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Case Note Review Booklet

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Contents

Case study 1: Vascular surgery I - vasculopath may have had a better outcome with a less invasive operation

Case summary:

A middle-aged ex-smoker presented with a 2 week history of severe acute lower leg pain. There was a previous history of right-sided stroke with residual weakness and analgesic use for nerve impingement in the neck causing chronic pain. The patient was on Clopidogrel and Aspirin as well as several other medications, and the relevant cardiovascular risk factors included hypertension and dyslipidaemia.
The patient presented to the emergency department (ED) in the evening and was reviewed by a resident medical officer (RMO). The initial impression was a neurological problem given the history of previous stroke and nerve impingement. The patient was admitted under the medical team.

During the consultant ward round the next morning, critical ischaemia was diagnosed and ultrasound arranged with a request for vascular surgical review. The ultrasound suggested severe proximal arterial disease in the aorto-iliac segments. A computed tomography (CT) scan was arranged that evening. The handwritten report noted that the CT showed an aortic and iliac artery occlusion below the renal arteries with a superior mesentery artery stenosis. The ankle-brachial index was not recordable on the left and 0.25 on the right. Plans were made to continue intravenous (IV) heparin with an angiogram booked for the next morning to more accurately assess the arterial disease.

The angiogram showed a patent coeliac axis and stenosis of the superior mesentery artery and an occluded right renal artery. Patency of the left renal artery would suggest that the aorta was patent at the level of the renal arteries, though heavily diseased.

An aortobifemoral bypass was scheduled for the next day. An aortobifemoral bypass was performed, but at the same time there was a bypass from the aortic graft to the left renal artery, the superior mesentery artery and the coeliac axis. There was no indication from the notes that the left kidney or the intestines were ischaemic preoperatively. The operation took 7.5 hours and the patient was then transferred to the intensive care unit (ICU).

During the ICU admission the patient became anuric requiring dialysis. The patient deteriorated with worsening acidosis and inotrope requirements. A CT scan showed acute ischaemia of the bowel with no comment made as to the patency of the superior mesenteric and coeliac axis grafts. The patient was urgently returned to theatre where findings showed an ischaemic ileum, transverse, descending and sigmoid colon. These segments of the intestine were resected with the assistance of the general surgeons. The patient returned to the ICU but continued to deteriorate and palliation occurred following discussion with the family.

Comment:

There are two areas of concern with this case:

1. The delay between the patient being admitted through the ED and review by the vascular surgical team. This delay occurred partly as a result of the missed diagnosis by the ED and admitting team, and is not attributable purely to a delay in the vascular surgical team reviewing the patient. Potentially, an earlier diagnosis and earlier intervention may have led to a different outcome.
2. The second concern was the choice of operation and whether such a large operation was necessary. The operation took 7.5 hours and included an aorto-bifemoral bypass and bypass to the left renal artery, coeliac artery and superior mesenteric artery. This would have resulted in ischaemic time to the intestines and kidney. Based on the previous comments in the notes, there appears to be no need to have intervened on these vessels apart from doing a straightforward aorto-bifemoral bypass to get the patient out of trouble. If there was a good reason to bypass to the other arteries it was not outlined in the notes. The least invasive procedure to get the patient out of trouble is best. These vessels could have been stented later if required. A lesser invasive operation may have had a different outcome.

Case study 2: Vascular surgery II – ruptured aortic aneurysm diagnosed as renal colic

Case summary:

A middle-aged man presented to a country hospital with right-sided abdominal pain. He had been discharged by his general practitioner (GP) 1 week earlier with abdominal pain radiating into his scrotum. He was transferred to a metropolitan hospital and arrived there at midnight and was triaged as renal colic. The first assessment by an emergency registrar was 1.5 hours later. The examination notes describe the pain as sharp, stabbing and constant. At that time it was not radiating into his scrotum. There is a note that no pulsatile mass was palpable in the abdomen. A CT scan of the kidneys, ureters and bladder was ordered for the next morning. This was performed 6 hours after admission and revealed a 10.5 cm ruptured abdominal aortic aneurysm (AAA). The patient was moved to the resuscitation area and then transferred to a tertiary teaching hospital as an emergency.

At the tertiary teaching hospital he went to theatre without any further delay. The intraoperative findings showed a large infrarenal AAA and a right common iliac aneurysm. The intraoperative decision was to insert a tube graft and not repair the common iliac aneurysm, as there was prolonged bleeding from the caval side of the aortic sac. Multiple logical manoeuvres were performed intraoperatively to control the bleeding but were unsuccessful. After the tube graft insertion the abdomen was packed and temporarily closed.

