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Foundation years journal

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ALTERNATIVE CAUSES OF ABDOMINAL PAIN REFERRED TO THE SURGEONS

M Nordblad, R Dickson-Lowe

Abstract

Four interesting cases of acute abdominal pain admitted under the surgical team are described. After further investigations the patients were found to have alternative, non-surgical diagnoses. Case 1 describes a gentleman who presented with left upper quadrant pain who was later diagnosed with B-Cell acute lymphoblastic leukaemia.

Case 2 was treated as a perianal abscess but later found to have a liver abscess and Crohn's disease. Case 3 presented to hospital with right upper quadrant pain and was later diagnosed with metastatic prostate cancer. Case 4 was admitted with pain in the epigastric area and following numerous investigations his symptoms remained unexplained and no diagnosis was made.

These cases highlight alternative diagnoses to consider in patients with abdominal pain and aims to further educate junior doctors on this topic. It emphasises the importance of complete clerking and keeping a broad list of differentials when seeing new hospital admissions.

Introduction

This article describes four interesting cases of acute abdominal pain which were admitted under the surgical team and after further investigations were found to have non-surgical pathologies. It highlights alternative diagnoses to consider when seeing patients with abdominal pain and aims to broaden the horizons and further educate junior doctors on this topic.

Cases

Case 1

A 33 year old gentleman presented to hospital with a sharp, sudden onset, left upper quadrant abdominal pain. The abdominal pain was associated with a ten day history of headaches but there were no other symptoms such as vomiting, nausea or fevers. He had no urinary symptoms or changes in bowel habits.

This gentleman had no past medical history and was otherwise fit and healthy. He worked as a carpenter and lived with his wife and child. He was a current smoker and consumed 21 units of alcohol per week. On examination there was central and left upper quadrant tenderness with no guarding. An ultrasound scan of the anterior abdominal wall was performed as a rectal sheath haematoma was suspected but this was negative and no mass was identified in this region.

Chest and abdominal X-rays were arranged but these showed no abnormalities. The patient's bloods revealed a pancytopaenia (see table 1) and a blood film was examined, this showed blast cells, mild poikilocytosis (dacryocytes) and teardrop poikilocytes, indicative of acute leukaemia.

In addition he had an ultrasound of the abdomen as his abdominal pain was not settling, this showed an enlarged spleen with the long axis measuring 15.25cm homogenous in appearance with no fluid collections. He was reviewed by the haematology team and a bone marrow sample was sent off, this confirmed the diagnosis of acute leukaemia.

Following further examination of his bone marrow sample a diagnosis of B-Cell Acute Lymphoblastic Leukaemia was made and he was transferred to a specialised haematology ward to commence immediate chemotherapy.

Test	Result	Units	Normal Range
White Cell Count	4.1	10^9/L	4.0 to 11.0
Red Cell Count	3.10	10^12/L	3.8 to 5.8
Haemoglobin	102.0	g/L	130 to 175
Platelet count	39	10^9/L	150 to 400
Neutrophils	1.09	10^9/L	2.0 to 7.5

Table 1: Case 1 Blood test on admission.

Case 2

This 46 year old gentleman was admitted to hospital with perianal pain and pyrexia with rigours and reduced appetite. On examination there was erythema and evidence of a collection in the perianal region. There was no past medical history except hearing impairment and a penicillin allergy. He was a current smoker with a 20 pack year history and consumed approximately 45 units of alcohol per week. He worked as a site manager and lived with his parents.

During the admission he underwent an incision and drainage of a perianal abscess without complications and discharge was planned for the following day. However, post-operatively the patient became increasingly septic with temperature spikes at 38.9°C and decreased urine output. His wound was clean with no discharge and there was no obvious cause of sepsis.

He was started on IV antibiotics and closely monitored. He had further temperature spikes with fevers as high as 40.1° C, tachycardia at 110 bpm and poor urine output. On examination his chest was clear and his urine dip was negative. The Sepsis Six protocol was started and microbiology advised prescribing Vancomycin, Metronidazole and Ciprofloxacin. At this point the source of sepsis was still unknown, however abnormal LFTs were noted (see table 3).

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Test	Result	Units	Normal Range
White Cell Count	9.2	10^9/L	4.0 to 11.0
Red Cell Count	4.19	10^12/L	3.8 to 5.8
Haemoglobin	117	g/L	130 to 175
Platelet count	227	10^9/L	150 to 400
Neutrophils	7.62	10^9/L	2.0 to 7.5
Na^+	122	mmol/L	133 to 146
K^+	3.6	mmol/L	3.5 to 5.3
Urea	4.8	mmol/L	2.5 to 7.8
Creatinine	60	umol/L	36 to 107
eGFR	>90	mL/min	

Table 2: Case 2 admission bloods.

Due to the unstable nature of his current condition he was admitted to Surgical HDU and was administered a Metaraminol infusion and continued on the antibiotics. A CT CAP was arranged to look for a source of infection. The scan showed mild atelactatic changes at the lung bases, but otherwise the lung fields were clear and no adenopathy was seen. Some inflammatory changes of unknown nature were seen on the distal appendix and an 8 cm lesion was noted in the liver (Image 1 and 2).

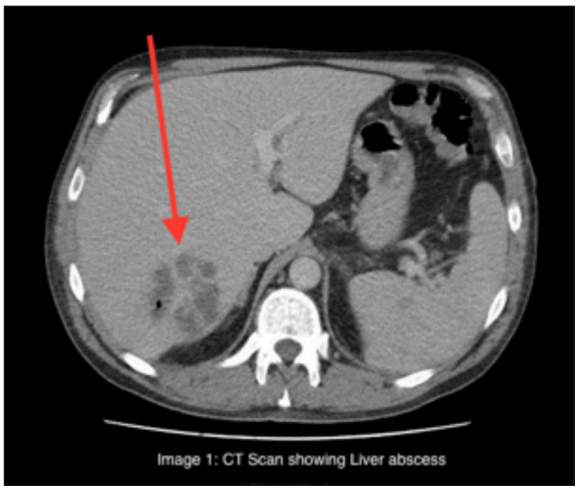

Image 1: CT Scan showing Liver abscess

Image 2: CT scan showing liver abscess

The appearance was not entirely typical of a hepatic cyst and it was suggested to consider the diagnosis of a liver abscess. It was discussed whether the source could be the appendix and following a discussion with interventional radiology he underwent ultrasound guided drainage of the liver abscess, a drain was inserted and 75 ml of thick pus was aspirated. Four days later the patient had a repeat CT scan to assess if there was improvement on the abscess and review the inflammation of the appendix previously seen on CT.

It showed a reduction in size of the liver lesion and confirmed an inflammatory process of the appendix, distal ileum and adjacent mesentery with contained perforation, highly suspicious of appendicitis, likely secondary to Crohn's disease. The patient was then taken to theatre for a diagnostic laparoscopy with appendicectomy and drain insertion. He was given a stat dose of Gentamicin following the operation. He markedly improved following this procedure and all symptoms resolved.

Whilst still an inpatient he was reviewed by the gastroenterology team who organised a colonoscopy, faecal calprotectin and a gastroenterology outpatient follow up appointment. Upon further questioning it was found that he had had a three week history of diarrhoea prior to admission. They started him on Mesalazine as Crohn's disease was the likely differential diagnosis. This diagnosis was later confirmed through the arranged outpatient investigations.

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Test	Result	Units	Normal Range
ALT	72	U/L	9 to 55
ALP	212	U/L	30 to 130
Bilirubin	16	umol/L	0 to 21
Albumin	31	g/L	36 to 50
CRP	143.2	mg/L	0 to 5
Amylase	90	U/L	30 to 123
Magnesium	0.54	mmol/L	0.70 to 1.00
Sodium	124	mmol/L	133 to 146
Potassium	2.9	mmol/L	3.5 to 5.3
Urea	3.0	mmol/L	2.5 to 7.8
Creatinine	75	umol/L	36 to 107
eGFR	>90	mL/min	
Calcium (corr)	2.25	mmol/L	2.20 to 2.60
Phosphate	0.27	mmol/L	0.80 to 1.50

Table 3: Case 2 Further blood tests.

Case 3

A gentleman, aged 62, came to hospital because of sudden onset right upper quadrant abdominal pain radiating to the back. The pain was worsened by movement but there were no associated symptoms such as nausea, vomiting, fevers or jaundice.

The patient reported no urinary symptoms and no changes in bowel habits. This was the first episode of such abdominal pain. There was a past medical history of hypertension, hypercholesterolaemia and haemorrhoids. He had a myocardial infarction four years ago. This gentleman was a retired joiner who lived with his wife, he was an ex-smoker and consumed 30 units of alcohol per week. On examination his abdomen was soft but there was right upper quadrant tenderness with voluntary guarding and positive Murphy's sign.

The main differential diagnoses were gallstones and cholecystitis. Bloods, urine dip and an ultrasound scan were arranged and he was treated with intravenous fluids and analgesia. The ultrasound abdomen and pelvis revealed that the gallbladder wall was not thickened and no obvious gallstones were seen, in addition the liver, spleen and kidneys appeared normal. His blood test did not reveal any abnormalities, except slightly raised white cell count and a raised ALP (see table 4).

The patient then underwent a CT scan which showed no evidence of acute intra-abdominal pathology, it did however reveal widespread sclerotic bone metastases (see image 3). The primary malignancy was found to be in the prostate and the patient was managed by the urology team.

Test	Result	Units	Normal Range
White Cell Count	12.7	10^9/L	4.0 to 11.0
Red Cell Count	4.97	10^12/L	3.8 to 5.8
Haemoglobin	143.0	g/L	130 to 175
Platelet count	190	10^9/L	150 to 400
Neutrophils	10.21	10^9/L	2.0 to 7.5
CRP	4.1	mg/L	0 to 5
Amylase	58	U/L	30 to 123
Na^+	139	mmol/L	133 to 146
K^+	4.2	mmol/L	3.5 to 5.3
Urea	5.0	mmol/L	2.5 to 7.8
Creatinine	69	umol/L	36 to 107
eGFR	>90	mL/min	
ALT	20	U/L	9 to 55
ALP	946	U/L	30 to 130
Bilirubin	9	umol/L	0 to 21
Albumin	43	g/L	36 to 50

Table 4: Case 3 Blood Test.

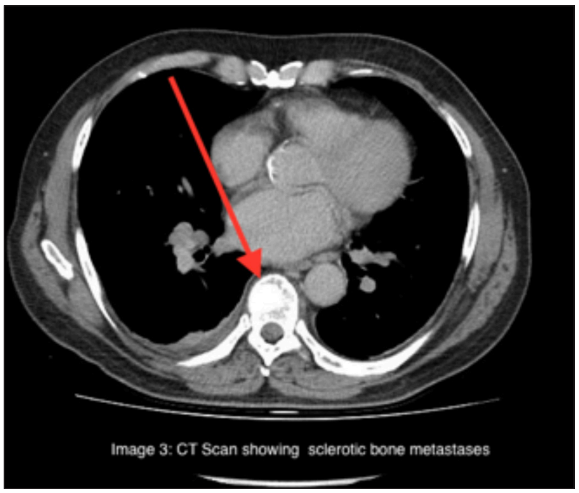

Image 3: CT Scan showing sclerotic bone metastases

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Case 4

This 21 year-old gentleman was admitted under the surgical team with a two week history of abdominal pain, mainly in the epigastric area, vomiting and fever. There were no changes in bowel habits, weight loss or lower urinary tract symptoms associated with the pain. He was septic with a tachycardia of 109, a spiking temperatures of 39° C and was given a stat dose of Gentamycin.

This gentleman had autism but was otherwise fit and well with no past medical or surgical history. There was a family history of Crohn's disease. Two years prior to this admission he had presented with similar symptoms and was discharged following numerous investigations with an inconclusive diagnosis. During the current admission his initial bloods showed no abnormalities but later developed a neutropaenia with a raised CRP and ALT (see table 5), following this a blood film was examined which showed some reactive lymphocytes. The patient was treated with Tazocin IV 4.5g TDS. An ultrasound of the abdomen and pelvis was arranged in order to rule out a diagnosis of appendicitis and no abnormalities were detected on this scan. The patient then had a CT scan of the abdomen and pelvis, a chest x-ray and an abdominal x-ray all of which had normal findings.

Test	Result on admission	Results on day 4	Units	Normal Range
White Cell Count	5.9	2.7	10^9/L	4.0 to 11.0
Red Cell Count	5.12	4.47	10^12/L	3.8 to 5.8
Haemoglobin	151	130	g/L	130 to 175
Platelet count	242	170	10^9/L	150 to 400
Neutrophils	4.43	0.79	10^9/L	2.0 to 7.5
CRP	13.0	27.1	mg/L	0 to 5
Amylase	93		U/L	30 to 123
Sodium	135	141	mmol/L	133 to 146
Potassium	3.8	3.7	mmol/L	3.5 to 5.3
Urea	3.9	2.0	mmol/L	2.5 to 7.8
Creatinine	100	66	umol/L	36 to 107
ALT	21	36	U/L	9 to 55
ALP	96	64	U/L	30 to 130
Bilirubin	12	6	umol/L	0 to 21
Albumin	49	38	g/L	36 to 50

Table 5: Case 4 Blood Tests on admission and day 4.

Following these investigations, an oesophago-gastro-duodenoscopy (OGD) was arranged, which was entirely normal. His pyrexia settled but the abdominal discomfort continued. Following all these investigations with normal findings, the surgical team referred the patient to the medical team as no surgical cause for this patient's symptoms was found.

The case was discussed with the medical registrar who took over the case and investigated for lymphoproliferative disorder as well as inflammatory bowel disease. The patient was moved to a medical bed where he had further blood tests including viral serology, coeliac screen, globulin levels, autoantibody screen, all of which came back with normal results (see Table 6).

Test	Result	Units	Normal Range
Tissue Transglutaminase IgA	0.5	u/ml	<7 u/ml - negative
Tissue Transglutaminase IgG	<0.1	u/ml	<7 u/ml - negative
IgA	2.7	g/L	0.7 to 4.0
IgG	8.8	g/L	7.0 to 16.0
IgM	1.4	g/L	0.4 to 2.3
C3	0.98	g/L	0.9 to 1.8
C4	0.26	g/L	0.10 to 0.40
HBsAG	Not detected		
HIV 1 & 2 antibody	Not detected		
Anti-Hepatitis C	Not detected		
EBV VCA IgM	Not detected		
EBV VCA IgG	Detected		
CMV IgG	Not detected		
CMV IgM	Not detected		
Autoantibody screen	Negative		

Table 6: Case 4 Further Blood Tests.

The patient also had a bone marrow biopsy which came back as haemorrhagic marrow and showed reduced erythopoiesis with no other diagnostic features. In addition he had a flexible sigmoidoscopy which was normal. During the admission, the abdominal pain settled with oral medication and the liver function and full blood count values improved, however, the cause of his presentation was still unknown. Approximately six months later, this patient is still undergoing investigations and the cause of this patient's symptoms is still unclear.

Discussion

The cases outlined above describe scenarios where patients with abdominal pain were admitted under the surgical team and following further investigations alternative diagnoses were made and the patients were transferred to the appropriate team for further management. These cases highlight the importance of considering a wide range of alternative diagnoses when seeing patients and recognising when a clinical picture is not entirely compatible with the suggested diagnosis.

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Case 1, a young gentleman admitted following an episode of sudden onset left upper quadrant abdominal pain, was after blood tests and bone marrow aspiration diagnosed with B-Cell Acute Lymphoblastic Leukaemia (ALL). ALL is a malignant haematological disorder where proliferation and accumulation of blast cells results in bone marrow suppression and pancytopenia (1). This is a rare disease in adults, affecting 1.28 in 1 000 000 individuals in Europe (2).

A comprehensive diagnostic approach to this condition has been outlined and reviewed by WHO and includes numerous investigations such as the study of cell morphology and genetic tests (2,3). In this particular case the initial investigation was a basic venous blood sample including full blood count, urea and electrolytes, liver function test and C-reactive protein. This was done to further investigate the patient's abdominal pain and rule out any septic or surgical causes. The pancytopaenia on the initial blood test triggered a blood film analysis which is how the diagnosis of ALL was first suspected.

The surgical team discussed the case with the haematology team who reviewed the patient, did further investigations such as a bone marrow aspiration and made the diagnosis of ALL. The patient was then transferred to a specialist haematology-oncology ward and started on immediate chemotherapy.

In this case the patient did not present with the typical symptoms of ALL, such as fevers, lethargy, dyspnoea, angina, headaches and dizziness (1). The presenting complaint was instead sudden onset, sharp left upper quadrant abdominal pain and a ten day history of headaches, however no history of nausea, vomiting, fevers or changes in bowel habits.

The location of the abdominal pain and the lack of associated abdominal symptoms in this case do not necessarily trigger a typical surgical diagnosis as left upper abdominal pain is more frequently reported in conditions such as gastritis and gastric ulcers (4). The patient was later found to have splenomegaly which could have been the cause of the left-sided abdominal pain, however splenomegaly often causes more an abdominal fullness and ache as opposed to a sharp pain (5).

Case 2, a gentleman with perianal pain who had an incision and drainage of a perianal abscess, was initially thought to be a straight forward case for the surgical team. Discharge was planned for the following day but due to severe sepsis further investigations and treatment were necessary. The patient was found to have a liver abscess which required drainage and acute appendicitis with localised perforation which required laparoscopic surgery.

Prior to discharge the patient was reviewed by a gastroenterologist and a history of diarrhoea for three weeks was revealed. This had not been picked up by the surgical clerking, probably as the focus was on the current issue of a perianal abscess. The diagnosis of Crohn's disease was later confirmed with a colonoscopy and the patient was followed up by the gastroenterology team. Crohn's disease is an inflammatory disorder of the gastrointestinal tract of unknown aetiology (6).

Presenting symptoms depend on location and severity of disease and the presence of extraintestinal involvement. Commonly, patients present with chronic diarrhoea, abdominal pains, malaise, anorexia and fevers (7). Extraintestinal features are mostly present in Crohn's disease affecting the colon and the most common manifestation is musculoskeletal abnormalities involving the joints (7).

However, perianal disease, such as anal fistulae and perianal abscesses, is a frequent complication of Crohn's disease with an incidence ranging from 4 to 52% depending on location of active disease in the gastrointestinal tract (8)(9). The case outlined above described an undiagnosed case of Crohn's disease where the presenting complaint was a perianal abscess.

As a result of this being directly referred to the surgical team for an incision and drainage without further questioning on other symptoms, such as diarrhoea, and involvement of the gastroenterology team, the diagnosis of Crohn's disease was delayed. Due to unsettling sepsis following the incision and drainage, the patient had a CT scan which revealed both appendicitis and a liver abscess. Acute appendicitis has been found to be the presenting manifestation of Crohn's disease in some cases, representing 1.8% of cases of acute appendicitis at one particular site (10). The final complication found in this patient was the presence of a liver abscess. This is a rare and serious complication of Crohn's disease and the exact incidence is not known (11).

Clinical manifestations of liver abscesses in inflammatory bowel disease are often similar to those of a flare up of their disease causing delayed diagnosis of liver abscess. As a result of this phenomenon, it is advised to consider liver abscesses as a complication in patients presenting with fevers, anorexia and abdominal pain with a background of Crohn's disease (12).

In the case described in this article the diagnosis of Crohn's disease was not yet made and the patient was experiencing severe, unsettling sepsis of unknown cause. Once a CT scan had been done the liver abscess and appendicitis were found and further management could be arranged.

Severe sepsis and surgical HDU admission could have possibly been avoided if the source of sepsis had been found earlier. According to the operation notes, not a large amount of pus was drained from the abscess, a fact which should have triggered thoughts regarding an alternative septic source. The history of changes in bowel habits for three weeks prior to admission could have been an indication that something more complex than a simple perianal abscess was the background of this clinical presentation. This highlights the importance of always keeping your mind open when seeing patients and clerking a patient fully including a complete list of symptoms.

Case 3 described above was highly suspicious of acute cholecystitis or gallstones due to the right upper quadrant pain and the positive Murphy's sign. A CT scan, which revealed bone metastases, was then arranged once the ultrasound abdomen was negative. The patient was diagnosed with prostate cancer with bone metastases. Prostate cancer accounts for 26% of new diagnoses of cancer and is the most common cancer among men in England (13).

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This type of cancer is also the second most common cause of death caused by cancer in men, after lung cancer. Prostate cancer does not always present with specific symptoms but some men will experience symptoms, in particular urinary symptoms such as nocturia, dysuria, haematuria or weak urine flow (14).

According to the NICE guidelines, where prostate cancer is a possible diagnosis, a digital rectal examination (DRE) should be carried out to assess for prostate size and texture and a prostate specific antigen level should be measured (15). The diagnosis will then be made based on a biopsy of the prostate. This diagnostic pathway may come about as a result of patients experiencing suspicious symptoms or through a routine examination.

In the case described in this article, the diagnosis was revealed differently. It was a finding on a CT scan when assessing a patient's abdominal pain. On further questioning it appeared that this gentleman did have some urinary symptoms, in particular hesitancy and difficulties passing urine. In view of these symptoms, a DRE should have been performed when the patient was admitted. This examination was later performed, when the diagnosis was clear, and an enlarged irregular prostate was palpated.

He also had an isolated raised alkaline phosphate level (ALP), with the rest of his liver function test being within normal limits. ALP is an enzyme originating mainly from the liver and bone and its elevation may be either physiological or pathological and requires further investigations. To assess whether the cause is hepatic, the other liver function tests play an important role, in particular gammaglutamyl transferaseGGT which is not always routinely done. If these are not raised a non-hepatic cause is likely. In this case the raised ALP was assumed to be caused by a diagnosis such as cholecystitis, however this does not entirely fit into the clinical picture, something that could have been considered earlier during the diagnostic work-up.

The question remained what caused his right upper quadrant pain and this was revealed by a closer look at the CT scan. It was found that the patient had sclerotic bone metastases in the 9th right-sided rib which is located in the same plane as the gallbladder. This may explain the right upper quadrant pain and the positive murphy's sign.

Case 4, a young man with a two week history of epigastric pain and vomiting was admitted with sepsis of unknown source under the surgical team. There was no past medical history and he was otherwise fit and well. All scans during the admission were inconclusive, including an ultrasound abdomen and pelvis, a CT scan of the abdomen and pelvis, a chest x-ray and an abdominal x-ray as well as a normal OGD.

Under the medical team, further blood tests were carried out, including viral and auto antibody screens, all of which were negative. As the patient's symptoms settled, he was discharged home with follow up in a gastroenterology clinic. This patient had previously had a similar admission with the same type of pain and all investigations were inconclusive.

This is an example of a case where the diagnosis is unknown and the patient's symptoms could not be explained despite numerous investigations. In the case of abdominal pain this is usually called non-specific abdominal pain, a diagnosis given to approximately 16.5% of general surgical admissions (16). Months later, this patient's symptoms had still not been explained and the diagnosis was still inconclusive. The patient has had further investigations, been seen by gastroenterologists and microbiologists and no conclusion has been reached.

Case 4 highlights the difficulty of some diagnoses, where after extensive investigations symptoms remain unexplained. In a paper looking at frequent attenders in secondary care it is found that gastroenterology symptoms, particularly abdominal pain, are likely to remain unexplained, with at least 50% of referrals of frequent attenders to gastroenterology clinic having an inconclusive diagnosis (17). These patients undergo numerous investigation which are lengthy and time consuming, causing frustration among both patients and healthcare professionals (17), (18).

Conclusion

This article gives four examples of cases where patients were admitted under the surgical team to later be diagnosed with alternative diagnoses. It aims to broaden the horizons of junior doctors and remind them to carry out complete clerking on admission in order to avoid missing out signs and symptoms which could be crucial when making the diagnosis and managing the patient. The article also highlights certain points in the diagnostic work up which should have diverted the clinician from the main differential diagnosis and consider alternatives. A further important consideration in this article is the large number of patients with medically unexplained symptoms and how this affects patients, staff and the NHS.

