a few drops of urine.

What do you understand about the size of catheter?

One Fr equals 0.33 mm diameter and so 18 Fr catheter means 6mm outside diameter, however, different catheters have different a luminal size depending on the material it is made of.

What are the different types of catheter?

Rubber/latex made catheters were the first invented. They can be used as a one-time catheter only. Problems with these catheters include allergy, encrustation. Foleys catheters are traditionally used. They are a simple 2-way catheter or a 3-way with an extra irrigation channel. Long-term catheters are usually made of silastic/silicone as they are less reagenic. Nowadays silver coated/medicated catheters are available, which are helpful in special situations. However, to date their role in preventing infections has not been firmly established.

When can you expect difficulty in catheterisation?

Catheterisation can be difficult for beginners in cases of post TURP retention, acute urinary retention, post radical prostatectomy, urethral stricture, difficulty in finding the external urethral meatus as in tight phimosis/labial oedema and in very apprehensive patients.

Key points:

- understand the anatomy
- anticipate problem
- never force a catheter
- inflate the balloon at the end once you are sure that the catheter is in the bladder
- seek senior advice when in doubt.

Discussion

Long-term catheterisation is a conservative treatment option in relieving persistent/recurrent urinary retention in elderly and unfit patients or in patients with neurogenic bladder dysfunction. Patients should be educated about all available treatment options and their long-term complications.

Forty per cent nosocomial infections originate in the urinary tract and almost 80% of these patients have chronic indwelling catheters. (EAU Guidelines 2007.) Risk factors for development of catheter associated bacteriuria depends on the duration of catheterisation and whether it is a closed system drainage or not. The risk increases in diabetics, female patients, renal impairment and poor quality catheter care.

LONG-TERM URETHRAL CATHETERISATION

Ramachandran Vaidyanathan and Barry Hayden Maraj

What is Biofilm?

Biofilm is an accumulation of bacterial degradation protein within a mucopolysaccharide medium which together forms a layer coated over the catheter. It has three layers:

1. Linking film attached to surface tissue.
2. The base.
3. Surface film adjacent to lumen into which planktonic organisms can be released. Organisms within a biofilm are protected from any mechanical flow of urine, host defences and antibiotics.

What are the complications of a long-term catheter?

Catheter blockage, urinary tract stones, epididymitis, prostatitis and pyelonephritis. There is also a risk of bladder cancer for patients with a catheter for more than 10 years.

Prevention of catheter associated bacteriuria:
1. Aseptic precautions.
2. Adequate lubrication to minimise urethral trauma.
3. Smallest possible size for the purpose.
4. Closed drainage.
5. Adequate oral hydration.
6. Once a catheter is removed test for routine culture and sensitivity.
7. Less allergic and inert material.
8. Frequent change of catheter as recommended.
9. Antibiotic cover with special situation as per local guidance.

Multiple Choice Questions

1. Which one of the following is an OPTION for the use of a long-term catheter?
a. Spinal cord injury.
b. Elderly institutionalised patient with incontinence.
c. Unfit patient with chronic high pressure retention.
d. All of the above.

2. What type of catheter should be used for a long-term catheter?
a. Rubber.
b. Latex.
c. Malecots catheter.
d. Silicone catheter.

3. Who will require antibiotic prophylaxis?
a. Spinal cord injury.
b. Diabetics.
c. Immunocompromised.
d. Mechanical heart valve.
e. All of the above.

4. What is/are the objectives of long-term catheterisation in spinal cord injured patients?
a. Prevent bladder stones.
b. Improve quality of life.
c. Prevent UTI.
d. Protect renal function.
e. All of the above.

5. What are the complications of long-term catheterisation?
a. Catheter block.
b. Haematuria.
c. Bladder cancer.
d. Stone formation.
e. All of the above.

Answers

1. Answer d: long-term catheterisation may be the ideal choice of management in these groups of patients.

2. Answer d. silicone is most inert material and less likely to lead to encrustation and bacteriuria.

3. Answer e: these group of patients are at high risk of acquiring UTI and therefore must have antibiotic prophylaxis prior to any urological intervention.

4. Answer e: a–d can occur in patients with large residual urine in their bladders.

5. Answer e: catheter encrustation leads to stone formation, catheter block and haematuria. Chronic irritation and infection may lead to bladder cancer.

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BILATERAL EMPHYSEMATOUS PYELONEPHRITIS: A CASE REPORT

Udo Abah

A 35-year-old non-diabetic female with a history of urolithiasis presented with loin pain. CT scan revealed bilateral EPN. Initial cultures of aspirate from a perinephric collection grew streptococcus milleri and multiple anaerobes. Treatment entailed high-dose antibiotics and percutaneous drainage.
Patient Management.

Abstract

Introduction – Emphysematous pyelonephritis (EPN) is an acute necrotising infection associated with high morbidity and mortality. It is strongly associated with diabetes mellitus and commonly linked with ureteric obstruction. Management includes: parenteral antibiotics; percutaneous drainage; and nephrectomy as indicated.

Case Report – A 35-year-old non-diabetic female with a history of urolithiasis presented with loin pain. CT scan revealed bilateral EPN. Initial cultures of aspirate from a perinephric collection grew *streptococcus milleri* and multiple anaerobes. Treatment entailed high-dose antibiotics and percutaneous drainage. The patient made a good recovery and was discharged home after 38 days of hospitalisation.

Introduction – literature review

Emphysematous pyelonephritis (EPN) is a rare acute necrotising infection, characterised by the presence of gas formation within the renal parenchyma and perirenal tissues, which has a significant morbidity and mortality. The condition was first described in 1898 in connection with pneumaturia as a result of gas forming pathogens[1]. The common pathogen is *Escherichia coli (E. coli)* (69%), followed by *Klebsiella pneumoniae* (29%)[2]. *Proteus mirabilis, Pseudomonas* species, streptococci and fungi[3]. have also been found to cause EPN. The bacteria ferment sugars within the urine to produce gases including: nitrogen; hydrogen; carbon dioxide; and oxygen[4]. The pathogenesis of EPN is undefined, however, implicated factors include: elevated tissue glucose level; impaired renal perfusion; and impaired immunity. There is a strong link with diabetes mellitus, seen in over 90% of cases[2, 8]. Cases of EPN in non-diabetic patients are almost entirely associated with urinary tract obstruction. End-stage renal disease, polycystic kidneys[5] and immunosuppression are also linked with EPN. Clinical presentation varies, common symptoms include: fever; abdominal or back pain; nausea and vomiting; lethargy and confusion; dyspnoea; and shock. The condition is generally unilateral; it has been shown to be bilateral in up to 10% of cases[6]. Management of EPN is an area of controversy. Commonly high dose parental antibiotic therapy is employed with precutaneous drainage and nephrectomy as indicated[7, 8]. A combination of antibiotic therapy and percutaneous drainage has been shown to be successful in 80% of cases[8]. Mortality rates are high (40–50%) with medical therapy alone[2], this reduces to 25% when combined with nephrectomy and 13.5% in combination with percutaneous drainage[7].

Computerised tomography (CT) is generally accepted as the best imaging technique in EPN[9, 10]. Two classification systems have been developed based upon CT findings. Wan et al.[11] classifies EPN into two categories: type I – parenchymal destruction with streaky or mottled gas collection but no fluid accumulation; and type II – bubbly or loculated gas within the parenchyma or collecting system with associated renal or perirenal fluid accumulation. Type I has a 69% mortality rate and type II 18%. Huang et al.[4] also developed a CT classification for EPN[2], dividing the condition into four classes.

Class 1 – Gas confined to the collecting system.
Class 2 – Gas confined to renal parenchyma alone.
Class 3a – Perinephric extension of gas or abscess.
Class 3b – Extension of gas beyond the Gerota fascia.
Class 4 – Bilateral EPN or unilateral EPN with a solitary kidney.

Huang et al.[4] concluded that class 1–2 and class 3–4 with the presence of less of the two associated risk factors (e.g. thrombocytopenia, acute renal failure and shock) could be managed with antibiotics and precutaneous drainage; however, in class 3–4 with three or more risk factors, nephrectomy was the treatment of choice.

A literature review of case reports of bilateral EPN was performed using the electronic databases OVID Medline and PubMed, the search was limited to articles in the English language. To date there has been 26 reported cases of bilateral EPN in English literature (see Further reading). *E. Coli* was the major causative organism in 21 of the cases reported, in individual cases it was found as a joint infective agent with *klebsiella pnuemoniae, enterococcus faecium, cryptococcus neoformans* and *candida.* In addition one sole case of *Candida* infection and 3 other cases of *klebsiella* infection were reported, 1 of which was in conjunction with *pseudomonas aeruginosa.* One case report did not identify a causative agent. Twenty-two of the 26 cases reported were inpatients with DM. Of the 26 cases reported, 10 were managed on antibiotic therapy alone, 6 in combination with percutaneous drainage, 5 with unilateral nephrectomy, 2 with bilateral nephrectomy and 1 patient required bilateral pyeloplasty, with 1 report not documenting management. Of the reported cases, 24 made a good recovery but 2 patients died.

BILATERAL EMPHYSEMATOUS PYELONEPHRITIS: A CASE REPORT

Udo Abah

Case report

A 35-year-old woman presented in July 2008 with left loin pain and associated vomiting requiring hospital admission. She had an extensive history of urolithiasis, having recently undergone four sessions of extracorporeal shock wave lithotripsy (ESWL) for a right lower pole calculus. Imaging in early July revealed a remaining 1cm calculus in the region of the upper right ureter, with two 12mm calculi in the left kidney. A right-sided ureteric stent was placed and percutaneous nephrolithotomy (PCNL) was recommended for management of the left stones. Her previous medical history included an ectopic pregnancy in 2000 and menorrhagia in association with a fibroid uterus. There was no history of diabetes mellitus. She took no regular medications and did not smoke.

On admission initial examination revealed bilateral loin tenderness, greater in severity on the left side. She was apyretic, hypertensive (170/110mm Hg), tachypnoea (24 breaths/min) and tachycardic (109 beats/min). Investigations revealed a creatinine of 118umol/L, C-reactive protein (CRP) of 463mg/L, white blood cell count (WCC) of $6.21x10^9$/L and mildly elevated liver function tests. Urine analysis showed 20–$100x10^6$ WCC and RBC, with no growth. Blood samples cultured no organisms. An initial CT found bilateral perinephric and retroperitoneal gas, mild right-sided hydronephrosis with a 4mm lower pole and a 4mm ureteric calculus. There was a right-sided subcapsular collection with an air fluid level suggestive of an abscess and an 8mm calculus in the lower pole of the left kidney.

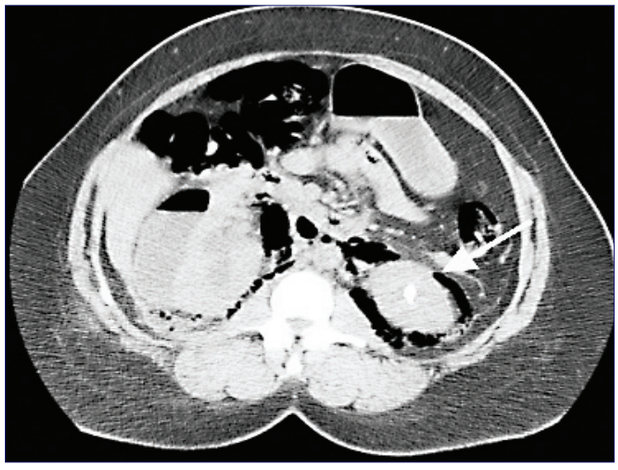

Image 1: CT without contrast - demonstrates bilateral perinephric gas, with a right perinephric collection. Left calculus seen.

The diagnosis of EPN was made. Empirical antibiotic therapy was initiated with meropenem, gentamicin and teicoplanin, and intensive care unit admission was required for close monitoring. On day 2 of admission, bilateral ureteric stents were inserted and a drain inserted under CT guidance into the right subcapsular abscess, 100mls of brown feculent fluid was aspirated and a drain left in situ. Culture of the fluid revealed, *streptococcus milleri* group and the anaerobes; *peptostreptococcus anaerobius, anaerococcus tetradius* and *prevotella timonensis*. On day 5 the patient deteriorated clinically with worsening sepsis. Blood cultures remained negative. A second CT showed decreased size of the abscess with no sign of further abscess formation. Retrograde studies revealed likely calyceal rupture supported by the production of urine from the right perinephric drain. Metronidazole and benzylpenicillin were commenced and teicoplanin discontinued.

Immunodeficiency was considered due to the poor immune response and lack of a marked leucocytosis (WCC dropped to $2.71x10^9$/L on day 2 of admission); therefore a human immunodeficiency virus (HIV) test was sent, with a negative result. Day 6 of admission revealed a WCC of $14.55x10^9$/L; renal function returned to normal after mildly climbing to 120umol/L. Turbid straw-coloured fluid cultured from the wound abscess grew *enterococcus* species from the enrichment medium only.

The right perinephric drain became dislodged on day 8 and on day 12 CT guided drainage of the collection was attempted with no fluid aspirated. A small anterior abdominal wall collection was noted. A CT KUB (kidneys, ureter and bladder) on day 15 showed a 6mm right-sided calculus near the right pelvicoureteric junction and bilateral intraparenchymal stones.

On day 26 of the hospital stay, CT showed an increase in size of the left abdominal wall collection, this was aspirated 8 days later under ultrasound guidance, 10ml of thick pus was removed, the culture showed no growth.

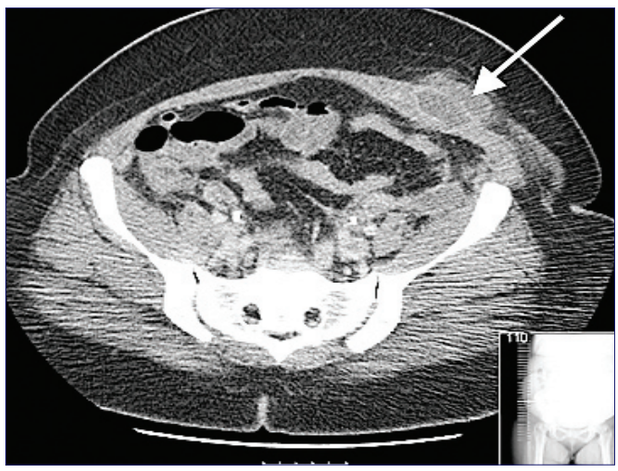

Image 2: CT without contrast – left abdominal wall collection.

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On day 28 benzlypenicillin was discontinued and antibiotic therapy continued with meropenem, gentamicin, metronidazole and teicoplanin. On day 32 a CT scan detected a left retroperitoneal collection, 10ml of pus was aspirated and a drain inserted.

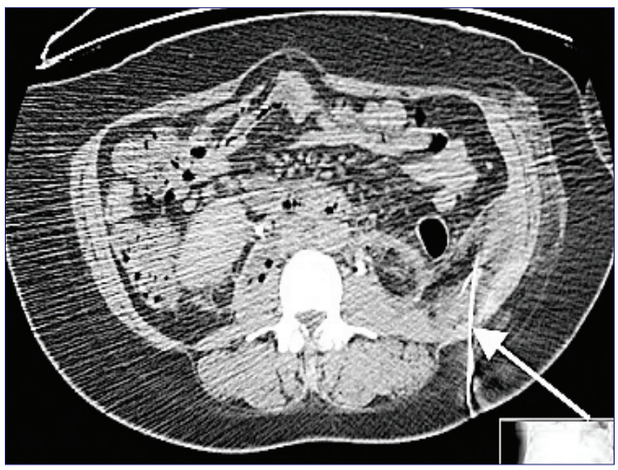

Image 3: CT without contrast – drain insertion into left retroperitoneal collection.

On day 35 of the hospital stay, the right-sided perinephric collection was approximately 1.5cm in size, this was further aspirated under ultrasound guidance, 15ml blood stained fluid containing a blood clot, was aspirated and sent for analysis, this showed no growth and AFB (acid fast bacilli) testing was negative.

The patient showed clinical improvement and remained apyrexial from day 30 of the hospital stay, she was discharged on day 38 with oral clindamycin 300mg QDS for 2 weeks. A CT scan 17 days after discharge showed almost complete resolution of the left perinephric and anterior abdominal wall collection, with a reduction in size of the right perinephric collection and a 4x8mm lower-right ureteric calculus causing moderate hydronephrosis and two left-sided calculi in the lower pole parenchyma. The right-sided calculus was managed with a ureteric stent, followed by ureteroscopic extraction of two remaining stone fragments.

Summary

Bilateral EPN is a rare and sinister diagnosis. The management of this condition remains controversial. In the past, many surgeons favoured the more aggressive approach of early nephrectomy for EPN, however, in the case of bilateral disease this course of management would condemn the patient to lifelong dialysis. Recent case reports have shown the success of antibiotic therapy in combination with percutaneous drainage and current literature suggests this to be the management option of choice[12]. This case report is the first to identify *streptococcus milleri* as a causative agent for bilateral EPN and further demonstrates the successful management of bilateral EPN with high dose antibiotics and percutaneous drainage.

Constent

Written consent was obtained from the patient for publication of the study.

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BILATERAL EMPHYSEMATOUS PYELONEPHRITIS: A CASE REPORT

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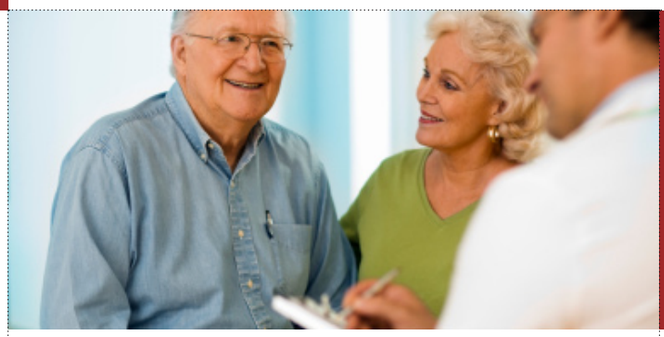
BENIGN PROSTATIC HYPERTROPHY / HYPERPLASIA

Kathy Duong and Amir V Kaisary



Mr Smith contacted his GP urgently after he had been unable to pass any amount of urine and feeling as though his "bladder was bursting". This is the first time this has happened.
Patient Management.

Abstract

This article covers the management of Benign Prostatic Hypertrophy/ Hyperplasia and its complications.

Case Study

Mr Smith, a 75-year-old retired postman was referred to A&E by his GP unable to pass urine.

Mr Smith contacted his GP urgently after he had been unable to pass any amount of urine and feeling as though his "bladder was bursting". This is the first time this has happened.

Mr Smith describes a 7-year history of nocturia of >5 episodes per night, poor urinary flow and incomplete emptying of his bladder which have worsened significantly over the past few weeks.

On further questioning you find that he is currently being managed as an out-patient by a Consultant Urologist at your hospital for his lower urinary tract symptoms (LUTS).

He has no other co-morbidities, no allergies and has been taking an alpha-blocker for the past 5 years which although initially gave some symptom relief, now "makes no difference at all".

What would you like to do next?