On the first postoperative day the patient was stable with bilateral viable limbs. The decision was made to remove the packs the following day.

Some 48 hours after the initial operation the senior Fellow removed the packs. There was no further bleeding and the patient was closed. Six hours later the vascular team was informed by the ICU that the patient's limbs looked ischaemic. A CT angiogram showed right internal iliac and popliteal occlusions with evidence of compartment syndrome. On the left, the iliac system and common femoral artery/profunda femoris artery were occluded with luminal compromise of the superficial femoral artery. The patient went back to theatre that evening. A tube graft extension onto both femoral arteries and thrombectomies were performed. A right-sided full compartment fasciotomy was performed. While still on the table the patient developed a massive reperfusion injury and went into electromechanical dissociation and consecutive asystole. Resuscitation measures were unsuccessful.

Comment:

The main issue was the preoperative and diagnostic management. The patient appears to have had a symptomatic aneurysm when he presented to the GP and the diagnosis was missed. The diagnosis was also missed at the large hospital ED. This is surprising given that:

1) The documented clinical history of sharp, permanent, severe pain does not concur with renal colic.
2) An emergency registrar should be able to palpate a 10.5 cm giant AAA on thorough examination even in an obese patient.
3) It is known that abdominal aneurysm rupture is the main differential diagnosis for renal colic. Focussed Assessment Sonography for Trauma scanning in ED is now state of the art.The AAA should have been picked up that way.
4) In a patient with severe, constant abdominal pain and an unclear diagnosis, sophisticated imaging such as CT scan must not be delayed, especially if the service is readily available.

The operative management of the primary operation was sound. The severity of the reperfusion syndrome would suggest that the legs had been profoundly ischaemic for a longer time. However, in the notes there is clear documentation from the vascular surgical team that the legs were adequately perfused and viable. Imaging was performed once the concern of ischaemia was raised. In view of the patient's age and the potentially reversible nature of the ischaemia, it was reasonable to take the patient back to the operating theatre and perform a bifemoral extension of the graft. The CT angiogram did suggest compartment syndrome, which was adequately addressed with fasciotomies. The extent of the reperfusion injury was severe and unfortunate. Additional measures would not have altered the outcome.

Case study 3: NGT usage I – decompression of stomach in acute pancreatitis

Case summary:

An elderly woman from a nursing home was admitted to a tertiary hospital with abdominal pain and vomiting. She had a significant background history of interstitial pulmonary fibrosis (requiring home oxygen), epilepsy, hypothyroidism, diabetes insipidus, osteoporosis, sensory deficit (blind and deaf) and a hospital admission with bacterial pneumonia 2 months previously.

The abdomen was distended and tender maximally in the epigastrium. She had vomited “black bile liquid” and bilateral basal coarse inspiratory crepitations were also documented on chest auscultation. She had type II respiratory failure, marked leukocytosis (white cell count [WCC] >21,000) with neutrophilia and raised lipase at 6,500U/L. Imaging results were documented as bilateral interstitial opacifications on chest x-ray and a sentinel loop in the upper outer quadrant on abdominal film.

A diagnosis of acute pancreatitis was made and goals of care were established after discussions with family, with a decision not to escalate to ICU/high dependency unit (HDU), progress to operative intervention or initiate cardiopulmonary resuscitation (CPR) in the event of cardiopulmonary arrest. Around 24 hours after initial presentation to hospital she became unresponsive after a large vomiting episode, developed Cheyne-Stokes type of breathing and died shortly afterwards due to presumed aspiration of gastrointestinal contents.

Comment:

Whilst the accurate determination of the severity of pancreatitis early in the clinical course is difficult, this patient also had profoundly impaired physiology, most particularly her pulmonary reserve. Added to this was the evidence of systemic inflammatory response syndrome on admission. She undoubtedly presented with a life-threatening condition.

Quite appropriately, a ceiling of care was agreed to with her next of kin, and an appropriate decision was made to not escalate the patient beyond ward-based care.

The use of a nasogastric tube (NGT) in pancreatitis has been shown in randomised trials not to be routinely required. There is no mention of an NGT in the medical/nursing records or fluid chart. This patient died of aspiration following a large vomit, so it is reasonable to ask whether she was an exception to the recommendations regarding the use of an NGT in pancreatitis. However, the decision not to insert an NGT was in keeping with standard practice and she appears to have aspirated after a single vomit.