MCQs

1. Which of the following types of haematological malignancy is associated with the Philadelphia chromosome?

a. Acute Lymphoblastic Leukaemia

b. Chronic Myeloid Leukaemia

c. Acute Myeloid Leukaemia

d. Chronic Lymphoblastic Leukaemia

e. Hodgkin's Lymphoma

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2. What is the mechanism of action of the antibiotic Metronidazole?

a. Inhibition of cell wall synthesis

b. Alteration of cell membranes

c. Inhibition of synthesis of folic acid

d. Inhibition of DNA synthesis

e. Inhibition of protein synthesis

3. Which of the following statements is not correct about Crohn's disease?

a. Crohn's disease can affect the gastrointestinal tract anywhere between the mouth and the anus

b. Skip lesions are common in Crohn's disease

c. The inflammation is limited to the colorectal mucosa of the GI tract in Crohn's disease

d. Abdominal pain, diarrhoea and weight loss are common presenting symptoms in Crohn's disease

e. Diagnosis of Crohn's disease is based on histology from biopsies taken during endoscopy

4. Which of the following options is the most common site of prostate cancer metastases?

a. lung

b. bone

c. colon

d. liver

e. adrenals

5. Select three options below which are part of "The Sepsis Six" bundle.

a. Take urine cultures

b. Start intravenous fluid resuscitation

c. Check CRP level

d. Give intravenous antibiotics

e. Monitor hourly urine output

Answers

1. Correct Answer: b

Explanation: The Philadelphia chromosome is a chromosome abnormality caused by a translocation in one of the chromosomes 9 and one of the chromosomes 22, resulting in a longer chromosome 9 and shorter chromosome 22 than normal. This abnormality is present in the leukaemic cells in most cases of CML (19). This chromosome abnormality is diagnosed using Fluorescence in situ hybridization (FISH) (20).

2. Correct Answer: d

Explanation: The five mechanisms of action listed above cover the main categories of antibiotics (21). Metronidazole acts on anaerobic bacteria by intracellularly reducing to its active form. It then creates a covalent bond to the bacteria's DNA, disrupts its helical structure. This causes inhibition of nucleic acid synthesis which finally causes bacterial cell death (22).

3. Correct Answer: c

Explanation: Crohn's disease is a relapsing and remitting inflammatory bowel disease affecting the gastrointestinal tract anywhere between the mouth and the anus. Patients commonly present with a history of abdominal pain, diarrhoea and weight loss. It is not continuous inflammation of the bowel and skip lesions are common. In ulcerative colitis, however, the inflammation is continuous and affects the colon only. Crohn's disease affects different layers of the bowel, including submucosal and transmural, whereas ulcerative colitis is limited to the mucosal layer (23).

4. Correct answer: b

Explanation: The most common metastatic site of prostate cancer is bone. Lung and liver metastases are also commonly reported (24).

ALTERNATIVE CAUSES OF ABDOMINAL PAIN REFERRED TO THE SURGEONS

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5. Correct answers: b, d, e

Explanation: "The Sepsis Six" improves the outcome in septic patients, if the full bundle is completed within one hour after recognition of sepsis, the mortality has been reported to reduce by 50% (25). The six factors of "The Sepsis Six" are:

- administer high flow oxygen to maintain saturations of at least 94%
- take blood cultures (preferably prior to administering antibiotics)
- give intravenous antibiotics (broad-spectrum, according to local protocol)
- start intravenous fluid resuscitation
- check lactate level
- monitor hourly urine output

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HIP FRACTURES - DIAGNOSIS, INVESTIGATIONS & MANAGEMENT

M Koziara, M Hampton

Abstract

Fractured necks of femurs (NOFs) are the most common type of fragility fractures that are surgically managed and have a significant morbidity and mortality associated with them (2,3). With the ever-ageing population the incidence of hip fractures will continue to rise. (4,5) As well as the high morbidity and mortality associated with hip fractures, there is also a significant cost implication to the NHS. (6) Treatment aims to control pain, reduce complications and allow the patient to weight bear immediately after the operation. In order to decide on appropriate treatment an understanding of the blood supply to the hip and interpretation of x-rays is essential.

Case Based Discussion

An 82 year old lady with a past medical history of memory impairment, hypertension, ischaemic heart disease and a previous wrist fracture presents to the A&E department following a fall. She complains of right hip pain. She lives alone, mobilises with a frame and has a pre op abbreviated mental test (AMT) score of 5/10. On examination her right leg is shortened and externally rotated when compared to her left. She is neurovascularly intact.

Anterior posterior (AP) pelvis and AP and lateral x-rays of the right hip show a displaced intracapsular fracture of the right neck of femur.

Introduction

Hip fractures are common with around 65,000 occurring annually. (5) In the elderly they are a type of fragility fracture secondary to osteoporosis. (5) They can also occur in young patients, secondary to high energy major trauma. The average age of a patient with a hip fractures is 83 years. (5,7) Women are at a much higher risk of sustaining a hip fracture with 72% of fractures occurring in women, although that proportion is slowly decreasing (5,7) Mortality and morbidity is very high in these patients with a mortality of 1 in 10 within a month and 1 in 3 within 12 months. (3)

Fragility fractures of the hip are almost always due to a fall; however it is important to differentiate the cause of the fall. Patients will present with an inability to weight bear and hip/groin pain. Initial investigations and treatments aim to distinguish the type of fracture the patient has sustained as well as identify any other systemic illness the patient may be suffering with such as chest infections and urinary tract infections.

Treatment aims to allow the patient to weight bear fully the day after their operation. (8,9) The operation should be carried out as soon as safely possible to prevent complications associated with prolonged bed rest and to prevent unnecessary pain and agitation for the patient.

The type of fracture identified will determine the treatment required. Treatment is also guided by the guidelines produced by the National Institute of Health and Clinical Excellence (NICE). (8,9)

Anatomy

The hip joint is a ball and socket joint. The head of the femur articulates with the acetabulum of the pelvis. This articulation is reinforced by ligaments and a strong fibrous capsule.

To understand the reasons for the different treatment types of hip fractures a knowledge of the blood supply is required.

The head of the femur receives it blood supply from 3 sources.

1. Retinacula vessels formed from an anastomosis of the lateral and medial femoral circumflex arteries (main supply)

2. Nutrient vessels from within the shaft of the femur (small supply)

3. Artery within the ligament of the head of the femur (negligible in adults)

The main blood supply to the femoral head comes from the retinacula vessels. These vessels are formed from a ring anastomosis of the medial femoral circumflex and the lateral femoral circumflex arteries, both branches of the deep femoral artery in the thigh.

The retinacula vessels run from the capsule line on the femoral neck to the head of the femur. This means that any fracture that occurs proximal to the capsule line (intracapsular fracture) may lead to a disruption of the blood supply to the femoral head and hence risks femoral head avascular necrosis or a non-union of the fracture.

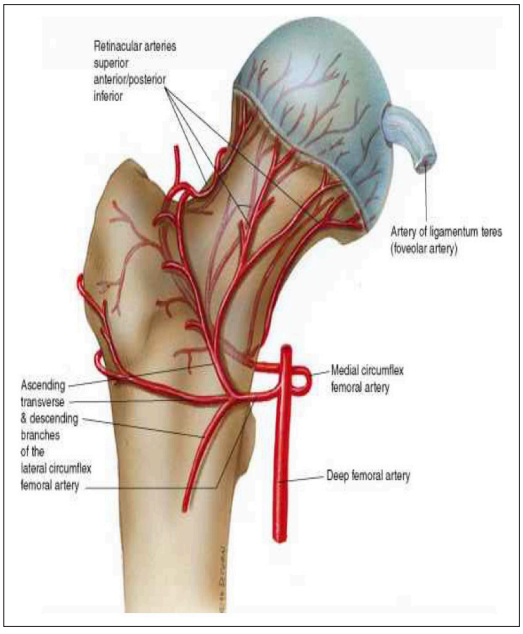

Figure 1A: Picture showing the blood supply to the femoral head.

HIP FRACTURES - DIAGNOSIS, INVESTIGATIONS & MANAGEMENT

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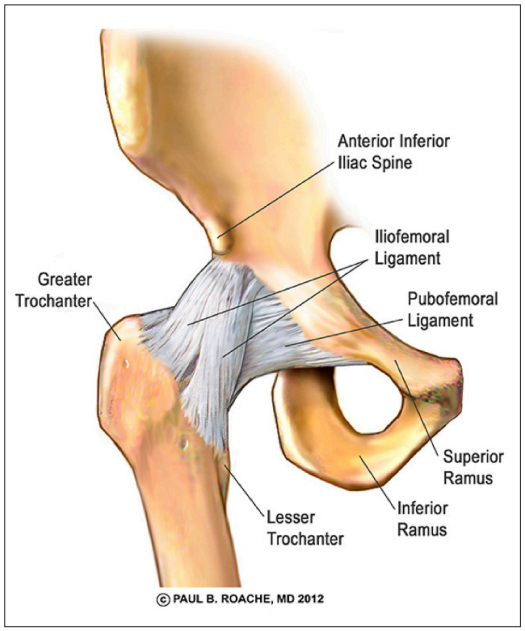

Figure 1B: Picture showing the joint capsule origin and insertion.

History

As with any orthopaedic history, the mechanism of injury is crucial. This is particularly the case in patients with neck of femur fractures, where a comprehensive history can unearth precipitating factors, potentially prevent other injuries, identify safeguarding issues and guide your further management.

In an elderly patient, up to 95% of NOF fractures are caused by a fall10. It is important to establish the events leading to a fall to differentiate a simple mechanical fall from those caused by an underlying cardiac condition, concurrent infection or malignancy.

The SOCRATES mnemonic is a useful tool to aid this part of history taking. This will be further supplemented by an exhaustive systems review.

As a significant proportion of patients are elderly and frail (7,11) a comprehensive past medical history will offer further insight. It is particularly important to elicit co-morbidities that will affect the anaesthetic risk (e.g. significant cardiac, respiratory and endocrine issues), as well as those which may affect the bone quality or healing potential (e.g. previous cancers or radiotherapy, history of rheumatoid arthritis, or previous fractures).

Rates of polypharmacy are rising with the ever-ageing population (12). As much of the patient population will be taking multiple medications, it is vital to ensure all are accurately recorded. The Summary Care Record, throughout the UK, is a useful tool in obtaining that information (see https://digital.nhs.uk/summary-care-records for more information).

As with past medical history, concurrent medication use may alter the anaesthetic and surgical management of the patient. You should always directly ask about use of warfarin or other anticoagulants (LMWH or NOACs), aspirin and clopidogrel. You should highlight any prolonged use of steroids.

The final step in history taking is a thorough social history. This should focus on pre-morbid functional status (in line with NICE guidelines as pre-morbid mobility status may affect the treatment given). You should also clarify any other social issues (e.g. dependants at home), which may require you to involve therapy or social services.

Given that some patients will have a degree of memory impairment, it is crucial to seek collateral history from family or carers.

Examination

All patients with a neck of femur fractures should have a comprehensive A to E assessment and resuscitation. It is particularly important to elicit any evidence of cardiovascular or respiratory disease, which may prompt further investigations.

In order to assess the hip, the general look, feel, move approach should be followed. Examination of the affected leg should be focused, thorough and swift, to ensure the least discomfort for the patient.

Look: *Patients with neck of femur fractures classically present with their legs shortened and externally rotated. Careful inspection of the whole limb to exclude other injuries and open fractures is required.*

Feel: *Patients are likely to experience pain on palpation of the ipsilateral groin. Careful documentation of the neuro-vascular status of the limb, including comparison to the contralateral leg is a must.*

Move: *Patients typically will be unable to move the affected limb secondary to pain.*

Once the physical examination is complete, an Abbreviated Mental Test score (out of 10) needs to be carried out and clearly documented in the clerking.

Investigations

When a neck of femur fracture is suspected, radiographs of the pelvis (antero-posterior) and the affected hip (lateral) should be obtained. The radiological appearance will guide classification and further management of the fracture (see below).

If the radiographs do not correlate with the clinical examination and the patient is unable to weight bear, you should consider MRI as a definite imaging to exclude a neck of femur fracture, as per the NICE guideline. If an MRI is contra-indicated, or not available within 24 hours, a CT of the hip should be performed. (8,9)

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Once a diagnosis of a NOF fracture is confirmed, further investigations should be undertaken:

1. Chest X-ray : to rule out acute infections and signs of chronic disease;

2. Electrocardiogram (ECG) : to exclude any acute cardiac event and to serve as a baseline for the admission;

3. Full set of bloods, including FBC, U+E, Bone Profile with Vitamin D, Clotting, Group+Save / Crossmatch.

All investigations should be reviewed and acted on in a timely manner.

Classification

Accurate recognition of fracture configuration and appropriate classification will guide further operative management of the patient.

Generally speaking, neck of femur fractures can be classified into two broad groups based on their radiological appearance.

1. Intracapsular (with the fracture line within the limits of the capsule)

These fractures are further described using Garden's classification. The classification aims to differentiate intracapsular neck of femur fractures based on the degree of displacement of the femoral head from the neck.

There are 4 grades within the Garden classification:

I (partial fracture through the neck);
II (complete fracture, with undisplaced head);
III (complete fracture, with partial displacement);
IV (complete fracture, with total displacement).

2. Extracapsular (with the fracture line distal to the capsule)

Intertrochanteric (with fracture line between the greater and lesser trochanter)
Subtrochanteric (with fracture line beneath trochanters)

Management

As discussed, patients with neck of femur fractures may be elderly and frail, on multiple medications and have memory problems. Ultimately, their management will involve not only the orthopaedic team, but also the orthogeriatricians, physio - and occupational therapists as well as community teams on discharge. (3,5).

The National Institute for Health and Clinical Excellence (NICE) has issued guidance regarding management of patients with neck of femur fractures from admission to discharge. (9)

Below, we have focused on operative management options available for patients with neck of femur fractures.

Operative management of neck of femur fractures aims to allow early mobilisation and manage pain. According to the NICE guideline, the surgery should take place on the day of, or the day after, admission on a scheduled operating list. (5,8,9)

Depending on fracture configuration, different intra-operative solutions may be used.

Cannulated screws - *this solution is used for undisplaced (Garden I and II) intracapsular fractures. Given lack of displacement, it is assumed that the blood supply to the head of the femur is in continuity.*

Patients offered this option need to be aware that there is a potential of avascular necrosis of the hip and a further surgery may be required at a later stage.

Arthroplasty - *this solution is used for displaced (Garden III or IV) intraarticular fractures. In this configuration, the blood supply to the head of the femur is compromised. The treatment is to replace the joint (Total Hip Replacement), or the proximal part of the femur (Hemiarthroplasty), with a prosthetic component.*

According to NICE guidance, Total Hip Replacements should be offered to any patient who:

a) was mobile outdoors independently with no more than the use of a stick prior to admission;

b) has no cognitive impairment;

c) is medically fit for the procedure and anaesthetic.

Otherwise patients with Garden III or IV fractures should be treated with a cemented hemiarthroplasty.

Sliding Hip Screw (Dynamic Hip Screw/Dynamic Compression Screw) - this solution is used for intratrochanteric fractures. This method of fixation allows for reduction of fracture and for bone fragments to compress against each other, which leads to healing by primary intention.

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Conclusion

In conclusion, hip fractures are significant injuries, associated with high mortality and morbidity in the elderly population. X-rays, computed tomography (CT) and magnetic resonance imaging (MRI) scans remain the mainstay of investigation.

When considering surgical treatment of the fracture, the knowledge of anatomy and blood supply is essential in deciding which option will be the most suitable for the patient.

However, not only the fixation or arthroplasty need to be considered. The cause of fall should be clarified and further medical management may be needed. Furthermore, the patient should also be screened and treated for osteoporosis, and closely screened for other complications of the fractures and operation – e.g. hospital-acquired infections and veno-thrombotic events.

Patients should also be aware that their level of mobility is likely to decrease – from independent to mobilizing with one stick; from one stick to mobilizing with two sticks or a frame, and so on.

MCQs

1. An 82 year old lady with a past medical history of memory impairment, hypertension, ischaemic heart disease and a previous wrist fracture presents to the A&E department following a fall. She complains of right hip pain. She lives alone, mobilises with a frame and has a pre op abbreviated mental test (AMT) score of 5/10.

On examination her right leg is shortened and externally rotated when compared to her left. She is neurovascularly intact. Anterior posterior (AP) pelvis and AP and lateral x-rays of the right hip show a displaced intracapsular fracture of the right neck of femur. What is the most appropriate treatment?

a. Hemiarthoplasty

b. Total Hip Replacement

c. DHS

2. A 70 year old female is admitted with a NOF # following a mechanical fall. She suffers from hypertension, but is otherwise well and independent in all activities of daily living. Her AMT score on admission is 10/10. Figure 2a is the AP x-ray of her hip. What would be the most appropriate surgical treatment ?

a. Hemiarthoplasty

b. Total Hip Replacement

c. DHS

Figure 2A: Displaced intracapulsar neck of femur fracture.

3. A 68 year old male EMI nursing home resident is admitted with a NOF # following an unwitnessed fall. He has multiple co-morbidities (COPD, hypertension, previous MI), but is currently medically stable. His AMT is 1/10. The AP x-ray of the fracture is represented on the Figure 2b. What would be the most appropriate surgical treatment?

a. DHS

b. Total Hip Replacement

c. Hemiarthoplasty

Figure 2B. Comminuted intertrochanteric femoral fracture.

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4. An otherwise fit and well, independent 79 year old lady sustained an undisplaced neck of femur fracture. She underwent surgery, results of which are portrayed on Figure 2c. Which of the following is the least likely sequalea to the injury?

a. Avascular necrosis

b. Decrease in mobility

c. Hip dislocation

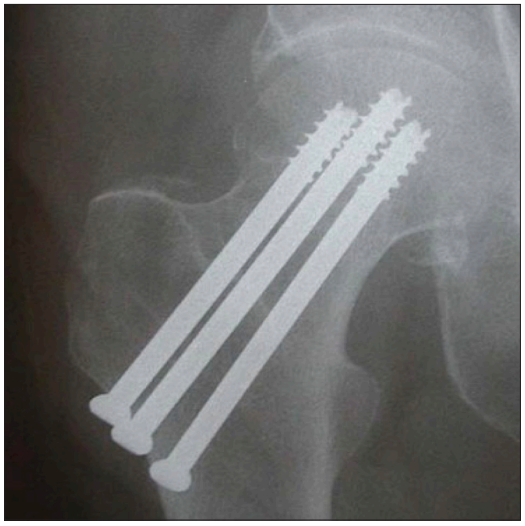

Figure 2C: Cannulated screws for neck of femur fracture.

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OESOPHAGEAL MOTILITY DISORDERS: DIAGNOSIS & MANAGEMENT

MQ Almerie, PK Jain

Abstract

Oesophageal motility disorders are less common than mechanical and inflammatory conditions affecting the oesophagus. The clinical presentations are usually dysphagia, regurgitation and chest pain. The diagnosis of a motility disorder should be considered after excluding a mechanical obstructing lesion. Diagnosing oesophageal motility disorders can be challenging and hence delayed. Here, we discuss a case of achalasia and give a brief overview of the different types of oesophageal motility disorders, the used diagnostic tools and their mainstream management options.

Case History

A 34-year-old male was referred to our clinic with difficulty in swallowing both fluids and solid food for over a year. His symptoms were initially variable and associated with some retrosternal discomfort. The patient found it usually helpful to 'swallow air' during meals and sit upright to allow easier passage of food down. Upper GI endoscopy (OGD) showed no abnormality and the patient was treated as having gastro-oesophageal reflux (GORD). Later on, however, he began to lose weight and complained of regurgitating food. The patient had no significant past medical history apart from some respiratory symptoms and recurrent chest infections which were thought to be related to 'asthma'.

In view of the patient's progressive symptoms, a repeat OGD was requested which showed a tight cardia and a pool of saliva in his oesophagus (figure 1).

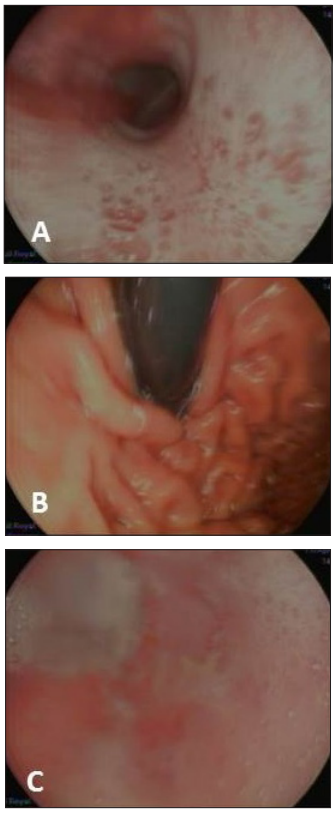

Figure 1: OGD findings in a patient with achalasia A: Tight cardia, B: No hiatus hernia on scope retro-flexing views, C: Pooling of saliva in the oesophagus.

Subsequently, the patient underwent a barium swallow which showed a 'bird's beak' appearance in his distal oesophagus (figure 2).

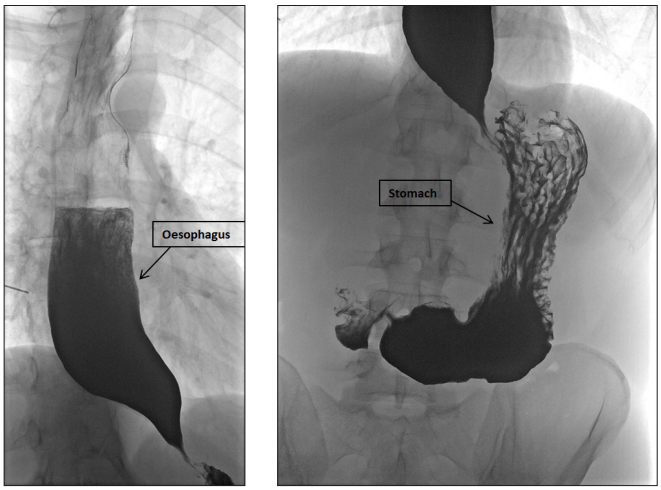

Figure 2: Barium swallow X-ray in a patient with achalasia. It shows the typical picture of 'bird peak'. This is due to a dilated oesophagus which tapers down to a very narrow area as it reaches the gastro-oesophageal junction which is affected by the achalasia.

The suspected diagnosis of achalasia was later on confirmed using high resolution oesophageal manometry. This revealed an impaired relaxation of the patient's lower oesophageal sphincter (LOS) and failed peristalses in the body of his oesophagus.

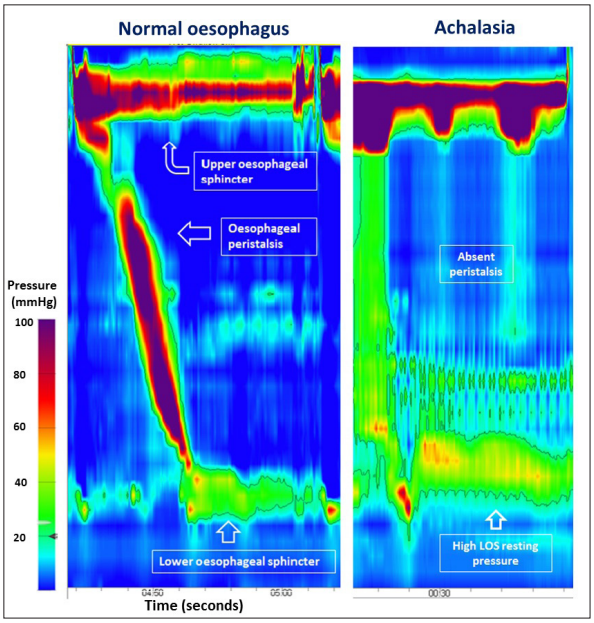

Figure 3: high resolution oesophageal manometry graphs. Normal oesophagus: coordinated peristalsis in the body of the oesophagus. Achalasia: absent peristalsis in the oesophagus and high resting pressure in the lower oesophageal sphincter.