Examination

Mr Smith was in great discomfort at rest. Vital observations revealed a regular pulse of 86 beats per minute, blood pressure of 120/90mm Hg and a temperature of 36.8°C. The cardiovascular and respiratory examinations were normal. Examination of his abdomen revealed a large, tense and tender palpable mass arising from the pelvis which was dull to percussion. These findings were consistent with an enlarged bladder up to the level of his umbilicus. External genitalia were normal. The bladder should be decompressed at the first instance before digital rectal examination of the prostate gland.

Digital rectal examination revealed a large, smooth firm prostate the size of a plum. Otherwise, bowel sounds were present and palpation of the upper quadrants revealed a soft abdomen and no further organomegaly.

Investigations

Imaging

A bladder ultrasound scan performed on presentation to the A&E department revealed a residual volume of >1L confirming the clinical findings of acute urinary retention.

Management and Intervention

To relieve Mr Smith's acute urinary retention, prompt urethral catheterisation was performed with antibiotic cover as per local protocol. Mr Smith passed 1.2L of clear urine.

Routine blood tests were all normal and urinalysis showed no evidence of a urinary tract infection. A urine sample was sent for microscopy, culture and sensitivities.

Mr Smith was discharged later that day with the catheter in situ, attached to a leg bag which he was taught how to empty independently at home. Mr Smith was started on finasteride 5mg in addition to doxazosin 4mg once daily. The basis of combination therapy with finasteride and doxazosin is that the former is slower to achieve a therapeutic effect compared to the latter.

Follow-up was arranged for Mr Smith with a urology nurse specialist-led Trial WithOut Catheter (TWOC) clinic and out-patient urology clinic follow-up with his usual consultant.

Mr Smith was also given patient advice brochures on the surgical and medical management options for Benign Prostatic Hyperplasia so that when he next attends follow-up he can discuss future management options with his consultant.

BENIGN PROSTATIC HYPERTROPHY / HYPERPLASIA

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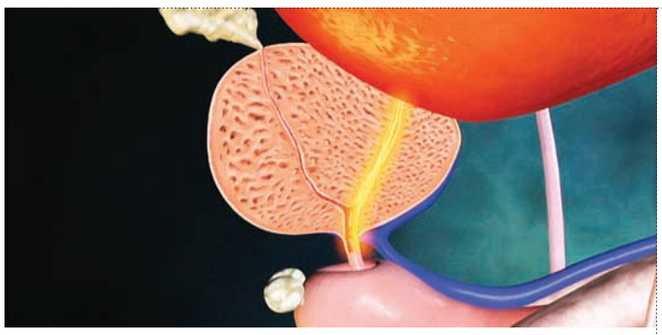

Discussion

Benign Prostatic Hypertrophy, also referred to as Benign Prostatic Hyperplasia (BPH) is a phenomenon characterised by progressive enlargement of the prostate gland. This enlargement is non-cancerous and benign, as the name suggests. The condition becomes problematic when obstruction of urinary flow through the prostatic urethra occurs, leading to Bladder Outlet Obstuction (BOO).

Enlargement of the prostate gland peri-urethrally can lead to constriction or narrowing of the prostatic urethral lumen (the volume effect). This typically occurs in the transition zone of the prostate gland. Alpha 1-adrenoceptor mediated bladder neck smooth muscle innervation could also lead to an obstructive pattern of urinary flow. This may or may not be present alongside hypertrophy of the glandular bulk of the transition zone (see Figure 1).

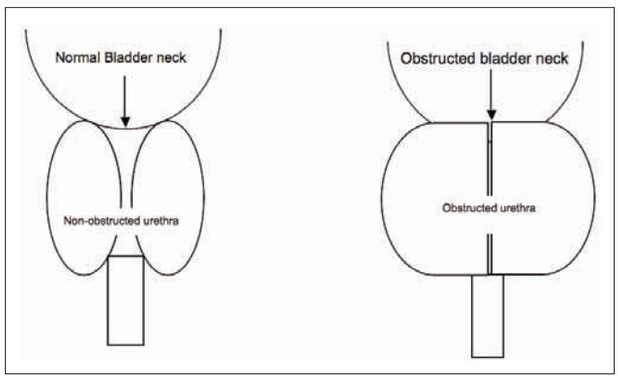

Figure 1: Normal anatomical bladder outlet configuration and sites of obstructive changes.

Hypertrophy of the detrusor muscle occurs as the body attempts to overcome resistance to urinary flow at the bladder neck/prostatic urethra. This presents as thickening of muscle bundles of the bladder wall which lead to saccule/diverticula formation. Eventually, the impairment of detrusor muscle tone could lead to inefficient bladder emptying, thus chronic urinary retention manifests (see Figure 2).

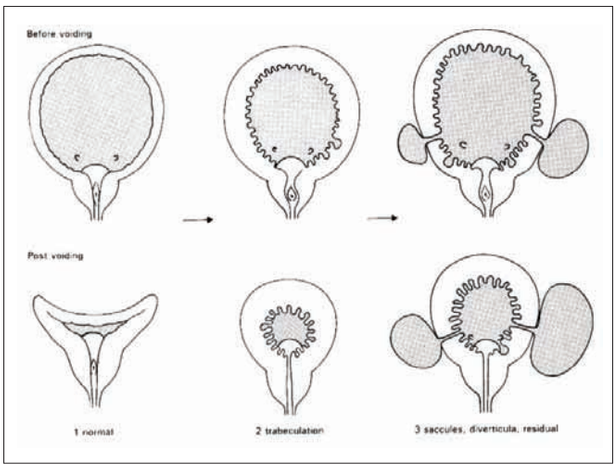

Figure 2: Pathological sequence of long-term obstructive uropathy.

As obstruction of urinary flow occurs, patients experience a wide array of Lower Urinary Tract Symptoms (LUTS) or none at all. The presence and severity of these symptoms have been shown to have little correlation with worsening objective measures such as prostate size, urinary flow rate or residual urine volume. LUTS are reported in up to 30% of men over the age of 65 years and this prevalence increases with age[1,2]. It has been hypothesised that diabetes and hypertension increase a man's risk of developing BPH, however, the evidence behind these associations are less clear since diabetes and hypertension are common co-morbidities in older men with and without BPH.

Lower Urinary Tract Symptoms include:

- difficulty starting urination (hesitancy)
- weak urinary flow
- frequent need to urinate (frequency)
- urgent need to urinate (urgency)
- increased frequency of urination at night (nocturia)
- dribbling at the end of urination (terminal dribbling)
- incomplete emptying of the bladder
- blood in the urine (haematuria)
- urinary tract infection
- stopping and starting again while urinating.

BENIGN PROSTATIC HYPERTROPHY / HYPERPLASIA

Kathy Duong and Amir V Kaisary

Indicators of disease progression and risk factors

Gender aside (since women do not have prostates), age and hormonal status are the two well-known true risk factors for development of the disease. Histological BPH increases in prevalence with age and is not found among eunuchs (men castrated before reaching puberty)[3].

BPH manifests clinically with lower urinary tract symptoms (LUTS). These LUTS reduce a patient's quality of life significantly with disease progression.

Age, PSA levels and prostate volume have been shown to predict disease progression however as mentioned previously, the degree of correlation with symptom severity on the whole, is low.

Disease progression can also be gauged according to the degree and presence of complications associated with pathogenesis of BPH.

Complications of BPH include:

1. Recurrent urinary tract infections – this occurs secondary to prolonged incomplete emptying of the bladder.

2. The formation of bladder stones – these are mineral deposits found in the bladder causing bladder irritation. They form where there is prolonged incomplete emptying of the bladder and thus a chronic residual volume of urine. They can present simultaneously with or cause urinary tract infections, haematuria (blood in the urine) or physical obstruction of urinary flow.

3. Obstructive uropathy can lead to a rise of intra-luminal pressure within the lower urinary tract segment leading to impairment of renal tubular function and subsequently glomerular filtration. This can be identified using imaging modalities such as ultrasound assessment looking for hydroureter/ hydronephrosis. Serum creatinine measurement in routine blood tests can also indicate the presence of impaired renal function which may or may not be attributable to a distal obstructive uropathy.

Changes in the bladder configuration and pathological changes are seen in Figure 2.

Assessment

Tools used in the initial assessment of BPH include:

- clinical history
- symptom assessment
- physical examination
- validated symptom scores, such as IPSS.

The introduction of the International Prostate Symptom Score (IPSS) by the American Urological Association Clinical Practice Guidelines is an effort towards standardising the worldwide assessment of clinical BPH/LUTS (see Table 1).

	Not at all	< 1 in 5	< half the time	About half the time	> half the time	Almost always	Score
1.Incomplete emptying Sensation of not emptying the bladder completely after finishing urination.	0	1	2	3	4	5	
2. Frequency You have to urinate again less than two hours after you finished urinating.	0	1	2	3	4	5	
3. Intermittency Stop and start frequently when urinating.	0	1	2	3	4	5	
4. Urgency Difficulty to post-pone urinating.	0	1	2	3	4	5	
5. Weak Stream	0	1	2	3	4	5	
6. Straining You have to push or strain to begin urination.	0	1	2	3	4	5	
7. Nocturia	0	1	2	3	4	5	

Total I-PSS= Quality of Life due to Urinary Symptoms

How do you feel if you have to spend the rest of life with urinary function as it is now?

Delighted	Pleased	Satisfied	Mixed	Dissatisfied	Unhappy	Terrible
0	1	2	3	4	5	6

Table 1: International Prostate Symptom Score: IPSS.

BENIGN PROSTATIC HYPERTROPHY / HYPERPLASIA

Kathy Duong and Amir V Kaisary

Assessment of symptom severity of BPH/LUTS is best quantified using questionnaires, such as the 36 item short form health survey (SF-36) or question 8 of the IPSS. Comparison of baseline and serial IPSS is a method by which a doctor can quantify an individual patient's disease progression. This information can be used by both patient and doctor to assess the need for surgery and timing.

It is important to bear in mind that worsening symptom severity as reported with the IPSS does not necessarily correlate with physiological variables measured, such as peak and average urinary flow rates, post-void residual volumes or prostate volume.

• Prostate specific antigen (PSA) measurement

A simple blood test. Although increased by many factors ranging from infection, trauma, age and more importantly cancer, it is well recognised that PSA levels correlate with prostate volume and is an arguably cheaper and less invasive method of measuring prostate volume compared to Trans-Rectal UltraSonography (TRUS). PSA measurements predict cancer probability and therefore may influence management.

• Creatinine measurement

Raised creatinine levels reflect impaired renal function. There is international consensus that routine creatinine measurement is indicated in those with BPH4.

However, any identified renal impairment is thought to be more commonly due to co-morbidities, such as diabetes and hypertension, as opposed to obstructive uropathy alone[5].

• Urinalysis

This is a cheap test with high sensitivity but low specificity. It is mandatory in the evaluation of any patient, male or female, presenting with lower urinary tract symptoms. Patients complaining of LUTS may have an underlying urinary tract infection requiring antibiotics and not BPH. Bladder carcinoma can also present with LUTS, such as haematuria.

• Digital rectal examination

The positive predictive value of a suspicious digital rectal examination in the diagnosis of prostate cancer is in the region of 26–34%[6]. The digital rectal examination is useful in assessing prostate size in consideration of treatment options and also in excluding other pathologies in the initial workup of a patient with LUTS.

Further tools in the assessment of BPH include:

• **Imaging of the urinary tract** – commonly performed to ensure no other coexisting pathology within the upper and lower urinary tract. Imaging modalities include transabdominal, and when indicated, transrectal ultrasonography of the prostate gland.

• **Voiding charts (diaries)** – a cheap, simple and useful tool in the outpatient or general practice setting. Recording of a frequency volume chart is considered a standard investigation. A frequency volume chart is non-invasive and provides important insights into LUTS.

• **Post-void residual volume** – a simple, non-invasive and accurate test which measures the volume of urine by calculating bladder height, length and width measurements from trans-abdominal ultrasonography.

• **Uroflowmetry** – a simple, non-invasive test. Uroflowmetry identifies abnormal voiding patterns. Flow rate assessments provide information on total volume voided, maximum flow rate (Qmax), average flow (Qave) and time to Qmax. Two or more tests with a voided volume exceeding 150ml are recommended to get a representative flow rate. BOO can only be diagnosed with a pressure flow study (pQs). Men with a Qmax less than 10ml/sec are more likely to have BOO and are also more likely to benefit from surgery. In conjunction with serial IPSS and quality of life measures such as the SF-36, regular urinary flow rate measurement and bladder scanning can be used to map – subjectively and objectively – disease progression over time.

• **Urodynamic studies** – these are pressure-flow studies. Where flow rates predict the probability of obstruction, pressure-flow studies categorise the degree of obstruction.

• **Endoscopy** – flexible cystoscopy is a useful procedure which can be performed under local anaesthesia should the history or clinical assessment raise the need for endoscopic evaluation of the lower urinary tract morphology. An obstructive flow could occasionally be due to the presence of a urethral stricture. It can also identify intravesical pathology but should be performed cautiously since it is associated with up to a 2.4% risk of the patient developing a clinically significant urinary tract infection[7].

BENIGN PROSTATIC HYPERTROPHY / HYPERPLASIA

Kathy Duong and Amir V Kaisary

Treatment

Management of BPH can be conservative, medical or surgical. The different treatment options are not mutually exclusive.

Watchful waiting (WW): also known as conservative management. This is considered the first step in the management of BPH in men with mild to moderate LUTS or those where the LUTS do not have a high impact on quality of life. Education on BPH, reassurance, lifestyle advice and periodic monitoring are the mainstay of this management option.

European Association of Urology Lifestyle Advice Recommendations

1. Reduction in fluid intake (not less than 1500ml daily) at specific times. (e.g. at night or when going out in public).
2. Avoidance or moderation of caffeine and alcohol intake which may have a diuretic and/or irritant effect.
3. Use of relaxed and double voiding techniques.
4. Urethral "milking" to prevent post-micturition dribble.
5. Distraction techniques – such as penile squeeze, breathing exercises, perineal pressure and mental "tricks" to take the mind off the bladder and toilet.
6. Bladder retraining – men are encouraged to "hold on" when they have sensory urgency to increase
their bladder capacity (to around 400ml) and the time between voids.
7. Reviewing a man's medication and optimising the time of administration or substituting drugs for others that have fewer urinary effects.
8. Providing necessary assistance when there is impairment of dexterity, mobility or mental state.
9. Treatment of constipation.

Medical treatment

• Alpha-blockers were first used in the management of LUTS secondary to BPH in 1978. Currently, examples of alpha-blockers include alfuzosin, doxazosin, indoramin, prazosin, and terazosin. They are thought to act by antagonising the adrenergic smooth muscle bulk found in within the prostate and bladder neck. The response to therapy is usually swift. It is a member of a family of medications that is commonly taken to reduce elevated blood pressure. However, it does not necessarily lead to problems with patients receiving it to help with bladder emptying. The patient should be warned that he might experience some dizziness or tendency to faint with sudden quick movements initially. These symptoms seem to settle down gradually in a large number of patients. The tablet can have an impact in some patients with regards to sexual function. This takes the form of decreased ejaculate volume and some men might describe it as "dry orgasm".

• 5-alpha reductase inhibitors such as FINASTERIDE (a type 2, 5-alpha reductase inhibitor) act by suppressing 5-alpha reductase activity and thus decreasing levels of circulating dihydrotestosterone (DHT). This leads to a reduction in size of the enlarged prostate gland in BPH and thus relieves symptoms of bladder outlet obstruction. DUTASTERIDE is a newer drug that works by suppressing types 1 and 2, 5-alpha reductase activity producing a greater reduction in serum dihydrotestosterone (DHT) compared to finasteride. Response to therapy can take up to 12 months in some cases, and unfortunately it is known that probably only 50% of patents will respond to treatment. It occasionally has an effect on the sexual function which includes: loss of potency (approx. 8%), decreased libido (approx. 5%) and decreased ejaculate volume (approx. 4%). There is definite evidence that men with larger prostates respond better to 5-alpha reductase inhibitors.

Surgical management

On the whole, indications for surgery and choices of surgical technique differ according to individual patient preference, outcomes of additional investigations and geographical location. The aim is to remove the central adenoma which is causing the obstruction. This can be achieved by either of the following modalities:

Trans-Urethral Resection of the Prostate gland (TURP)

An operation, commonly known as prostatectomy, resection of the central adenoma is performed under general/regional anaesthesia. Following the procedure, a catheter is left in the bladder to drain urine and some blood for the first 24–48 hours. Once the catheter is removed, the patient is able to void with a much improved urinary stream. Occasionally, patients might experience a degree of urgency or urge incontinence. Those who find this symptom troublesome can be given anticholinegic medication for a short while. Hospital stay averages 2–3 days. Retrograde ejaculation is an expected outcome of prostatectomy which must be clearly advised to the patient and recorded as part of the consent process.

Laser enucleation/Vaporisation of the Prostate gland

There are currently an array of different types of lasers to choose from to either enucleate or vaporise the prostate central adenoma. These include right-angle fibres and Holmium laser enucleation of the prostate (HoLEP). Laser thermal destruction of the prostate is performed under a short general/regional anaesthetic. A catheter is left to drain the bladder for probably a few hours or 1 night only. Once it is removed, efficient bladder emptying is achieved relatively quickly. Healing of the prostate bed takes a few weeks during which time occasional bleeding during straining and voiding can happen. The necessary medication to combat discomfort might be needed in the initial days (see Figures 3a and 3b).

BENIGN PROSTATIC HYPERTROPHY / HYPERPLASIA

Kathy Duong and Amir V Kaisary

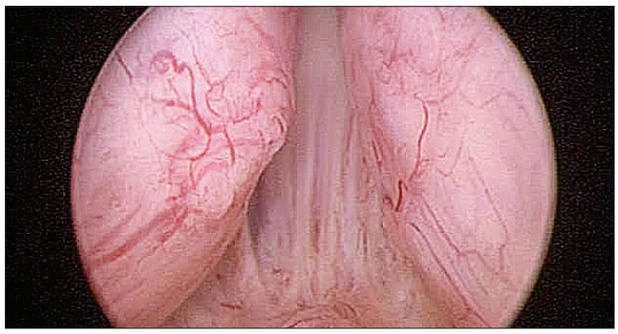

Figure 3a: Bladder neck obstruction. The two lateral lobes of the prostate are projecting into the prostatic urethra resulting in mild narrowing of the lumen.

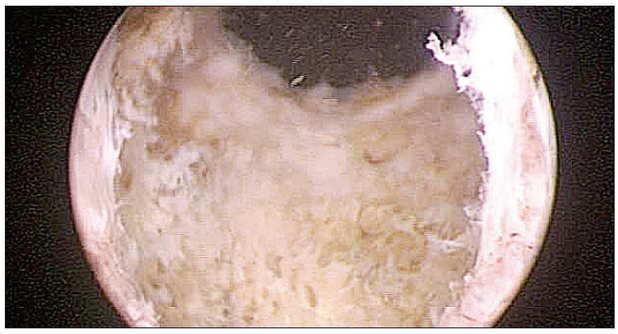

Figure 3b: Bladder outlet following completion of laser vaporisation of the bladder neck and prostate.