Case study 4: NGT usage II – to tube or not to tube

Case summary:

A very elderly patient was admitted to a private hospital for an elective laparoscopic-assisted right hemicolectomy for a caecal carcinoma. The preoperative anaemia was corrected with transfusion preoperatively.

The patient had a history of reflux, was taking Omeprazole and had diet controlled non-insulin dependent diabetes mellitus (NIDDM)/glucose intolerance. The patient had an abnormal heart rhythm, presumably atrial fibrillation, managed with Digoxin and asthma managed with Seretide and Ventolin. The patient also had previous bilateral inguinal hernia repairs.

Preoperative nursing and anaesthetic assessments seemed thorough. The operation took 1.5 hours, with the main difficulty involving the division of pelvic adhesions related to previous hernia repairs. The operation was completed laparoscopically except for the extracorporeal stapled ileocolic anastomosis.

The first 2 postoperative days were relatively unremarkable, with nursing concerns mainly relating to the patient's reluctance to use the patient-controlled analgesia, and intermittent runs of venous thromboembolism (self-limiting and without haemodynamic compromise). The anaesthetist reviewed the patient on days 2 and 3. Deep vein thrombosis (DVT) prophylaxis was given.

On days 1 and 3, the patient was seen by a surgeon who was happy with the patient's progress. Given the difficult division of adhesions, the surgeon was concerned about the likelihood of postoperative ileus, as suggested by a nursing entry associated with the day 1 review by the surgeon: "patient at high risk of ileus – observe and report". The nursing records noted that the patient had bowel movements on day 3. However, on day 4 there were increasing symptoms of reflux and nausea. It was noted by both the surgeon and the anaesthetist that the patient's abdomen was very distended. The patient also complained to the surgeon of chest pain and was in atrial fibrillation. A cardiologist reviewed the patient, excluding ischaemia as the cause of the atrial fibrillation and indicating that it could be due to the patient's abdominal distension and emphysema. In general, the patient was not feeling well on day 4, with increasing small bowel obstruction and lethargy.

In the morning of day 5 the nursing staff noticed worsening abdominal distension and nausea. A surgeon was contacted and gave instruction to insert an NGT. Thirty minutes later a Code Blue was called, after the patient was heard vomiting in the bathroom and had become unresponsive after being brought back to bed. Emergency medical staff in attendance promptly found the patient covered in a copious volume of faeculent vomitus. The patient was also in bradycardia (with no measurable blood pressure [BP]) that quickly deteriorated to asystole. About 700 mL of vomitus was suctioned out of patient's trachea and endotracheal tube during intubation. CPR was maintained for 20 minutes with no success.

Comment:

This elderly patient vomited profusely on the fifth postoperative day, aspirated, collapsed and was not able to be resuscitated. The deterioration occurred gradually from day 4 onwards, which would fit more with a picture of paralytic ileus, perhaps exacerbated by the division of adhesions. The alternative diagnosis was early postoperative small bowel obstruction, despite the reassuring passing of flatus and bowel motion. Should an NGT be placed during the operation? It often comes down to surgeon preference.

Case study 5: Poor team coordination I – massive occult gastrointestinal bleeding in patient with alcoholic cirrhosis

Case summary:

A middle-aged man with NIDDM, hypertension, macronodular cirrhosis, Childs A liver failure and a history of heavy alcohol consumption presented to a metropolitan hospital with large per rectal bleeding and haemoglobin of 82g/L. He had vomited but had no blood in the vomitus. He was compromised with tachycardia and hypotension. A transfusion was commenced and he was transferred to a teaching hospital.

At the teaching hospital the bleeding continued. He underwent two CT angiograms in the first 12 hours, neither of which showed the bleeding source. An NGT had been inserted which initially showed dark and then bright red blood. He was transferred to the ICU for ongoing resuscitation.

Gastroenterology was contacted on the first night at 01:30 with a request for an urgent gastroscopy, but they did not attend to the patient until 06:45. Due to ongoing bleeding and deterioration he was taken to theatre at 08:30 for a laparotomy. An on-table gastroscopy suggested bleeding from the second or third part of the duodenum but this could not be localised. A laparotomy and duodenotomy was performed but the site of bleeding was not found. A gastroscopy was passed through the duodenotomy into the jejunum but no pathology was identified. He was closed and returned to the ICU.