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The patient was counselled regarding management options to treat his symptoms and he opted for surgical intervention. He had an uneventful laparoscopic cardiomyotomy and remained asymptomatic at 6 months follow-up.

Discussion

Achalasia is a rare disorder with an annual incidence of approximately 1.6 cases per 100,000 population and a prevalence of 10 cases per 100,000 population in Europe1. Achalasia and diffuse oesophageal spams are the most well-defined diseases of the oesophageal motility disorders. The introduction of high resolution oesophageal manometry, however, has disclosed considerable new information about oesophageal motility disorders showing them to represent a wide spectrum of disorders (Chicago classification (2), figure 4).

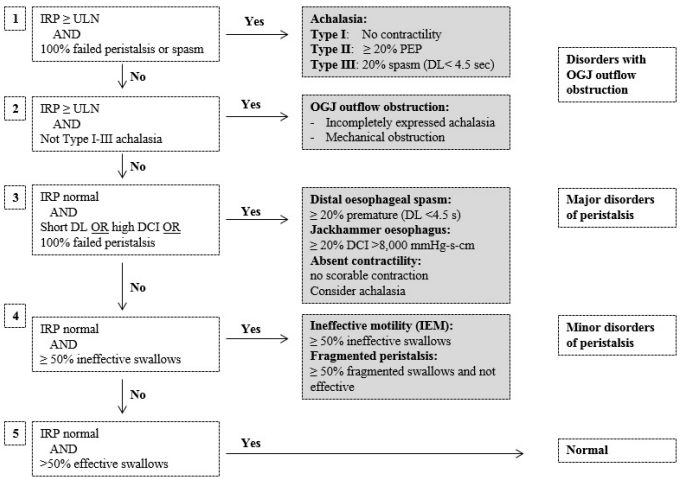

Figure 4: Chicago criteria for oesophageal motility disorders v3.0 (hierarchical algorithm) (2). DCI, distal contractile integral; DL, distal latency; IRP, integrated relaxation pressure; ULN, upper limit of normal.

Primary achalasia

Primary achalasia is a disease of unknown aetiology in which there is a loss of peristalsis in the distal oesophagus and a failure of the LOS to relax with swallowing. The pathophysiology involves a progressive loss of the ganglion cells in the myenteric plexus. This, in fact, selectively affects the inhibitory innervation to the oesophageal smooth muscles in the LOS (1).

Men and women are affected with equal frequency. The disease can occur at any age although it mostly affects people between the ages of 25 and 60 years old. Long standing achalasia is associated a 50-fold increased risk of developing squamous cell carcinoma in the oesophagus (3). There is also a marginal increased risk of adenocarcinoma in patients with achalasia (4).

Clinical presentation

Dysphagia is the cardinal symptom of achalasia. It usually slowly worsens over time and characteristically affects both fluids and solid food ingestion. Regurgitation of undigested food, which collects in the dilated oesophagus, is also common especially in the lying position.

This could potentially lead to recurrent aspiration-related chest infections. Hence, it is not unusual for these patients to be wrongly labelled as 'asthmatics'. Retrosternal chest pain could also occur mainly due to stasis oesophagitis. Due to the overlap between achalasia and GORD symptoms, the diagnosis can be delayed because many of achalasia patients are initially thought to have GORD (5).

Investigations

Barium swallow and/or OGD are the commonest used initial tests when investigating dysphagia. They allow the assessment of any anatomical lesions such as strictures or cancers. While achalasia may be suspected at endoscopy by findings of tight cardia, food residue in the oesophagus or a dilated oesophagus; these signs might not be present particularly in the early stages of achalasia. Barium swallow might show the pathognomonic 'bird's beak' appearance due to the persistently contracted LOS and dilated proximal oesophagus (figure 2).

Again, these features are not always present and barium swallow might look normal. High resolution oesophageal manometry is the gold standard for diagnosing all oesophageal motility disorders including achalasia (sensitivity of 97%)6. The two classic manometric findings in achalasia are aperistalsis of the lower two thirds of the oesophagus and incomplete relaxation of the LOS. Swallows may elicit no oesophageal contraction or may be followed by simultaneous contractions. Incomplete LOS relaxation distinguishes achalasia from other disorders associated with aperistalsis where the LOS is completely relaxed on swallowing.

Secondary achalasia

Few other diseases could produce symptoms which mimic achalasia. Chagas' disease has marked clinical and pathological similarities with achalasia. It is caused by a chronic infection with Trypanosoma cruzi, a parasite known in South America. Pseudo-achalasia is also an achalasia-like disorder which is produced by the presence of cancer at the cardia of the stomach. Tight wraps after anti-reflux operations could also mimic the presentation of achalasia.

Treatment

The treatment options for achalasia includes botulinum toxin injection, pneumatic dilation, peroral endoscopic myotomy (POEM) and surgical myotomy (table 1).

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Endoscopic botulinum toxin injection	Botulinum toxin is injected into the LOS (single course or repeated multiple courses). The most common dose is 80 to 100 units, injected in 1-mL aliquots (20 to 25 units BoT/mL) in each of the four quadrants about 1 cm above the Z-line.
Pneumatic dilatation	Air filled balloon (diameter 30-40 mm) which is used endoscopically to disrupt the muscles at the LOS and render them incompetent. Perforation risk increases with larger balloons (<0.5% perforation risk with 30mm balloon). Careful progressive dilatation is usually used over weeks.
Heller myotomy	Surgical operation which is usually done laparoscopically and involves making a single anterior cardiomyotomy by cutting the muscle of the lower oesophagus and cardia for approximately 8 to 10 cm length. A prophylactic anti-reflux operation is usually done at same time to reduce the risk of gastro-oesophageal reflux.
Peroral endoscopic myotomy (POEM)	New endoscopic procedure still under study. The endoscopist makes a small incision in the mid-oesophageal mucosa with the endo knife, tunnels through the submucosal space to the defective gastroesophageal valve and performs a myotomy. The procedure is associated with risk of reflux as anti-reflux operation is not part of the procedure.

Table 1: Management options for achalasia.

Pneumatic dilatation and surgical cardiomyotomy are generally the two mainstream therapeutic modalities for achalasia. They have been found to be around 90% effective at 1-year symptom-free (7). Surgical cardiomyotomy is usually performed laparoscopically. As GORD is a common adverse effect of any achalasia treatment, surgical myotomy is usually combined with fundoplication to reduce the risk of reflux. This operation is widely known as laparoscopic Heller's myotomy (LHM). Botulinum toxin injection, on the other hand, is often reserved for patients with significant co-morbidities as there is a high recurrence rate of symptoms even when the course is repeated (38% symptom-free at 1 year) (8).

POEM is a new endoscopic intervention which was first performed in 2008. This procedure is still under study and is only available in limited number of centres around the world. The initial reports showed POEM to be equivalent in efficacy to LHM (efficacy 82-96%) (9,10). POEM is less invasive than LHM and needs a shorter recovery period. (10) However, POEM procedure does not include the anti-reflux operation which is part of LHM surgery and thus patients undergoing POEM are at higher risk of developing GORD.

A recent systematic review of evidence showed that, in comparison with LHM surgery, POEM procedure is associated with significantly higher risk of developing GORD symptoms (OR 1.69, 95% CI 1.33-2.14, P < 0.0001), GORD evidenced by erosive esophagitis (OR 9.31, 95% CI 4.71-18.85, P < 0.0001), and GORD evidenced by pH monitoring (OR 4.30, 95% CI 2.96-6.27, P < 0.0001) (10).

Diffuse oesophageal spasm

This is a rare condition which presents as severe chest pain and/or dysphagia. As in achalasia, even though OGD and barium swallow are the best initial tests to evaluate dysphagia, they are not good at diagnosing diffuse oesophageal spasm. When clinically suspected, patients should have oesophageal manometry. The manometry shows abnormal contractions with multi-peaked waves of increased duration and amplitude.

Medical management of diffuse oesophageal spasm includes the use of short-acting nitrates, calcium channel blockers, phosphodiesterase inhibitors and botulinum injections. These usually provide some patients with a degree of relief. In severe nonresponding cases, long oesophageal myotomy, usually through thoracoscopic approach, could be considered with success rate reaching 80% in relieving symptoms (11).

Other non-specific oesophageal motor disorder

High resolution oesophageal manometry disclosed a wide range of abnormalities which could occur to oesophageal motor function (figure 4). Management with proton pump inhibitors for the reflux symptoms provide good control of good proportion of these patients.

Oesophageal motor disturbance due to autoimmune disease

The oesophagus can be affected in at least 80% of patients with systemic sclerosis (12). There is usually weak peristalsis due to atrophy in the oesophageal smooth muscles including the LOS. Oesophageal symptoms could include dysphagia, regurgitation and aspiration as well as reflux symptoms related to the LOS defect and poor clearance. Patients are most commonly managed with proton pump inhibitors and rarely need anti-reflux surgery (12).

Brief overview of the high resolution oesophageal manometry

High resolution oesophageal manometry is a test which measures the pressure activity within the oesophagus and the sphincters. The multi-pressure sensor catheter has sensors situated at 1cm intervals and allow for the measurements along the entire length of the sphincters at each end simultaneously.

The procedure takes about 20min and is done in the outpatient setting. The catheter with the pressure sensors is passed from the nose to the stomach. The patients is asked to drink sips of water and later asked to eat solid food (bread). The sensors' signals are inserted into computer programme which analyse them and generate the graphs.

High resolution oesophageal manometry helps answering the below questions:

1. Oesophago-gastric junction (OGJ): What is the LOS resting pressure (high or low)? Does the LOS relaxes adequately with wet swallows? Is there a hiatus hernia?

2. Oesophageal body response to wet swallows: Is peristalsis present or absent? What is the amplitude of peristalsis? Is there a spasm?

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MCQ Questions

1. What is the best test to diagnose oesophageal motility disorders?

a) OGD
b) Barium swallow
c) CT chest/abdomen/pelvis
d) Oesophageal manometry
e) MRI chest

2. Please select the one or more statements about achalasia which are true:

a) Dysphagia is the principle symptom
b) Patients typically have problems with swallowing solid food only.
c) Botulinum toxin injection is the most effective therapy to resolve symptoms
d) Achalasia increases the risk for oesophageal cancer
e) The pathophysiology involves failure of relaxation in the upper oesophageal sphincter

3. What is the best first initial test for patients presenting with dysphagia:

a) CT chest/abdomen/pelvis
b) OGD
c) Oesophageal manometry
d) MRI chest
e) Bronchoscopy

4. Select one or more diseases from below which presentation mimics primary achalasia?

a) GORD
b) Chagas's disease
c) Duodenal ulcer
d) Oesophageal varices
e) Tight wrap after anti-reflux operation

5. Which one or more of the below statements about oesophageal manometry test is true?

a) It is usually done under general anaesthesia
b) The test takes about 2-3 hours to finish
c) The tests measures the pressure activity within the oesophagus and the sphincters
d) Normal pressure at the lower oesophageal sphincter suggests achalasia
e) The patient is usually asked to drink sips of water and eat solid food during the test.

Answers

Q1: d

Oesophageal motility disorders (OMD) are best diagnosed with oesophageal manometry. The new has revolutionised the diagnosis of this group of diseases. The Chicago classification is the most widely used criteria for classifying the different oesophageal manometry disorders.

The introduction of high resolution oesophageal manometry has disclosed considerable new information about OMD showing it to represent a wide-spectrum of disorders. This has led to the introduction of new criteria to define OMD known as Chicago classification.

Q2: a + d

Primary achalasia is uncommon condition with in incidence of 1 case per 100 000 people in the year in Europe. The pathophysiology involves progressive loss of ganglion cells in the myenteric plexus which selectively affects the inhibitory innervation to the oesophagus smooth muscle and lower oesophageal sphincter (LOS).

Dysphagia is the cardinal symptom of achalasia. It usually slowly worsens over time and characteristically affects both solid and fluids. Achalasia is associated with increased risk of oesophageal cancer. Pneumatic dilatation and cardiomyotomy are generally the mainstream therapeutic modalities for achalasia. Botulinum injection is less effective with high recurrence rate and thus is only reserved for patients with significant co-morbidities

Q3: b

Dysphagia more commonly secondary to mechanical obstruction (e.g., cancer or strictures) OGD is the best initial investigations for dysphagia. Other investigations could be used based on clinical suspicion of the cause of the dysphagia and after OGD performed to rule out mechanical cause.

Q4: b + e

Achalasia-like manifestation could present due to few other diseases. Chagas' disease has marked clinical and pathological similarities with achalasia. It is caused by chronic infection with the Trypanosoma cruzi, a parasite infection known in South America. Pseudo-achalasia is also an achalasia-like disorder produced by cancer at the cardia. Secondary achalasia could also happen due to a tight wrap after anti-reflux operation.

OESOPHAGEAL MOTILITY DISORDERS: DIAGNOSIS & MANAGEMENT

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Q5: c + e

High resolution oesophageal manometry is a test which measures the pressure activity within the oesophagus and the sphincters. The multi-pressure sensor catheter has sensors situated at 1 cm intervals and allow for the measurements along the entire length of the sphincters at each end simultaneously.

The procedure takes about 20 min and is done in the outpatient setting. The catheter with the pressure sensors is passed from the nose to the stomach. The patients is asked to drink sips of water and later asked to eat solid food (bread). The sensors signals are inserted into computer programme which analyse them and generate the graphs.

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PAIN CONTROL IN SURGICAL PATIENTS: ARE WE ON TOP OF IT?

GV Phang, M Budhoo

Abstract

Pain control is a common clinical situation junior doctors encounter on the wards. Giving appropriate pain relief has positive physical, and psychological effects for patients, whilst poor pain control can create the opposite effect. We completed an audit cycle on the compliance of analgesia use in surgical patients in accordance with the World Health Organisation (WHO) analgesic ladder. Despite this being perceived as straightforward, this audit highlighted that there is still much scope for improvement in analgesia prescription.

Background and objectives

Pain is a common presenting complaint for patients admitted to the general surgical wards in the hospital. There are different options in the management of pain; pharmacologic, neuromodulation and surgical approaches. The pharmacologic option is the most commonly used therapeutic approach to relieve pain, and in most of clinical practice, this is often been based on the WHO analgesic ladder. (1) The WHO pain ladder was originally developed for cancer pain, where it guides the titration of analgesia according to the severity of the pain.

The aims of this audit are to assess the compliance of analgesia prescription with respect to the WHO analgesic ladder and subsequently to evaluate if further measurement is required to improve the management of pain control among patients.

Method

This was a retrospective review of the drug charts of 50 successive surgical patients in three general surgical wards over 2 week period from the end of October to early November 2016. We included both elective and emergency admissions and focused only on the analgesic requirements and compliance with the analgesic ladder. We excluded patients who have allergies and contraindications to analgesia.

Results

The initial audit in 2013 reported 86% compliance with the WHO analgesia ladder in 50 surgical patients. More appropriate analgesia was not always prescribed before adding in opiates.

Following this audit, a number of interventions were identified. Education regarding the need for regular paracetamol for all surgical patients rather than only as required (PRN) analgesia to control background pain was incorporated at the foundation year induction programme. Educating the nursing staffs on the wards with regard to the importance of regular analgesia was also carried out. This audit was then repeated in 2016 to complete the audit cycle.

	Paracetamol		NSAIDs		Codeine		Morphine		Compliance with WHO ladder
	Reg	PRN	Reg	PRN	Reg	PRN	Reg	PRN	
	78%	14%	16%	2%	34%	26%	6%	74%	
Total	92%		18%		60%		80%		14%

Table 1: Results of the audit (2016).

With regards to the re-audit, there was only 14% of compliance to the WHO analgesic ladder, compared to 86% compliance in the initial audit. Among the 50 patients, 92% were prescribed paracetamol, where 78% was in the regular prescription and 14% in the PRN section. As for nonsteroidal anti-inflammatory drugs (NSAIDs), only 9 (8 regular and 1 PRN) patients were prescribed this analgesic. In terms of opiates, oral morphine sulphate (80%) was prescribed more often than codeine phosphate (60%) in the drug charts. Out of the 40 patients who were prescribed oral morphine sulphate, 37 of them were in the PRN part of the drug charts.

Discussion

In the general surgical wards, most patients present with an acute abdomen. A minority are elective admissions in post-operative recovery. As such, the majority of the patients will have pain as one of their symptoms.

In addition to the importance of finding the aetiology of the pain, well-targeted pain control is imperative for the holistic management of the patient. This can improve patient satisfaction, achieve early mobilisation post-operatively, and reduce the length of stay in hospital.

From the audit outcome, we are fairly good at prescribing regular paracetamol and PRN morphine. However, it is evident that the consideration of NSAIDs for surgical patients is still poor despite the absence of obvious contraindications. This is possibly due to doctors being overly cautious with the known side effects of NSAIDs such as renal and gastrointestinal side effects.

The massive decline in compliance with the analgesia ladder in the re-audit has shown that this matter should not be ignored despite what seems to be a simple topic. It is evident that the education of junior doctors on analgesia has not been conveyed effectively. The lack of clinical experience among junior doctors could potentially explain the audit results, as this audit was conducted in the first rotation of the foundation years.

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WHO analgesic ladder

The general approach to prescribing analgesia has been based on the WHO pain ladder (Figure 1). (1) It is often adopted as a model in titrating the analgesia according to pain in a step-wise manner. The severity of the pain should always be evaluated and whenever appropriate, the analgesia prescribed should always be guided by the severity of pain.

Regular review of pain intensity is vital in ensuring optimal pain control. Increasing the dose of the analgesia or adding an additional analgesia might be necessary for increasing pain severity and vice versa, if the pain is improving, it might be reasonable to step down on the analgesic ladder. This can minimise the side effects of the pain relief and patient dependence on the analgesic.

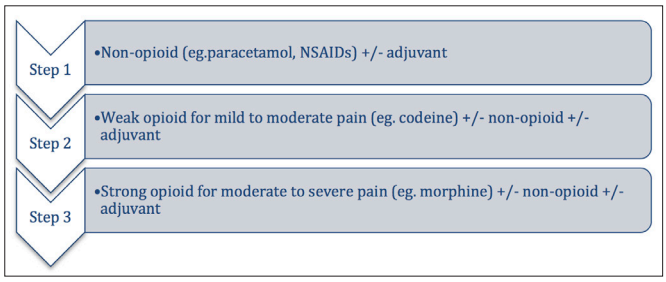

Figure 1: WHO analgesic ladder (1)

Multimodal analgesia

Multimodal or 'balanced' analgesia has been widely practiced in the last two decades. (2, 3) It involves the use of a combination of analgesia which allows different pain receptors and pathways to be targeted. The rationale of this concept is to eliminate the need for stronger pain relief, such as opioid administration. In addition, it advocates the administration of analgesia at a lower dose, hence reducing the side effects.

For example, studies have shown a reduction of opioid use by 20 to 30% when paracetamol and NSAIDs are co-prescribed, due to their synergistic effects. (4, 5) Additionally, the consideration of adjuvant analgesia, such as gabapentin or pregabalin, can help reduce pain intensity especially in neuropathic pain.

Post-operative pain

The concept of 'preventive' analgesia has been commonly incorporated in most of the post-operative patients.(6) This is an approach that involves the regular administration of pain relief to prevent acute pain post-operatively. This replaces the previous practice of administration of analgesics only in response to pain.

The choice of analgesia post-operatively will be different for each individual, as it is tailored to the type of surgical procedure performed. For example, open major surgery will often require patient-controlled analgesia (PCA) or an epidural catheter in situ in comparison to laparoscopic surgery that may just need oral analgesia.

The model of preventive analgesia has been widely recognised as key in the understanding of treatment optimisation for pain control post-op. Adequate pain control after surgery is important in preventing unwanted outcomes such as tachycardia, hypertension, and poor wound healing. Furthermore, there is a risk that acute pain can develop into long-term psychological distress and eventually lead to chronic pain. Ultimately, this will be a challenge to manage later on.

Interestingly, a recent large observational study conducted in NHS hospitals involving 15,040 participants reported that at least 48% of the patients experienced moderate to severe pain at the surgical site post-op. (7) Another study by Sommer et al. showed that despite assessing and treating 1490 surgical patients according to the acute pain protocol, 41% of the patients still reported moderate to severe pain post-op.(8) These studies have proved that we are still not addressing the pain symptom adequately, and there are still areas to be addressed.

The enhanced recovery after surgery (ERAS) pathway, which has been implemented in colorectal surgery, also reinforces the importance of providing optimal analgesia post-operatively. (9) This is an evidence-based recommendation for each pre-operative, intra-operative, and post-operative strategy, where it was shown to reduce the length of stays in hospital and accelerate the recovery phase.

The protocol supports the use of multimodal analgesias such as paracetamol and NSAIDs, with the aim to reduce the need for an opioid. (10, 11, 12) Although there have been case reports highlighting the links between the use of NSAIDs and anastomotic leak post-colorectal surgery, there is no strong evidence to support the association. (13) There have also been ongoing trials looking into the potential benefits of NSAIDs in preventing and reducing the number of colorectal cancers. (14)

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Multidisciplinary team involvement

Occasionally, it can be difficult to achieve adequate pain control in some patients despite aggressive use of analgesic choice (e.g. morphine). In this instance, it will be appropriate to liaise with the pain team in the hospital for their expertise in such matter.

Pain team often consists of the specialist pain nurses and consultants with special interest in pain medicine (often anaesthetists). Earlier consultations with the pain team can also be beneficial for patients who are already on a combination of regular analgesia such as paracetamol and strong opioids.

Side effects and contraindications of analgesia

It is also of paramount importance to be familiar with the side effects and contraindications of each type of pain relief (Table 2). (15) Prescribers should consider the potential contraindications and side effects of the analgesia to the each individual patient, before introducing these drugs to the patients.

For example, reviewing the renal function and checking for previous gastrointestinal side effects from patients can aid in the decision for NSAID administration. The addition of a proton pump inhibitor (PPI) for a patient with regular NSAID can reduce the GI side effects.

Analgesia	Dose for adults	Cautions	Side effects
Paracetamol	• 500mg–1g every 4–6 hours • Max dose: 4g daily • Dose adjustment for body weight <50kg	• Alcohol dependence • Severe liver disease • Renal impairment	• Rare: rash, blood disorders, hepatic failure (especially when overdose)
NSAIDs: ibuprofen	• 200–400mg 3–4 times daily • Max dose: 2.4g daily	• History of hypersensitivity to aspirin or any other NSAIDs • Asthma • Active/history of GI bleeding • Heart, liver, and renal failure	• Gastrointestinal upset, bleeding, peptic ulcer • Hypersensitivity reactions: rashes, angioedema, and bronchospasm • Headache, dizziness • Fluid retention, oedema
Codeine (weak opioid)	• 30–60mg every 4 hours • Max dose: 240mg daily	• Acute respiratory depression • Acute obstructive airway disease • Risk of ileus • Raised intracranial pressure, head injury • Biliary tract diseases • Liver and renal impairment	• Nausea and vomiting • Constipation • Hypotension • Respiratory depression • Dry mouth • Biliary spasm • Hallucinations • Dependence
Morphine (strong opioid)	• 5–10mg PO/SC/IM every 4 hours • 5mg IV every 4 hours • Dose adjusted according to response	As above in codeine	As above in codeine, side effects tend to be milder in codeine

Table 2: An overview of different categories of analgesia (15)

Limitations of the audit

This audit did not specifically review the analgesia prescribed for the types of each admission, i.e, those who were admitted via emergency department or as an elective admission. It focused primarily on managing pain. This audit also did not look at the adjuvant analgesia prescription in the patients, so we were unable to comment on the administration of this type of pain relief.

Conclusion

The use of analgesia in clinical practice is a common and simple topic. However, this is still not addressed adequately among junior doctors as evidenced in our audit. Further education on the importance of analgesia and regular review of the analgesia prescription by the senior member of the team will be essential in providing optimal pain control to the patients. It is vital to remember that giving appropriate and adequate analgesia will have a positive and tremendous effect on the patients' care. There is also constant need to reinforce the importance of adequate analgesia to ensure correct use of the WHO pain ladder.