Follow-up

Routine follow-up with a urologist is important in the management of BPH. The urologist and GP guide each patient through the management of LUTS with disease progression.

Other than watchful waiting, the urologist has in their armament alpha blocker therapy, 5-alpha reductase inhibitors and surgical management. The timing of each of these treatments is guided by regular and serial assessments of disease progression and symptom severity which can be quantified using subjective and objectives measures, such as the IPSS, uroflowmetry and post-void residual urine volume scans.

Questions for reflection

1. What proportion of men over the age of 65 report Lower Urinary Tract Symptoms?
2. What are the classical lower urinary tract symptoms associated with BPH?
3. How does BPH cause bladder outlet obstruction?
4. What are the complications of BPH?
5. Which tools used in the assessment of BPH can be employed in the GP setting?
6. Give examples of lifestyle advice recommendations in the management of BPH
7. Which pharmacological agents can be used in the management of BPH?
8. What are the different types of surgical intervention in the treatment of BPH?

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BLADDER TRAINING URINARY INCONTINENCE

Amit Mevcha and Hashim Hashim

A 42-year-old lady with a history of diet controlled diabetes mellitus and well-controlled hypertension was referred to the urology outpatients.
Good Clinical Care.

Clinical scenario

A 42-year-old lady with a history of diet controlled diabetes mellitus and well-controlled hypertension was referred to the urology outpatients. She has hourly daytime micturition frequency, associated with urgency and occasional involuntary urine leakage. She previously had two normal vaginal deliveries. These symptoms are affecting her life significantly and stopping her from indulging in social activities and gatherings. The patient is keen to have active intervention (operation) and wants to get better soon.

What is your clinical diagnosis?

Overactive bladder syndrome. This is a symptom complex including urgency, with or without incontinence, usually accompanied by daytime frequency and nocturia.

How would you approach this case?

History taking: this should be focused on assessment of type, severity and frequency of urinary symptoms (storage and/or voiding symptoms) and trigger factors (exercise, sneezing, cough, position, urgency). You should be able to categorise incontinence into stress, urgency or mixed type with a careful history. Severity of incontinence should be assessed including the number and type of incontinence pads worn, if any.

Evaluate past medical and surgical history to reveal any risk factors (e.g. obstetric and gynaecological history, spinal cord injury/trauma) and social history (alcohol, smoking, tea/coffee intake). The medications being taken by the patient need to be evaluated.

Physical examination: in both sexes, abdominal examination should be carried out to rule out a palpable bladder secondary to urinary retention. A neurological examination should include assessment of anal tone and reflex, perineal sensation and lower limb function.

Pelvic floor muscle contraction should be assessed in females with digital examination and inspection for any vaginal wall prolapse, atrophic vaginitis and urethral hypermobility. Women with urinary incontinence who have symptomatic prolapse should be reviewed by a specialist in prolapse surgery for consideration of treatment. Women are asked to cough with a full bladder to look for any stress urinary incontinence. A digital rectal examination in men aims to assess prostate size and texture as well as anal tone, sensation and reflex.

A validated patient completed symptom scoring and quality of life assessment questionnaire may be useful and recommended:

- IPSS – international prostate symptom score (in men)
- ICIQ-MLUTS and ICIQ-FLUTS – International Consultation on Incontinence male and female questionnaire for lower urinary tract symptoms
- KHQ – Kings Health Questionnaire
- SF36 QOL – short form 36 health survey questionnaire. Assesses health status in persons with incontinence.

What investigations will you do?

Height and body weight need to be measured in order to calculate the body mass index. This can be used to advise on weight loss if required. It is important to make sure that diabetes, hypertension and any other medical pathology is well controlled.

A urine dipstick test should be performed in all patients with urinary incontinence to detect presence of blood, glucose, protein, leucocytes and nitrites. Patients with symptoms of urinary tract infections (UTI) (i.e. frequency and dysuria) whose urine test is positive for both nitrites and leucocytes should have a mid-stream urine specimen sent for microscopy, culture and antibiotic sensitivity. An appropriate antimicrobial agent should be prescribed empirically pending culture result. Patients with dipstick haematuria and LUTS should be investigated according to the local haematuria protocol.

Flowmetry and post-void residual urine: flowmetry measures the flow rate of urine voided. A low rate (e.g. <10ml/s) may indicate bladder outflow obstruction or reduced bladder contractility. The volume of the urine remaining after voiding (post-void residual) is also useful and should generally be less than 10% of the total bladder capacity (<50ml = normal, >200ml = abnormal, 50–200ml requires clinical correlation). This can be measured by bladder scan and should be performed in all patients. If no scanner is available, then an in/out catheterisation could be performed to assess residuals. The high post-void residual requires further investigations and may warrant catheterisation.

Frequency/volume chart: this should be used in initial assessment of urinary incontinence and overactive bladder syndrome. Patients should be encouraged to complete a minimum of 3-days diary covering variation in their usual activities, such as both working and leisure days and recording frequency and volume of urine voided, incontinent episodes, pad usage, fluid intake and possibly degree of urgency.

BLADDER TRAINING URINARY INCONTINENCE

Amit Mevcha and Hashim Hashim

There is no evidence that blood tests, radiological investigations and cystoscopy are routinely indicated in the initial assessment of patients with urinary incontinence. They are indicated if there is persistent symptoms or an abnormality on investigations (e.g. blood in the urine). Similarly, other invasive interventions like multichannel cystometry, ambulatory urodynamics or video urodynamics are not recommended before starting conservative therapy because of the potential morbidity associated with them, albeit low (e.g. less than 5% risk of urinary tract infection).

What advice would you give to the patient?

Expert opinion concludes that symptomatic categorisation of urinary incontinence (UI) based on history taking and clinical examination is sufficiently reliable to initiate initial, non-invasive treatments.

Life style change

Weight loss – obesity is an established risk factor for stress urinary incontinence in women. Patients with a high body mass index are more likely to develop incontinence, and they tend to have more severe symptoms than patients with a lower body mass index. Weight loss significantly decreases incontinence in morbidly obese patients.

Fluid and diet management – fluid restriction is an appropriate measure in patients who consume an abnormally high volume of fluid and can be helpful for reducing urine loss. However, prolonged dehydration may cause problems, such as headaches and constipation. So, encourage patients to consume at least 1 litre of fluid per day and aim for a urinary output of about 1.5L/d (24ml/kg/d). Caffeine and alcohol are stimulants and can irritate the bladder. Reduction of intake or avoidance may help with the bladder symptoms. Eliminating dietary factors, such as artificial sweeteners and certain acid food, may play a role in continence. It is important to remind patients that certain foods, such as fruits and vegetables, are mainly water and this will have to be adjusted as well.

Bowel management – constipation and faecal impaction are recognised factors contributing to incontinence, especially in elderly patients. Dietary fibre and fluid intake are important for regular bowel movements and normal stool consistency.

Can you treat incontinence with a conservative approach?

The answer is, yes. Conservative treatment is therapy that does not involve any pharmacological or surgical intervention and is cheap and easy to do. The main drawback is that it can take about 3 months to see any effect.

Pelvic floor muscle training (PFMT): this is also known as Kegel exercises and involves the selective repetitive voluntary contraction and relaxation of specific pelvic floor muscles. It is an effective way and a trial of supervised pelvic floor exercise for at least 3 months' duration should be offered as first line treatment to patients with stress or mixed urinary incontinence[1]. A range of regimens have been employed, with variation in the number and frequency of exercises advocated, the duration of treatment, the method of delivery and the role of adjunctive therapies. Patients should be taught the correct way of doing pelvic floor exercise by a clinician, physiotherapist or continence advisor. There is evidence suggesting that a supervised pelvic floor exercise programme with, for example, a physiotherapist has a better outcome than an unsupervised one. Each contraction is held for about 5 to 10 seconds and is repeated at 10 to 15 seconds intervals. The abdominal, gluteus and thigh muscles are kept relaxed.

The systemic review has supported pelvic floor muscle training should be included in any first line conservative management programme for stress, urgency or mixed incontinence[2]. It is important to warn patients that these exercises will take a while to work and encourage them to persevere with them.

Bladder retraining

It is also known as bladder drill, bladder training, bladder re-education or bladder discipline. Bladder retraining is an educational and behavioural process used to control urinary incontinence. It was first described by Jeffcoate and Francis in 1966 as bladder discipline. The goal of the training is to break the cycle of urgency and frequency using consistent, incremental voiding schedules.

Guided by the bladder diary, one has to decide a baseline voiding interval which is comfortable for the patient. Patients are instructed to void first thing in the morning, then every time the interval passes, and finally before going to bed at night. Over time, the voiding interval is gradually increased. Patient must resist the sensation of urgency and postpone urination by contracting their pelvic floor muscles. This is believed to increase bladder capacity, decrease overactivity and improve bladder control.

Delayed voiding – whenever a sudden urge occurs, patients are encouraged to wait about 5 minutes before voiding. After a brief wait patients may notice that the strong urge subsides or disappears. Once patients experience some success, they can extend the delay in voiding over a longer period.

BLADDER TRAINING URINARY INCONTINENCE

Amit Mevcha and Hashim Hashim

Urgency control technique – as part of bladder training, all patients need to have or learn strategies to suppress the desire to void. Various techniques have been suggested for relaxation or distraction. Patients are encouraged to divert attention away from the bladder by engaging in tasks, such as counting to 10 or making a "to do" list.

In the past, patients were admitted in hospital for strictly supervised bladder retraining. In the current situation it is not possible to do so. There is also a lack of consistency in bladder training programmes. The outpatient bladder training protocol should include an initial voiding interval beginning at 1 hour during waking hours only, which is increased by 15 to 30 minutes per week depending upon the response to the initial schedule and the patients' comfort, until a 2 to 3-hour voiding interval is achieved. Continence advisors or uro-gynaecology specialist nurses play a very important role in verbal information, communication, encouragement and being the first point of contact.

The results of the bladder retraining programme typically occur within 2 weeks of commencing. The reported efficacy rate for reducing urinary incontinence across all the studies ranges from 12–97%[3]. Bladder training should be offered as first line treatment in patients with urgency and mixed incontinence for a minimum of 6 weeks[1]. There is good evidence that bladder training is an effective treatment for urgency or mixed UI, with fewer adverse effects and lower relapse rates than for treatment with antimuscarinic drugs. It is best supplemented by pelvic floor muscles training especially when changing position (e.g. from sitting to standing). Bladder diaries should be used to assess success. Correctly taught bladder training, pelvic floor exercise with electrical stimulation and fluid restriction are effective in management of detrusor overactivity in elderly women[4].

Risk factors for UI

Predisposing factors:

- gender (F>M)
- race (Caucasian)
- neurological disorders (e.g. multiple sclerosis, Parkinson's disease, stroke)
- anatomical disorders (e.g. urethral diverticulum, ectopic ureter)
- childbirth
- pelvic radiotherapy
- pelvic, perineal and prostatic surgery leading to pelvic muscle and nerve injury (e.g. TURP, radical prostatectomy, hysterectomy).

Promoting factors:

- obesity
- smoking (e.g. chronic cough and raised intra-abdominal pressure)
- urinary tract infection
- increased fluid intake
- medications
- poor nutrition
- ageing
- cognitive deficits
- poor mobility.

Indication for urgent urological referral

In the following circumstances, patients with UI should be referred urgently to a specialist for further assessment:

- microscopic haematuria if aged 50 years and over
- visible haematuria
- recurrent or persisting UTI associated with haematuria if aged 40 years and over
- suspected malignant mass arising from the urinary tract.

Management of urgency UI

Prevention is better then cure, and all women in their first pregnancy should be offered pelvic floor exercise training to prevent post-natal stress urinary incontinence. Urinary incontinence should be dealt with in a multidisciplinary team approach, involving urologist, gynaecologist, continence advisor, uro-gynaecology specialist nurse, physiotherapist and community-based health care worker.

Treatment should be focused on bothersome symptoms instead of presence of symptoms. Furthermore, the patient's expectation from the treatment needs to be carefully evaluated. The outcome of any intervention should be measured with any improvement in quality of life.

Multichannel filling cystometry, voiding cystometry and even ambulatory or video urodynamics is recommended before surgery for UI if there is suspected detrusor overactivity, history of previous surgical intervention for stress incontinence or prolapse and suspected voiding dysfunction.

Pharmacological treatment for urgency UI

About 50% of patients will benefit from medical treatment and should be offered to patients who failed to respond to conservative management.

Antimuscarinic (anti-cholinergic) agent

Normal bladder contraction in humans is mediated mainly through stimulation of muscarinic receptors in the detrusor muscles. These receptors are not only responsible for normal bladder contraction but also for principle contractions of overactive bladder. Antimuscarinic agents, such as oxybutynin, act to inhibit bladder contractions and increase the bladder capacity.

NICE recommend that immediate release non-proprietary oxybutynin could be offered to women with OAB or mixed UI as first line drug treatment if bladder training has been ineffective. If after 2 weeks, this was poorly tolerated or ineffective then other antimuscarinic medications could be tried. All antimuscarinics have good efficacy and level 1 evidence in the treatment of overactive bladder syndrome[5].

The addition of behavioural therapy with drug therapy may help to reduce incontinence frequency but does not improve the ability to discontinue drug therapy[6]. Many trials had been conducted comparing conservative and pharmacological treatment alone and in combination. There is no level 1 evidence that drug treatment is better than non-pharmacological treatment. Adverse effects were reported in around a third of those taking anti-cholinergics.

BLADDER TRAINING URINARY INCONTINENCE

Amit Mevcha and Hashim Hashim

In practice, one may start patients on a combination therapy of conservative and pharmacological treatments[7]. However, response to treatment needs to be monitored by patient reported improvement in symptoms or cure and improvement in quality of life score. Other medications such as tricyclic antidepressants (imipramine), desmopressin (DDAVP) and baclofen have been tried for incontinence but none have received level 1 evidence.

Other treatments which have been tried include biofeedback and hypnotherapy. Biofeedback is mainly helpful in women who are not able to voluntarily contract their pelvic floor muscle at pre-treatment assessment[8]. One study on hypnotherapy found a 96% cure or significant improvement with 70% symptom relief at 12 months[9].

If medical and conservative treatments fail, then patients will need to have urodynamics to confirm a diagnosis of detrusor overactivity causing overactive bladder symptoms. Following that, options for urgency incontinence treatment include intradetrusor botulinum toxin, sacral nerve stimulation, percutaneous tibial nerve stimulation and major surgery in the form of augmentation ileocystoplasty, auto augmentation (detrusor myectomy) or urinary diversion.

Conclusion

Urgency urinary incontinence is a bothersome symptom and can greatly affect quality of life. Treatment is aimed at relief of symptoms and improving quality of life. A detailed history and directed physical examination is required. This is followed by simple investigations, such as frequency/volume charts, urine dipstick and free flow rate and post-void residual measurement.

A frequency volume chart helps to quantify patients symptoms and allow the clinician to correlate history and bothersome symptoms. The presence of blood on a dipstick examination or any visible haematuria warrant urgent investigations (i.e. cystoscopy, urine cytology) USS/IVU/CT to rule out urinary tract malignancy or other pathology.

Treatment should include controlling any concomitant medical aggravating factors and patient education about the condition and what to realistically expect from treatment. Management should be in a multidisciplinary environment and is initially tailored around fluid manipulation, pelvic floor exercises and bladder training. These can be combined with pharmacological treatment in severe bothersome cases.

North Bristol NHS Trust Bladder Training Patient Information leaflet

The overactive bladder means that your bladder contracts (squeezes) when you do not want it to. This is the probable reason for your **frequent and urgent** need to pass urine. It can also cause leakage of urine because you cannot get to the toilet in time. We can help you to improve this, providing we have your co-operation and you have determination.

Your **attitude of mind** is one of the most important aspects of this treatment and we feel sure you will accept the challenge.

The purpose of bladder training is to help you regain control of your over-active bladder by suppressing its contractions. You must gradually increase the **capacity** of your bladder and the **time interval** between voiding (passing water).

Start by voiding **every hour on the hour** whether you need to or not, from when you get up in the morning until you go to bed at night, but try very hard not to void at any other time, that is, in between your set times.

If you have difficulty doing this, try and distract yourself by doing something such as making a drink, sitting on your feet, crossing your legs or sitting on a rolled up towel to prevent yourself from voiding before the time is up. Practice this for 3–4 days. When you feel you have mastered this, gradually extend the time between voiding.

For example:

1¼ hours for 1 week or until mastered

1½ hours for 1 week or until mastered

1¾ hours for 1 week or until mastered

2 hours for 1 week or until mastered

2¼ hours for 1 week or until mastered

2½ hours for 1 week or until mastered

2¾ hours for 1 week or until mastered

3 hours for 1 week, **then** maybe longer, if you feel able.

It is important to carry out pelvic floor exercises (see separate leaflets NBT000600 or NBT000613) at the same time in order to control your bladder.

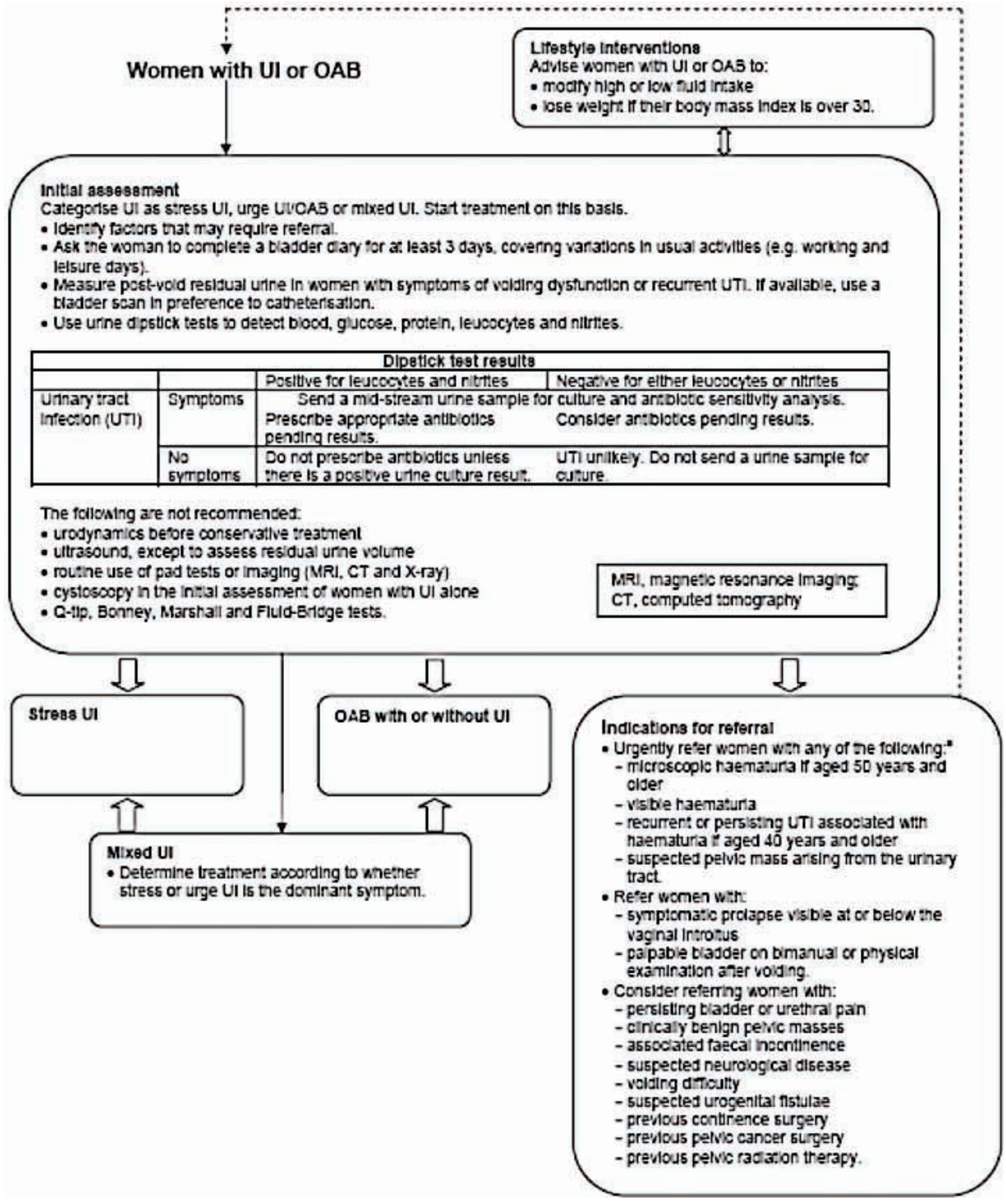
Remember it is important to keep your fluid intake at a reasonable level – 8 cups of fluid a day.