On further review of his CT with radiology, varices were identified around the third part of the duodenum. A further gastroscopy was performed that identified previously unseen oesophageal varices, but no varices or bleeding in the third part of the duodenum.

The patient continued to bleed and went on to have a transjugular intrahepatic portosystemic shunt (TIPS) procedure and subsequent embolisation of the duodenal varices via the TIPS. His bleeding ceased but he developed progressive liver failure and died 12 days post admission. He had transfusion of blood and blood products.

Comment:

This patient represents an extremely challenging surgical case: occult gastrointestinal bleeding that was never localised. Every resource of the teaching hospital was deployed, generally in a timely way and in the appropriate order. The decision making was good.

I agree with the surgical team that the gastroenterology response on the first night was not ideal, but that a more timely response would not have made a difference to the outcome.

Case study 6: Poor team coordination II – lessons to be learned despite very high risk patient

Case summary:

A middle-aged man with known alcoholism and alcoholic liver disease presented with a 3-day history of abdominal pain, shown on CT scan to be the result of sigmoid diverticulitis with free intraperitoneal gas indicative of perforation. The CT also revealed features of cirrhosis and portal hypertension. He was tachycardic and febrile on admission. His liver function tests were deranged, including a bilirubin of 51mmol/L and C-reactive protein (CRP) of 450mg/L.

Although surgery was seriously considered, the initial management was nonoperative with IV broad spectrum antibiotics. A second surgical team reviewed the patient the next day and chose to maintain the nonoperative management. Over the next 48 hours his condition remained stable, though unimproved from a septic perspective, but the development of overt alcohol withdrawal resulted in increasing confusion. He was admitted to the ICU for sedation and intubation prior to a repeat CT scan (48 hours after the first) with a view to subsequently performing a laparotomy. The CT revealed resolution of the pneumoperitoneum but progressive small bowel dilatation consistent with a paralytic ileus.

Review by a third surgical team after the repeat CT scan favoured ongoing nonoperative management, encouraged by a fall in the CRP as well as by the resolution of the pneumoperitoneum and the absence of a discrete collection on the second CT scan. Thereafter the patient remained essentially unchanged from a septic perspective. He had a steadily declining CRP over successive days and return of spontaneous gastrointestinal tract function, but had persistently high swinging fevers, ongoing ventilator dependence, worsening ascites and rapidly progressive weakness and deconditioning.

Antibiotics were modified and extended during the ICU admission. A further CT scan (ICU day 6) demonstrated some resolution of inflammation but the febrile course continued. A tracheostomy was established on the ninth day in the ICU because of difficulty weaning the patient from the ventilator. On ICU day 17 the tracheostomy tube was replaced, for which tracheal dilatation was required. A resulting tension pneumothorax was promptly recognised and treated but caused extensive surgical emphysema.

By ICU day 19, the failure of the sepsis to respond to all nonoperative treatment prompted a review of the direction of treatment and, with the consent of the patient's family, active management was withdrawn. The patient died the next day.

Comment:

The mortality associated with emergency surgery for diverticular perforation remains significant. In the added presence of moderately advanced liver disease, emergency colonic resection is unequivocally hazardous and the reluctance of the various surgical teams to operate is understandable. Without doubt, this patient's prognosis was poor from the outset, regardless of the decision to operate or not.

Nevertheless, the patient was only middle-aged. The fatal outcome in this case raises three points of consideration:

1) The optimal time for this patient to have undergone surgery, had that course of action been taken, was within the first 48 to 72 hours of this admission. Based on the case notes, serious consideration was given to this possibility on two occasions but, on both occasions, a "back-up" surgical team opted to maintain the status quo and wait until the admitting team reviewed the situation. In the current era of combined care the overall management can sometimes be transferred from one team. There is a real risk that each surgical team sees their role as simply keeping the patient alive until the next team takes over – effectively abrogating the responsibility for the "hard" clinical decisions. Although it is difficult to know from a case note review alone, the sense is that this occurred here.
2) Over the past decade there has been increasing interest in the role of laparoscopic peritoneal lavage and drainage in the treatment of acute sigmoid diverticulitis. Although the data does not support this as routine management, it clearly has an emerging (if ultimately limited) role. This might have been an occasion where minimally invasive surgery could have been appropriate.