Learning points

1. Regular analgesia is essential for patient satisfaction, reduces post-op complications (unrelieved pain reduces mobility), and can reduce the length of stay.

2. All patients with pain should be prescribed regular analgesia which should be titrated against their pain score. Remember to use the WHO analgesia ladder to guide your decision. If the patient is not in pain, or if the pain is not severe, then stronger pain relief can be prescribed PRN and changed to regular if required.

3. Often, having a patient-centred approach with regards to their pain control can allow appropriate analgesia to be prescribed and eventually improve patients' satisfaction.

4. Prescribe NSAIDs with PPI or limit a prescription to 2 or 3 days, then review.

5. Regular review of analgesic regimen in ward rounds as to increase the analgesia requirement or to step down as necessary.

6. Liaise with the pain team in the hospital for alternative options of analgesia.

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SURVIVING SURGICAL TRAINING - TAKING INSPIRATION FROM MARATHON TRAINING

M Adam Heetun

Mohammad Adam Heetun Describes How He Used His Experiences In Running To Mould His Approach To Surgical Training

"Running is the greatest metaphor for life, because you get out of it what you put into it."

Oprah Winfrey

Surgical training is an arduous and long apprenticeship, with a highly competitive selection process. Despite the many highs, there are numerous challenges that the trainee faces - gaining adequate surgical exposure despite reduced working hours, achieving technical competencies and meeting rigorous yearly standards set by the local ARCP panel. Surviving surgical training is as important as flourishing within it.

As I trained for my first full marathon, it became obvious that the trainee surgeon is like a runner, taking part in his or her own personal marathon. The experiences of marathon training appeared to parallel surgical training and offered a number of lessons for approaching and surviving the long path ahead.

1. Take a step at a time

"Marathons don't come to you overnight"

Sebastian Coe, Former Olympic Champion

Running 26.2 miles is tough. Like other runners, this was achieved by initially completing small distances, building up slowly and mentally breaking down a long race into sizeable chunks. Similarly, surgical training is a lengthy and daunting process, but made more manageable by splitting it to smaller checkpoints. Current surgical training has guidelines of achievement for each stage (via the ISCP website: www.iscp.ac.uk). The same applies to learning a surgical procedure: break it down into component parts, master each in turn and add them together. As I found with running longer distances, conquering each step yielded a sense of pride that spurred me on to the next challenge.

2. Set your goals

"You don't have to be a fantastic hero to do certain things – to compete. You can be just an ordinary chap, sufficiently motivated to reach challenging goals."

Edmund Hillary, Explorer

In training, I learnt to set concrete goals that provided focus. These were realistically achievable in the long term, but required effort and dedication. My first goal was to complete a 5k run, which led to a 10k, a half marathon and finally to running a marathon. Similarly, setting ambitious but achievable goals within each year of surgical training provides a means keeping focus, measuring progress and targeting future goals.

3. Repeat, repeat and repeat. Then repeat again

"I fear not the man who has practiced 10,000 kicks once, but I fear the man who has practiced one kick 10,000 times."

Bruce Lee, Martial Arts and Movie Star

Repetition leads to mastery - in any field. Running 20 miles a week along the proposed race route helped me adapt to both the distance and the conditions I was likely to face on race day. The same is applicable to learning a surgical craft. There are few ways to becoming a better technical surgeon than to repeat procedure (again and again) until it becomes second nature.

4. Setbacks are inevitable

"I've missed more than 9,000 shots in my career. I've lost almost 300 games. 26 times, I've been trusted to take the game winning shot and missed. I've failed over and over and over again in my life. And that is why I succeed."

Michael Jordan, Basketball Player

As I painfully found out, the path to successfully completing a marathon is laden with setbacks. Injuries, fatigue, self-doubt and countless psychological battles blotted the landscape leading to the starting line of my first marathon.

However, I learnt more about my training when things didn't go my way. Similarly, surgeons will face setbacks, unexpected outcomes and complications. Such events can be personally difficult and painful to reflect on, but, viewed differently, they provide an unparalleled moment of learning from a different angle.

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5. Rest and recovery

Marathon runners know that the rest days are as important as training days. Overdoing it risks injury, fatigue and psychological burnout. Get enough sleep, eat well, see loved ones and enjoy the time you aren't at work. You'll come back energised and more likely to succeed.

6. There is a downhill stretch just around the corner

"When you first get a hill in sight, look at the top of it only once. Then imagine yourself at the bottom of the other side."

Florence Griffith Joyner - American Athlete, Fastest Woman of All Time

Downhill runs are easy. Everything is on your side. The strides are wider, the effort less and the speed more considerable. However, uphill runs are tough as I discovered on a few formidable hills: every step felt sluggish and each breath increasingly laboured, but the reward came with a downhill segment. Surgical training can feel much the same with it's numerous ups and downs. If it feels like you are on an uphill segment, keep going - there will be a downhill moment to savour.

7. Sometimes let go

Running has taught me that you cannot control everything and provided a sense of acceptance of conditions that cannot easily be changed. Anything from inclement weather, an injury, sluggish legs or fatigue can conspire to make a run difficult. Similarly, challenging work conditions, such as a busy on-call, can create a sense of being overwhelmed. Accept that conditions may sometimes be far from optimal and that ultimately, you can only do your best.

8. Run your own race

"When you run the marathon, you run against the distance, not against the other runners and not against the time."

Haile Gebrselassie, Marathon runner

When you enter a marathon, your opponent is the distance. How you get to the finish line is up to you. Run it slow, run it fast, a bit of both or walk some of the distance. It doesn't really matter as long you get to the end. Surgical training is similar. Comparison to others is a useful tool to raise one's own game, but your approach to achieving the relevant competencies and skills is up to you.

9. Enjoy the journey (and the destination)

On my journey to my first marathon, I have had the chance to set and achieve personal goals, make new friends, and develop my confidence and determination. On reflection, this journey was as enjoyable as crossing the finishing line.

As a trainee, it is easy to over focus on the endpoint of training, but the experiences gained during training should be relished, reflected on and enjoyed as they alchemise to form our future self. It isn't always about the destination, but the journey that takes you there - relishing the individual moments along the way.

10. There is no finish line

"The miracle isn't that I finished. The miracle is that I had the courage to start."

John Bingham, running speaker and writer

In the end, I realised there is no finish line. Once we achieve our goals, there will always be another challenge and the desire to improve ourselves even more. Surgical training, unlike a marathon, has no finish line. We will always be learning, always striving and always running to the next finish line of achievement for our patients and ourselves.

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TELEPHONE CLINICS IN SECONDARY CARE

SB Mutunayagam, A Mallin, A Norton, A Bailey, A Watson

Abstract

Background

Telemedicine is becoming increasingly adopted in modern healthcare systems as a method of seeing large numbers of patients in a cost-efficient manner. The benefits of telephone consultations are accentuated when used in hospitals with a wide geographical catchment and low population density. The aim of this study was to assess the efficacy of telephone consultations in a district general hospital in rural Scotland.

Methods

Data was collected on all colorectal patients seen via telephone clinic between the dates of 25/03/2015 and 13/02/2017 at Raigmore Hospital, Inverness. Variables assessed were patient postcode, reason for attendance and final clinic outcome. Distance and time saved were also calculated using the Google Maps application.

Results

A total of 100 patients were included in this study with a mean age of 48 years. Final outcomes were: discharge back to GP 52% (n=48), re-booked for outpatient clinic 17% (n=16), referral to another specialty 12% (n=11), and hospital admission 9% (n=8). Rate of non-attendance was 7% (n=7). Mean distance of travel avoided was 74 miles with approximate time saving of 113 minutes.

Conclusion

Telephone clinics are an effective method of reducing financial and time burden for patients in the Highland region. With low rates of non-attendance they also result in hospital economic savings. This study provides proof of principle that telephone consultations are a useful tool for surgical follow up in remote areas.

Introduction

Telemedicine is being increasingly used in healthcare systems worldwide. In Scotland, NHS 24 has been using telephone consultations, as a method of triaging patients, since 2001.1 There is a growing body of evidence demonstrating that telephone consultations are a safe and cost effective way of following up patients after surgery and after discharge from hospital. (2–5)

Furthermore, patients report high satisfaction rates with telephone consultations. Potential benefits of telephone clinics include decreased travel time and cost of transport, less time off work and decreased childcare costs. (5-7).

NHS Highland is the largest health board in the United Kingdom by geographical area. It serves an area the size of Belgium (over 32,500 square kilometres) but with a limited infrastructure of only 14 miles of dual carriageway. The population of 320,000 people is primarily served by Raigmore Hospital, Inverness. (8)

Here, the general surgical department has a high outpatient demand; 25,963 clinic appointments in 2015 with each appointment costing £182.9. Due to this unique geographical situation and pressure on outpatient clinics, the colorectal department at Raigmore Hospital began to trial telephone clinics over 2 years ago. The aim of this study is to look at the effectiveness of these clinics – specifically looking at the indication and outcomes of these clinics, the level of patient engagement, travel miles and time saved.

Methods

Data were collected on one hundred patients seen by the colorectal surgery team at Raigmore Hospital between 25/03/2015 and 13/02/2017. Using Community Health Index (CHI) numbers it was possible to access medical records via the Scottish Care Information (SCI) store search.

The following variables were collected from the Electronic Patient Record (EPR): patient post code, reason for attendance and final clinic outcome. If a patient did not attend (DNA) this was noted, but a reason for clinic and the outcome was still recorded. If a patient had attended more than one clinic, the reason for attendance was taken from the first telephone consultation and the outcome was recorded from the most recent telephone appointment. This ensured consistency across the study period.

Patient post codes were used to calculate distance of return travel to hospital (miles) and travel time (minutes). Calculations were performed using Google Maps (https://www.google.co.uk/maps/), which also allowed for an estimate of increased travel time due to traffic if that journey was to be made at 09:00 on a weekday morning. The results were analysed using simple calculations on Microsoft Excel.

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Results

A total of one hundred patients were included in this study. The mean age was 48 (range 18-88 years) and 60% of the cohort were female. With the exception of one patient, telephone clinics were mostly used to follow up patients. The major indication for a telephone appointment was post-operative follow up, with 71% of patients being reviewed in relation to this.

Patients were also reviewed following discharge from a hospital admission and follow up after physical outpatient appointments, 15% and 14% respectively. Only 1% of patients were new referrals, either from a general practitioner or a hospital consultant (See Table 1).

There was no reply from 7 patients and 5 of these DNAs were discharged back to the GP with the provision for further follow up if required. Of the 2 not discharged, one was kept on the telephone clinic list and the other was booked for physical outpatient appointment due to clinical concerns.

Indications for telephone clinic	Number of patients (n=100)
Follow up post-operative	71% (71)
Follow up post hospital discharge	15% (15)
Follow up post physical outpatient	14% (14)
First contact	1 (1%)

Table 1: Indications for telephone consultations.

For patients who completed telephone consultations, 52% were discharged from clinic and 11% were kept on the telephone clinic list. A further 17% and 9% were escalated to a physical outpatient appointment and hospital admission respectively. All patients escalated to a hospital admission had an elective procedure performed. Most of the patients escalated to an outpatient appointment required further examinations or investigations. The remaining patients (12%) were referred to another speciality (See Table 2).

Outcome of telephone clinic	Proportion Clinic Attenders (n=93)
Discharge	52% (48)
Continue Telephone clinic	11% (10)
Physical outpatient appointment	17% (16)
Hospital admission	9% (8)
Referral to another speciality	12% (11)

Table 2: Outcomes of telephone consultations.

On average patients were saved from making a 74 miles return journey between their home and Raigmore Hospital. Distances travelled ranged from 2-238 miles. We also calculated that on average these telephone consultations saved patients 113 minutes not including the time taken for cark parking and waiting to be seen. Most patients (47%) saved less than 1 hour, however 6 patients saved more than 5 hours of their time with one individual avoiding a 12 hour journey (See Figure 1).

Discussion

Telemedicine has been used in a variety of clinical settings including assessing acute presentations, follow up of patients with chronic diseases, post-operative patients and patients discharged from hospital. (2-5,10-16).

It has been considered a more efficient and cost-effective method to optimise outpatient resource utilization in a healthcare system struggling to keep pace with rising demands and cost pressures. Research into the workload of four surgeons in a district general hospital found that 67% of routine post-operative follow up appointments and 51% of those attending for results were unnecessary. (17)

This was echoed in another study which demonstrated that a significant number of patients returning to a cardiology clinic did not require regular outpatient review.18 These face to face consultations could have been replaced with telephone appointments optimising outpatient resources and enabling new patients to be seen faster. Telephone follow up of low risk general surgical procedures resulted in a 50% reduction in outpatient clinic appointments among patients. (2)

NHS Highland provides healthcare to one of the largest and most sparsely populated area in the United Kingdom, with Raigmore Hospital being the main general hospital in this region.8 For the past two years, the colorectal department has used telephone clinics to offer remote consultations, increasing access to its widely distributed patient cohort.

These clinics have been used for a variety of reasons, most predominantly post-operative follow up. Past research has shown telephone encounters can be successfully used to follow up patients who have undergone low risk general surgery procedures, office anorectal surgery, orthopaedic surgery, urological surgery, tonsillectomy and adenoidectomy. (10-13)

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Potential benefits offered by these clinics include sparing patients the cost and inconvenience of travel and reducing time taken off work. We calculated the time and miles saved for patients in not having to travel to hospital for face to face consultations as a measurement of indirect costs. Patients were saved from making a 74 mile return journey and approximately saved 2 hours on average, not including the time spent for parking and waiting to be seen.

Furthermore, previous research has shown telephone appointments are generally shorter in duration compared to outpatient consultations, with up to 30 minutes taken to complete a telephone consultation compared to a maximum of 60 minutes for an in person appointment. (2) These cumulative savings of time from missing work as well as travel expenses can translate to significant cost savings for the patient.

In the majority of studies, patients reported greater satisfaction with telephone clinics compared with outpatient follow up. (10-12, 21) An appropriate follow up to this paper would be an assessment of patient preferences comparing telephone clinics and face to face consultations. Previous research has highlighted that transportation related factors greatly impacted on preference for a telephone clinic compared with an outpatient appointment.10 Considering the vast geographical catchment area of NHS Highland, we assume that transportation factors will have a large impact on patient preferences.

A limitation of this study is that we were not able to assess the cost-effectiveness of telephone clinics. However previous studies have demonstrated that telephone clinics can result in significant savings over physical outpatient appointments. (4,5,11) An economic evaluation (including patient-related costs, loss of productivity and hospital-level costs) demonstrated that hospital or clinic follow up incurred more costs in total compared with nurse led telephone clinics in the follow up of post-operative breast cancer patients. (22)

A study into gynaecology patients found that there was an average saving of £57.75 per appointment when patients were followed up in telephone clinic opposed to face to face consultations. (4) Other limitations include an assumption that all patients would be driving to the outpatient appointment without utilising any other mode of transport. The estimates of distance and time saved were based only on a singular day.

Outpatient clinic appointments are a constrained resource which needs to be managed to maximise efficiency and patient satisfaction. This study has demonstrated that telephone clinics can be used to follow up patients, reduce the indirect costs associated with outpatient appointments and are likely to have high patient satisfaction rates.

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EMERGENCY LAPAROSCOPIC CHOLECYSTECTOMY VERSUS EXTERNAL BILIARY DRAINAGE

A Hussain, I Al-shoek, F Clift, K Oaikhinan, S Balchnadra, S Yeluri, P Vasas

Abstract

Background

Emergency laparoscopic cholecystectomy is a management option for acute calculus cholecystitis and it's complications. Percutaneous cholecystostomy is a valid alternative for a variety of conditions such as gallbladder's empyema, for those who are not fit for surgery and for palliation. The aim of this study is to evaluate the outcome of emergency laparoscopic cholecystectomy and external biliary drainage to treat a variety of acute hepato-pancreatic and biliary emergencies at a secondary centre.

Methods

This is a retrospective study of emergency laparoscopic cholecystectomy and external biliary drainage for cohort of patients during 2014-2016 at a secondary referral centre.

Results

53 patients aged 22-86 years (40 females and 13 males) underwent emergency laparoscopic cholecystectomy and 40 patients aged 36-91 years (24 female and 16 males) underwent external biliary drainage. The American Society of Aneasthiologists (ASA) score was ranging from 1-3 for both groups of patients. Following external biliary drainage, 3 (7.5%) morbidity was found to be due to bile leaks and no organ injury reported. The study population is homogenous in terms of demographic features.

The indications for emergency cholecystectomy were cholecystitis (grade I-3) in 38 (71%), biliary colic in 10 (18%), perforation and pancreatitis in 5 (9.4%) patients. The indications for external biliary drainage group were cholecystitis 21 (52.5%), pancreatic cancer 9 (22.5%) and bile duct stones and biliary stricture 5 (12.5%). One-year mortality was 1 (1.8%) and 14 (35%) in the cholecystectomy and external biliary drainage cohorts respectively. There was a significant difference in mortality, length of stay and morbidity p value <0.001.

Conclusions

Both emergency laparoscopic cholecystectomy and external biliary drainage are valid options to manage acute presentations of the biliary system. Emergency laparoscopic cholecystectomy is safe and has the potential to save money. External biliary drainage is the procedure of choice for unfit patients with biliary obstruction; this includes hepato-biliary pancreatic cancers which account for the high first-year mortality figures.

Key words

Emergency Laparoscopic Cholecystectomy, External Biliary Drainage, Internal Biliary Drainage, Length Of Stay.

Introduction

External Biliary Drainage (EBD) is an option to manage the acutely inflamed gall bladder and obstructed biliary system. This applies to patients who do not want emergency surgery, patients who are for palliative management or high-risk patients and in a limited resource settings where Emergency Laparoscopic Cholecystectomy (ELC) is not practiced (1-4).

Although EBD is perceived as a low risk procedure, morbidity and mortality should never be underestimated especially with high-risk patients. A recent study showed 10% mortality and 69% morbidity for 96 Intensive Care Unit (ICU) patients (5). Even with average risk patients, Furtado et al reported high morbidity including tube dislodgement and infection (6).

When comparing two groups of an elderly high-risk population, Lin et al found EBD resulted in reduced hospital stay and morbidity compared to ELC (4). Popowicz et al found less complications but longer stays with EBD compared to ELC(3). Schaefer et al reported good results of EBD in critically ill children and even suggested the avoidance of future laparoscopic cholecystectomy(7).

Wang et al suggested that the severity of the initial attack of cholecystitis is predictive of the recurrence of cholecystitis in 10% of EBD patients in the first year(8).Yeo et al reported 19 days median length of stay and 10.7% 30-day mortality for high risk non cancer patients who were treated with EBD for cholecystitis (9),while Bala et al studies showed significant short stays after ELC compared to EBD(10).

Methods

This is a retrospective study of patients who underwent EBD and ELC during 2014-2016 at a secondary care centre. The data was retrieved from case notes as well as radiology, Medsec and blood test software systems. The data has been tabulated in excel files and has also been analyzed. Simple statistical methods are used. The primary outcome is the morbidity and mortality of patients treated with either modalities at our hospital. T-Test and correlation statistics were used and p value was taken as <0.05 to show the statistical significance.

Results

Emergency Laparoscopic Cholecystectomy

Length of stay (LOS) for ELC was 0-163 days (mean 10.58). By excluding two lengthy odds (127,163 days) the mean LOS is 5.11 days. Female/male ratio was 40/13 (3.07).

The indication for the procedure included; known chronic cholecystitis/biliary colic was 10 (18%), acute cholecystitis, 38 (71%), gangrenous/perforated gallbladder and recent pancreatitis, 3 (5.6%) and 5 (9.4%) respectively.

EMERGENCY LAPAROSCOPIC CHOLECYSTECTOMY VERSUS EXTERNAL BILIARY DRAINAGE

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Complications of ELC included; a bile leak in 2 patients (3.6%), 2 (3.6%) patients were admitted to the intensive care unit (ITU). 52/53 (98.11%) patients were discharged home after the operation. 30 day mortality was 0. One patient died after 163 days due to a complex connective tissue disease and chronic renal failure.

External Biliary Drainage

3 bile leaks and 3 hospital deaths were reported during the index admission. LOS ranged from 3-61 (21) days. 14 (28.5%) all-cause deaths were recorded in the first year. No organ injury was reported after insertion of biliary drains. The indications were 21 (52.5%) calculous cholecystitis, 9 (22.5%) hepatobiliary cancer, 5 (12.5%) pancreatic cancer and 5 (12.5%) bile duct stones and strictures another 5 (12.5%) for bile duct stones and strictures.

5 (12.5%) patients failed conservative management and underwent subsequent laparoscopic cholecystectomy during the study period. 9 (22.5%) readmissions were reported. 10 patients (25%) underwent drain removal, the EBD was considered as definitive palliative treatment in the rest, see table 1. There were significant differences in the mortality, LOS ,organ injury and bile leaks among the two groups of patients(see table 1). The population is homogenous for the study, p value = 0.35, no significant difference between two groups in terms of demographic and indications for the intervention value =0.25. There were significant differences in mortality between the two groups, p value=0.02. See table 1.

Parameters	External biliary drainage	Emergency laparoscopic cholecystectomy	P value
Average age	36-91(75)	22-86(51)	0.35
Male Female	16 24	14 39	
Indications 1.Pancreatic cancer 2.Cholangiacarcinoma 3.Bile duct stone 4.Stricture 5.Calculous cholecystitis 6.Biliary colic 7.Gangrenous/perforated gall bladder	 9 5 3 2 21 0 0	 0 0 0 0 38 10 03	 0.25
Complications Mortality during index admission Mortality in first year (total)	 3 14(all causes)	 1 1	 0.02 0.05
Length of stay	3-61[15] days	1-163[5.3]	0.04
Bile leak	3	2	0.02
Organ injury	0	1	0.01

Table (1): Our data and p values.

Discussion

Many studies have shown the value of EBD and ELC in treating different biliary pathologies including cholecystitis, benign and malignant biliary obstruction (11-22).

Mortality and morbidity of ELC is a focus of the research and the hospital episode statistics showed fewer gallbladder-specific complications, a shorter total length of hospital stay and similar operative complications compared with those among patients who have had one or more emergency admissions (23-25).

In health systems that are facing financial pressure, ELC may be a reasonable option to promptly manage gall stone disease, as well as avoiding recurrent admissions, and thus saving money. CholeS study of more than 8000 patients showed ELC to be less costly (£4570 versus £4720; €5484 versus €5664) and more effective (0·8868 versus 0·8662 QALYs) than delayed cholecystectomy.

Therefore ELC should be offered when the clinical criteria are fulfilled. These include fitness for general anaesthetic, adequate surgical experience and infrastructure settings (26). The selection for ELC and EBD is largely influenced by fitness and underlying diagnosis. Some surgeons prefer to perform ELC, while others may opt for EBD when a patient is not responding to antibiotics. This variable practice has been demonstrated /reported in the UK's largest study (27).

Cholangitis can sometimes complicate acute cholecystitis. Tokyo guidelines for management of cholangitis 2007, agreed the two types of severe and non-severe cholangitis warrant approaches. In the severe type, EBD is indicated (see fig.1).

Figure 1: cholangiogram of 82 years old patient with multiple comorbidities and unfit for surgery. Multiple common bile duct stones and cholangitis were managed by EBD.

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In the non-severe type monitoring is preferred and for those who do not respond to medical treatment; EBD is then indicated (28). Severe cholangitis that is secondary to non-gall stone disease is usually managed either by Internal Biliary Drainage (IBD) or EBD depending on whether patients are for palliative care or require minimal intervention to bridge the gap until they are ready for more aggressive surgical intervention [29-32]. Sometimes combined EBD and IBD are performed (see fig.2).

Figure 2: Cholangiogram of a 75 old patient who had cholangocarcinoma, presented with cholangitis and managed by EBD and IBD.

For gall stone disease, the options between external biliary drainage and the ELC is totally depending on the following issues; surgical experience, response to the medical treatment and general fitness of the patient. Age is a factor and the American Society of Anestheologists (ASA) grade is the hallmark to decide in the elderly patients above the age of 80 years. They are expected to have higher mortality (29). Age plus the significant comorbidities are the main indications for EBD in this group of patients. In borderline cases, a more conservative approach of EBD is favored over ELC for safety reasons.