NICE guidelines on Overactive bladder syndrome and urgency incontinence (http://www.nice.org.uk/nicemedia/pdf/CG40NICEguideline.pdf)

BLADDER TRAINING URINARY INCONTINENCE

Amit Mevcha and Hashim Hashim

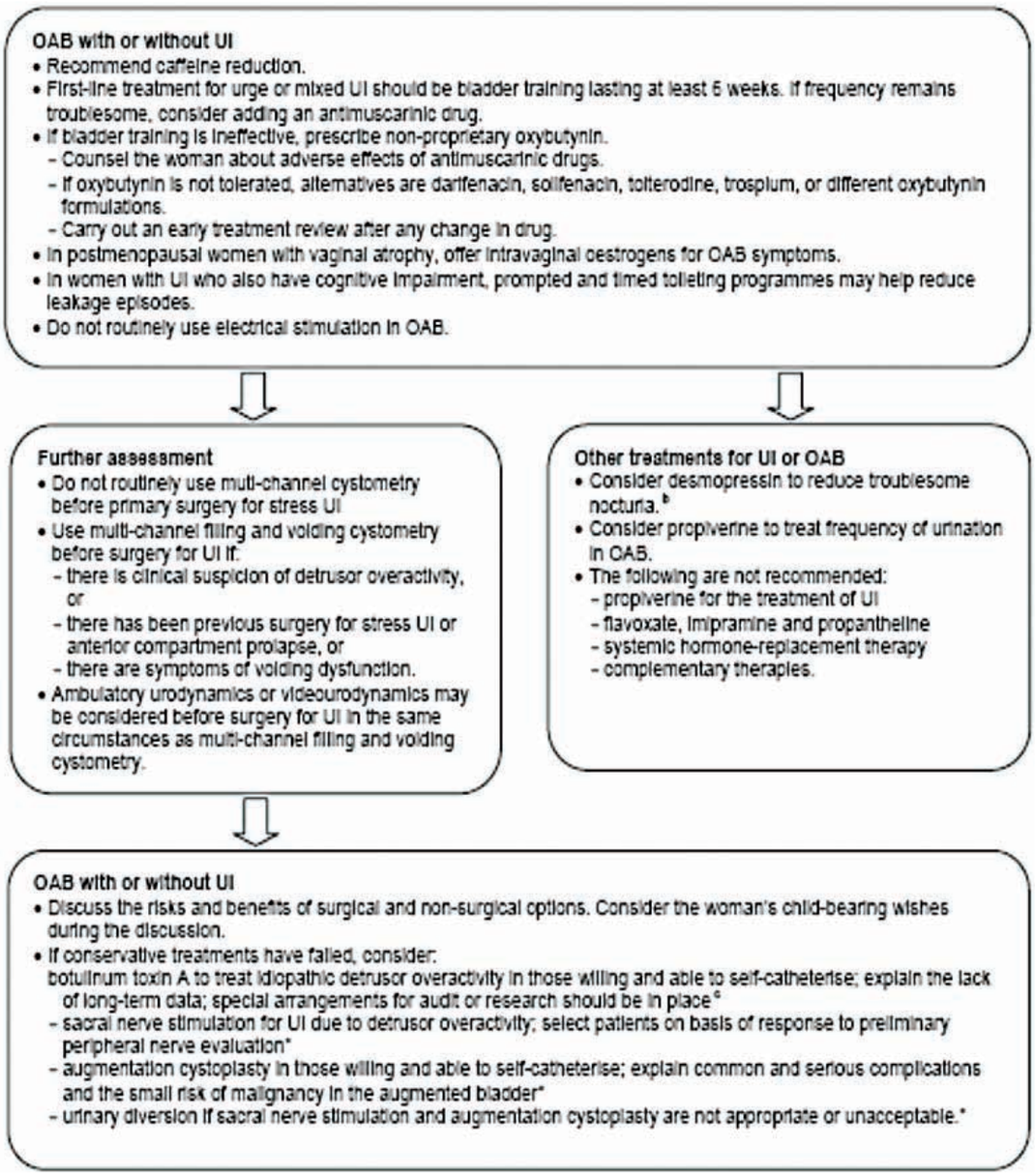
Women With UI or OAB



BLADDER TRAINING URINARY INCONTINENCE

Amit Mevcha and Hashim Hashim

OAB With Or Without UI



Multiple Choice Questions 2

BLADDER TRAINING URINARY INCONTINENCE

Amit Mevcha and Hashim Hashim

Multiple Choice Questions

Please select true or false.

1. A patient complains of urinary leakage on sneezing, coughing with urgency and also leakage before making to the toilet. This is a:

a. Stress urinary incontinence.
b. Urge urinary incontinence.
c. Over active bladder syndrome.
d. Mixed urinary incontinence.
e. None of the above.

2. Initial investigation of uncomplicated stress urinary incontinence is:

a. CT scan of kidney.
b. Urine dipstick test.
c. Urodynamics study.
d. Flexible cystoscopy.

3. Cystometry is required for:

a. Confirmation of the type of incontinence.
b. Prior to having surgical intervention for UI.
c. Assessment of haematuria.
d. Previous surgery for prolapse.

4. Initial management of incontinence involves:

a. Bladder training.
b. Antimuscarinic medication.
c. Pelvic floor exercise.
d. Botulinum toxin injection in the bladder.
e. Life style modification.

5. First line pharmacological treatment for OAB is

a. Neuromodulator.
b. Desmopressin.
c. Tricyclic antidepressant.
d. Oxybutynin.
e. Solifenacin.

Answers

1. The correct answer is d (mixed type).

Patient complaining incontinence in two different situations. First, during conditions that increase intra abdominal pressure and second, when there is urgency.

2. b is the correct answer.

Urine dipstick is required to rule out infection. None of the other investigations required in uncomplicated cases before starting conservative treatment.

3. b is true.

Multi-channel filling and voiding cystometry or ambulatory or video urodynaemics is recommended before surgical intervention for UI.

4. a, c and e are true.

With history and examination one can start conservative treatment. If conservative treatment fails then patient need pharmacological or surgical intervention.

5. d is the correct answer.

Oxybutynine is recommended as first line treatment by NICE. If it fails then other antimuscarinic agent can be used. Always warn the patient about potential side effects of antimuscarinic.

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HAEMATURIA CASE BASED DISCUSSION

Ahmad Rahman, Hani Ertemi and Faiz Mumtaz

A 75-year-old male presented with a single episode of visible painless haematuria and a history of frequency and urgency for 4 months. Good Clinical Care.

A 75-year-old male presented with a single episode of visible painless haematuria and a history of frequency and urgency for 4 months. Two years ago he had a routine medical check-up and was found to have 2+ microscopic haematuria. There was no history of UTI.

He used to work at a dye factory and smoked 20 cigarettes a day. Examination was unremarkable.

How do patients present with haematuria?

- Visible haematuria (VH): also called macroscopic haematuria or gross haematuria.
- Non-visible haematuria (NVH): also called microscopic haematuria or dipstick positive haematuria.

These patients may present with:

- Symptomatic non-visible haematuria (s-NVH: associated symptoms include voiding lower urinary tract symptoms) (LUTS: hesitancy, frequency, urgency, dysuria).
- Asymptomatic non-visible haematuria (a-NVH: incidental detection in the absence of LUTS or upper urinary tract symptoms).

The current consensus is that urine testing for haematuria should only be requested for identifiable clinical reasons. However, incidental haematuria continues to be the mode of presentation as many patients have a urinalysis as part of a medical examination for life insurance or employment purposes. Approximately 5% of randomly chosen adults over 25 years of age have microscopic haematuria on the first urine dipstick test. This is confirmed by a second test (dipstick or microscopy) in 2.5%. The population prevalence of macroscopic haematuria is approximately 1% with a third of these (35%) will have an underlying urological malignancy[1]. Haematuria may arise from the upper (kidneys and ureter) or lower urinary tract (bladder, prostate or urethra).

How would you classify significant haematuria?

- Any single episode of visible (macroscopic) haematuria (VH).
- Any single episode of symptomatic non-visible (microscopic) haematuria (NVH) (in the absence of UTI or other transient causes).
- Persistent asymptomatic – NVH (in the absence of UTI or other transient causes). Persistence is defined as two out of three dipstick positive NVH.

Transient causes of haematuria include:

Urinary tract infection (UTI). Following treatment of UTI, a dipstick should be repeated to confirm absence of haematuria. It should also be noted that UTI (regardless of haematuria) can be the first presentation of significant genitourinary pathology and should be further investigated if clinically indicated.

Exercise induced haematuria or rarely myoglobinuria (VH and NVH).

Menstruation.

N.B. The presence of haematuria (VH or NVH) should not be attributed to anticoagulant or antiplatelet therapy and patients should be evaluated regardless of these medications.

How would you define significant microscopic haematuria?

Dipstick versus microscopy

- Urine dipstick of a fresh voided urine sample, containing no preservative, is considered a sensitive means of detecting the presence of haematuria. It relies on the peroxidase-like activity of haemoglobin to oxidize a chromogen. Thus, the degree of colour change is proportional to the concentration of haemoglobin present. False-positive results will be given by other peroxidases (e.g. myoglobin, free haemoglobin) or hypochlorite solutions. False-negative results may be given in the presence of interfering agents (e.g. ascorbic acid).
- Community-based urine samples sent for microscopy have a significant false negative rate; the procedure is more labour intensive and adds little to establishing the diagnosis of haematuria. Routine microscopy for confirmation of dipstick haematuria is not necessary.

Trace versus 1+

- While the sensitivity of urine dipsticks may vary from one manufacturer to another, significant haematuria is considered to be 1+ or greater. Trace haematuria should be considered negative.

Haemolysed versus non-haemolysed

- There is no distinction in significance between non-haemolysed and haemolysed dipstick positive-haematuria. 1+ positive for either should be considered of equal significance.

HAEMATURIA CASE BASED DISCUSSION

Ahmad Rahman, Hani Ertemi and Faiz Mumtaz

What are the other causes of red or dark urine?

- Haemoglobinuria: dipstick positive but no red cells on microscopy.
- Myoglobinuria.
- Food, (e.g. beetroot).
- Drugs, (e.g. rifampicin, nitrofurantoin, senna).
- Porrphyria; urine darkens on standing.
- Bilirubinuria: obstructive biliary disease.

What are the causes of Haematuria?

The urological causes:

- Infection: cystitis, tuberculosis, prostatitis, urethritis, schistosomiasis.
- Cancer: bladder, kidney, prostate and ureter.
- Urinary tract stones.
- Inflammation: interstitial cystitis.
- Trauma: renal tract trauma.
- Renal cystic disease: medullary sponge kidney.
- Others: BPH-Urethral stricture, loin pain, Haematuria syndrome.

The medical causes:

- Nephritic syndrome.
- IgA nephropathy.
- Glomerulonephritis.
- Vasculitis: Henoch-Schonlein purpura.
- Coagulation disorder (haemophilia – warfarin).
- Renal papillary necrosis.
- Post-irradiation.
- Haematological: sickle cell disease.
- Toxins: sulphonamides, cyclophosphamide.

What is the risk of bladder cancer in patients with macroscopic haematuria?

- Risk is negligible under 40 years, increases with age and is twice as high in men.
- Smoking, past or present, including exposure to second-hand smoke.
- Past history of gross haematuria.
- Previous urologic disease (e.g. renal calculi, urologic tumours).
- Occupational exposure to chemicals or dyes (e.g. benzenes or aromatic amines).
- Exposure to certain drugs (e.g. phenacetin, cyclophosphamide, HIV therapies).
- Systemic diseases (e.g. HIV, SLE-systemic lupus erythematosis, vasculitis, schistosomiasis).
- History of pelvic radiation.

How would you assess this patient?

Haematuria targeted clinical history.

1. Onset of haematuria and its relation to micturition (i.e. beginning, during or the end of micturition).
2. Occupation.
3. Smoking.
4. Family history of hereditary diseases or a tendency for urinary calculus formation.
5. Travel abroad (exclude infectious diseases, such as schistosomiasis, malaria, etc.).
6. Medication: use of non-steroidal anti-inflammatory drugs (NSAIDs) or treatment with cytotoxic agents (cyclophosphamide); these drugs may cause interstitial nephritis (NSAIDs), interstitial cystitis or urothelial cancer (cytotoxic agents).

Full clinical examination.

General:

- Pulse, temperature, blood pressure.
- Look for petechiae, signs of anaemia, bruising or enlarged lymph nodes.

Abdominal Examination:

- The size and contour of the liver, spleen, kidneys.

vDigital rectal examination (prostate status).

How would you investigate this patient?

The "ideal" set-up to investigate haematuria consists of a "one-stop" open access clinic where radiological and urological investigation can be completed with the results and management plan available to the patient at the end of the clinic[2].

- FBC, U&Es
- PSA (patients with suspicious prostate cancer)
- urinalysis and MSU
- urine cytology
- ultrasound of the urinary tract
- CT-IVU
- flexible cystoscopy.

HAEMATURIA CASE BASED DISCUSSION

Ahmad Rahman, Hani Ertemi and Faiz Mumtaz

What is the role of cytology in the assessment of haematuria?

Cytological examination of centrifuged urine is currently the "gold standard" urine-based test for malignancy. The pathologist looks for atypical or malignant epithelial cells from a tumour. It is more sensitive and specific at detecting poorly differentiated tumours and carcinoma in situ (which are poorly adhesive and grossly abnormal cells), than low grade papillary tumours.

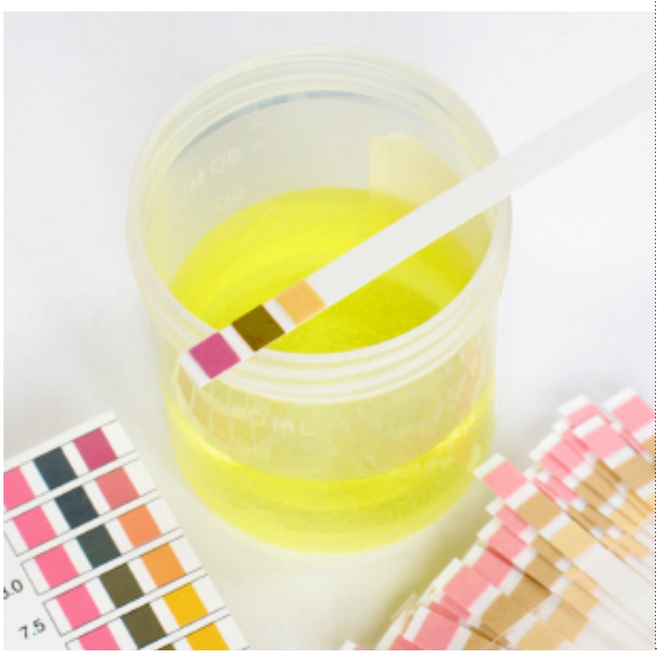
Urinary cytology is best done on a random daytime urine sample. Urine sample obtained on a bladder wash out specimen has higher sensitivity in picking up malignant cells. Generally three separate samples should be analysed for the highest diagnostic yield. Up to 60% of transitional cell bladder carcinomas may be diagnosed with urinary cytology. False-negative cytology is frequent (40–70%) in patients with low grade papillary TCC. False-positive cytology can rise due to infection, inflammation, instrumentation and chemotherapy3.

What is the role of ultrasound and CT-IVU in the evaluation of haematuria?

These imaging modalities are primarily designed to evaluate the upper urinary tract which is always accompanied by cystoscopy.

Ultrasound of the upper urinary tract is the primary modality at detecting renal parenchymal lesions (e.g. renal cell carcinoma, renal cysts), stones and the presence of collecting system dilatation (hydronephrosis). However, it is poor at detecting small lesions of the collecting system (e.g. renal pelvic TCC).

Ultrasound investigation of the kidneys is safe and in pregnancy it's the recommended investigation[4, 5].



When ultrasound and cystoscopy are normal in a patient with persistent visible haematuria and upper urinary tract symptoms are not visible (microscopic haematuria) CT–IVU should be requested. This has higher sensitivity of identifying abnormalities of the ureter and renal pelvis.

CT-IVU should be preceded by a non-contrast scan of the urinary tract to evaluate renal calculi. This is followed by the injection of iodinated contrast media to provide CT-IVU with the acquisition of high-resolution 1–2mm thick sections in the nephrographic and delayed pyelogram phase.

Magnetic resonance urography is the choice of investigation to assess haematuria in pregnant women.

What is the role of cystoscopy in the evaluation of haematuria?

Cystoscopy is generally performed using a flexible cystoscope under local anaesthetic. A lignocaine gel is instilled into the urethra which also acts as a lubricant to allow easy passage of the cystoscope. Both ultrasonography (USS) and intravenous urography (IVU) can visualise the bladder, but are less sensitive than cystoscopy.

Cystoscopy is indicated in:

1. All patients with visible (macrosopic) haematuria.
2. Symptomatic microscopic haematuria.
3. Asymtomatic microscopic haematuria in over 40-year-old males and over 50-years-old females.
4. In low-risk patients with persistent haematuria, the decision must be on an individual basis after a careful discussion between the patients and physician[6].

What if no urological cause is found for haematuria?