3) In the presence of moderately advanced liver disease the reluctance of the surgeons to operate was understandable. However, this reluctance needs to be balanced against the likelihood of survival without surgery. In this case the presence of significant liver disease not only elevated the risk of a postoperative death but also dramatically reduced the likelihood of survival without surgery.

Case study 7: Bed pressures in HDU I – discharge from HDU was premature

Case summary:

This was a case of an elderly man (weight 125kg, BMI 49) with a history of prostate cancer on Zoladex, severe obstructive sleep apnoea, on continuous positive airway pressure, diet controlled diabetes and hypertension.

The patient had undergone a bowel resection 8 years earlier for strangulation and had developed a large incisional hernia. He was recommended for incisional hernia repair, having been assessed preoperatively by the cardiologist and respiratory physicians. He was admitted for repair electively and a high dependency bed had been prearranged for the postoperative period.

The procedure went without incident. He was admitted to the HDU and was well. As there was a shortage of beds he was transferred out of the HDU to the ward at 22:00.

In the early hours of the morning he developed decreasing urine output and tachycardia. He was assessed by the RMO who gave him a fluid challenge and performed some blood tests. He seemed to be improving, but only 30 minutes after the last review was found cyanosed and unresponsive, having had what was assumed to be a cardiorespiratory arrest. Resuscitation was attempted but he was not revived.

An autopsy failed to show the cause of death. It did show congested lungs and some mottling on the posterior of the heart that could be related to the resuscitation effects.

The primary surgeon was upset at not being contacted about the transfer of this patient from the HDU to the ward on the evening that it occurred; the surgeon had arrived the following morning to be told the patient had died overnight in the ward. Apparently a protocol change had occurred within the hospital, meaning that permission did not need to be sought from the surgeon to move the patient out of the HDU if the physician deemed that the transfer could be undertaken safely.

Comment:

There are several issues here. Firstly, could this patient, who was very high risk, have managed without surgery? It is difficult to judge from the notes whether he was suffering enough to require surgery.

It is also difficult to say from the notes whether the death was due to a primary respiratory arrest or a cardiac event. The death may have occurred even if the patient was still in the HDU but obviously the chance of survival there would have been higher. In reality the patient was probably transferred out of the HDU prematurely at 22:00, which may have contributed to his death.

Case study 8: Bed pressures in HDU II – iatrogenic liver injury after pleural aspiration may be secondary to inadequate level of supervision

Case summary:

An elderly patient was admitted with an acute abdomen and sepsis secondary to a perforated sigmoid diverticulum. After an emergency Hartmann's procedure the patient was managed postoperatively in the ICU and was discharged to the ward on postoperative day 4.

The patient was readmitted to the ICU 36 hours later due to respiratory failure; there was a medical emergency team (MET) call and re-intubation. A right pleural effusion was noted and pleural aspiration was attempted three times to drain the effusion. Subsequently it became apparent that the pleural aspiration attempt had led to an iatrogenic liver injury, causing significant bleeding.

Two laparotomies were performed to control the liver injury bleeding. The patient suffered significant blood loss and became coagulopathic, developed subsequent liver and renal failure and died.

Comment:

The treating team was concerned that the patient was discharged too soon from the ICU. It would appear the patient was extubated within 24 hours, and remained in the ICU for a further 2 days with apparently good oxygenation without assistance apart from supplemental oxygen. However, the patient seemed to be in respiratory difficulty only 6 hours after discharge from the ICU. Around 24 hours post-ICU discharge the patient was in significantly greater respiratory distress, seemingly related to acute pulmonary oedema, and was becoming "respiratorily tired". Eventually a MET call for respiratory failure resulted in the patient's return to the ICU.

The clinical decision to progress the patient seems to have been a considered one based on the clinical information and metrics available at the time. Perhaps return to an HDU after the initial deterioration may have prevented a MET call, but this is mere speculation.

The more pressing issues were (1) the liver injury and subsequent bleeding, which contributed to the patient's ultimate demise, and (2) whether the level of supervision for right pleural effusion drainage was insufficient and, if so, contributed to the iatrogenic injury

From the notes the ICU RMO did the procedure under the supervision of the ICU registrar. Ultrasound guidance appears to have been used to determine a site for placement of the drainage needle, both pre-procedure and then to recheck prior to first pass of the aspiration needle. Three passes occurred and the depth of penetration was recorded as 6 cm. No fluid, air or blood was recorded to have been aspirated.