Conclusions

Both ELC and EBD are valuable measures to manage acute surgical presentation of acute cholecystitis. EBD is the favorable option in biliary obstruction due to gallstone and non-gall stone disease if the patient is not fit for ELC and or IBD. In this study, the high mortality in the EBD arm is mainly due to hepato-pancreatic biliary malignancy. In subgroup analysis, there was no significant change in mortality for the acute calculous cholecystitis patients who were managed by either intervention.

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EMERGENCY LAPAROSCOPIC CHOLECYSTECTOMY VERSUS EXTERNAL BILIARY DRAINAGE

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ACUTE ABDOMEN IN A PATIENT ON PERITONEAL DIALYSIS

T Sabah, U Khalid, A Zaidi, K Donovan, R Chavez

Abstract

Peritoneal dialysis is a suitable treatment option for patients with end-stage renal failure. It is an effective type of dialysis that uses the patient's peritoneum as a membrane through which fluid and electrolytes are exchanged with the use of a cuffed, tunnelled, indwelling catheter inserted through the abdominal wall. As a result, one of the main risks associated with peritoneal dialysis is peritonitis, with estimated incidence rates as high as 50%. The differential diagnosis of PD peritonitis may be complex. Here we discuss one case that illustrates this.

Introduction

Peritoneal dialysis is an established form of renal replacement therapy for patients with end-stage renal failure, that is used by approximately half of UK dialysis patients. In comparison to haemodialysis, it has the advantage of greater flexibility allowing more independence and improved quality of life. It is also better tolerated in patients with significant cardiac disease and allows patients to be less restricted with their diet.

Peritoneal Dialysis Method

Peritoneal dialysis works by the use of an indwelling catheter that is inserted into the peritoneum. The most common peritoneal dialysis catheter is the Tenckhoff catheter which is cuffed and which has a curled intraperitoneal tip. Although the mode of dialysis is the patient's choice, there are some contraindications to its use. Absolute contraindications include severe peritoneal adhesions and inflammatory bowel disease; relative contraindications include chronic obstructive pulmonary disease and morbid obesity.

The commonest method of catheter insertion is an open surgical procedure in which a small midline infra-umbilical laparotomy incision is made. The tissues are dissected down to the rectus sheath, the rectus sheath is opened and access gained to the peritoneal cavity via a small cut, through which the catheter tube is inserted. The peritoneum is closed tightly around the cuff to make it watertight and prevent any leak, before closure of the rectus sheath. The catheter is then tunnelled subcutaneously such that its exit site is in one of the iliac fossae.

Peritoneal dialysis works by using the peritoneum as a membrane which has a surface area of around 1 – 2m^2. A hypertonic dialysate fluid is infused into the peritoneal cavity which causes ultrafiltration of waste solutes, electrolytes and water from the gut into the peritoneal cavity. The peritoneal fluid is then drained from the peritoneal cavity usually with the aid of gravity.

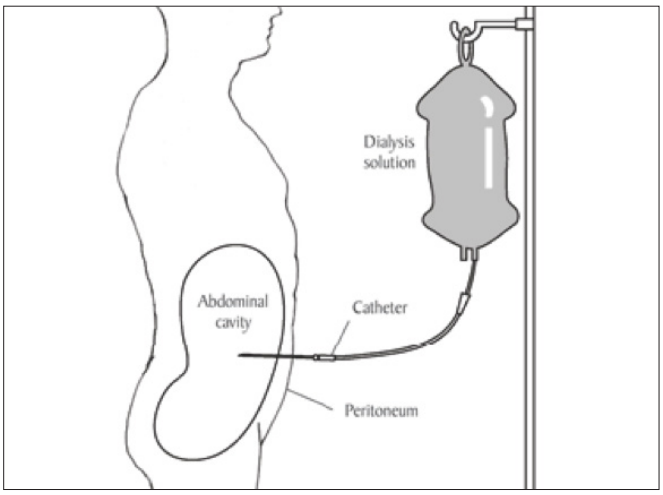

Figure 1: Illustration of the principle of Peritoneal Dialysis. (1)

Complications of Peritoneal Dialysis

Complications of peritoneal dialysis can be divided into early or late (Table 1).

Early	Late
Bleeding	Infection (commonly at exit site or cuff extrusion)
Infection – exit site or tunnel	Outflow failure (associated with constipation)
Bowel Perforation	Peritonitis
Catheter Outflow failure i.e. clots, omental wrapping, kinking or misplacement	Peritoneal leak
	Hernia

Table 1

One of the commonest and the most significant complication of peritoneal dialysis is peritonitis with a reported incidence as high as 50%[2]. The Peritonitis rate at the University hospital of Wales, Cardiff is currently 1 in 35 patients, with approximately 25 episodes per year. Exit site and tunnel infections are common with approximately 10% leading to PD peritonitis. PD peritonitis is the commonest cause of PD failure.

Clinical features of PD peritonitis include abdominal pain with cloudy PD effluent fluid that has more than 100 x 10^6 white cells. The commonest organisms are skin-borne coagulase negative staphylococci[4]. Management includes use of intra-peritoneal antibiotics initially. In more severe cases, intravenous antibiotics are required.

In the case of severe generalised peritonitis, failure of resolution after 5 days of antibiotics, or fungal peritonitis, surgical intervention will be required with need for removal of PD catheter and thorough lavage of peritoneal cavity. The presence of multi-bacterial, Gram negative infection is normally suspicious of bowel origin of the infection and perforation should be considered. Less than 4% of peritoneal dialysis associated peritonitis results in death; it has been reported however as a contributing factor in 16% of cases[5].

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Patients with recurrent episodes of PD peritonitis can develop a rare but extremely serious complication known as encapsulating peritoneal sclerosis, in which the peritoneum becomes thickened with fibrosis, leading to the formation of a 'fibrous cocoon' that encapsulates the bowel causing failure of PD, intestinal failure and/or intestinal obstruction. This complication has very high morbidity and mortality[6].

The following case illustrates an atypical presentation of acute abdomen receiving peritoneal dialysis.

Case

An 80-year-old gentleman, with end-stage renal failure, Mr D, was admitted to the surgical assessment unit with generalised abdominal pain and diarrhoea. The primary diagnosis of renal failure was Hypertensive nephrosclerosis. A recent echocardiogram had shown mild concentric left ventricular hypertrophy. He had been using continuous ambulatory peritoneal dialysis as his renal replacement therapy for 6 years.

At the time of presentation Mr D was taking a course of ciprofloxacin for a urinary tract infection. On clinical examination, Mr D was found to be septic, with clinical evidence of peritonitis. The differential diagnosis included colitis, intra-abdominal collection, diverticulitis, or PD peritonitis.

Initial radiographs of the chest and abdomen were non-specific and no sub-diaphragmatic gas was identified. Blood tests escalated to a WCC of 31.7 x 10^9/L, CRP of 145 and a lactate of 5.3. The PD effluent fluid was turbid with a WCC count >100 x 10^6/L. A CT scan was preformed following initial resuscitation to the patient (figures 2 and 3).

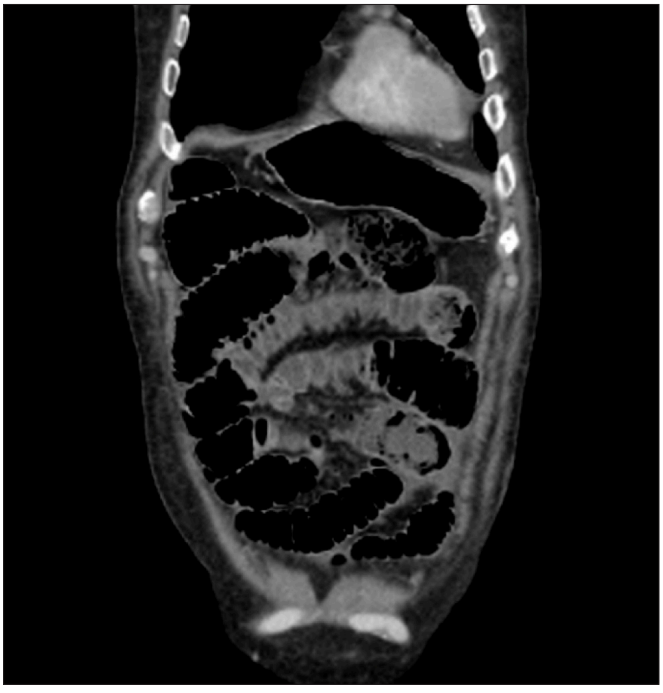

Figure 2: CT abdomen (coronal view) showing dilated loops of large and small bowel and intramural bowel gas.

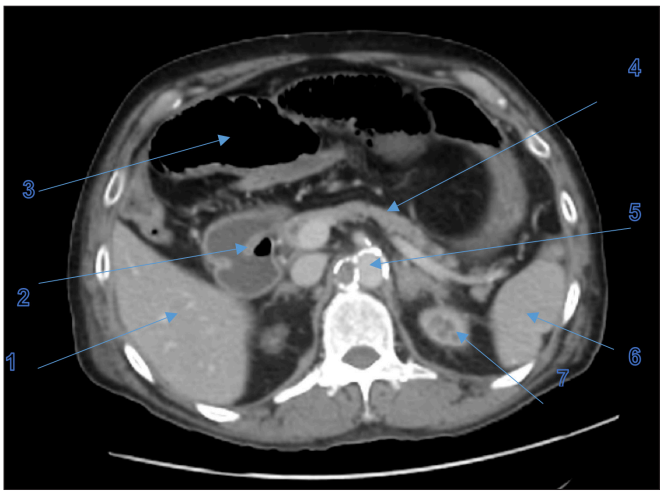

Figure 3: CT Abdomen (axial view) showing dilated bowel loops with intramural (jejunal) gas consistent with ischaemic bowel.

1. Liver

2. Gas within dilated portal system

3. Gas within dilated colon

4. Pancreas

5. Calcified abdominal aorta

6. Spleen

7. Left Kidney

The blood cultures grew gram negative organisms and subsequently the peritoneal fluid grew a moderate growth of Pantoea species, a gram negative bacterium. The sensitivities reported from the cultures were Ciprofloxacin and Gentamicin.

Mr D did not respond to intra-peritoneal or intravenous antibiotic and was subsequently diagnosed with bowel infarction. Unfortunately, following the findings of the CT scan, the clinical picture deteriorated and the patient died of an irretrievable bowel infarct.

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Case Discussion

Peritonitis is a significant and relatively common complication of peritoneal dialysis, with a reported rate of 0.24 – 1.66 episodes per patient per year[3]. PD peritonitis is defined by the presence of abdominal pain and cloudy effluent that contains more than 100 x 106 white cells. The most common organisms responsible are gram positive cocci.

Staphylococcus aureus, Staphylococcus epidermidis and Streptococcus spp are responsible for approximately one third of the PD peritonitis cases.[1] Less commonly, gram negative organisms are responsible. These include E. Coli, Klebsiella and Proteus. More rarely, cultures have been found to be atypical non-tuberculous mycobacterium and enterococcus species. Fungal infections are scarce, however, when present are associated with high morbidity and mortality.[7]

In case of Mr D, the organisms responsible was Pantoea agglomerans, a gram negative bacterium, which interestingly has been shown to be isolated on the 'surface of plants, fruits and animal or human faeces'.

Assessment of a patient with generalised abdominal pain should always be carried out with a thorough history and systematic clinical examination. Tests that can be carried out at the end of the bed include sputum, urine, faeces and drain fluid and any other likely orifice. In this case culturing the dialysate from the peritoneal catheter is imperative.

Peritoneal dialysis patients found to have cloudy effluent should always be acknowledged with the differential of peritonitis. This is confirmed by obtaining a cell count of more than 100 x 10^6 white cells per litre, culture and gram staining. Patients on peritoneal dialysis are often immunocompromised and therefore clinicians should be suspicious of peritonitis and make this diagnosis early. With this high index of suspicion, any patient with signs such as a high temperature, abdominal pain or evidence of leucocytosis should have the dialysate or peritoneal fluid cultured for sensitivities.

Culture and sensitivities are vital in treating with the most appropriate antimicrobial. Identification of the organism will also aid diagnosis in finding the source of the infection.

Patients found to have peritonitis should be appropriately resuscitated especially if septic and initiated on empirical antimicrobials, with an alternative modality of dialysis established as required. Haemodialysis via a temporary line is usually preformed if required. The choice of antimicrobials commenced are dependent on isolation of organisms and their sensitivities.

Antibiotics are preferably delivered via the intraperitoneal route initially. This route does have its complications, mainly due to being absorbed into the systemic circulation. This can be supplemented by intravenous antibiotics in severe cases. Duration of the treatment varies by each clinical case, but can be up to 3 weeks.[8]

If the patient fails to respond to conservative treatment after 5 days, then removal of the PD catheter (source of infection) is required. Other indications for removal of catheter are gram-negative organisms, fungal aetiology and relapsing peritonitis. The tip of the catheter is frequently sent for culture if the dialysate is negative. Catheters are removed in approximately one-fifth of cases of PD peritonitis.[9]

In PD patients presenting with clinical features that resemble PD peritonitis such as this case, other differentials must still be considered. In the case of Mr D, the cause of death was actually due to a significant bowel infarct. Risk factors in this case for bowel infarct were hypertension, congestive cardiac failure, end stage renal disease, with CT evidence of calcified and diseased vessels. It is always pertinent to keep an open mind when PD patients present with abdominal pain.

Conclusions

PD peritonitis is a relatively common complication of patients on peritoneal dialysis, and a high index of suspicion is required in a PD patient who presents with abdominal pain. In the case discussed above the patient died of ischaemic bowel due to an infarct, however, this presented as a clinical picture of PD peritonitis. It is paramount that patients who have PD peritonitis must be diagnosed early and treatment commenced. Those that do not respond to medical treatment may require surgery. It is always important to treat the patient as a whole with a number of differentials in mind.

Test Yourself: Two best MCQs

1: The following organisms are common causes of peritonitis associated with peritoneal dialysis:

A) Pantoea agglomerans

B) E. Coli

C) Tuberculous mycobacterium

D) Staphylococcus aureus

E) Klebseilla

2: If a patient with PD peritonitis fails to respond to conservative treatment, when should removal of the PD catheter be considered?

A) 5 days

B) 10 days

C) 2 weeks

D) 4 weeks

E) 6 weeks

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Answers

1: D) Staphylococcus aureus

Organism associated with skin flora and therefore commonly associated with PD infections.

2: C) 5 days

If the patient fails to respond to conservative treatment after 5 days, then removal of the PD catheter (source of infection) is required.

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BEDSIDE PRACTICAL PROCEDURES IN GENERAL SURGERY

JF Curran, O McCallion, S Appleton

Abstract

Foundation Year Doctors based on General Surgical placements will frequently witness, and may have the opportunity to perform, basic bedside procedures. However, many of these practical procedures do not feature in undergraduate curricula and therefore may be comparatively unchartered territory for new trainees. This article will provide an overview of how to perform rigid sigmoidoscopy, flatus tube insertion, and incision and drainage of an abscess and discuss the practical considerations for wound and stoma care at the bedside.

Introduction

Foundation Year doctors based on General Surgery commonly encounter practical procedures outside of those defined by their curriculum (1). While the theory for these may have been covered at medical school, most will not have prior personal experience performing these procedures. Here we highlight technical aspects of rigid sigmoidoscopy, flatus tube insertion, and incision and drainage of an abscess to help trainees build on their clinical experience and more confidently perform procedures themselves where appropriate. We also discuss some less apparent considerations surrounding wound care, stoma care, and dressings to help foundation year doctors in their day-to-day clinical practice.

Rigid Sigmoidoscopy and Flatus Tube Insertion

Rigid sigmoidoscopy involves using a rigid hollow plastic tube to directly visualise rectal and sigmoid colon mucosa. It can be both diagnostic and therapeutic and is generally well tolerated by patients (1).

Indications for a diagnostic rigid sigmoidoscopy include a change in bowel habit, anal or rectal bleeding, symptoms suggestive of proctitis or colitis, or to biopsy a lesion. Therapeutic rigid sigmoidoscopy may be used to treat a sigmoid volvulus, pseudo-obstruction, to cauterise a small bleeding vessel, or to remove a foreign body from the rectum. However, bear in mind that flexible sigmoidoscopy or colonoscopy may be more appropriate in certain clinical scenarios. Absolute and relative contraindications are provided in Table 1 (2, 3).

Absolute Contraindications
Imperforate anus
Suspected or known colonic perforation
Anal stricture
Relative Contraindications
Peritonitis
Toxic megacolon
Recent colonic surgery
Anal fissures

Table 1: Contraindications to rigid sigmoidoscopy.

Consent must be obtained from the patient and it is good practice to have a chaperone present. The sigmoidoscope itself is a rigid tube with an introducer, a tube for inflation with pump and a light-source (Figure 1). Additional equipment, such as biopsy forceps, may be required depending on the indication for the procedure. Bowel prep is not required; however, if impacted stool is present, an enema may be useful.

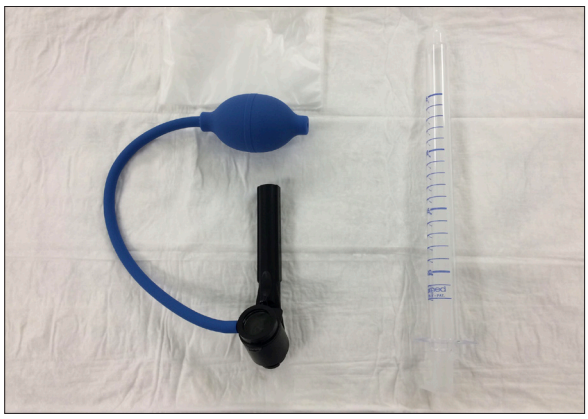

Figure 1: Rigid Sigmoidoscope.

The patient is typically positioned in the left lateral position - similar to that used in a digital rectal exam - with the hips and knees flexed, the patient's back along the edge of the bed, and the buttocks exposed and slightly sticking out over the edge of the bed or couch. The perineum and perianal areas should be inspected and a digital rectal exam should be performed.

The scope is lubricated with a water-soluble gel and held in the right hand with a secure grip on the introducer. The scope is gently inserted into the anal canal aiming initially towards the patient's umbilicus. Asking the patient to 'push down as if opening their bowels' as you insert the scope will relax the anal sphincter. Once the pectinate line is reached the scope should be angled posteriorly to follow the curve of the sacrum.

At this stage the introducer can be removed and the remainder of the scope inserted under direct vision. Gas insufflation with the attached pump will be necessary to inflate the rectum and guide the scope in as far as possible; try to keep this to a minimum to prevent patient discomfort. Typically, a rigid sigmoidoscope can be inserted 15-20cm. The mucosa should be inspected circumferentially as the scope is withdrawn. If mucosal lesions are seen, make a note of their site and distance from the anus.

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If the purpose of the procedure is to decompress a volvulus or to treat pseudo-obstruction a flatus tube can be introduced when the sigmoidoscope is fully inserted by passing the tube through the lumen of the scope. Once in place the sigmoidoscope can be withdrawn and the flatus tube connected to a flatus bag. Remember to discuss your findings with the patient and ensure they are comfortable following the procedure. As always, comprehensively document the procedure and findings in the patient's notes.

Incision and Drainage of an Abscess

An abscess is a collection of pus. It can occur anywhere on the body with typical sites including the axillae, trunk and the perianal area (4). They are diagnosed clinically. Patients typically present with a fluctuant or pointing swelling that is erythematous and painful to touch. Signs of systemic sepsis may be present. Causative organisms vary by site with large bowel organisms such as bacteroides, Streptococcus Faecalis, and coliforms frequently cultured from peri-anal abscesses and Staphylococcus Aureus typically cultured from limb and trunk abscesses (5, 6).

Management can be medical or surgical. All patients should be started on empirical antibiotic therapy as per local sensitivities and any patient allergies. Surgical management is via an incision and drainage (I&D). The operation is commonly performed under general anaesthetic on a day-case pathway. However, in patients with evidence of systemic sepsis admission may be necessary for urgent drainage and parenteral antibiotics. Small superficial abscesses may occasionally be drained under local anaesthetic (LA) if the patient is compliant. However, bear in mind that LA is less effective in areas of inflammation putatively as the decreased pH (acidity) of the tissue inhibits the anaesthetic effect. A wider field block will be required (7).

Standard pre-operative investigations - including routine bloods and a Group & Save - should be completed prior to the day of surgery. On the day, the patient should be identified and their consent forms reviewed to confirm validity. Risks include bleeding, scar formation and recurrent infection. Ensure the area is marked before the procedure begins.

The fundamental principles of surgical management are constant irrespective of abscess location. The abscess is opened, drained, washed out and dressed appropriately. To open, an incision is made along the long axis of the abscess, intersecting the point of maximal fluctuance, and utilising existing skin tension lines as appropriate (4). It should be deep and long enough to drain the abscess adequately. A pus sample should be collected at this point and sent to microbiology for microscopy, culture and sensitivity. The abscess should be deloculated and explored using a finger to ensure complete drainage.

If present, necrotic tissue is curetted from the abscess cavity until healthy tissue is encountered. Copious washout of the abscess cavity with normal saline or hydrogen peroxide is necessary. Remember the surgical adage 'the solution to pollution is dilution'. Finally, the wound should be dressed with sterile gauze and a semipermeable film. Deep cavities may require packing with gauze or an absorbable material. This is to prevent the skin wound closing before the abscess cavity has fully resolved. It also acts as a 'wick' to draw out residual infection and exudate from the cavity. Packing the cavity tightly will cause the patient pain and is only indicated - for the first 24 hours - to ensure haemostasis in the event of excessive bleeding.

If there is surrounding cellulitis then appropriate antibiotics should be prescribed. Patients can often be sent home the same day with analgesia. Postoperative care includes a wound review at 24 hours and removal of the packing, if used. Continued wound care can often be performed in primary care and large abscesses may take some weeks to heal.

Dressings and Wound Care

Wound assessment and management is an important part of post-operative care and this is frequently performed by foundation year doctors. Regarding dressings, there is often more than one solution to a particular problem, so justifying your choice is important.

Surgical wounds typically heal by primary intention, where the edges of the wound are opposed. The dressing is used to control postoperative bleeding, absorb exudate and protect the healing tissue (8). They vary in size, shape, material, and additives (e.g. iodine). Some have a specialised function such as an ostomy bag or vacuum dressing.

An ideal dressing ensures that: the wound remains slightly moist; is not a source of infection; releases no toxins, particulate matter or fibres into the wound; maintains an optimum temperature and pH for healing; and does not need to be changed frequently (6). In wounds healing by primary intention, a transparent polyurethane dressing with a central pad of absorbent material, is ideal ((8). This allows for inspection of the wound site whilst absorbing any excess exudative material. They are waterproof and cost effective.

Try to avoid taking down a dressing more often than necessary as this can impair healing and expose the wound to pathogens unnecessarily (8). When examining wounds, check for signs of infection such as a purulent discharge, cellulitis, a tense swelling or wound dehiscence. Up to 34% of hospital-acquired infections are due to wound infections and this should always be considered if a post-operative patient is systemically unwell (9). If there are signs of infection or cellulitis and the patient is clinically well, a microbiology swab should be taken and antibiotics prescribed.

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A tense, painful swelling around the wound may indicate a collection or haematoma; after discussion with a senior, removing a few stiches may allow drainage of the collection. Granulation tissue can look worrying but is part of the healing process. Significant granulation tissue can be treated with a silver-nitrate-coated stick. A small wound dehiscence can often be left to heal by secondary intention. However, extensive or deep wound dehiscence may require a return to theatre for re-suturing. If there are concerns about a wound, foundations doctors should inform their senior colleagues or involve the tissue viability team as appropriate.