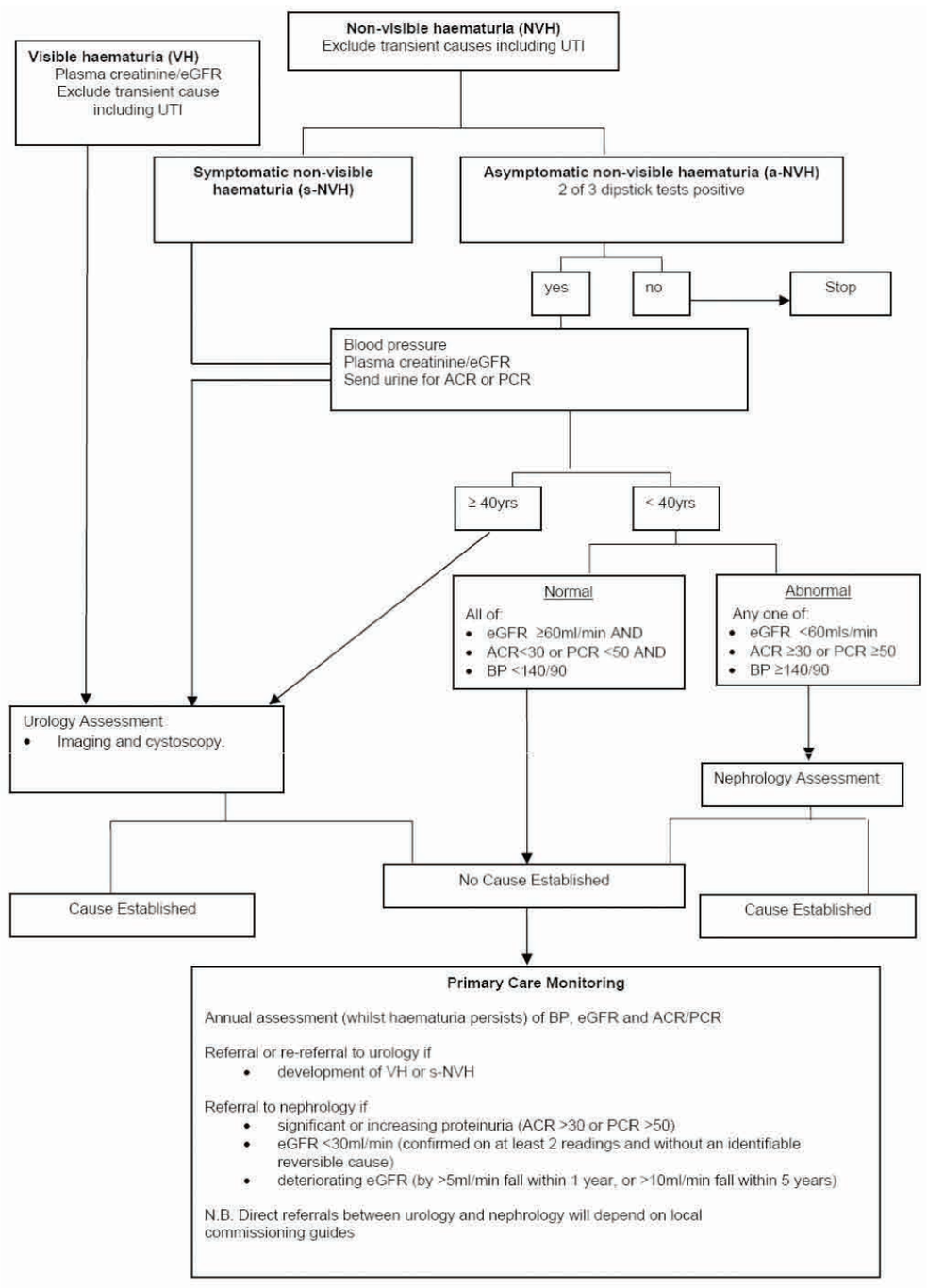
Long-term monitoring may be need in the following group of patients:

- voiding LUTS
- visible haematuria
- significant or increasing proteinuria
- progressive renal impairment (falling eGFR of greater than 10ml/min over an year)
- hypertension.

HAEMATURIA
CASE BASED DISCUSSION

Ahmad Rahman, Hani Ertemi and Faiz Mumtaz

What is the joint consensus statement by the Renal Association and British Association of Urological Surgeons on the initial assessment of haematuria?



PCR: protein creatinine ratio, ACR: albumin creatinine ratio

HAEMATURIA CASE BASED DISCUSSION

Ahmad Rahman, Hani Ertemi and Faiz Mumtaz

What is the current recommended NICE cancer referral guideline for haematuria to the urologists?

- Patients of any age with painless macroscopic haematuria.
- Aged 40 years and older who present with recurrent or persistent urinary tract infection associated with haematuria.
- Aged 50 years and older who are found to have unexplained microscopic haematuria.
- With an abdominal mass identified clinically or on imaging that is thought to arise from the urinary tract.

Questions

1. A 66-year-old female developed sudden severe pain in the left loin with macroscopic haematuria. What is the investigation(s) of choice?

a. Urine MSU.
b. Urine cytology.
c. CT-IVU.
d. Flexible cystoscopy.
e. All of the above.

2. Which of the following is a risk factor for bladder cancer?

a. Cigarette smoking.
b. Schistosomiasis.
c. Age.
d. Pelvic radiotherapy.
e. All of the above.

3. After a normal assessment of a patient with asymptomatic microscopic haematuria a referral to the nephrologist is indicated for:

a. Patient develops painless haematuria.
b. Increasing proteinuria.
c. Deteriorating estimated GFR > 5ml/min within a year.
d. Hypertension.
e. All except a.

4. A 75-year-old gentleman with no lower urinary tract symptoms but episodes of painless macroscopic haematuria. What is the most likely diagnosis?

a. Bladder cancer.
b. Grossly enlarged prostate gland.
c. Urinary tract infection.
d. IgA nephropathy.
e. Bladder stone.

5. A 35-year-old woman who is 6-months pregnant presented to A&E with right renal colic and microscopic haematuria, what is the radiological investigation of choice:

a. CT KUB.
b. USS.
c. MRU.
d. IVU.
e. None of the above.

Answers

1-e: This patient may have a tumour in the renal pelvis/ureter and therefore all the investigations are needed to arrive at a definitive diagnosis. It is essential to exclude a UTI.

2-e: Cigarette smoking, schistosomiasis, increasing age, male gender, occupational exposure like aniline together with pelvic radiotherapy are all recognised risk factors of bladder cancer. Smokers have a two-to-five-fold increased risk compared to non-smokers.

3-e: Protenuria, deteriorating GFR and hypertension are more likely to be due to medical cause like glomerulonephritis while painless macroscopic haematuria is more likely to be urological in origin.

4-a: Bladder cancer is more likely to present with painless macroscopic haematuria while BPH, UTI and bladder stones are more likely to be associated with lower urinary tract symptoms like urgency, frequency and nocturia.

5-b: USS is the recommended radiological investigation for renal colic in pregnancy as it is completely safe with no risk of radiation and it has high sensitivity for detecting kidney stones (around 95%) and hydronephrosis, unfortunately it isn't as sensitive as CT scan for ureteric stone.

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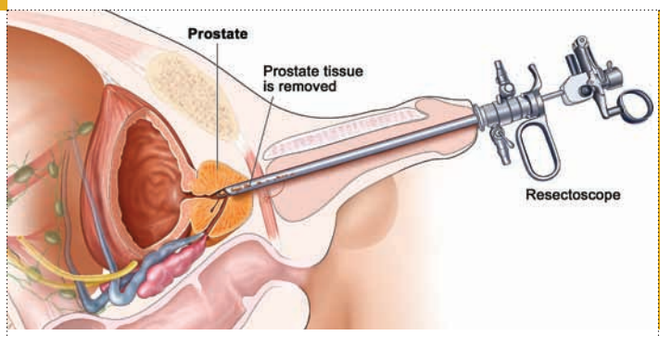
CONSENT OF TURP PATIENT

Hani Ertemi, Ahmad Rahman & Faiz Mumtaz



A 72-years-old patient presented to urology pre-assessment clinic (PAC) for a transurethral resection of the prostate (TURP).
Good Clinical Care.

A 72-years-old patient presented to urology pre-assessment clinic (PAC) for a transurethral resection of the prostate (TURP). His initial presentation was with acute urinary retention. His subsequent trail without catheter (TWOC) in the community was unsuccessful.

How would you assess this patient's fitness for surgery at the pre-admission clinic?

- Identify any significant co-morbidity: hypertension, cardiac disease, bleeding disorders, chronic pulmonary disease, diabetes mellitus, etc.
- Drug history: ask specifically about warfarin, aspirin and clopidogrel and the indications for their use. Aspirin and clopidogrel should be stopped 1 week before the operation while warfarin needs to be stopped 4–5 days before. Always consult as regards the need for starting alternative short acting anticoagulants prior to stopping these drugs; this will depend on the primary indication of the initial prescription of these drugs. If necessary liaise with the haematology and cardiology team and refer to local guidelines in your hospital.
- Obesity, smoking and alcoholism are an important risk factor.

What preoperative investigation would you check?

- Full blood count, renal function test and coagulation screen (if indicated) .
- Urine dipstick and MSU.
- Urine flow rate (at least two readings) and residual volume (for all patients undergoing TURP).

What are the indications of TURP?

1. Bothersome lower urinary tract symptoms which fail to respond to medical treatment.
2. Recurrent acute urinary retention.
3. Renal function impairment due to BOO.
4. Bladder stone.

Is there any indication for open prostatectomy?

- Large prostate >100gm.
- Failed TURP because of bleeding.
- Presence of large bladder stones which are too big for endoscopic cystolitholapaxy, combined with marked enlargement of the prostate.

What key issues will you address during consent for a TURP ?

- Anaesthetic: TURP can be carried out under general and spinal anaesthesia and it is not a day case procedure.
- Duration of the operation: duration varies between 45 to 90 minutes.
- Length of hospital stay: majority will be discharged on the third post-operative day.

How would you describe TURP to the patient?

The procedure involves the telescopic removal of obstructing parts of the prostate with an electric diathermy loop leaving the compressed outer zone intact. The cut chips of the prostate are pushed back into the bladder by the irrigating fluid and then removed at the end of the surgery using special designed evacuator.

What are the risks associated with this operation?

The BAUS (British Association of Urological Surgeon) consent form[1] classify the risks as:

Common

- Temporary mild burning, bleeding and frequency of urination after procedure.
- Retrograde ejaculation which means that no semen will be produced during an orgasm: 65–70% in cases of TURP[2-5].
- May not relieve all prostatic symptoms.

Occasional

- Poor erection is possible, the risk of Impotence following TURP is 6.5%[2-5].
- Infection of bladder or kidney (cystitis or pyelonephritis) requiring antibiotic.
- Bleeding requires returning to theatre and/or blood transfusion, the need for blood transfusion following TURP is 2–5%.
- Discuss briefly the common complications related to blood transfusion.
- Ten per cent risk of re-operation in the future, due to re-obstruction. Secondary prostatic operation is reported at constant rate of 1–2%[2-5] a year after TURP.
- May need self-catheterisation after the operation if bladder is weak (hypotonia).
- Failure to pass urine after surgery requiring catheterisation.

CONSENT OF TURP PATIENT

Hani Ertemi, Ahmad Rahman & Faiz Mumtaz

Rare

- Finding unsuspected cancer in the removed tissue which may need further treatment.
- Injury to the urethra or the bladder neck. (The risk of bladder neck stenosis following TURP is 4%, while urethral stricture is 3.8%[2-5]).
- TUR Syndrome (absorption of irrigation fluid causing confusion, heart failure).
- Urinary incontinence; the median probability of developing stress incontinence after TURP is around 2.2%[2-5].
- Very rarely perforation of the urinary bladder.

The possibility of an increased long-term risk of mortality after TURP compared to open surgery has been raised by Roos et al.[6], these finding have not been replicated by others[7, 8].

What is a transurethral resection (TUR) syndrome?

This is best described as a multifactor syndrome which occurs in approximately 0.5%–1% of TURPs as a result of absorption of large volume of irrigation solution into the circulation. This typically leads to dilutional hyponatraemia with fluid overload as well as the effects of glycine used as an irrigant fluid. Although a rare occurrence TUR syndrome if undetected can lead to a significant morbidity and mortality.

What are the signs and symptoms of TUR syndrome?

- nausea
- vomiting
- confusion
- seizures
- visual disturbances
- hypertension and bradycardia.

How can you avoid TUR Syndrome?

Since TUR syndrome occurs predominantly due to the absorption of the irrigation fluid at the time of surgery few measures can be taken[9]:

- a normal preoperative plasma sodium
- low pressure irrigation
- limit resection time to a maximum of 1 hour
- avoid aggressive resection near the capsule

vreduce the height of the irrigation fluid.

How would you describe to the patient his post-operative care?

Patient will have a 3-way catheter through which normal saline is used as an irrigant fluid to reduce the risk of forming blood clot. Occasionally, if the bleeding is excessive a blood clot may obstruct the catheter which may require a change of catheter. This should always be performed by an experienced surgeon using a catheter introducer.

The catheter is normally removed on the 2nd post-operative day.

Multiple Chioce Questions

Please select the best answer

1. Patient on warfarin for a metallic heart valve is due to have TURP in 2 weeks time you should:

a. Stop the warfarin immediately.
b. Stop the warfarin 4–5 days before the operation.
c. Continue with the warfarin till the day of the operation to avoid the risks of stroke.
d. Substitute warfarin with clopidogrel
e. Stop warfarin 4–5 days prior to surgery and substitute with intravenous heparin which should be stopped 6 hours prior to surgery.

2. From the list below please choose the most common complication after TURP:

a. Impotence.
b. Incontinence.
c. Bleeding requiring blood transfusion.
d. Retrograde ejaculation
e. Regrowth of prostate.

3. All of the following is a necessary investigation before TURP except:

a. Full blood count.
b. Flowrate.
c. Post-void residual.
d. Flexible cystoscopy.
e. Urine dipstick.

4. During the immediate post-operative period following a TURP the patient becomes confused and agitated with blurred vision. The most likely diagnosis is:

a. Hypoxia.
b. Anaesthetic complication.
c. TUR syndrome.
d. Intra-operative stroke.
e. None of the above.

5. All of the following is a recognised complication of TURP except:

a. Incontinence.
b. Bleeding requiring blood transfusion.
c. UTI.
d. Bladder Neck stenosis.
e. Recto-vesical fistula.

6. To avoid medicolegal issues the following should be considered before performing TURP:

a. Preoperative urodynamic study.
b. Retrograde ejaculation.
c. At least two well-documented flow rates.
d. Urine culture.
e. All of the above.

CONSENT OF TURP PATIENT

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Answers

1 e – Warfarin should be stopped 4–5 days before TURP operation, however, this depends on the indication of the anticoagulation, in low-risk patient, for example, patient with atrial fibrillation it is safe to stop the warfarin, however, in case of high-risk patient like patients with metallic heart valve it is recommended that the patient should be admitted and started on IV heparin , medical practitioner should be aware of the local guideline.

2 d – Retrograde ejaculation is the most common complication after TURP (risk is approximately 70%) that is why it is essential to be discussed with the patient before the operation and to be well documented in the consent form.

3 d – Any patient under going TURP should have basic blood investigation including FBC and renal function test, basic urodynamic test (flow rate and residual volume scan) and urine dipstick, flexible cystoscopy is not recommended before the operation.

4 c – TUR syndrome is a rare complication after TURP and is caused by a absorption of the irrigation fluid causing a dilutional hyponatraemia, symptoms include agitation, confusion, blurred vision and may progress to seizures.

5 e – Incontinence, bleeding requiring blood transfusion, UTI, bladder neck stenosis are all recognised complication after TURP.

6 e – Before TURP it s mandatory that every patient should have flow rate study , residual volume scan, basic blood investigation and urine test. Patient should also be informed about the high risk of retrograde ejaculation.

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STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

Riyad Al-Mousa and Hashim Hashim

A 38-years-old lady has been experiencing episodes of urinary leakage for the last three years.
Good Clinical Care.

A 38-years-old lady has been experiencing episodes of urinary leakage for the last three years. Her symptoms were just occasional occurring once every 2–3 days but her condition deteriorated after she delivered her last baby a year ago and symptoms became more frequent on a daily basis especially when she coughs, sneezes or laughs, for which she had to seek medical advice.

What is the likely diagnosis?

Stress urinary incontinence.

What would you like to ask her to clarify her condition?

History taking of such a patient should include frequency of daytime and night-time voiding, timing of leakage and any exacerbating factors. It is important to know if she leaks at night and whether she is awake or asleep when this happens. Also, it is important to know if the leakage is associated with urgency suggesting the presence of urgency urinary incontinence.

The number and type/thickness of pads she uses, if any, and how frequent she changes them day and night should be noted. Leaking small amounts at a time may indicate stress urinary incontinence while leaking large amounts that could flood the outer clothes or the floor may indicate urgency urinary incontinence.

You should also enquire about the association of leakage to the monthly cycle, whether there is any leakage during intercourse and if present is it at penetration (more indicative of stress urinary incontinence) or orgasm (more indicative of urgency urinary incontinence).

History of previous surgeries especially pelvic operations is extremely important as well as medical history of chronic disease like asthma, diabetes and intake of any medications.

Obstetric history is important especially the number and type of deliveries (e.g. ventouse) and whether there were any complications. In this case, she had three children in 5 years, one of whom was a ventouse delivery and she had a tear with it.

This patient claimed that her main complaint is leakage whenever she coughs or laughs and denied any urgency and urgency incontinence. She uses one thick pad per day with moderate soaking, and none at night.

The most important thing is to know if this is affecting her quality of life, as this will dictate management.

What would you do next?

She needs a thorough physical examination of her abdomen and vaginal examination to look for any masses in the lower abdomen, such as an enlarged bladder secondary to retention. The pelvic floor muscle strength should be assessed clinically by doing a vaginal examination and asking the women to squeeze her pelvic floor (mainly the muscles they use to stop voiding). Look for any atrophic vaginitis and prolapse and then ask her to cough on a full bladder to demonstrate leakage. A lower limb neurological examination will also need to be done as well as anal tone, sensation and reflex examination.

To examine for prolapse you will need to lay her in the left lateral position and using a Sim's speculum assess the anterior and posterior compartments of the vagina.

Measure her height and weight to calculate the body mass index to advise on weight loss, if needed.

Simple bedside tests should include urinalysis using a dipstick to rule out infection or blood in the urine and a voiding diary to objectively document her symptoms over a 4-day period.

The next step is to arrange for free uroflowmetry and post-void residual. There is no need to have formal urodynamic studies (cystometry and pressure/flow studies) at this stage as treatment can be initiated on a presumptive diagnosis of stress urinary incontinence.

She will also need to fill out a quality of life questionnaire, such as the ICIQ-FLUTS (International Consultation on Incontinence Questionnaire for female lower urinary tract symptoms) or the ICIQ-UI (ICIQ for urinary incontinence).

What do you think is the most probable cause for her condition?

The causes of stress urinary incontinence usually are multifactorial but in this patient specifically with multiple pregnancies and deliveries in a relatively short period have affected and weakened her pelvic floor muscles and caused the deterioration of her symptoms especially after the last pregnancy.

STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

Riyad Al-Mousa and Hashim Hashim

How would you manage this patient?

First line therapy should be conservative therapy and that includes fluid manipulation, weight loss, if needed, timed voiding and teaching her how to strengthen her pelvic floor muscles by doing a set of exercises to train the pelvic floor muscles. Warn her that it would take at least 3 months for this work and she should persevere with it. You can either give her the instructions in a written sheet of paper or refer her to the physiotherapist or continence advisor to help with her exercises.

There is no evidence that biofeedback, electrical stimulation of the pelvic floor muscles or vaginal cones offer any extra benefit except in patients who cannot locate their pelvic floor muscles.

She started doing these exercises for 4 months and came to you stating that her symptoms are slightly better but still complaining that it is affecting her quality of life.

What would you do next?

She can be offered tablets in the form of duloxetine, which is a selective noradrenaline re-uptake inhibitor (but she will need to be warned of side effects) or have surgery.

What type of surgeries might help this patient?

Currently, synthetic mid-urethral sling procedures including trans-vaginal tapes (TVT) or trans-obturator tapes (TOT) are simple, effective and relatively safe procedures, which can be done on a day surgery basis. Alternatives include colposuspension or rectus sheath slings. Prior to invasive treatment we would recommend having urodynamics to confirm the diagnosis and exclude detrusor overactivity.

Introduction

Urinary incontinence is a worldwide problem affecting millions of patients with female to male ratio of approximately 4:1 in patients below age of 60 and 2:1 in patients 60 years and over[1].

Although it is not a life-threatening condition, it affects quality of life, causing economic burden and loss of self-confidence[2].

Most women accept urinary incontinence as a sign of aging and a childbearing-related event and that it should not be considered serious[3]. Kirkland et al.[2] reported that only one-third of women seek medical advice.

Management options of patients with stress urinary incontinence

A thorough history and directed physical examination of the patient is vitally important for the correct assessment and management. Simple bedside investigations include height, weight and dipstick urinalysis to role out urinary tract infections. Free uroflowmetry and post-void residual assessment is recommended.

Urodynamic study is an important diagnostic tool to evaluate patients with incontinence in order to accurately diagnose the type of incontinence the patient has (stress, urgency or mixed incontinence) only if invasive treatments are planned or after failure of conservative and medical therapy.

Treatment options include conservative supportive therapy, medical, minimal invasive procedures or major surgical procedures.

Conservative measures

This includes bladder training, pelvic floor muscle training and lifestyle modifications, like a change of eating habits, smoking cessation or weight reduction.

Patients should be taught well to help improve their symptoms including good urinary hygiene, good bladder habits and adequate fluid intake.

Studies showed that bladder training is an effective therapy for women with stress, urgency and mixed incontinence[4].

Pelvic floor muscle training (PFMT)

Women and men with different degrees of stress and urgency incontinence can use pelvic floor exercises to try to correct their problem. Nowadays, many primary care physicians, urologist and urogynecologist recommend that patients with incontinence do exercises to strengthen pelvic floor muscles especially the pubococcygeus muscle which act as a sling to keep the bladder and bladder neck supported in order to help maintain continence. Pelvic floor muscle training is a learned technique to increase urethral resistance by increasing periurethral muscle tension.

Anatomy of the pelvic floor

The urethra is closed by the urethral sphincter and the surrounding pelvic floor muscles, mainly the pubococcygeus muscle. This muscle consists of a mixture of slow and fast twitch muscles controlled by the pudendal nerve. Fast twitch muscle fibres are striated type II fibres which produce a strong quick muscle contraction and those types are the ones needed to produce a powerful contraction during a cough or sneeze. The slow twitch fibres are again striated muscle fibres but they are type I and are responsible for producing a sustained less intense contraction which is useful to build muscle strength.

STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

Riyad Al-Mousa and Hashim Hashim

How do I know which muscle is the right one?

If you are in a public place or in a meeting and the food you have eaten causes you to pass wind, the muscle that you use to hold back the wind is the pelvic floor muscle. Another way of knowing it is by trying to stop your urinary stream half-way. Also, the muscle can be identified by pulling the rectum, urethra or vagina inward inside the body.

Definition

PFMT is defined as any programme of repeated voluntary pelvic floor muscle contraction taught by a health care professional.

Historical background

Pelvic floor muscle exercise or what is currently known as pelvic floor muscle training (PFMT) was initiated by Arnold Kegel when he reported in 1948 his successful treatment of 64 cases of females with stress urinary incontinence using pelvic floor muscle exercises[5] hence the name Kegel's exercises.

With the change in practice by years, the term Kegel's exercises no longer was appropriate as the program of exercise is very different to the programme originally suggested by Kegel in 1948.

Currently, the term had to include the word muscle as it is the muscular component of the pelvis floor that is the focus of any exercise programme. Also, it had to specify the term pelvic floor muscle not the pelvic muscle in general.

Finally, Wilson et al.[4] in 2002 chose the term training instead of exercise as they think it is more appropriate and means repeated exercises over time whereas the word exercise is commonly interpreted as an episode of training.

What is the rationale for the use of pelvic floor muscle training in the management of stress incontinence?

The rationale is based on many theories:

1. A fast and strong pelvic floor muscle contraction will clamp the urethra, increasing the urethral pressure and preventing leakage during an abrupt increase in intra-abdominal pressure[6].

2. An effective contraction of the pelvic floor muscle may press the urethra against the symphysis pubis, which creates a mechanical pressure rise.

3. Clinical evidence that suggest that the pelvic floor muscle contraction is a feed – forward loop, as it may precede the bladder pressure rise by 200–250 milliseconds[7].

4. Also, it has been suggested that a well-timed, fast and strong pelvic floor muscle contraction may prevent urethral descent during abrupt intra-abdominal pressure rise[8].

Is there a role of PFMT in patients with urgency incontinence?

The answer is yes. Many studies showed that reflex inhibition of detrusor contraction may accompany repeated voluntary pelvic floor muscle contraction[8, 9, 10].

What are the factors that affect the training result?

The objective of pelvic floor muscle training in the management of stress incontinence is to improve strength and timing of the pelvic floor muscle contraction. This is a slow process which needs regular and intense strength training for at least 8 weeks[11].

The effect of training is dependant on four factors[12]:

1. The type of exercise.

2. Frequency of the exercise.

3. Intensity of the exercise.

4. Duration of the training period.

STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

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Comparison between PFMT and other modalities of treatment

The most up to date review regarding the PFMT was done by Hay-Smith et al.[13].

This included 31 trials comparing PFMT with no treatment, placebo treatment or any other modality of treatment (medications, electrical stimulation or surgery). We can summarise the results of the review as follow:

1. PFMT versus no treatment:

The meta-analysis for seven trials that randomised a total of 679 women for PFMT versus no treatment showed that PFMT was significantly better than no treatment for women with stress and/or mixed incontinence.

Lagro-Janssen and Van Weel[14] reported that 25% of women who were included in the trial (110 patients) were continent even after 5 years of follow-up. Women with urgency or mixed incontinence were less satisfied with the results, although two-third of all the patients were overall satisfied and did not want any further intervention.

2. PFMT versus Placebo:

208 women with urinary incontinence were enrolled in three trials comparing PFMT with placebo treatment[15, 16, 17]. The meta-analysis found that PFMT was significantly better than placebo in the treatment of women with stress, urgency or mixed incontinence.

3. Intensive PFMT versus a standard training programme:

Intensive PFMT is better than a standard training programme for women with stress, and post-natal women with symptoms of urinary leakage (this was shown in six trials with a total of 1,080 women).

4. PFMT versus electrical stimulation :

Eight trials included 295 women with stress urinary incontinence. There is still insufficient evidence of the effect of PFMT versus electrical stimulation in women with stress urinary incontinence.

5. PFMT versus medications:

- Burgio et al.[16], showed that PFMT may be better than oxybutynin chloride in women with detrusor overactivity with or without stress urinary incontinence.
- Henalla et al.[18], showed that PFMT may be better than topical oestrogen in patient with stress urinary incontinence.
- Wells et al.[19], showed that there may be no difference between PFMT and phenylpropanolamine in women with stress and mixed incontinence.

6. PFMT versus surgery:

Klarskov et al.[20] reported that in patients with stress urinary incontinence, surgery had a better result than PFMT with fewer leakage episodes.

Is there a standard protocol or programme for PFMT?

From the previous review that was done by Hay-Smith et al.[13], we can observe the following:

1. The PFMT period: the length of training period was between 6 weeks[17] and 6 months[19, 21, 22]. The American College of Sports Medicine (1992) recommend to keep training for at least 20 weeks.

2. Programme varied from hourly contraction18 to sets of contractions repeated three times a day[21].

3. Number of contractions ranged from 36[21] to 200[23].

4. Length of hold from 3[23] to 40 seconds[22].

This wide variation in the parameters of training programmes gives us an idea that practitioners still lack solid information about what constitutes an effective PFMT programme.

On the basis of what we have in the literature, pelvic floor muscle training programmes should include at least three sets of 8–12 slow velocity maximal voluntary pelvic floor muscle contraction sustained for 6–8 seconds each to be performed 3–4 times a week and continued for at least 20 weeks.

The Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) suggested a protocol for a PFMT consisting of a daily minimum of 3–45 contractions, with a duration of 10 seconds for each contraction, and at least 10 seconds of relaxation between each contraction for a duration of training of at least 6–8 weeks[24].

STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

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Strategies to improve outcome of PFMT

Effective strategies include the following:

1. Increase length of contractions.
2. Increase number of contractions.
3. Reduced rest periods.
4. Close to maximal voluntary pelvic floor muscle contraction.

Out of these four, near or close to maximal pelvic floor muscle contraction is considered the most significant factor in increasing strength[25].

Summary

Urinary incontinence is a worldwide common problem with a higher prevalence in women than men. Yet, only a small percentage of patients seek medical help to solve this problem.

Conservative therapies play an important role to treat patients with incontinence.

Clinical trials showed that PFMT is significantly better than no treatment and placebo treatment for patients with urinary incontinence. Also, intensive PFMT programmes are more effective than standard training programmes. However, the effectiveness of PFMT versus other forms of modalities including electrical stimulation, medication and surgery is not clear.

Therefore, PFMT should be offered as a valid type of therapy to patients with stress and/or mixed incontinence.

Finally, more clinical trials with long-term follow-up and a greater number of patients is needed in order to determine the best strategies for PFMT and further investigate the effectiveness of PFMT compared to other forms of therapies available.

Multiple Choice Questions

1. Exercises that are used to strengthen pelvic floor muscles are best called:
a. Kegel's exercises.
b. Pelvic floor exercises.
c. Pelvic floor muscle training.
d. Pelvic floor muscle exercises.

2. Factors that may affect the training result include all except:
a. Type and frequency of the exercise.
b. Race of the patient.
c. Duration of the exercise.
d. Intensity of the exercise.

3. Effective strategies to improve outcome of pelvic floor muscle training include all except:
a. Decrease length of contraction.
b. Increase number of contraction.
c. Reduced rest periods.
d. Close to maximal voluntary pelvic floor muscle contraction.

4. All true except:
a. PFMT is superior to no treatment or placebo in patients with stress and mixed urinary incontinence.
b. Studies showed that PFMT is better than sling procedures to treat patients with stress urinary incontinence.
c. The more intensive the PFMT programme, the better the result is.
d. PFMT may have a role in patients with urgency incontinence.

5. Male patients with stress urinary incontinence post radical prostatectomy:
a. May benefit from PFMT.
b. Are not a good candidate for PFMT.
c. PFMT is contraindicated in those types of patients.
d. None of the above.

Answers

1. c: pelvic floor muscle training is the most recent and comprehensive term to describe such exercises. The rest of choices incompletely describe the process.

2. b: types, duration and intensity of the exercise all are vital parameters that were shown to affect training. Race of the patient doesn't affect training result.

3. a: effective strategies to improve outcome of PFMT include choices b, c and d, and increase the length of the contraction not decrease the length of the contraction.

4. b: studies showed that surgery had a better result than PFMT with fewer leakage episodes[20].

5. a: PFMT in patients with stress urinary incontinence post radical prostatectomy still may have a role in improving symptoms especially in those with mild to moderate symptoms.

STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

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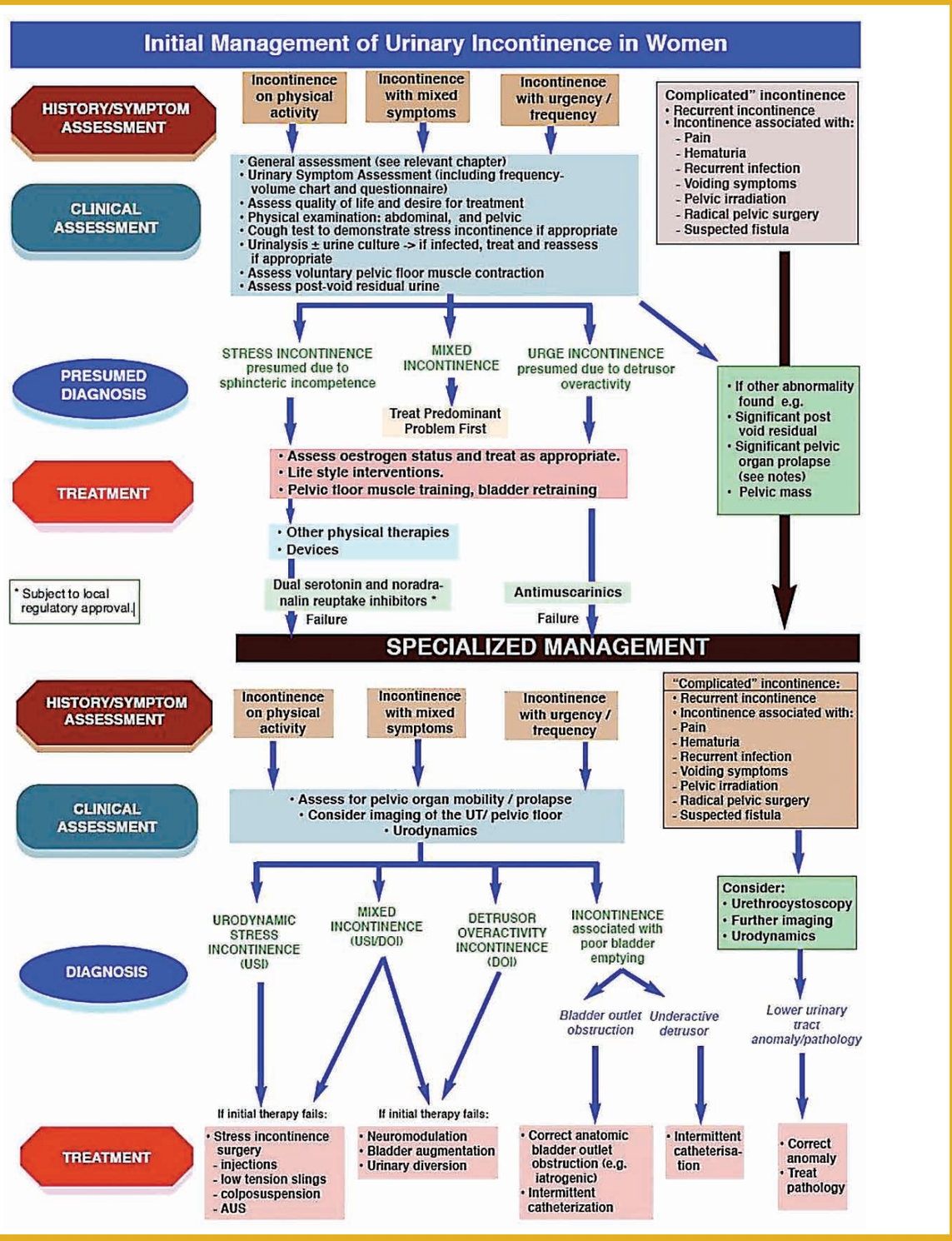


Figure 1: Management of urinary incontinence in women.

STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

Riyad Al-Mousa and Hashim Hashim

What are pelvic floor muscles?

They are layers of muscles stretching like a hammock from the pubic joint at the front of the pelvis to the coccyx and sacrum at the back of the pelvis. They are firm and supportive, helping to hold the bowel, bladder and uterus in place and closing the outlets of the bladder and bowel. When you pass urine or have a bowel motion, the pelvic floor muscles relax. After emptying, they tighten again to restore control.

Why do pelvic floor exercises?

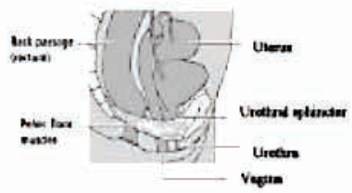
Weakness of the pelvic floor muscles can be a common problem affecting 1 in 3 women by middle age, resulting in incontinence and prolapse.

This may be due to being overweight, post pregnancy/childbirth, pelvic surgery or simply getting older. Incontinence can affect your bladder and/or bowel.

So if you:

- leak on coughing, sneezing, laughing or physical exertion
- leak before reaching the toilet
- are of child-bearing years
- are menopausal

pelvic floor exercises are for you.



Identifying the pelvic floor muscles

Sit comfortably on a firm chair with your knees slightly apart, lean forward over your knees with your elbows resting on your thighs – relax in this position.

Stage 1:
Tighten your back passage – imagine that you are stopping yourself passing wind, focus on the tightening around the opening of the bowel. Do not squeeze your buttocks or leg muscles.

Stage 2:
Tighten your vagina and front passage – imagine that you are trying to stop the flow of urine. Focus on this tightening; try to feel the muscles lifting upwards and forwards towards the pubic bone.

Stage 3:
Do both of the above tightening exercises together and hold this. How many seconds can you hold? Aim for 5 seconds – when you let go, can you feel the muscles relax? If not, you have held too long – try again with a shorter hold. Some women may be able to hold for only 1-2 seconds and others as many as 8-10 seconds. It is important to discover your hold.

Pelvic floor exercises

In sitting – as before:

Exercise 1 - slow pull-ups
Tighten the pelvic floor muscles slowly, as in Stage 3, continue to tighten for your length of hold, relax, and feel the muscle let go. Rest for a count of 5 seconds. Repeat this 5 times. As it gets easier, gradually increase length of hold and number of repeats.

Exercise 2 - fast pull-ups
Tighten the pelvic floor muscles quickly, do not hold, and feel the muscle let go straight away. Repeat this 10 times – approximately 1 contraction per second.

Pelvic floor exercise routine
Do exercise 1 and 2 at each session. That is 5 slow pull-ups and 5 fast pull-ups. Aim to repeat each session up to 5 times each day.

Do not expect immediate improvement – so do not give up. You need to continue this routine for at least 6 months. As the muscle gets stronger you will be able to increase your hold and number of repetitions at each session.

Do not practice stopping midstream.

Exercise for life

Continue pelvic floor exercise several times per day for the rest of your life in order to keep these muscles fit and healthy. If symptoms return increase your daily input again.

Additional tips

Being constipated or overweight can strain the pelvic floor muscles so eat a balanced diet including fruit and vegetables and between 6 and 8 cups of fluid a day. Avoid tea, coffee or coca-cola if you suffer from urgency or frequency.