The depth of penetration does seem quite deep, but without knowing more about the habitus of the patient it is impossible to know if this was appropriate.

The level of experience of the supervising ICU registrar is unknown (it was not indicated in the notes or in any of the available documentation) and hence it is impossible to comment on whether there was an appropriate level of supervision for this procedure.

Case study 9: Weekend effect? Issues with the management of distal colitis/pseudo obstruction, especially on long weekends

Case summary:

This middle-aged man, with a past history of NIDDM on Metformin and Sitagliptin, and previous epilepsy attributed to a head injury (managed with Dilantin), was transferred from a rural hospital to a tertiary hospital for ongoing management of “gastroenteritis”, dehydration and severe electrolyte imbalance.

The referral letter describes 4 days of watery diarrhoea, cramping abdominal pain, vomiting and severe lethargy. He had now developed abdominal distension. Blood tests had confirmed the severity of his illness: WCC 12.5, platelets 607, CRP 239mg/L, acidosis with a bicarbonate of 16mmol/L (Normal range 22-34), hypokalaemia 2.6mmol/L (Normal range 3.4-5.0), hypomagnesaemia 0.48mmol/L (Normal range 0.7-1.1) and hypocalcaemia, which when adjusted for an albumin level of 25g/L, was 1.55mmol/L (Normal range 2.15-2.60). His blood sugar level was 4.9mmol/L.

An abdominal x-ray prior to transfer showed the features of a large bowel obstruction with dilated small bowel loops and gas in a distended colon. A CT scan showed markedly dilated fluid-filled small bowel loops and gaseous distension of the colon proximal to a markedly thick walled distal sigmoid and rectum consistent with distal colitis/proctitis.

On review by the surgical registrar at 22:00 the patient’s abdomen was moderately distended with generalised tenderness without rebound. The rectum was empty with no blood on the glove. A stool sample was requested and IV fluids included potassium, magnesium and calcium. IV antibiotics were commenced for presumed septicaemia from proctocolitis. A request was made to the ICU for assessment. Meanwhile, the patient was transferred to the ward at 00:30. Diazepam was prescribed for his agitation. He was seen in the early hours of the morning by the ICU senior registrar who added IV bicarbonate to the fluid replacement therapy. Repeat blood tests later that day showed improvement, as did the patient, other than oliguria and mild hypotension (systolic 95mmHg) that responded to fluid boluses.

The following day (Friday), the gastroenterology unit was consulted regarding his proctocolitis and the need for flexible sigmoidoscopy. The opinion was that the colitis was most likely infectious and conservative management was recommended. The gastroenterology unit planned to review the patient after the long weekend. The admitting consultant general surgeon reviewed him late that afternoon and advised that a CT scan with oral contrast should be done if his obstruction did not settle.

That evening the patient pulled out his NGT and refused to allow it to be replaced. Over the long weekend the patient had several visits documented by the after hours RMO for oliguria requiring multiple fluid boluses, but had little change in his abdomen.

On review by the surgical team on the Tuesday morning following the long weekend, the patient was still distended with tenderness despite having his bowels open the day prior (diarrhoea). The gastroenterology team booked a flexible sigmoidoscopy for the following day. A CT scan was arranged after discussion with the surgical consultant due to the lack of clinical improvement and to exclude perforation.

Five minutes after being given the IV contrast for his CT the patient had a large vomit. This was followed by cardiac arrest with pulseless electrical activity requiring CPR and intubation. Limited CT pictures showed no change to the marked distal proctitis and ongoing small bowel distension without evidence of perforation or collection. Contrast reflux into the intrahepatic inferior vena cava and hepatic veins was suggestive of right ventricular strain. He was transferred to the ICU with a differential diagnosis of anaphylaxis due to IV contrast or aspiration.

The following day the patient had developed a coagulopathy (international normalised ratio [INR] 3.0) and per rectal bleeding. Limited colonoscopy to the hepatic flexure revealed deep ulcers in the rectosigmoid region and extensive blood proximal to that. Gastroscopy excluded an upper gastrointestinal tract source. A decision was made by the gastroenterology consultant with the on-call general surgeon that the patient would not survive an emergency total colectomy. With transfusion of blood, fresh frozen plasma, platelets and albumin the coagulopathy was reversed and the patient stopped bleeding. However, he continued to decline, developing multiple organ failure and hypotension despite maximum inotrope support.