There are a variety of dressings available for wounds healing by secondary intention. This is where the wound edges are not opposed. Alginates are derived from seaweed and help maintain a moist, debris-free wound surface (6). Hydrogel dressings have a high water content and so help to rehydrate tissues. Dressings containing iodine or silver are useful for wounds where there is suspicion of persistent infection (6). Continuous low-pressure vacuum dressings will remove exudate and accelerate wound healing in larger wounds healing by secondary intention.

Stoma Care

Many patients on the surgical ward will have a stoma. Junior doctors will often be asked by patients, relatives and other healthcare professionals about how to care for them. It is therefore important to have a general understanding of their assessment and management.

Stomas may broadly be classified as small bowel (ileostomy) or large bowel (colostomy). They may be temporary (created to protect a more distal anastomosis and reversed a few months later such as after low anterior resection) or permanent. Ileostomies have one or two lumen, are typically on the right side of the abdomen and are spouted by approximately 2cm (10) to protect the skin from irritation. They produce liquid effluent and their output is directly proportional to how proximal the stoma is, with a normal range of 1000 to 1500 mL per day (11).

Colostomies (large bowel stomas) are typically sited on the left of the abdomen, are flush with the skin, and produce formed faeces. Other stomas that may be encountered by foundation doctors are ileal conduits—spouted single lumen small bowel stomas connected to the ureters to allow for urine excretion following cystectomy - and mucous fistulae - which are visually similar to colostomies and allow drainage of mucous from a distal remnant of bowel after an end stoma.

Time	Complication	Signs and Symptoms	Initial management
Early	Ischaemia/ necrosis	Dusky/black mucosa	Sigmoidoscopy, stoma revision
	Wound infection	Skin cellulitis, purulent discharge	Resuscitation, antibiotics
Late	Prolapse	Stoma mucosal outpouching, obstruction	Surgical correction with a permanent stoma (12)
	Stenosis	Narrowing of stoma, visible scar tissue, history of granulation/infection/necrosis, subacute obstruction	Dilation, diet modification, stoma revision
	Herniation	Parastomal bulge, obstruction, pain	Repair, if symptomatic
Continuous	High output stoma	Dehydration, high volume stoma output, signs and symptoms of electrolyte disturbances	Fluid replacement, electrolyte replacement, gut motility antagonists (e.g. codeine, loperamide)
	Retraction	Unable to identify stoma, indrawn skin, no-spout (when spout appropriate), patient systemically unwell (if faecal content in abdomen), soiling (due to improper bag fitting)	Monitoring, may require relook and washout, convex stoma bag, stoma revision
	Skin irritation	Erythematous/raw skin	Alternative stoma bags, patient education, surgical revision

Table 2: Common complications of stoma formation.

Early complications of stoma formation include retraction, ischaemia and necrosis, wound infection, and skin irritation (12) (Table 2). An ischaemic stoma has a dark purple colour and looks 'dusky'; this will eventually blacken as the stoma becomes necrotic. Dusky stomas should be quickly escalated to seniors. Strict fluid balance following stoma creation is important as high-output stomas may result in electrolyte disturbances. Late complications include prolapse, stenosis, and herniation.

The initial siting, bag fitting and patient counselling is often performed by specialist stoma care nurses. The ostomy bag is removed from the skin which is then cleaned and dried to allow the adhesive to work (13). A key point is to ensure that the aperture of the bag snugly fits the stoma site. This is especially important with small bowel stomas as leakage onto the abdominal wall causes skin irritation due to the digestive enzymes within the effluent.

Conclusion

A rotation in a surgical specialty can be a rewarding learning experience and provide many opportunities for foundation doctors to develop practical skills. We hope the above has provided you with a comprehensive knowledge base to confidently approach a general surgery placement and capitalise on the opportunities the speciality has to offer.

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MCQs

1. After performing an incision and drainage of an abscess, the wound is best dressed with:

A. A hydrogel dressing to keep tissue moist
B. A vacuum dressing with tissue viability review
C. Iodine or silver dressing to prevent further infection
D. Sterile gauze and a semipermeable film with an alginate pack if a deep cavity
E. A transparent polyurethane dressing with a central pad of absorbent material

2. A double lumen, spouted stoma placed on the right side of the body is most likely to be:

A. Ileal Conduit
B. End colostomy
C. Loop ileostomy
D. Mucous fistula
E. End ileostomy

Answers

1. Answer: D.

Remember, abscess cavities can often be deep and require a pack to act as a wick for infection to drain along. Further, the gauze performs the role of absorbency with adequate bulk, while the semipermeable film, like me-fix, secures the dressing. All of these wounds should be reviewed promptly at 24-48 hours post procedure and have routine follow-up with their primary care nurse.

2. Answer: C.

Ileostomies are typically right sided (remember the location of the terminal ileum as it relates to the caecum). They should also be spouted to prevent spillage of effluent fluid onto the skin which can be irritating. A double lumen stoma is indicative of a loop stoma and these are often used in ileostomies to allow spillage of content from one loop to the other. These loop stomas are used primarily when a future procedure is likely to reverse a more distal colostomy.

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BOUVERET'S SYNDROME: AN UNUSUAL COMPLICATION OF GALLSTONES

LI Smith, G McColl, CM Sharp, JR McGregor

Abstract

Small bowel obstruction and gallstones are common pathologies encountered during the acute surgical take. We present an unusual case of gastrointestinal obstruction secondary to gallstones. We discuss the presentation, aetiology, clinical findings, investigations and management of this condition. The initial management of bowel obstruction is simple and should not require early senior input. The foundation doctor is usually the first point of contact for the surgical team and should be made aware that they have the ability to positively influence patient outcomes at an early stage with prompt fluid resuscitation and correction of electrolytes.

Case History

An 81 year-old man presented to the physicians with a one-week history of nausea and vomiting. His bowels had been moving throughout although were more sluggish. He denied any infective contacts or unusual foods. He was unable to recall when he had last passed urine.

His past medical history included hypertension, chronic obstructive pulmonary disease, a 4.8cm abdominal aortic aneurysm (under surveillance), hiatus hernia and benign prostatic hypertrophy.

Medications included Tiotropium and Salbutamol inhalers, Bisoprolol 2.5mg, Co-Amilofruse 5/40, Dutasteride 500mcg, Omeprazole 40mg, Ramipril 2.5mg, Simvastatin 40mg and Tamsulosin 400mcg MR.

Routine observations were normal but he was fluid deplete with dry mucous membranes. His obese abdomen was soft and non-tender with no palpable masses or bladder. Bowel sounds were present and active.

Admission blood tests are shown in table 1, revealing an acute kidney injury (AKI) with an eGFR of 19 from a baseline of 33.

Test	Result	Range
CRP	<5	2-10
Full Blood Count		
Haemaglobin	175	133-176
WBC	20.4	3.7-95
Neutrophils	15.4	1.5-6.5
Platelets	312	150-400
U&Es		
Urea	27.7	2.5-7.8
Creatinine	286	50-120
Sodium	137	133-146
Potassium	3.9	3.5-5.3
Chloride	88	95-108
eGFR	19	>60
Liver Function Tests		
Bilirubin	27	3-21
ALP	146	67-291
AST	29	10-45
ALT	20	5-55
Total Protein	79	60-80
Albumin	45	35-50

Table 1: Admission blood results

The admission chest X-ray in Figure 1 demonstrates a gastric fluid level, with the abdominal film (Figure 2) revealing significant gastric dilation containing fluid and food.

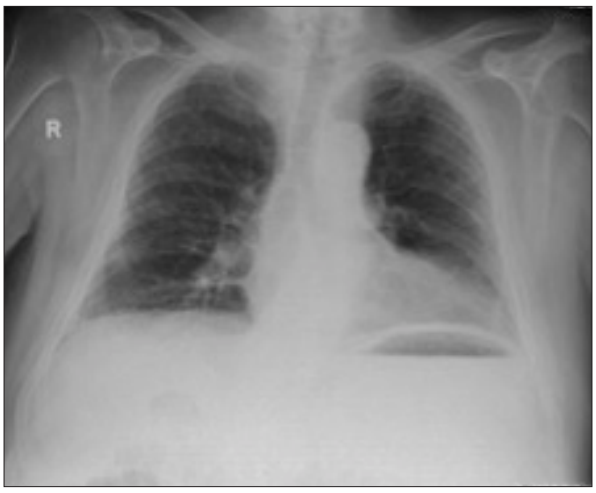

Figure 1: Admission chest X-ray showing air fluid level within the stomach

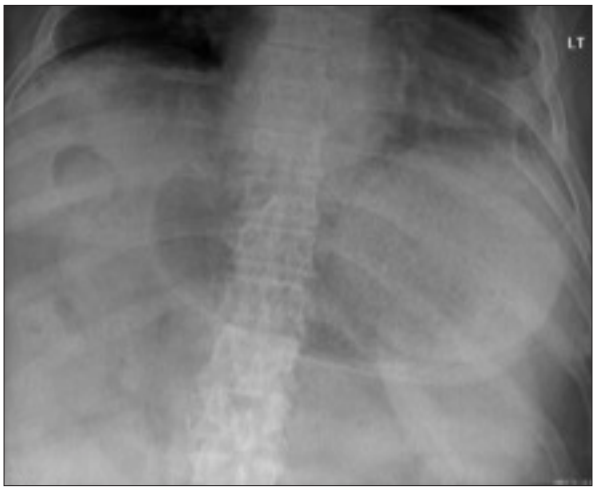

Figure 2: Admission abdominal X-ray demonstrating gastric dilation containing food and fluid

Differential diagnoses at this stage were:

- *Gastroenteritis: common pathogens including Norovirus and Rotavirus*
- *Food poisoning: bacteria including E.coli, Shigella and Salmonella*
- *Gastroparesis: especially relevant in a diabetic patient*
- *Gastric outlet obstruction: vomiting of undigested foodstuffs devoid of bile*
- *Small bowel obstruction: bilious vomiting with constipation*

He was initially managed as gastroenteritis resulting in AKI with intravenous fluid resuscitation, urinary catheterisation and antiemetics, in addition to assessing polypharmacy and stopping nephrotoxic drugs.

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After 36 hours of conservative management his renal function was improving (eGFR 48) with good urine output. Unfortunately his vomiting continued, and by this stage his nutritional status was deteriorating.

Surgical review was sought and he was noted to have an epigastric fullness with succussion splash (sloshing sound heard over the stomach when shaking the patient). These clinical findings are in keeping with gastric outlet obstruction (GOO), which has a variety of causes (outlined in Table 2). In light of the patient's age and epigastric fullness, a malignant aetiology seemed more likely, hence a CT scan of his abdomen and pelvis was arranged. IV contrast was given as his renal function had improved to baseline with adequate fluid resuscitation.

Causes of Gastric Outlet Obstruction
Benign
Peptic ulcer disease
Gastric polyps
Ingestion of caustics
Pyloric stenosis (paediatric)
Gallstones (Bouveret's syndrome)
Pancreatic pseudocyst
Malignant
Pancreatic cancer
Gastric cancer
Ampullary cancer
Cholangiocarcinoma
Extrinsic compression from metastasis / lymph nodes

Table 2: Causes of gastric outlet obstruction

Figures 3 and 4 are slices from the CT scan. These demonstrate a grossly dilated stomach with air-fluid level, and a spherical mass within D1. There was no small bowel dilation or any evidence of malignancy. In addition the gallbladder was noted to be shrunken around stones (not seen on these figures).

Figure 3: Saggital CT of obstructing gallstone with dilated stomach

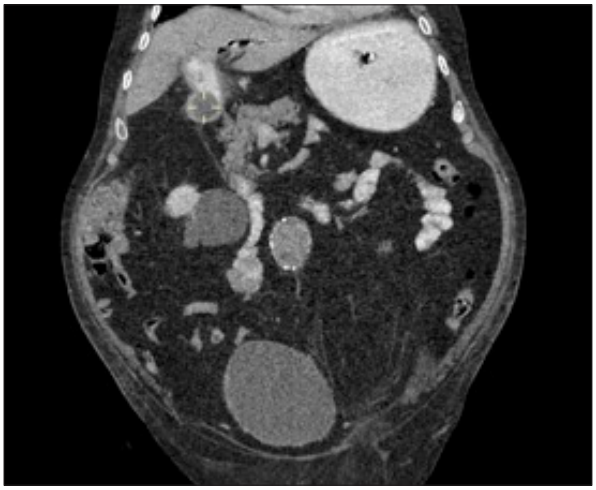

Figure 4: Coronal CT showing obstructing gallstone, dilated stomach, with no distal small bowel dilation

The radiological diagnosis was that of a gallstone gastric outlet obstruction (Bouveret's syndrome) – a rare subtype of gallstone ileus. At this stage a nasogastric tube (NGT) was placed to decompress his stomach. Upper GI endoscopy was performed the following day and identified the gallstone just beyond the pylorus within the duodenal bulb (Figure 5)

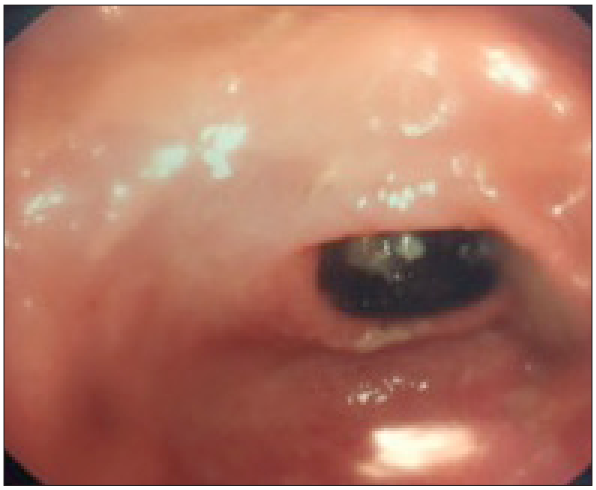

Figure 5: Endoscopic view of gallstone sitting at the pylorus

Extraction of the gallstone using an endoscopic retrograde cholangio-pancreatography (ERCP) balloon was attempted but was unsuccessful; plans were made for a laparotomy. This revealed a gallbladder encased in omental adhesions adhering it to the duodenum. Gallstones were palpable within the duodenum, with no evidence of distal obstruction. Once the omental adhesions were cleared and the duodenum visualised, it was possible to milk the obstructing stones back into the stomach. The stomach was then opened (gastrostomy) to facilitate extraction of the gallstones (Figure 6).

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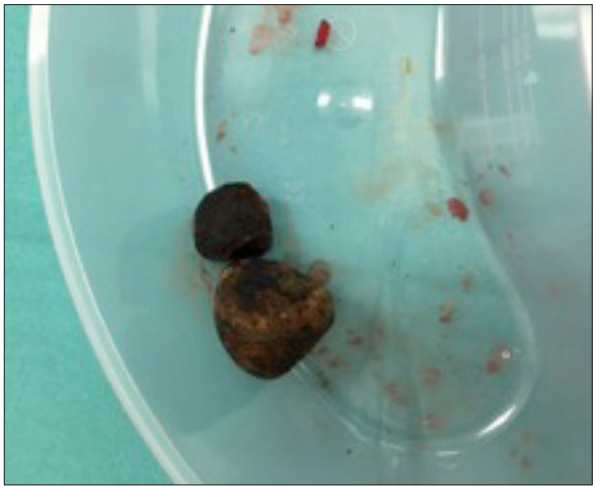

Figure 6: The gallstones extracted at laparotomy

The choledochoduodenal fistula was palpable through the pylorus, and an empty gallbladder was confirmed. The gastrostomy was closed, and the abdomen washed prior to closure of the abdomen.

Post operatively this gentleman was cared for in the high dependency unit. He made a slow but uneventful recovery, with care being paid to his nutritional status. He was discharged to his daughter's home for a period of further recuperation. He has subsequently been reviewed in surgical clinic and has returned to his pre-morbid condition.

Discussion

This is an interesting case demonstrating an unusual cause of a common general surgical presentation (bowel obstruction), and a rare complication of gallstone disease. We have therefore addressed both within our discussion. A summary of the step-wise management of bowel obstruction can be seen in Figure 7 for quick reference.

Clinical Assessment

Bowel Obstruction

Bowel obstruction is a common acute surgical presentation. The symptoms of colicky abdominal pain, vomiting, distension and absolute constipation should feature. Depending upon the level of the obstruction the pattern of these will differ. Proximal obstructions, including GOO leads to early vomiting with minimal effect on bowel function. Distal obstructions (large bowel) conversely present with constipation and late vomiting. In cases with a competent ileocaecal valve vomiting may not occur at all.

Examination should pay particular attention to the presence of scars from previous surgery (leading to adhesions) and hernias as these are the two most common causes of small bowel obstruction (SBO) in the Western world – specifically examine the hernial orifices. Abdominal distension, resonance and hyperactive or tinkling bowel sounds may also be evident. GOO can cause a succussion splash.

Gallstones

The prevalence of gallstones is quoted to be 5-30% of the adult population in Western countries (1,2). Presentations of gallstones include:

- *Biliary colic*
- *Cholecystitis*
- *Choledocholithiasis*
- *Cholangitis*
- *Pancreatitis*
- *Gallstone ileus*
- *Incidental finding*

Right upper quadrant or epigastric pain and tenderness will be evident in symptomatic presentations, except gallstone ileus. Vomiting will be a frequent accompaniment. Cholecystitis, cholangitis and potentially pancreatitis will also display fevers ± rigors. Choledocholithiasis can cause pale stools and dark urine due to the reduced excretion of bile pigment in faeces and increased conjugated bilirubin in the urine.

Investigations

Bowel Obstruction

Blood tests can be normal with early presentation. However if the symptoms, particularly vomiting, have been prolonged then AKI, hypokalaemia and hypochloraemia may be evident. Patients may also be alkalotic due to the acid loss from vomiting. It is important to correct any electrolyte imbalances. An abdominal X-ray will reveal multiple dilated small bowel loops to confirm your diagnosis. In selected cases a CT (with oral contrast) will also be arranged to identify the site of the obstruction in addition to the underlying aetiology.

Gallstones

Investigations vary according to the presentation, but in general should be arranged in a step-wise manner.

Routine blood tests will reveal any inflammatory response in keeping with cholecystitis or cholangitis. Liver function tests will be deranged with an obstructing stone in the common bile duct (CBD) and amylase / lipase will be raised with acute pancreatitis.

In terms of imaging, ultrasound is the first line investigation with a sensitivity of greater than 90% (3,4) unless gallstone ileus is suspected. Plain abdominal X-rays have limited value in diagnosis of gallstone disease. In this case, the pathognomonic sign is air within the biliary tree, although the features of SBO should also be present.

BOUVERET'S SYNDROME: AN UNUSUAL COMPLICATION OF GALLSTONES

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MRI (specifically magnetic resonance cholangiopancreatography, MRCP) is the modality of choice for visualising the bile ducts where ductal calculi are suspected. CT identifies 74-79% of gallstones (5), but this investigation tends to be utilised for the exclusion of extra-biliary pathology including pancreatic malignancy (as in this case), rather than the investigation of gallstones themselves.

Treatment

Bowel Obstruction

Initial management steps are the same irrespective of the cause. Fluid resuscitation is key, with appropriate correction of electrolytes. This should be aggressive unless the patient has significant cardiac impairment. A catheter should be placed to monitor urine output and guide ongoing fluid prescription.

A NGT on free drainage (or suction) will decompress the GI tract, which can help the obstruction to resolve. In addition, it will prevent further vomiting by emptying the stomach and provide further information for fluid balance and prescription. Patients should be nil by mouth. However, with a NGT in situ it is acceptable to allow the patient to sip fluids for comfort as it will come back up the tube. It is important to record the oral intake so that the NGT output is not falsely elevated.

Early operative intervention is required for an obstructed hernia to prevent bowel ischaemia. If the bowel obstruction has an adhesional aetiology then a trial of 48-72 hours of conservative management is advised - 65-81% (6,7) of cases will settle with these measures. If the obstruction continues after this time then surgery is inevitable with adhesiolysis +/- bowel resection. Rarer causes of bowel obstruction require an approach designed to tackle the specific problem.

Gallstone ileus is a rare cause of SBO, accounting for 1-4% of all cases. The majority of stones impact in the terminal ileum (60-70%) (8). Rarely the gallstone can lodge in the duodenum causing gallstone GOO (Bouveret's syndrome). Only 1-3% of all gallstone ileus cases are due to Bouveret's syndrome (9,10).

Endoscopy has a role in GOO for diagnosis and treatment. Malignant causes can be stented to palliate symptoms. In some cases gallstones can be removed endoscopically.

The operative approach to this complication of gallstone disease differs to all others. Here the primary problem is not the gallbladder itself, but the gallstones lodged within the gastrointestinal tract. This necessitates relieving the obstruction (regardless of the level) usually via laparotomy. The bowel is opened over a healthy section of bowel, not over the impacted gallstone, which is then milked through the enterotomy (or gastrostomy in this case), and subsequently closed (11).

In these cases the choledochoduodenal fistula (through which the gallstone has passed) is not repaired, and the gallbladder is left in situ. The fistula allows free drainage of bile which should prevent further gallstone formation and hence associated complications.

Gallstones

Management varies based on clinical presentation, in addition to the patient's co-morbidities and pre-morbid state. Signs and symptoms of sepsis should be treated with resuscitation and antibiotics as per your hospital's local protocol. All patients should receive adequate analgesia and antiemtics.

A laparoscopic cholecystectomy would be considered after an acute presentation with a complication of gallstone disease – ideally on the index admission. A more aggressive surgical approach is adopted in those patients presenting with gallstone pancreatitis in light of the associated morbidity and mortality - severe pancreatitis carries a morbidity of 92% and mortality of 17% (12).

In those with choledocolithiasis an ERCP would be employed to confirm the diagnosis and clear the of ERCP prior to surgery. In patients deemed unfit for operative intervention this can be used as their ceiling of treatment, as the sphincterotomy made at the time has been shown to be a safe alternative to surgery (13). A further more specialised operative approach is that of bile duct exploration (laparoscopic or open) in combination with cholecystectomy.

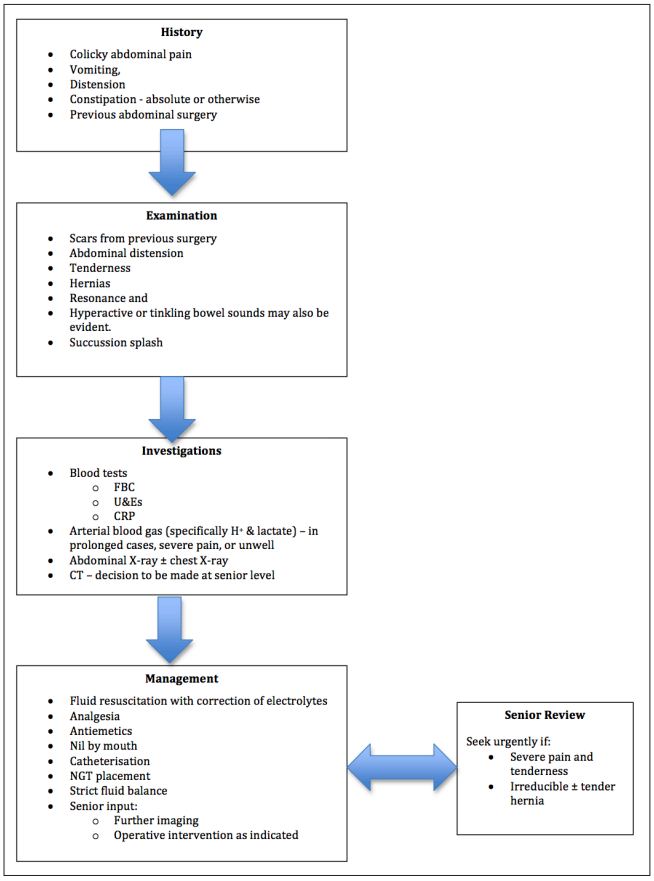

Figure 7: Management of bowel obstruction

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Questions

1. The commonest cause of a small bowel obstruction (SBO) is:

a. Hernias

b. Strictures related to inflammatory bowel disease (IBD)

c. Gallstones

d. Adhesions

e. Tumours

2. The following are all signs and symptoms of GOO except:

a. Bloating / epigastric fullness

b. Constipation

c. Nausea

d. Vomiting devoid of bile

e. Dehydration

3. What is the first step in the management of small bowel obstruction:

a. Catheterisation

b. NGT placement

c. Operative intervention

d. Making the patient nil by mouth

e. Fluid resuscitation

4. Which of following LFTs are most in keeping with obstructive choledocolithaisis (reference ranges Bilirubin 3-21, ALP 67-291, AST 10-45, ALT 5-55):

a. Bilirubin 89	*ALP 321*	*AST 754*	*ALT 324*
b. Bilirubin 15	*ALP 72*	*AST 309*	*ALT 229*
c. Bilirubin 30	*ALP 103*	*AST 32*	*ALT 23*
d. Bilirubin 12	*ALP 212*	*AST 22*	*ALT 46*
e. Bilirubin 62	*ALP 349*	*AST 67*	*ALT 59*

5. Which of the following biochemical abnormalities would you not expect to see in GOO:

a. Hypochloraemia

b. Hypernatraemia

c. Hypokalaemia

d. Alkalosis

e. Raised creatinine

Answers

1. d Adhesions

The commonest cause of SBO in westernised countries is post-operative adhesions. A structured history and careful examination of the patient's abdomen for scars and hernias (second most common cause) is important when assessing a patient with SBO to determine the likely cause.