Tightening the pelvic floor muscles when you lift heavy objects or when you are going to cough or sneeze will help your control.

If your problem is 'urgency', tighten your pelvic floor when you get the desire to empty your bladder, wait until the desire passes before moving.

Specialist referral

If you have difficulty in identifying your pelvic floor muscles and have symptoms of incontinence discuss this with your consultant or GP who can refer you to a Physiotherapist who specialises in Women's Health problems.

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Figure 2: North Bristol NHS Trust Pelvic Floor Muscle Training patient information leaflet.

STRESS URINARY INCONTINENCE: ROLE OF PELVIC FLOOR EXERCISES

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SUPRAPUBIC CATHETERISATION

Alistair Grey, Priyadarshi Kumar and Jhumur Pati

An 80-year-old male presents to the A&E department complaining of lower abdominal pain and an inability to pass urine. The history of this complaint starts a few days previously when his existing, but largely tolerated LUTS became steadily worse.
Practical Procedures.

Introduction

An 80-year-old male presents to the A&E department complaining of lower abdominal pain and an inability to pass urine. The history of this complaint starts a few days previously when his existing, but largely tolerated LUTS became steadily worse.

He gives a past medical history of ischaemic heart disease and hypertension. He also has a history of BPH and voiding type LUTS, for which he has been taking tamsulosin 400µg and dutasteride 500µg daily. He had an appendicectomy as a young man via a McBurney's gridiron incision but has had no other abdominal surgery. A check on the hospital computer system reveals normal serum creatinine and PSA levels from 2 months ago.

On examination the man is in obvious discomfort. His vital signs show that he is tachycardic with a pulse of 100 but that he is apyrexial with a normal blood pressure. Examination of his abdomen revealed it to be soft with tenderness in the suprapubic region but no signs of peritonism. A palpable midline mass extends from symphysis pubis to umbilicus and is dull to percussion. Digital rectal examination performed after catheter insertion showed only BPH.

What is the likely diagnosis?

The man is likely to have acute retention of urine. The cause of this is, at least in part, very likely to be his BPH. He has been taking dual pharmacotherapy to control his symptoms but the disease has progressed nonetheless. He may have had a contributing factor, such as ongoing lower urinary tract infection, constipation or prostatitis.

In this case careful attempts at urethral catheterisation, once by the attending Foundation doctor and once by the surgical SHO were unsuccessful. In this light a decision was reached to insert a catheter by the suprapubic route.

Suprapubic Catheterisation

The insertion of suprapubic catheters (SPCs) may be carried out in an emergency situation where the bladder cannot be drained by the urethral route or electively as an alternative to a long-term urethral catheter. It is considered by many an essential skill for the surgeon in training and may also be useful for Foundation doctors in acute specialities, given appropriate training. It is a commonly used technique for bladder drainage, particularly among urologists, but does however have a rare but serious range of complications including death and bowel injury requiring laparotomy[1] and as such some knowledge of its indications and dangers is useful for any doctor in training. This article aims to provide an overview of the SPC, its use and contraindications.

SUPRAPUBIC CATHETERISATION

Alistair Grey, Priyadarshi Kumar and Jhumur Pati

Indications for suprapubic catheterisation

Acute
Unable to pass urethral catheter
Suspicion of urethral injury (history, blood at the meatus)
Urethral stricture
Elective
Long-term catheterisation in incontinence, bladder outflow obstruction, neuropathic bladder.
Open bladder surgery (e.g. open prostatectomy, repair following injury, open cystolithotomy).
Recurrent UTIs with long-term urethral catheter
Reduced interference with sexual function
Patient comfort/preference

Methods of SPC insertion

Three types of suprapubic catheter are available commercially in the UK. The most useful of these to many urologists is the Add-a-cath™ kit (see Figure 1), manufactured by Femcare Ltd which uses a trocar to pass a Foley catheter through the abdominal wall. Other options include the Bonanno™ catheter which uses a small bore catheter with a needle for insertion. This has the advantage of being less traumatic but the disadvantage is that it blocks and kinks easily and cannot easily be exchanged for a long-term Foley[1].

A more recent introduction is the Mediplus SPC which takes a Seldinger approach using a trocar/dilator through which a guide wire may be passed. This has the theoretical advantage of reducing complications by reducing the possibility of injury to the patient from a misdirected trocar. It may do less to prevent injury to small bowel punctured en route to the bladder. There is not a great deal of clinical evidence yet available on this device[2,3].

A final technique, favoured by some urologists, is the retrograde bougie. This curved metal device (see Figure 2) is passed through the urethra of male or female patients and into the bladder. It is pushed in an anterior direction until palpable through the skin and may then be cut down onto directly through the abdominal wall. The catheter is tied to the bougie and is carried into the patient as the bougie is withdrawn. Once the catheter tip appears at the external urethral meatus the attaching suture may be cut and the catheter tip returned to the bladder under cystoscopic guidance. Clearly this technique is only viable if the urethra can be negotiated and, as such, will tend to be used only for elective SPCs.

Technique

We will describe the procedure for the trocar style SPC, which is most commonly used in acute situations in our unit. It is also the technique likely to be used by non-urologists. Clearly such techniques are best learnt at the bedside.

The procedure, as well as any alternatives, should be explained to the patient and verbal consent obtained. The patient should be positioned supine and the abdomen and pelvis exposed. Suprapubic catheterisations should be carried out using sterile gloves and precautions. The skin is cleaned around the midline above the symphysis pubis using an alcohol or iodine-based preparation and the surroundings draped. It is important to prepare all the parts of the kit in advance of starting the procedure. The authors recommend removing the Foley catheter from its packaging completely. Once the trocar is in the bladder the catheter must be inserted quickly. Leaking urine may cause the bladder to come away from the sheath as it empties and the tract to be lost. Clearly it may also be a source of distress to the patient and extra work for the nursing staff.

Local anaesthetic is instilled into the skin in the midline a 3–4cm cephalad from symphysis pubis. This point should be over the bladder at close to its current maximum diameter. The operator should be aware that a significant number of men who come to have SPCs placed also have a large prostate which protrudes into the bladder and may be caught with the trocar if too inferior an approach is chosen. It is important to aspirate urine from the bladder after anaesthetic injection. This will confirm correct positioning. In obese patients a spinal needle may be required to reach the bladder.

The knife is used on skin and superficial layers in a transverse stab incision about 1cm in length. The authors recommend carefully incising linea alba with the blade also as this will reduce the amount of force required with the trocar. This should be inserted held perpendicular to the skin and with the forefinger extended most of the way toward the tip, helping to prevent damage to the posterior bladder wall or structures beyond. Once a flashback of urine is seen the trocar is removed from its sheath and swiftly replaced with a Foley catheter. The balloon is inflated in the normal manner and a drainage bag fitted.

SUPRAPUBIC CATHETERISATION

Alistair Grey, Priyadarshi Kumar and Jhumur Pati

Complications and hazards of SPCs

The complications of these techniques largely stem from the potential for damage to pelvic contents found close to the bladder, such as the prostate. This potential seems higher in those patients who have had abdominal or pelvic surgery as they may have bowel lying anterior to the bladder. There is also the possibility of misdiagnosis, for example, if an ovarian cyst has been mistaken for the bladder.

Unfortunately the true incidence of these complications is difficult to assess as the published data is slight. Flock et al. in 19784, reported a complication rate of 1.6% in 244 patients. Given that SPC insertion could well be carried out by the non-urologist in a ward situation these figures may underestimate the true size of the problem.

Discussion

Acute urinary retention is most often a very painful experience for patients. It is important to realise that while the pain will in most cases be relieved by prompt urethral catheterisation, when this is unsuccessful analgesia, including IV opiates, should be considered.

Whereas urethral catheterisation may be used as a method of confirming the diagnosis of acute retention, clearly the consequences of insertion of an SPC into a patient without a full bladder may be catastrophic. If there is doubt over clinical examination findings it is important to confirm them. Portable ultrasound, now commonly available in A&E departments, or a simpler bedside bladder scanner are useful adjuncts to examination. An algorithm for patients in whom urethral catheterisation is unsuccessful may be found in Figure 3.

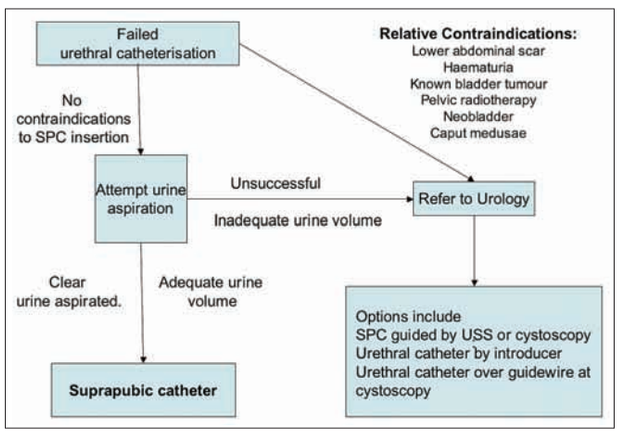


Figure 3: Options for catheterisation in urinary retention.

Conclusion

Suprapubic catheters are a useful way of draining the bladder in the acute situation where urethral catheterisation is unsuccessful or contraindicated. They are also the device of preference in many patients who require long-term catheterisation. Exact complication rates are unclear but there is a low risk of serious adverse consequences and as such their insertion should be practiced by doctors with appropriate training and experience of the procedure.

Multiple Choice Questions

1. A man is seen in A&E with acute on chronic urinary retention. What is his presenting complaint most likely to be?

a. Low abdominal pain and an unfulfilled desire to pass urine.
b. Stress incontinence.
c. Poor stream and nocturia.
d. Recent overflow incontinence as well as malaise, nausea and itching skin.
e. Urinary frequency and urgency.

2. You see a man in A&E with low abdominal pain. The history suggests acute retention of urine but he has previously had a sigmoid volvulus conservatively managed. What will be the most useful discriminator on examination?

a. Observation.
b. Palpation.
c. Percussion.
d. Auscultation.

3. The suprapubic catheter is inserted in the midline because:

a. The chance of damage to abdominal organs is least.
b. It is the most convenient position for the patient.
c. The abdominal midline constitutes a "bloodless field" and chances of haemorrhage are less.
d. Leakage of urine from the bladder is more likely in a lateral puncture.

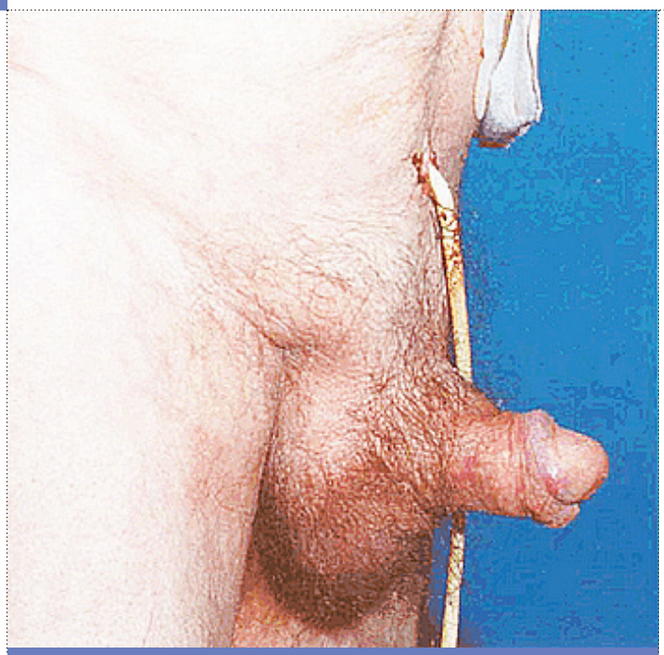
TRUE/FALSE

4. Suprapubic catheters are associated with a higher rate of UTI than urethral catheters.

5. SPCs may be safely changed by a district nurse.

SUPRAPUBIC CATHETERISATION

Alistair Grey, Priyadarshi Kumar and Jhumur Pati



Changing an SPC once the tract is matured is relatively straightforward and arguably easier than for the urethral route. The tract is short, straight and easy to find.
Practical Procedures.

Answers

1. d – Chronic retention tends to be characterised by high bladder volumes in the absence of the pain associated with distension in acute retention. The malaise, nausea and itch are characteristic of the renal failure or obstructive nephropathy often seen in chronic retention. Poor stream and nocturia are classically symptoms of bladder outflow obstruction (BOO) secondary to benign prostatic hyperplasia (BPH) but would tend not to be a presenting complaint as they are present over a longer period of time. Frequency and urgency may be seen in BOO but are more commonly associated with overactive bladder (OAB).

2. c – A patient with sigmoid volvulus may well have a tender mass toward the midline. One would expect increased or obstructive sounding bowel sounds in volvulus but these may not be as clearly identified as the dull percussion note of a distended bladder or the hyper resonant one heard in volvulus. Ironically volvulus in cattle, or "the bloat", has been treated with a percutaneous puncture with a trocar and sheath instrument very similar to an SPC kit, most famously in Far from the Madding Crowd. This would not constitute best management in humans.

3. c – The muscles of the abdominal wall coalesce in the central linea alba. Their blood supplies including inferior epigastric may be avoided by puncture in the midline. This is one of the reasons laparotomies tend to be carried out via midline incisions as well.

4. False – what evidence is available would suggest that SPCs have a lower rate of associated UTI5. This would support the theoretical argument that due to a shorter tract (particularly in males) lined by tougher squamous epithelium, rather than the more delicate transitional epithelium, penetration of bacteria is less likely. Infection rates may be even lower in a tunneled SPC using a technique similar to a Hickman line.

5. True – changing an SPC once the tract is matured is relatively straightforward and arguably easier than for the urethral route. The tract is short, straight and easy to find. The exception to this is in the first 4–8 weeks after placement. If the catheter is removed at this stage the immature tract may well be lost immediately as the tissues shear against each other. This may cause leakage of urine into the retropubic space. No recent SPC should be removed without Urological guidance.

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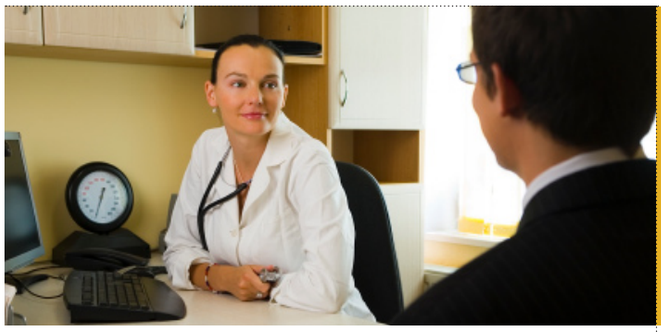
CASE BASED INVESTIGATION: URODYNAMICS

Zafar Maan, Samia Nesar, Asad Salman Mahmood, Nicola Dickens, Tamer El-Husseiny, Konstantinos Moraitis, Junaid Masood, Islam Junaid & Noor Buchholz



Mr RA is a 54-year-old gentleman referred by his GP for lower urinary tract symptoms (LUTS) with poor urinary flow, nocturia, increased daytime urinary frequency and urgency with occasional urge incontinence. Good Clinical Care.

The Case

Mr RA is a 54-year-old gentleman referred by his GP for lower urinary tract symptoms (LUTS) with poor urinary flow, nocturia, increased daytime urinary frequency and urgency with occasional urge incontinence. He also complains of right loin pain but denies haematuria or dysuria. He has type 1 diabetes and his current medications include insulin, tamsulosin (400µg ODS) and tolterodine (2mg ODS). He is a non-smoker.

On examination the abdomen is soft and non-tender. Examination of the external genitalia is unremarkable. The digital rectal examination (DRE) reveals a smoothly enlarged prostate gland. Lower limb neurological examination reveals no abnormalities.

Investigations

• Serum creatinine:	92 µ mol/L
• Urine dipstick analysis:	negative
• Urine cytology:	negative
• Microscopy culture and sensitivity (MSU):	no growth
• Prostate-specific antigen (PSA):	1.4ng/mL
• Urinary flow rate (maximum flow rate):	Qmax <10ml/sec
• X-ray of kidney, ureters and bladder (KUB):	no renal tract calcification
• Ultrasound KUB:	normal urinary tract

Mr RA is referred for urodynamics studies to distinguish between detrusor over activity (DO) and bladder outflow obstruction (BOO).

Introduction

This article aims to provide Foundation Year doctors with an insight into both the theoretical and practical aspects of urodynamics using current European Association of Urology (EAU) guidelines and available literature, initially being discussed as a case based investigation.

History and examination

EAU guidelines (2006) state that a thorough patient history should be taken, a full physical examination carried out and basic diagnostic tests be performed[1].

Definition: Lower urinary tract symptoms (LUTS)

Mr RA presented with LUTS. The guidelines of the standardisation subcommittee of the International Continence Society (ICS) divide LUTS into three main categories: storage, voiding and post-voiding symptoms[2].

Storage symptoms:

• Increased daytime frequency of micturition.
• Nocturia: patient complains of waking up during the night to pass urine (at least once).
• Urgency: a sudden compelling desire to void which is difficult to postpone.
• Urinary incontinence: involuntary leakage of urine in a socially or hygienically unacceptable place:
- Stress urinary incontinence: involuntary leakage of urine on exertion or a stimulus (e.g. sneezing or coughing)
- Urge incontinence: involuntary leakage of urine either associated with, or promptly following an episode of urgency.

Voiding symptoms:

• Slow stream: the rate of urine flow is lower compared to previous experiences or other people.
• Intermittency: urine flow that stops and starts during voiding.
• Hesitancy: a difficulty in starting to void resulting in a delay when the patient is ready to pass urine.
• Straining: muscular exertion needed to initiate, maintain and increase the stream.

Post-voiding symptoms
(symptoms experienced immediately after voiding):

• Feeling of incomplete emptying.
• Post-micturition dribbling (PMD).

Storage symptoms are associated, predominantly, with detrusor overactivity (where the detrusor muscle is contracting uncontrollably), whereas voiding symptoms are usually due to bladder outlet obstruction (BOO), with one of the main causes in men being benign prostatic enlargement (BPE) secondary to benign prostatic hyperplasia (BPH)[2].

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Medical history

From the medical history, Mr RA has moderate mixed storage and voiding symptoms with occasional urge incontinence.

His relevant past medical history includes type 1 diabetes. This can result in neurological dysfunction (diabetic cystopathy) of the lower urinary tract including voiding difficulties that could produce a poor urinary flow[2].

His current medications are tamsulosin (400µg once a day), tolterodine (2mg once a day) and insulin. Tamsulosin is a ∂1A receptor antagonist used in BPH treatment resulting in smooth muscle relaxation within the prostatic urethra and the bladder neck, and improves the urinary flow and bladder emptying. Tolterodine is an anti-cholinergic used to treat involuntary detrusor contractions of detrusor overactivity causing urgency and urge incontinence[3]. Anti-muscarinic drugs reduce these contractions and increase bladder capacity.