Comment:

It appeared that this man with proctocolitis died as a result of either anaphylaxis to the IV contrast used in the CT scan or of an aspiration while in the CT scanner that resulted in hypoxia, cardiac arrest and subsequent multiple organ failure. There are questions relating to this case regarding:

- Why the patient was admitted under general surgery rather than gastroenterology or general medicine. The patient had CT proven proctocolitis with marked electrolyte imbalance and was unlikely to require surgery.
- Why a stool sample was not submitted to microbiology.
- Whether a flexible sigmoidoscopy being performed sooner would have resulted in different treatment for the proctocolitis.
- Whether the reduced staffing over the long weekend delayed investigation of the proctocolitis and “pseudo” obstruction.
- Why the discharge summary makes no mention of the coagulopathy, colonoscopy and gastroscopy.

Case study 10: Fulminant sepsis from an infected total knee replacement

Case summary:

A 64-year-old male was admitted for a total knee replacement. His main comorbidity was a mechanical heart valve that required long term Warfarin therapy. This was appropriately reversed preoperatively and the total knee replacement surgery was uneventful. The patient did have increased swelling, pain and a central wound blister postoperatively secondary to his Warfarin therapy. He was discharged 8 days post-surgery without any problems other than a central wound blister.

Over the next few weeks he was noted to have moderate pain and swelling with an improving central wound blister. This was thought to be due to a resolving haemarthrosis secondary to his surgery and Warfarin therapy. Four weeks post-surgery he was noted to have gradually improving pain and swelling with a CRP of 27mg/L. Two weeks later he was seen in a dressing clinic and was noted to be improving. Three days after this clinic visit he was readmitted with very severe pain in his knee. On admission he remained systemically well, with his heart rate, BP, temperature and respiratory rate all within normal limits. His INR was 2.8, CRP 20mg/L and WCC 20. A provisional diagnosis of a haemarthrosis was made and the plan was for analgesia, rest and elevation. A provisional plan was made to washout the haemarthrosis the following day and the haematology team was contacted to advise on Warfarin reversal.

The following morning the patient's WCC had reduced to 7 but the CRP had increased to 280mg/L. The patient suffered a rapid deterioration mid-morning. The diagnosis was septic shock and acute renal failure secondary to septicaemia. He was resuscitated and taken to the ICU where inotropic support was required. Once stabilised, he was taken to theatre the same day for washout of the knee joint. The knee joint was noted to contain blood but no frank pus. Gram positive cocci were grown from both the blood cultures and the knee samples. Despite ongoing support in the ICU the patient continued to deteriorate and died from multiple organ failure the following day.

Comment:

Patients on Warfarin therapy often have more pain and swelling following knee replacement surgery than the average patient. In the 7 weeks prior to this patient's admission there was little to suggest infection. The patient's pain and swelling were improving and the CRP was gradually reducing towards a normal level. In a re-admission with severe pain at 7 weeks post-surgery, the two main differential diagnoses would be haemarthrosis and deep infection. This patient had a normal heart rate, BP, temperature and respiratory rate, all of which are not indicative of an infection. He also had an INR of 2.8 that would predispose him to a further bleed into the knee. The only clinical indications that this was more than just a haemarthrosis at this stage were the pain levels and raised WCC.

Unfortunately over the following 12 hours the patient's general condition deteriorated rapidly, with fulminant sepsis causing multiple organ failure and the CRP increasing from 20 to 280mg/l. It would have been very difficult to anticipate such a dramatic deterioration based on the patient's clinical state and blood parameters the previous evening. The management thereafter was appropriate, with full ICU support and a prompt washout of the knee in theatre once resuscitation was underway and Warfarin reversed. Gram positive cocci were obtained from both blood cultures and intraoperative knee samples, and this is likely to have been the source of the patient's sepsis.

In retrospect, an earlier washout of the knee may have altered the outcome. The level of pain and the raised WCC could have prompted an earlier washout of the knee, but the decisions made based on the clinical information available at the time were not unreasonable, particularly as the patient was fully warfarinised. This case does highlight the importance of interpreting a reassuringly low CRP in such a patient with great caution, especially in a patient with acute severe pain following a joint replacement.

Case study 11: Urosepsis could have been managed better

Case summary:

An elderly man was admitted to a tertiary hospital with urinary retention. A ureteric calculus was identified and a JJ stent placed into his left ureter. He was discharged 4 days later. He was then readmitted to hospital for a trial of void 14 days later. He was unable to void and was sent back to the nursing home with a new catheter inserted.