2. b Constipation

Signs and symptoms vary depending on the chronicity of the GOO and the completeness of the obstruction. Early signs tend to be of nausea and vomiting, often devoid of bile as there is no reflux of bile from the duodenum, but containing undigested foodstuffs usually about an hour after a meal. Vomiting may be intermittent initially. As the obstruction progresses, early satiety, epigastric fullness and bloating may become apparent The patient becomes dehydrated and nutritionally deplete. Weight loss is more frequent as the condition becomes chronic and is most marked in those with malignancy.

3. e Fluid resuscitation

The first step in the management of SBO is aggressive fluid resuscitation. Patients who have been vomiting will be dehydrated and will likely have biochemical abnormalities in their blood profile that require correction. NGT placement will decompress the stomach and provide relief from vomiting. Catheterisation allows monitoring of urine output and guides ongoing fluid management.

Making the patient nil by mouth will allow the gut to rest and, in some cases, allow for successful conservative management of the SBO. Operative intervention is usually delayed, unless the underlying cause of the obstruction is strangulation of the bowel in a hernia. In most cases, a period of conservative management (usually 48-72 hours) is attempted before proceeding with operative management. This is especially true for those with adhesional SBO as this can perpetuate a cycle of recurrent SBO secondary to adhesions.

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4. e Bilirubin 62 ALP 349 AST 67 ALT 59

e. Bilirubin and ALP will rise secondary to CBD obstruction. There may also be an increase in the transaminases.

a. Fits with alcoholic liver disease as all liver biochemistry is deranged and AST:ALT ratio is >2:1.

b. Is in keeping with acute hepatitis. The aminotransferases can be elevated by 20-50 times normal and usually precedes a rise in bilirubin.

c. Gilbert's syndrome – the most common familial cause of hyperbilirubinaemia. It is usually an incidental finding of a slightly elevated bilirubin and all other liver enzymes are normal.

d. Normal liver function tests.

5. b Hypernatraemia

Gastric contents are high in hydrochloric acid, loss of this through vomiting leads to hypochloraemia, and alkalosis (loss of H+) – metabolic. Renal compensation occurs, preferentially retaining H+ ions at the expense of K+, thus leading to hypokalaemia.

Urea and creatinine will be elevated in response to dehydration secondary to vomiting and if not corrected can result in an AKI.

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LIVING DONOR RENAL TRANSPLANTATION FOR THE GENERAL SURGICAL DOCTOR

S Dobbs, A Johnston, T Augustine

Abstract

Living donor renal transplantation is the most effective renal replacement therapy for end stage renal failure. With the expansion of living donor programmes, medical workforce realignment and improvements in medical training, it is not uncommon for junior doctors to encounter transplant patients whilst working in non-transplant surgical and medical areas. It is therefore important for the general surgery team to be familiar and confident with caring for this specialist subset of patients. This article aims to provide an overview of key areas in the living donor transplant process for junior doctors working in non-specialist transplant units; and to increase understanding of the early post-operative complications that may occur.

Pre-operative Assessment

From the donor perspective, transplantation involves extensive work up investigations, major surgery, inpatient admission, post-operative recovery and life with a single kidney. Following the principle of "first, do no harm", the transplant team must ensure that all potential donors fully understand the potential risks of living donor transplantation and take steps to ensure such risks are minimised if possible. It is also vital to ensure that the donor's decision to proceed is voluntary, informed and free of coercion.

Medical screening of potential donors includes urinalysis, blood tests, cardiac stress tests and radiographic imaging of the kidneys and vessels. CT angiography assessment of renal anatomy allows identification of vascular variants, nephrolithiasis and parenchymal disease; whilst split function isotope scans are performed to determine relative function of each kidney. (Figure 1).

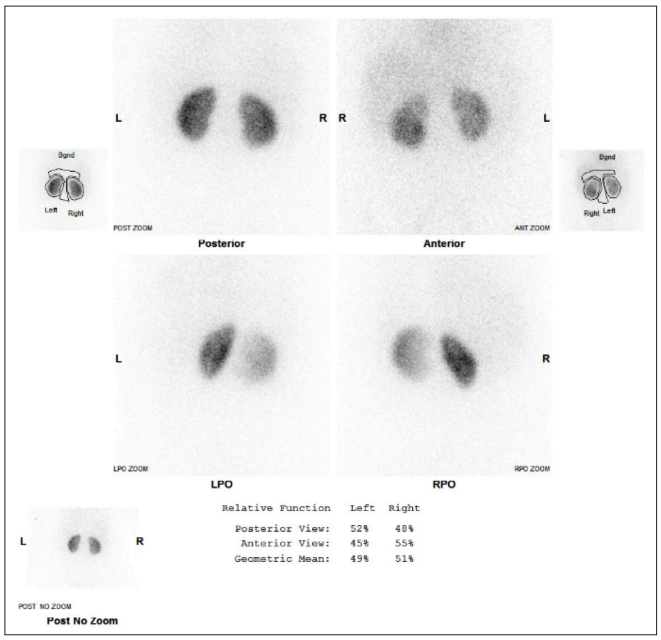

Figure 1: 99m-Tc DMSA Split Function Scan as part of potential living donor work-up. The above patient demonstrated equal divided split of renal function between both kidneys.

This information is used to determine which kidney is suitable for transplantation, whilst ensuring the predominantly functioning kidney is preserved. Further assessment includes blood grouping and crossmatch testing to ensure a compatible mismatch between potential donor and recipient. Viral screening is undertaken to prevent transmission of Hepatitis, HIV and other viral diseases from the donor to recipient via the transplanted organ. With the increasing practice of altruistic kidney donation, a thorough psychological evaluation is also carried out. All living donor transplants also have to be cleared by the Human Tissue Authority.

The potential renal transplant recipient undergoes multidisciplinary assessment to consider fitness for major surgery and the possible long term consequences of chronic immunosuppression. The British Transplantation Society recommends that all patients with CKD 5 and CKD 4 patients with progressive disease should be assessed for suitability for transplantation.

When clerking a renal transplant recipient, it is important to document primary renal disease, number of previous transplants, dialysis modality if applicable and if so length of dialysis dependence; native urine output and dry weight. It is important to document the patient's usual dialysis schedule as they may require urgent pre-operative dialysis.

Further information regarding the work-up for living donor transplantation for both donor and recipient can be found on the British Transplantation society website. (1, 2)

Peri-operative factors

Whilst the focus of this paper is the post-operative management of transplant recipients, an understanding of the regional anatomy and surgical procedure allows for further appreciation of the post-operative complications. Usually the transplant kidney is implanted extraperitoneally into the iliac fossa on either side.

A curvilinear incision is made to access the iliac vessels and the bladder. The transplant kidney is positioned optimally, and arterial and venous anastomoses are performed, typically utilising the external iliac artery and vein without any tension. (Figure 2).

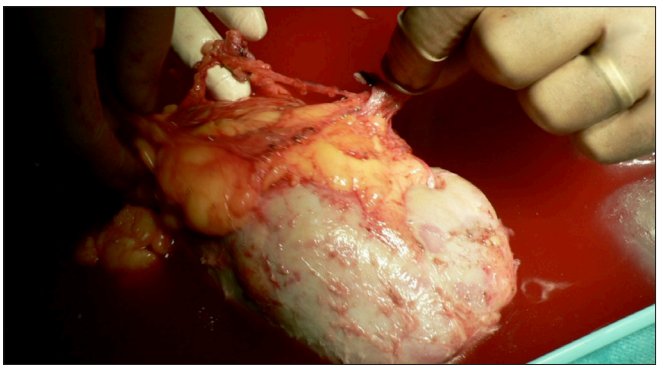

Figure 2: Donor kidney before anastomosis into recipient.

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Depending on individual donor and recipient anatomy, multiple anastomoses may be required. Sometimes, small accessory vessels may be sacrificed. Typically, the anastomosis time takes between 30 and 60 mins. Following anastomosis, the vascular clamps are removed and the kidney is re-vascularised. With the circulation restored, the kidney fills with blood and regains its normal "pink hue". In the majority of living donor transplants, the kidney functions straight away and can be seen to "make urine on the table." (Figure 3).

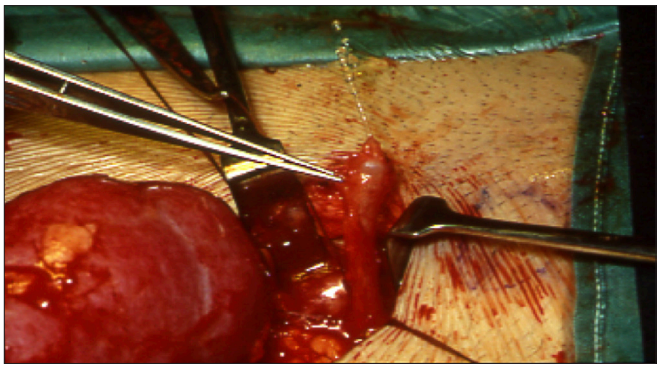

Figure 3: Well vascularised and pink kidney making urine on the table.

The transplant ureter is then shortened and implanted directly on to the dome of the recipient bladder (neocystostomy). A double-J stent is used in many departments across the ureteroneocystostomy.

Post-operative management

Whilst living donor transplantation has lower complication rates than cadaveric transplantation, there are nevertheless several complications which may occur that can cause allograft dysfunction. It is imperative these are identified and managed promptly to ensure graft survival. These may be identified through clinical manifestations, deranged laboratory results or a general deterioration in the overall clinical condition of the patient. In most transplant centres, the general surgical junior doctor is often the first to be called to review these patients before senior input.

A "typical" case

Following kidney transplantation, patients do not routinely require admission to critical care postoperatively. Patients are usually transferred back to the transplant ward unless comorbidity or other specific factors require high dependency or critical care monitoring. Patients are commenced on an induction immunosuppressive regime in the anaesthetic room and receive further intravenous immunosuppression peri-operatively followed by maintenance oral immunosuppression.

Immunosuppression is usually prescribed by the specialist transplant team according to local protocols and adjusted according to blood drug levels, the target ranges of which vary according to time since transplantation. The principle is that rejection is most common in the first three to six months after transplantation.

All patients will return from theatre with a urethral catheter in-situ which is typically kept in place for 5-7 days post-transplant to eliminate bladder pressures and therefore reduce stress on newly fashioned uretero- vesical anastomosis. Patients require strict fluid balance monitoring and intravenous fluids prescribed as "urine output +30" for the first couple of days post-transplant. The underlying principle is to keep the patient adequately hydrated whilst avoiding fluid overload.

Correct fluid management is critical and requires frequent daily assessment. Fluid therapy is also dictated by kidney function, native urine output, patient weight and oedema. On Day 1 after transplantation a transplant renogram or a Doppler assessment is performed to evaluate graft perfusion and function. (Figure 4).

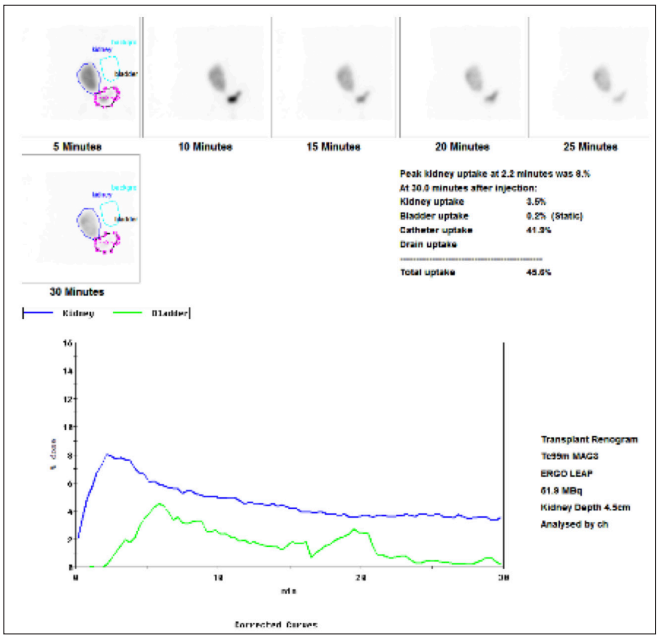

Figure 4: Day 1 Post Transplant Renogram. The above patient demonstrates "good functioning transplant kidney".

During the immediate post-operative period patients will be commenced on a Patient-Controlled-Analgesia regime. This can be withdrawn and replaced with oral analgesia as soon as patients feel comfortable to do so accompanied with early mobilisation. Most centres are actively pursuing enhanced recovery programmes with early discharges. Providing no complications are encountered, patients can be discharged home within 5-7 days post-transplant following a successful trial without catheter and with close monitoring in the outpatient setting (usually within 3 days post discharge).

The differential diagnosis of allograft dysfunction differs with time following transplantation. This article will focus on the management of the transplant recipient during the initial post-operative period.

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Vascular Complications

Major vascular complications are uncommonly encountered but are an important cause of graft loss in the early post-operative period. Renal allograft thrombosis usually occurs within the first week following transplantation. Thrombosis can either be arterial or venous and can occur due to technical factors such as "kinking" of the artery or vein, stenosis at the anastomosis site or an intimal dissection. It is also associated with hypercoagulable states and specific primary diseases such as anti-phospholipid syndrome and lupus nephritis. Arterial thrombosis is usually painless and presents with a sudden drop in urine output and is not always associated with transplant tenderness.

Venous thrombosis on the other hand is painful due to vascular engorgement of the transplant and in advanced case can present with rupture of the allograft and shock. Diagnosis requires urgent ultrasound scan with Doppler assessment and immediate surgical exploration to attempt to salvage the graft. Unfortunately, in over 80% of cases, vascular thrombosis usually leads to loss of the transplant nephrectomy and return to dialysis. (3)

Urinary Leak

A urinary leak is a relatively common early urological complication following renal transplantation; the primary risk factor being devascularisation of the distal ureter during organ retrieval. Poor construction of the uretero-vesical anastomosis may also result in a leak. It is therefore common practice for a ureteric stent to be placed in the transplant ureter during transplantation and removed after the risk of anastomotic leak is reduced. Urethral catheterisation in the immediate post-operative period also reduces this risk. Diagnosis of urinary leak can be complex.

In addition to allograft dysfunction, there may be tenderness and swelling of tissues around the transplant kidney and increasing output via the surgical drain. Drain fluid can be sent for biochemical analysis, which will show increased creatinine levels compared to serum, and additional imaging should be ordered such as ultrasound scan or a transplant renogram with delayed images. Patients who present with a urine leak post-transplantation are managed individually according to the degree of leak. Very low-volume leaks can be managed conservatively with the insertion of a urethral catheter and bladder decompression to allow the leak to heal, whilst early high-volume leaks are best definitively managed by surgical re-exploration and re-implantation of the transplant ureter.

In patients with significant comorbidity a percutaneous nephrostomy tube can also be inserted to divert urine away from the leak. An anterograde nephrostogram can be performed at the time of nephrostomy insertion to determine the location and extent of the leak to allow for appropriate management planning. The nephrostomy and bladder catheter can be removed once the leak has resolved and the ureteral stent is removed 4-6 weeks later. (4)

Ureteric Obstruction

Approximately 1-4.5% of renal transplant recipients will develop ureteral obstruction, with distal obstruction being the most common. Early post-operative obstruction (within 3 months) is typically caused by external compression (haematoma, lymphocele, abscess), kinking of a redundant ureter, a clot within the transplant kidney or anastomotic oedema. Obstruction developing beyond this period is typically caused by ureteric ischaemia.

Transplant recipients who present with an acute decline in renal function should receive anatomic imaging; ultrasound is an excellent imaging technique when patients present with declining function and may show hydronephrosis of the transplant kidney if obstruction is present. When ureteral obstruction is identified, decompression of the collecting system is the main priority, often through the insertion of a urinary catheter and nephrostomy. Following decompression, the cause of the obstruction must be identified; anterograde pyelography during nephrostomy insertion is useful diagnostic procedure to achieve this. (4)

Fluid Related Problems

Close fluid balance monitoring is required post-operatively to ensure the graft is not compromised by hypotension or hypovolaemia which could precipitate thrombosis and potentially graft loss. Volume depletion must be avoided and a post-operative fluid regimen of 0.9% Sodium Chloride at a rate of 30ml/hour plus previous hours urine output is usually appropriate ("urine output + 30").

This can be adjusted according to blood results, urine output and weight. The recipient's native urine output must be documented to allow assessment and interpretation of urine output post-transplant, along with correct daily weights. On the other hand, volume overload must also be avoided, especially in recipients who have had long periods of anuria or reduced urine output associated with dialysis. Fluid overload may precipitate oedema, pulmonary oedema or cardiac strain with congestive cardiac failure. If the patient has fluid overload with poor graft function, the definitive treatment is immediate dialysis. Symptoms of tacrolimus toxicity include nausea and vomiting, tremors, headache and biochemical disturbances.

Hyperkalaemia

Hyperkalaemia can commonly occur in the first few days following transplantation. If the patient was dialysis dependant prior to transplantation, it is likely dialysis will be required to correct hyperkalaemia in addition to medical management in the early post-operative period. Indications for acute dialysis in the immediate postoperative period are the same as among non-transplant patients who develop acute kidney injury.

If dialysis is required within the first post-operative week this is referred to as delayed graft function, regardless of the cause. Fortunately, delayed graft function is relatively rare (around 5-10%) in living donor renal transplantation due to the typically excellent quality donor kidneys and shorter cold ischaemic time compared to cadaveric transplantation. (5,6)

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Calcineurin Inhibitor (Tacrolimus) Toxicity

A calcineurin inhibitor (Tacrolimus) is the commonest agent used for maintenance immunosuppression. Tacrolimus toxicity can occur during the initial post-operative period whilst the patient is established on a maintenance immunosuppressive regime. Since the graft is most immunogenic in the early post-transplant period it is important to ensure adequate immunosuppression levels. However, the narrow therapeutic window of immunosuppressive medication is challenging to manage.

Whilst sub-therapeutic drug levels must be avoided due to the increased risk of graft rejection, levels beyond the therapeutic window will lead to tacrolimus toxicity and potentially allograft dysfunction.

British Transplantation Society guidelines suggest tacrolimus trough levels of between 3-7ng/ml in patients who are also taking steroids post operatively. Many factors can affect tacrolimus drug levels, the most common being absorption from the GI tract, drug interactions and disease state. With over 200 known drug interactions, it is not uncommon for drug interactions to be the cause of tacrolimus toxicity, especially in the acute setting when patients are commenced on new therapies, especially antimicrobials (figure 5).

Common Drug Interactions: Tacrolimus
Antifungals – azoles (ketoconazole, fluconazole, voriconazole)
Antibiotics – macrolides (erythromycin, clarithromycin)
Antihypertensives – Non-dihydropyridine calcium channel blockers (verapamil, diltiazem)

Figure 5: Common Drug Interactions with Tacrolimus.

It is therefore pivotal to review medication charts regularly and engage early with pharmacy colleagues. It is recommended that pharmacists undertake an active role in the transplant MDT during both the inpatient and outpatient management. Tacrolimus toxicity is a potentially reversible cause of transplant nephrotoxicity and can present in the acute or chronic setting. (7,8)

MMF Toxicity

Another maintenance immunosuppressive drug that is given in most centres is an antimetabolite, Mycophenolate Mofetil. Unfortunately, this can also have toxicity related side effects. MMF can precipitate gastrointestinal side effects such as diarrhoea and dehydration early after transplantation and also has haematological manifestations such as leucopenia. Management depends on dose reduction, dose splitting or dose omission, and in some cases substitution for another agent. Drug induced leucopenia may require GCSF administration. (9)

Acute Rejection

Acute rejection is an important cause of allograft dysfunction in the early post-operative period, and is described according to the main pathological process occurring – cellular or antibody mediated rejection. Patients may be asymptomatic and present with an acute rise in creatinine, or may experience fever, malaise, oliguria and graft tenderness. Renal transplant biopsy is the gold standard for diagnosis of acute rejection once other causes of acute creatinine rise have been considered.

The "Banff criteria" are most commonly used for diagnosis and classification of allograft rejection. The biopsy may show T cell mediated rejection, antibody-mediated rejection, or both. Treatment options for cellular rejection include a course of high dose corticosteroids ("pulsing") and Anti-T cell-antibody therapies including anti-thymocyte globulin. Antibody mediated rejection is less likely to respond to steroids and is managed with a range of treatments including intravenous immunoglobulin and plasmapheresis. When acute rejection occurs the possibility of non-compliance should be considered to reduce the risk of further rejection episodes. (10)

Long-Term follow-up and discharge planning

Following renal transplantation, it is recommended that transplant recipients receive frequent and structured follow-up (figure 6); most significantly this is necessary to enable early detection of graft dysfunction, rejection or complications.

Clinic Frequency
First month: 2-3 times weekly
Months 2-3: 1-2 times weekly
Months 4-6: every 1-2 weeks
Months 6-12: every 4-6 weeks
12 months +: 3-6 monthly.

Figure 6: Example of outpatient follow up schedule for kidney transplant recipient as per BTS guidelines.

LIVING DONOR RENAL TRANSPLANTATION FOR THE GENERAL SURGICAL DOCTOR

S Dobbs, A Johnston, T Augustine

The first 6-12 months following organ transplantation pose the highest risk and it is not uncommon for patients to be readmitted during this time due to concerns of the complications discussed above. It is therefore recommended that patients receive more frequent reviews throughout this period. Patients are typically reviewed in a consultant-led transplant clinic within 48 to 72 hours of discharge and 2-3 times weekly thereafter for the first month.

It is important to ensure early follow-up is arranged prior to discharge as part of the discharge planning process. Follow-up thereafter remains frequent for the following few months, after which frequency gradually decreases until the 12-month milestone is reached, after which follow-up becomes monthly. (11)

Questions

1. What should be considered in the differential diagnosis of reduced urine output 24 hrs after a living donor kidney transplant which has been producing good amounts of urine with improving renal function?

a. Blocked Catheter

b. Arterial Thrombosis

c. Dehydration

d. Delayed graft function

e. Venous Thrombosis

2. You are called to review a living donor kidney transplant recipient with pain and swelling under the transplant incision after 48 hrs. What are the potential causes you will consider?

a. Bleeding and Hematoma

b. Venous Thrombosis

c. CMV Infection

d. Urine Leak

e. Tacrolimus Toxicity

3. A living donor kidney transplant recipient is admitted with raised blood sugars. What could be the reasons?

a. Tacrolimus Toxicity

b. Steroids

c. Mycophenolate Mofetil

d. Underling Uncontrolled Diabetes

e. Antihypertensive drugs

4. Persistent Diastolic Hypertension in the early period after transplantation could be due to.

a. Tacrolimus Toxicity

b. Renal Artery Stenosis

c. Fluid Overload

d. CMV Infection

5. What are the commonest causes of pyrexia 2 weeks after transplantation?

a. UTI

b. Chest Infection

c. TB

d. Pyrexia of unknown origin

e. Hepatitis B

Answers

1. A, B, C, D, E are all possible causes of this.

The transplant patient with reducing urine output should be thoroughly assessed for the above complications urgently as immediate intervention may be required to prevent graft damage.