Physical examination

There was no palpable bladder (excluding chronic retention as a cause of symptoms). DRE revealed a smoothly enlarged prostate which raises the possibility of BOO secondary to benign prostatic hypertrophy (BPH). A neurological examination is performed to exclude gross neurological disease particularly as the patient suffers from diabetes[1].

Diagnostic tests

- Serum creatinine (in the normal range: 92mol/l).
- MSU and urine dipstick to exclude urinary tract infections (UTIs).
- Post-voiding residual bladder volume to exclude urinary retention.
- Maximum flow rate: <10ml/sec – this is a poor urinary flow.

Mr RA is relatively young for a typical BPH patient and has mixed storage and voiding symptoms. The storage symptoms may indicate detrusor overactivity, whereas an enlarged prostate could indicate BOO.

Therefore, urodynamics was performed to establish the diagnosis. It is recommended to perform urodynamics prior to surgery if a patient is <50 or >70 years, has neurological symptoms, has a mixture of symptoms or previous interventions[1].

Urodynamics

Definition

Urodynamics aims to reproduce the patient's symptoms and to provide a pathophysiological explanation by correlating the patient's symptoms with the urodynamic findings[4].

It is a dynamic investigation of the urinary tract, assessing how the bladder responds during filling and voiding. Conventionally it is performed by filling the bladder, via a catheter, with either saline and/or contrast media. Pressure transducers are also placed into the bladder and rectum. The "detrusor" pressure is calculated by subtracting the abdominal pressure (rectal line) from the intravesical pressure (bladder transducer). After the filling phase is complete the patient empties their bladder (voiding phase) and a pressure flow study is performed. This is known as conventional urodynamics and is also called a cystometrogram (CMG) or "filling and voiding cystometry".

Video-urodynamics gives anatomical information, for example, to characterise the descent of the bladder in female stress urinary incontinence (SUI). Occasionally, it is not possible to reproduce the patient's symptoms during conventional or video-urodynamics and in such cases ambulatory urodynamics is required. In this article, however, the term "urodynamics" refers simply to conventional urodynamics.

Indications

Urodynamics is used to answer questions, such as: is there any obstruction? Is there overactivity? What pressures can the bladder generate? Is the bladder emptying properly? It cannot answer questions regarding the underlying disease, such as: does this patient have multiple sclerosis? Does this man have BPH? Does this man have cancer?

Urodynamics is most commonly used in the diagnosis of SUI, BOO and DO. The necessity for such an investigation arose following studies which demonstrated that the symptoms of and existing investigations for female SUI[5, 6] and male BOO[7, 8] lacked diagnostic specificity. Thus urodynamic investigation may be indicated when patients present with stress or urge incontinence, or when the diagnosis is not clear.

Another important indication for urodynamics is the characterisation of the lower urinary tract in patients with neurological diseases, such as spinal cord injury. In these conditions urodynamics can identify patients at risk of injury to the upper urinary tracts and possible renal failure. Thus, urodynamics has a vital role to play in understanding, diagnosing and characterising important urological conditions and their subsequent management.

Contraindications and complications

The only absolute contraindication is urinary tract infection. Relative contraindications include psychiatric disorders, such as dementia, which make the patient unable to comprehend instructions; patients in isolation for infectious diseases; children or patients with pathologies which make catheterisation difficult, such as strictures. Complications include infection, haematuria and acute urinary retention.

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Urodynamic procedure

Consent is sought and the patient is given written information prior to urodynamics, a history questionnaire that includes drug history and relevant past medical history, and a bladder diary to be completed at least 24 hours before arrival.

A urine dipstick, or recent mid-stream urine (MSU), is necessary to rule out urinary infection.

Necessary equipment for urodynamics:

- strain gauge transducers – one each for bladder and rectum
- fluid filled lines – for the transducers
- catheter (the ICS recommends the double lumen type)
- tape – to secure the lines
- CMG computer and calibrated pump.

An example of typical urodynamics equipment is shown below (see Figure 1).

Figure 1: Typical urodynamic equipment.

Preparation

Before the test, the patient is asked to empty his bladder and a post-void residual is noted. The patient is then asked to lie down and the catheter and the two pressure transducer lines are inserted into the bladder and rectum, secured with tape and flushed with saline. The patient is then stood upright, usually, and the transducers are zeroed to atmospheric pressure and standardised by a reference height of the patient's symphysis pubis. The bladder transducer records the intravesical pressure (Pves), and the rectal line records the intra-abdominal pressure (Pabd). The detrusor pressure (Pdet) is then derived by subtracting Pabd from Pves.

Filling cystometry

The bladder is infused with normal saline. The standard rate of filling is 50ml/min, but in patients with a suspected neuropathic bladder the initial rate is usually 20ml/min. Subtraction is checked for, throughout, by asking the patient to cough; a biphasic wave will be seen on Pdet.

This part is called filling cystometry and provides information on the compliance (i.e. the change in volume divided by the change in pressure in ml/cm H20), stability and capacity of the urinary bladder, neurosensory sensation and competence of the bladder outlet.

As the bladder fills the patient is asked to announce a first sensation of bladder filling (FS), then the first desire to void (FD) at approximately 200ml, then the normal desire to void (ND) at approximately 300ml, then a strong desire to void (SD) at approximately 400ml; this is the maximum cystometric capacity and filling is stopped now. All symptoms that the patient complains of are recorded.

Voiding cystometry

The patient is instructed to void into a flowmeter and thus the so-called voiding phase of cystometry begins: detrusor pressure and urinary flow are simultaneously recorded and the computer plots this using the ICS nomogram. In simple terms a high detrusor pressure/low urinary flow suggests BOO, while a lower detrusor pressure with a high urinary flow suggests no obstruction at all.

Summary of Urodynamic Procedure[4,9]

1. Urological history taken and examination performed.
2. Type of urodynamics study selected.
3. Patient consent obtained.
4. Past medical history and drug history questionnaire filled out.
5. Frequency/volume chart filled.
6. Urine dipstick and MSU.
7. Urodynamic equipment prepared.
8. Patient asked to empty bladder and a post-void residual recorded.
9. Bladder and rectal lines prepared, flushed and inserted together with a bladder filling catheter.
10. Lines secured with tape.
11. Transducers zeroed to atmospheric pressure at reference height of the patient's symphysis pubis.
12. Filling of bladder commenced usually at a rate of 50ml/min.
13. Start at 20ml/min if neuropathic bladder suspected.
14. Subtraction is checked and then repeated throughout by asking the patient to cough.
15. All symptoms of patient complains are recorded throughout.
16. Filling cystometry – note volume infused at:
    - first sensation of the bladder filling (FS)
    - first desire to void (FD)
    - normal desire to void (ND)
    - strong desire to void (SD), and
    - urgency.
17. Voiding cystometry – patient instructed to void into a flow machine.
18. Residual volume recorded by using bladder scanner.
19. Detrusor pressure and urinary flow plotted on to ICS nomograph.

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Results

Mr RA's urodynamic findings are summarised below:

- FD: 266ml
- ND: 371ml
- SD: 385ml
- Cystometric capacity 429ml
- No detrusor overactivity demonstrated
- No hypocompliance
- Voiding phase/cystometry:

- Q (urinary flow) max: 11.7ml/sec
- Average Q (urinary flow): 7ml/sec
- Pdet @ Qmax (detrusor pressure at maximum flow): 94cm H2O
- Voided: 430ml
- Residual (volume in bladder): negligible

His voiding cystometry and nomogram are shown below (see Figures 2 and 3).

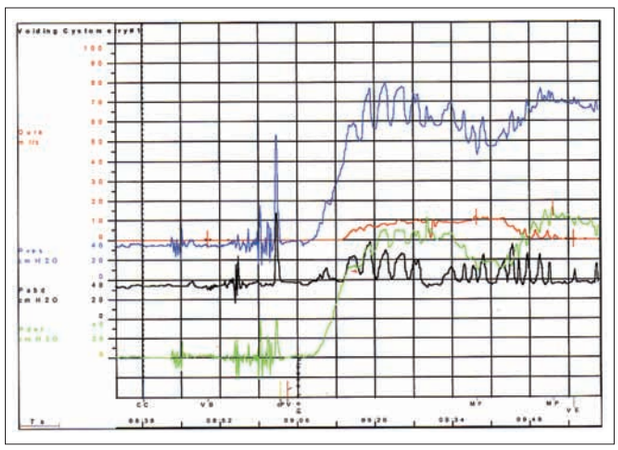

Figure 2: Filling and voiding cystometry.

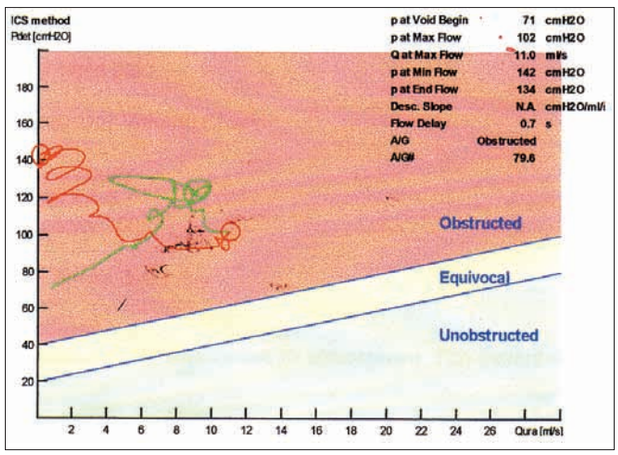

Figure 3: ICS nomogram.

Mr RA sensed his first desire to void after 266ml was infused into his bladder through the catheter; then he sensed his normal desire at 371ml and a strong desire to void at 385ml. It was found that his cystometric (bladder) capacity was 429ml. These values indicate a normal bladder capacity with no sensory urgency.

Mr RA's voiding cystography shows that a large rise in detrusor pressure produced little rise in urinary flow; this suggests bladder outflow obstruction (BOO). This can be formalised as the Bladder Ouflow Obstructive Index (BOOI) which is determined by the following formula.

BOOI	= Pdet @ Qmax	- 2 (Qmax)
	= 94	- (2 x 11.7)
	= 94	- 23.4
	= 70.6	

A BOOI of less than 20 suggests no obstruction, whereas a BOOI of greater than 40 suggests obstruction; any result in between is equivocal. Thus Mr RA's BOOI of 70.6 confirms BOO.

Conclusion

The history, examination and the diagnostic tests revealed that Mr RA presented with mixed lower urinary tract symptoms both storage (increased daytime frequency, urgency, nocturia and occasional urge incontinence) and voiding (poor flow with a Qmax <10ml/sec) symptoms. The digital rectal examination revealed an enlarged benign prostate. Since Mr RA is relatively young (54 years old) the underlying cause was difficult to establish clinically and so urodynamics was performed to differentiate between bladder outlet obstruction and detrusor overactivity.

Mr RA's urodynamic study showed no detrusor overactivity during the filling phase, but a high detrusor pressure/low urinary flow system during the voiding phase confirming bladder out flow obstruction.

Professional development questions

1. You are an FY1 doctor in a busy urodynamics clinic. The patient, who does not speak English, has consented to the procedure, with the help of a translator. You are told to catheterise the patient, unsupervised; however, you encounter difficulties, as the urethra is narrow and the patient starts to cry out in pain. You try and instruct the patient to relax, but to no avail.

You contemplate what to do next:

a. Call and wait for the translator to help instruct the patient.
b. Carry on trying to catheterise the patient and ignore the patient's cries.
c. Wait till your supervisor returns and seek his/her guidance.
d. Contact a senior member of your team (e.g. registrar/consultant).

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2. As the FY2 doctor in the urodynamics clinic, your next patient feels that you lack experience and insists that someone more senior should catheterise them instead.

You evaluate your options:

a. Calmly assure him/her that you are qualified and capable of catheterising them.
b. Call a senior member of your team and ask them to do it.
c. Refuse to treat this patient.
d. Argue with the patient that they are being unreasonable, you do not appreciate this kind of attitude and you deserve more respect.

3. You are an FY1 doctor being observed in the urodynamics clinic by the ST3 registrar. She instructs you to insert two transducer catheters: one into the patient's urinary bladder and another into his rectum; as you zero them to atmospheric pressure at the reference height of the patient's symphysis pubis, you make a mistake because the patient moves. Much to your embarrassment, she begins to shout at you in front of the rest of the team and the patient, while telling you to continue with the procedure.

You are unsure of how to respond:

a. Ignore her criticism and continue.
b. Shout back saying it's not your fault.
c. Tell her that you can't work with her if she is acting like this.
d. Say nothing and walk out.

4. You are the only male, or female, FY2 doctor in the urodynamics clinic. A female, or male, patient, who has consented to the procedure, is refusing to void, for voiding cystometry, with you in the clinic.

You consider your response:

a. Leave the clinic and miss voiding cystometry.
b. Explain to the patient that you will be in the next room and allow them privacy.
c. Tell the patient you've "seen it all" already.
d. Pretend to leave.

5. As you are assisting a fellow FY1 doctor in the urodynamic clinic, you observe him carrying out an unsterile catheterisation technique; when you later confront him about this, he replies that sterility is unimportant.

What do you do?

a. Report him to a senior member of your team.
b. Ignore it and let him do what he wants to do.
c. Explain the importance of sterility in catheterisation to him again.
d. Warn patients about him.

Answers

Answer 1.

This question tests both your communication skills and ability to cope with pressure. The answers, listed in reverse order of effectiveness, are as follows:
b. This is the least helpful option and will only exacerbate the situation.
d. Prompt action ought to be taken and senior members of your team are likely to be busy elsewhere.
a. While this is, essentially, the most effective option, it is too costly and time consuming to be an entirely helpful idea.
c. This is best as it ensures action is taken as soon as possible and allows you to discuss any problems you may be having in your catheterisation technique with an experienced urodynamics health care professional.

Answer 2.

This question tests your capability to adapt your behaviour and language as appropriate to different situations. The answers, listed in reverse order of effectiveness, are as follows:
d. Arguing with the patient is likely to only confirm reservations he/she has about you; GMC fitness to practice guidelines state that doctors should strive to build and preserve successful relationships by ensuring that they have the patient's trust and respect their autonomy and rights.
c. While sometimes this is the best course of action, it should be left as a last resort, when all other options has been explored.
b. You will often encounter patients that are uncomfortable with trainees, so the safety net provided by our seniors should be used only when appropriate.
a. This should be your first response; if, however, this fails, then
b. Is the next step.

Answer 3.

This question tests your ability to work as a member of a team and coping with difficult pressures. This is an important issue in regards of fitness to practice as the GMC states that doctors must have an effective working relationship with their team. The answers, listed in reverse order of effectiveness, are as follows:
b. Arguing only escalates situations; instead you should respond calmly and accept that you may be, at least partly, at fault.
d. If you feel you cannot calmly respond then this may be necessary; however this lack of communication hinders team-work and this may result in poor patient care.
a. If you have, in the past, tried to explain how you feel but to no avail, then this may be necessary.
c. This is the best course of action because it allows your colleague to understand that you did not appreciate being criticised in that manner, especially in front of the team and the patient.

CASE BASED INVESTIGATION: URODYNAMICS

Zafar Maan, Samia Nesar, Asad Salman Mahmood, Nicola Dickens, Tamer El-Husseiny, Konstantinos Moraitis, Junaid Masood, Islam Junaid & Noor Buchholz

Answer 4.

This question tests your ability to cope with a difficult situation. The GMC emphasise that patient care must not be compromised, nor should the patient's autonomy or rights. The answers, listed in reverse order of effectiveness, are as follows:

d. Deceiving the patient may harm your relationship with them if found it and you make a bad impression on your colleagues.

c. You should not dismiss the patient's concerns because it hinders rapport.

a. In some circumstances this may be necessary, but should be avoided as it means you will miss out on valuable learning opportunity.

b. By communicating effectively with the patient you develop rapport and trust, and maintains their dignity and autonomy.

Answer 5.

This question tests your professional integrity. It is important to put patient safety first; the GMC makes it clear that if a colleague may be unfit to practice then you should take the appropriate steps without delay.

The answers, listed in reverse order of effectiveness, are as follows:

d. This is only a short-term solution and does not address or solve the issue at hand.

b. You cannot let him continue thus as it means he is putting patients at risk.

a. If he continues to ignore your warnings then this may be necessary, however, it may damage your relationship.

c. It is important that your colleague is fully aware of why sterility is needed and the consequences of his action.

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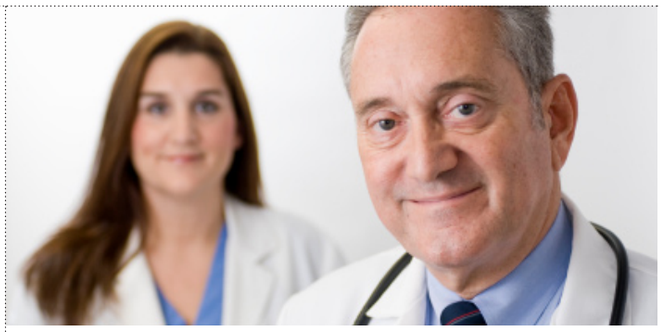

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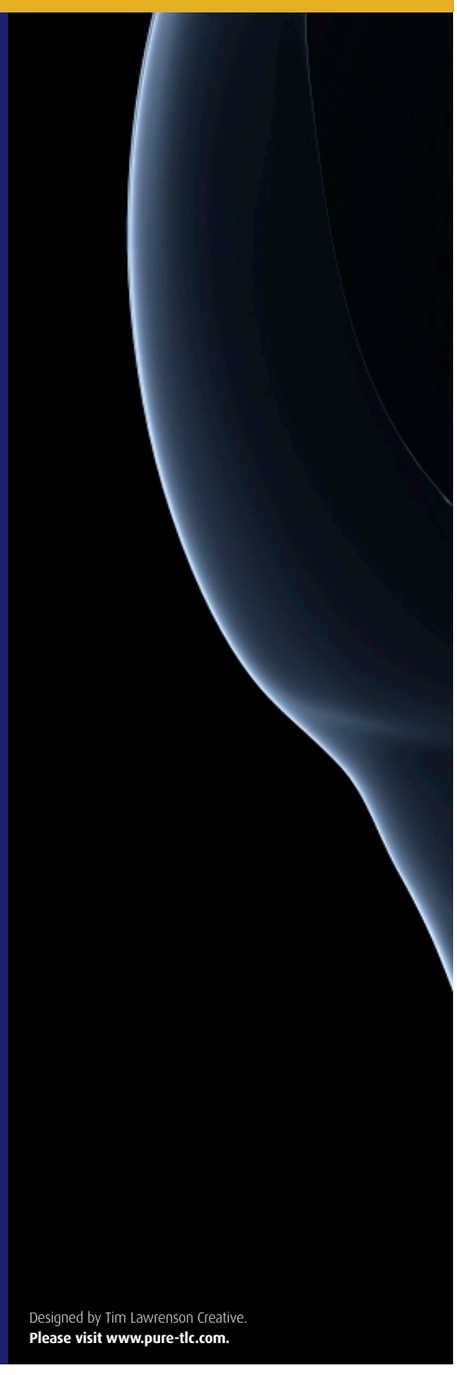

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