2. A, B, D.

As described above, urinary leak and vascular thrombosis may present with pain over the transplant site in the early post-operative period. However, it is also important to consider the common post-operative complications encountered in general surgical patients such as wound infection and haematoma, as transplant recipients are also susceptible to these.

LIVING DONOR RENAL TRANSPLANTATION FOR THE GENERAL SURGICAL DOCTOR

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3. A, B, D.

Both tacrolimus and steroid therapy are possible iatrogenic causes of deranged blood sugars. Underlying uncontrolled diabetes should also be considered, and patients should be screened for post transplantation diabetes in clinic. New onset diabetes after transplantation is not an uncommon occurrence, and should be managed in collaboration with specialist diabetologists. In addition, diabetic nephropathy is a common primary disease requiring transplantation and will still require strict post-operative blood glucose control

4. A, B, C.

It is important to consider renal artery stenosis as a cause of post-transplant hypertension as this will require intervention and is potentially reversible. Fluid overload, the use of glucocorticoids and calcineurin inhibitors should also be evaluated as the cause of hypertension in transplant patients.

5. A, B.

With the frequent use of urethral catheterisation, transplant recipients are at risk of developing urinary tract infections. UTIs are commonly encountered and treated promptly. Whilst enhanced recovery programmes have reduced the incidence of post-operative chest infections, like general surgical patients, transplant recipients may also encounter such complications.

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A GUIDE TO THE MANAGEMENT OF RECTAL PROLAPSE

D Sapre, A Tayo, A Menon

Abstract

Introduction

Rectal prolapse is a condition that affects mainly adults with a 6:1 predisposition to females. It is defined as protrusion of the rectum through the anal opening and is classified into 2 broad groups: partial thickness and full thickness.

Case Description

84 year old female who presented with a 6 year history of a mass protruding from her anus. Her symptoms progressively worsened over time with eventual inability to reduce mass back into the rectum. There was also associated pain, recurrent bleeds and faecal incontinence.

She was initially managed conservatively following manual reduction and a flexible sigmoidoscopy was performed to rule out any sinister distal colonic lesion.

She subsequently underwent an elective Delorme's operation.

Discussion

Rectal prolapse is an important colorectal condition that requires robust management with careful assessment and investigation in order to ensure adequate treatment. Surgical treatment is the mainstay for full thickness prolapses. Medical supportive treatment would be required in patients that are unfit for surgery.

Introduction

A 84 year old lady presented with a mass protruding out of her rectum which had progressively increased in size for 5-6 years. Initially the mass would protrude only during defecation and would spontaneously reduce.

Thereafter, she had to manually reduce it and for last one month the mass could not be reduced. She also complained of discomfort, inability to sit, recurrent bleeds, soiling and faecal incontinence. (Fig.1)

Figure 1

Background

The lady had stroke 5 years ago and was wheelchair bound secondary to residual paralysis. She had controlled hypertension on medical therapy. She had four full term vaginal deliveries, two of which were prolonged labour and suffered from urinary stress incontinence which was being conservatively managed.

She was managed conservatively during the acute admission when the prolapse was manually reduced. A flexible sigmoidoscopy was carried out to rule out a distal colonic lesion which could have caused the prolapse.

The lady, following a complete pre-operative evaluation, had an elective Delorme's operation.

A GUIDE TO THE MANAGEMENT OF RECTAL PROLAPSE

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Rectal Prolapse

The factors responsible for rectal angle and prevention of prolapse are:

1. Anorectal angle – Created by the pubo-rectalis muscle sling

2. Internal anal sphincter

3. External anal sphincter

Rectal prolapse is due to protrusion of the rectum through the anal opening. A Rectal Prolapse can be classified into:

a) Mucosal Prolapse / Partial thickness rectal prolapse

Mucosa and submucosa protrude from the anal canal

Approximately 1-4 cm protrusion

b) Full thickness Rectal Prolapse

All layers of the rectal wall protrude through the anal canal

Generally up to more than 4 cm protrusion; commonly 10-15 cm in length

Mucosal Prolapse of the Rectum

The prolapsed mucosa can be palpated between finger and thumb. It is seen in all age groups. The factors responsible for the prolapse however differ at different age groups:

1) Infants and children

In infants, the rectum has a direct downward course as the sacral hollow is not yet developed. Also the anal sphincter resting tone is not completely developed. Hence the rectal mucosa is prone to prolapse.

In children, often after a bout of diarrhoea or sudden weight loss with loss of the supporting ischio-rectal fat, rectal mucosa is seen to be prolapsing through anal canal.

Children with collagen disorders, cystic fibrosis, neurological causes with poor sphincter tone and maldevelopment of pelvis are also prone to mucosal prolapse as well.

2) Adults

The most common form of mucosal prolapse in adults is haemorrhoids. Partial prolapse may occur after perineal injury/operation like fistula-in-ano repair or episiotomy where the sphincter is injury and becomes weak.

Treatment

a) In children

1. Digital repositioning

2. Submucosal phenol injections

3. Surgery – Retro-rectal space is entered and rectum is sutured to sacrum

b) In adults

1. Local treatments – Submucosal phenol injections/band application to prolapsed mucosa

2. Excision of prolapsed mucosa

Full thickness rectal prolapse

The prolapse feels much thicker than a mucosal prolapse. It is commonly associated with weak pelvic floor muscles and hence weak anal sphincters. It begins as an anterior wall prolapse, as the supporting tissues there are weakest. It is more common in women. Full thickness rectal prolapse is uncommon in children. If a child presents with full thickness prolapse, it is essential to rule out intussuscepting bowel (most common ileocecal) protruding through the anus.

Full thickness rectal prolapse have impaired adaptation to distension and hence consequently high (upto 50%) incidence of incontinence. (2-4)

Treatment

Surgical treatment is the mainstay for the management of full thickness rectal prolapse. In individuals unfit for surgical intervention, medical supportive treatment can be offered.

A GUIDE TO THE MANAGEMENT OF RECTAL PROLAPSE

D Sapre, A Tayo, A Menon

a) Surgical Management

It can be done by a perineal or an abdominal approach. The abdominal approach has a better outcome but is a bigger procedure with more perioperative morbidity. A perineal procedure has a higher recurrence rate, is more suited to patients who have co-morbidities and cannot have an abdominal procedure. The risks are lower and it can be repeated if there is a recurrence.

A. Perineal approach

1. Delorme's operation

2. Altemier's operation (perineal recto-sigmoidectomy) (5)

3. Thiersch's stitch (not done anymore)

B. Abdominal approach

1. Sutured Rectopexy

2. Mesh Rectopexy

3. Resection Rectopexy

b) Medical Management

a. Fibre supplements – to improve stool consistency and reduce leakage

b. Antispasmodics – to reduce the bowel motility.
There is not much evidence to support its use though.

1) Following is the surgical treatment for complete rectal prolapse:

a. Sutured Rectopexy

b. Mesh Rectopexy

c. Resection Rectopexy

d. All of the above

2) Partial Rectal Prolapse includes:

a. Mucosa alone

b. Mucosa and submucosa

c. All layers of the bowel wall.

d. None of the above

3) Which of the following statement(s) about complete rectal prolapse, or procidentia is/are true?

A. Surgical intervention is best treatment for complete rectal prolapse.

B. The disorder is more common in men than in women.

C. Complete rectal prolapse is always associated with incontinence.

D. All of the above are true.

4) Which of the statements about rectal prolapse in children are true

a. It is mostly partial thickness

b. Non-surgical management is the mainstay of the treatment.

c. A bout of diarrhoea could precipitate rectal prolapse in a child

d. All of the above

5) Following are the types of rectal prolapse:

a. Full thickness prolapse

b. Mucosal prolapse

c. both a and b

d. None of the above

A GUIDE TO THE MANAGEMENT OF RECTAL PROLAPSE

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Answers

1) D.

Surgical treatment is the mainstay treatment for rectal prolapse. There are different surgical approaches and methods involve fixing the rectum or resection of the redundant sigmoid and anastomosis.

2) B.

Mucosa does not protrude independent of submucosa which carries blood supply to the mucosa.

3) A.

Women are more prone to rectal prolapse, specially when they have associated weak perineum. Incontinence is a symptom in 50 % of the patients.

4) D.

Rectal prolapse is children is rarely full thickness prolapse. There are variety of reasons causing the prolapse including a bout of diarrhoea and weakness of rectal supporting tissues.

5) C.

Rectal prolapse is divided based on the thickness of prolapsing rectal wall.

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THE PRINCIPLES & MANAGEMENT OF PSEUDOANEURYSMS IN PERIPHERAL LIMBS

K Alkhedairy, A Howard, A Sebastian, A Mandal, S Choksy

Abstract

A pseudoaneurysm (PA), also known as false aneurysm, occurs when there is a disruption in all 3 layers of the arterial wall causing leakage of perfused blood which is contained by the surrounding tissue. This differs from a true aneurysm which occurs when there is dilatation of the vessel wall that includes all three layers (the intima, media and adventitia). PAs have a higher risk of rupture in comparison to true aneurysms of similar sizes and always require treatment (1). A rupture will result in excessive blood loss.

In this case-based discussion we present a patient with a PA that was managed using a covered stent placed with an endovascular procedure. We will show how patients may present with a peripheral PA and consider the principles of its management. This article describes the typical features of a peripheral PA and discusses the importance of taking a focused history and examination when determining treatment options.

Case History

A 70-year-old man presented to ED with a short history of a sudden onset painful right arm. On examination his hand was cold, numb with reduced motor function. Arm pulses were impalpable and were inaudible on a hand held doppler.

A CT-angiogram (CTA) revealed an embolus in the brachial artery and the patient underwent a successful embolectomy. Post-procedure the patient regained strong radial and brachial pulses and his symptoms resolved. Prior to discharge he was commenced on oral anticoagulant to prevent further thromboembolisms and an echocardiogram did not reveal a cardiac source for an embolus.

The patient was discharged and 3 weeks later the patient presented again with a 3-day history of a painful, pulsatile mass in his right axilla. An arterial duplex scan suggested the presence of a PA in the proximal brachial artery, which was confirmed on a CTA measuring 3cm x 2.2cm with a neck measuring approximately 4.5mm [See Figures 1-3].

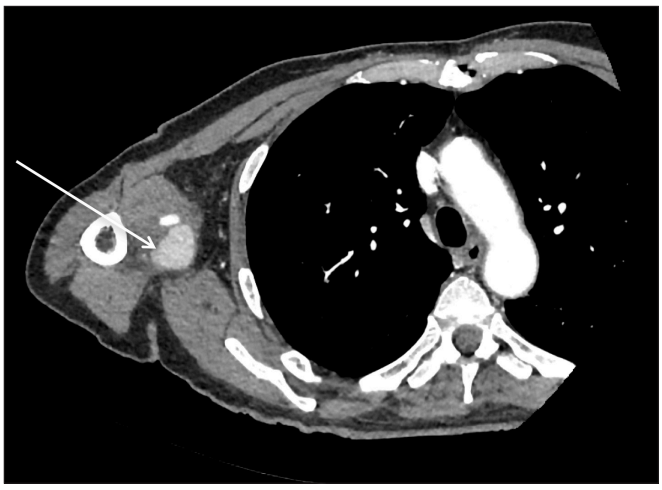

Figure 1: CT scan demonstrating a right-sided pseudoaneurysm in the proximal brachial artery.

Figure 2: CT scan demonstrating a right proximal brachial PA with adequate perfusion distally.

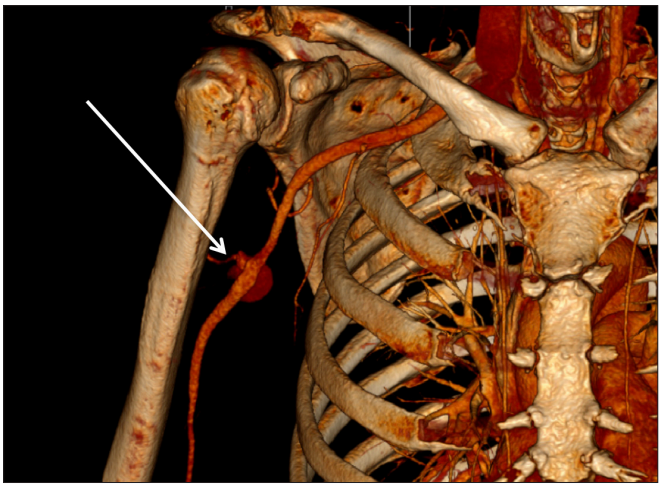

Figure 3: A CT scan image enhanced to show the 3D structure of the PA and its proximity to surrounding structures.

The patient denied any recent trauma or previous illicit drug use. Digital subtraction angiography (DSA) was carried out [Figure 4] and a covered stent inserted endovascularly to exclude it [Figure 5]. A post-procedure angiogram showed complete resolution of the PA [Figure 6]. The patient reported a resolution of his symptoms and was discharged with outpatient follow up.

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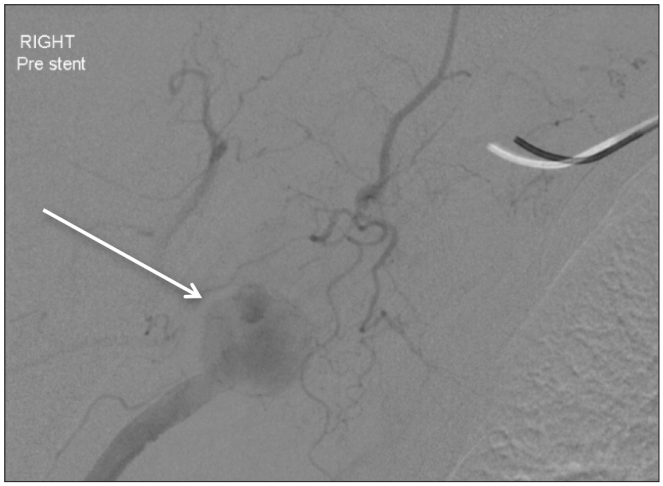

Figure 4: Digital subtraction angiography (DSA) revealing the exact location of the PA.

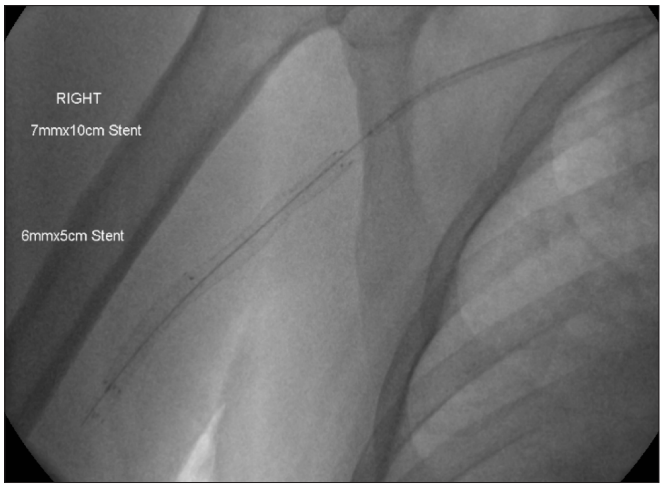

Figure 5: DSA revealing a stent inserted covering the neck of PA.

Figure 6: DSA with contrast, the PA is no longer visible and it has been completely occluded from the blood supply by the successful insertion of the stent.

Management of patients with suspected peripheral PAs

They key details that should be evaluated are described:

History

A PA should be in the top list of differentials in any patient presenting with a painful and pulsatile mass. A thorough history should be taken to look for any risk factors that may cause a disruption to the arterial wall, thus creating a PA. Common risk factors include trauma to the arterial wall (such as IV drug use, penetrating and blunt injuries), iatrogenic causes (following endovascular procedures) and inflammation of the blood vessel wall (vasculitis or mycotic aneurysm) (2). Onset and duration of the pulsatile mass are also important, as rapidly growing PAs are more likely to rupture (3,4,5). Other risk factors include age, obesity and hypertension.

Drug history is essential as the use of anticoagulants and anti-platelets increase the risk of developing a PA. Additionally, their use prevents PAs from resolving spontaneously and will likely require further intervention (6).

The location of the pulsatile mass may give a clue to the cause. Most endovascular procedures are carried out via femoral artery catheterisation (7), thus a PA should always be suspected in a patient presenting with pain or a mass in the groin after an endovascular procedure. With the growing practice of endovascular procedures, femoral artery PAs are becoming more common.

THE PRINCIPLES & MANAGEMENT OF PSEUDOANEURYSMS IN PERIPHERAL LIMBS

K Alkhedairy, A Howard, A Sebastian, A Mandal, S Choksy

The incidence of femoral artery PAs varies widely in literature; current guidelines state that <0.2% is an acceptable rate (8) however, recent studies have shown the incidence can vary between 2.9% - 8% depending on the type of procedure (9, 10). In IV drug users, the most common site for PAs is the femoral arteries due to their proximity to the respective veins that they are trying to inject (11).

Examination

A thorough clinical examination is essential, tachycardia and hypotension may indicate that a rupture has taken place, in which case resuscitation and immediate surgical intervention is required (See figure 8).

PAs are classically described as a tender, pulsatile mass (6). There may be bruising or erythema overlying the mass indicating close proximity to subcutaneous tissue. A bruit may be heard if the mass is auscultated. A thorough neurovascular examination distal to the suspected PA should always be carried out due to possibility of a local pressure effect.

If there is a palpable mass in close proximity to the skin, its size should be clearly demarcated with a pen so the rate of growth can be objectively assessed. The surrounding area should be closely examined for signs of infection that may indicate ongoing cellulitis or mycotic aneurysm. If the PA is large enough, the pressure effect may also compromise local skin perfusion and thus its integrity.

Investigations

Blood tests taken should include a Full Blood Count (FBC), clotting screen and blood cultures. The FBC will reveal sudden drops in haemoglobin, which could indicate a rupture. The white cell count (WCC) and blood cultures will indicate any signs of infection which may suggest a mycotic aneurysm.

A deranged clotting increases the risk of developing a PA and reduces the likelihood of spontaneous thrombosis (7, 13). If vasculitis, which is a rare cause of PA, is suspected then a vasculitis screen should be performed. This includes C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) for signs of inflammation. If positive then more specific disease markers should be screened, such as anti-nuclear antibody test and anti-DNA test for systemic lupus erythematosus (SLE).

The initial imaging of choice is duplex ultrasound, which has a high sensitivity (94%) and specificity (97%) in peripheral PAs (12). A CTA is useful in confirming the diagnosis and shows the anatomy in more detail. Both MRI and angiography can also be used.

Treatment of Peripheral PAs

A range of treatments are available for PAs depending on size, location and cause, from non-invasive compression techniques to open surgical repair. Some small PAs may also spontaneously resolve without any intervention over time. Studies have shown that this is especially the case if the PA is less than 3cm in diameter (7, 13).

Ultrasound-guided compression (USGC) involves continuous compression over the neck of the aneurysm in order to promote thrombosis. This has a better outcome if the PA is smaller (less than 4cm) and patient is not on anticoagulation (14,15,16).

Ultrasound is also used to guide thrombin injections in the PA to promote clot formation [Figure 7]. This is the treatment of choice for iatrogenic femoral artery PAs, with success rates ranging from 93–100% (17,18). The efficacy of this treatment is not affected by patients remaining on anticoagulation. However thrombin injection must be used with caution since it can cause distal embolization especially if the neck is greater than 3mm in diameter (16). Occlusion of the PA can be also promoted by injecting coils.

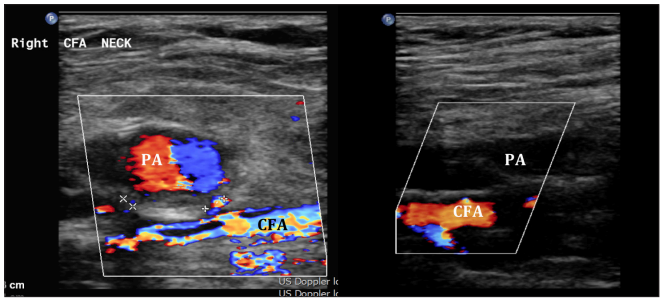

Figure 7: Ultrasound images of a right common femoral artery (CFA) PA before and after thrombin injection. The image on the left demonstrates a patent PA with blood clearly following into it. The image on the right demonstrates the same PA with no blood flow post-thombin injection.

Endovascular approaches to treating PAs include the insertion of a covered stent. This excludes the PA from the blood flow causing it to occlude. Stents have the advantage of maintaining flow in the parent vessel however are generally deemed not suitable for femoral artery PAs due to risk of occlusion and kinking (1).

THE PRINCIPLES & MANAGEMENT OF PSEUDOANEURYSMS IN PERIPHERAL LIMBS

K Alkhedairy, A Howard, A Sebastian, A Mandal, S Choksy

Open surgical intervention is commonly used in more complicated cases such as rupture or infection where revascularisation may be needed (19). PAs causing local pressure effects such as neuropathy typically require surgical intervention (1). Abscess drainage, vessel ligation or bypass surgeries are indicated if an infection is suspected, as may be the case with IV drug users.

These patients are at higher risk of limb amputation due to compromised blood flow (20).

Discussion

Appropriate history taking and examination are essential when examining a patient with a painful lump. PAs can be mistaken for abscesses if not examined properly, in which case an attempt to aspirate may lead to catastrophic consequences. If there is any doubt, as may be the case with IV drug users, then a duplex scan should be carried out immediately.

Currently there is no standardised way to treat PAs and options depend on the multiple factors discussed in this article. In this particular case, techniques that encourage thrombosis formation were deemed unlikely to succeed due to the patient being on anti-coagulant and the size of the PA neck. Thus a covered stent was inserted which led to successful resolution of the PA. Once a PA is suspected, it is essential that foundation doctors adequately assess the patient for haemodynamic instability and call for help early. The vascular team should be involved immediately to avoid complications such as rupture, limb loss or even death.

Test yourself questions

Question 1: An anti-coagulated patient that undergoes femoral catheterization for angiography of the left lower limb develops a haematoma. An ultrasound shows a 5cm diameter PA with a narrow neck. What is the treatment of choice for this patient?

1. Conservative measures – wait and see approach with regular follow up.

2. Ultrasound guided compression.

3. Percutaneous thrombin injection.

4. Covered stent via endovascular procedure.

5. Surgical treatment.

Question 2: A 50 year old patient presents to the emergency department with a painful and pulsatile mass in his right groin. From the history you note that he is a former IV drug user and admits to having previously injected in his groin. There is no other significant history to note and he is not anticoagulated. What is the most appropriate net step?

1. Drain the mass, as it is likely to be an abscess.

2. Assess his leg for critical limb ischaemia.

3. Request an ultrasound scan to confirm diagnosis.

4. Ensure the patient is haemodynamically stable.

5. Contact the oncall surgical team immediately.

Answers

Answer: 3.

Conservative measures and ultrasound-guided compression are unlikely to work in an anti-coagulated patient.

Percutaneous thrombin injection is currently the choice of treatment for PAs that develop post catheterisation in anti-coagulated patients with narrow necks.

Endovascular procedures and surgical treatment are reserved for larger PAs that have wide necks or more complicated cases (such as infected PAs or risk of limb ischaemia).

Answer: 4.

The mass could be a number of pathologies in an IV drug user; these include abscesses, PA and mycotic aneurysm. However, a painful and pulsatile mass should increase suspicion of PA. The first step in management is to ensure the patient is haemodynamically stable as a PA always has the risk of rupturing with rapid detrimental consequences. Once stable, the diagnosis can be confirmed by ultrasound and managed appropriately.

THE PRINCIPLES & MANAGEMENT OF PSEUDOANEURYSMS IN PERIPHERAL LIMBS

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