Three months later the patient saw a urological consultant, who arranged for him to be readmitted for treatment of his left ureteric stone and a transurethral resection of his prostate. It is unclear from the letter whether these were planned to be performed together or separately. He was further seen 3 months later, in what was presumably a preadmission clinic, and at that time had urine sent for culture and sensitivity. The result of the urine culture could not be located in the medical record. The patient was then admitted 9 days later and underwent treatment of his distal ureteric calculus. He did not appear to have been given any antibiotics preoperatively but was given 160 mg of Gentamicin on induction. Postoperatively he developed urinary sepsis and was admitted to the ICU where he developed multiple organ failure and died 6 days later.

Comment:

The inpatient notes indicate that the urine sent from the preadmission clinic grew gram negative and gram positive organisms. It would be reasonable to expect a patient to have bacteriuria following the presence of an indwelling catheter for 6 months.

It would have been appropriate for the urine result from the preadmission clinic to be followed up and for the patient to be commenced on an oral antibiotic prior to the operation to try and decrease his bacterial count and reduce the risk of septicaemia. There was also a long delay between his original admission and subsequent surgery, which may have increased the risk of sepsis following surgery.

Finally, the dose of Gentamicin given as a prophylactic antibiotic was fairly small and perhaps not the ideal agent or dose for this patient.

Preoperative antibiotic treatment may have prevented the septic episode that resulted in the patient’s death.

Case study 12: Heparin-induced thrombocytopaenia kills

Case summary:

A middle-aged, obese (BMI 31.4) male patient was newly diagnosed with a rectal cancer (T2N2). He had no other significant comorbidities. His case was discussed at the usual multidisciplinary team meeting. The decision was made to offer surgical treatment. The patient was informed and the potential risks and complications of the surgery were discussed. The patient underwent an open ultralow anterior resection with covering loop ileostomy. The surgery was completed without any intraoperative concerns. It was noted the patient had difficult intubation.

The patient was returned to the ward and managed using routine postoperative care. He was given subcutaneous Heparin (5000 IU twice daily) and thromboembolic disease (TED) stockings for DVT/pulmonary embolism (PE) prophylaxis. He had an eventful recovery. His temperature spiked to >38°C on days 2 and 4. An anastomotic leakage was diagnosed on day 5. It was managed conservatively with IV antibiotics and the drain remained in situ as the patient did not have signs of peritonitis and there was no obvious local collection. On day 6 the patient developed an erythematous rash, which was thought to be due to Tazocin. The infectious disease team's opinion was sought and the antibiotic was changed. In addition, a second opinion was sought regarding the management of the anastomotic leakage and it was agreed that conservative management was appropriate.

On days 7 and 8 the patient remained afebrile and was clinically improving. On day 9 the patient was well in the morning, as reported by the registrar. Later on the same day the intern was called to review the patient due to low platelet count (27,000). Heparin-induced thrombocytopaenia (HIT) was suspected and the haematologist was consulted, who recommended ceasing Heparin and commencing subcutaneous Danaparoid. The infectious disease team was also consulted to change the antibiotics.

In the early evening of day 9 the RMO was called to review the patient due to tachycardia (heart rate 140bpm). Continued monitoring of the patient was recommended. Four hours later on the same day a MET call was required due to tachycardia, tachypnoea and hypotension. A CT angiogram was done to exclude PE and check the CT abdomen. The patient had an arrest during the CT scan and died despite extensive resuscitation.

Comment:

I do not feel that there were any major adverse events in the management of this case that contributed to the ultimate outcome. The clinical consultation, diagnosis and surgical procedure were properly conducted. The surgery was completed as planned without any intraoperative complications. Postoperatively the patient was on routine prophylaxis for DVT/PE with subcutaneous Heparin (5000 IU twice daily) and TED stockings. The conservative management of anastomotic leakage seems appropriate as the drain was still in situ and there was no significant local collection. Clinically, the patient improved after administration of IV antibiotics. It was also wise that a second opinion was sought from an experienced colorectal surgeon regarding the management of the anastomotic leakage.

The patient subsequently developed HIT on postoperative day 8. The risk of multisystem thrombosis occurring was a significant clinical management challenge. It might be argued that attention should have been paid earlier, when the platelet count dropped from 218 on day 7 to 129 on day 8. In this context the repeat blood test should have been arranged later on day 8 and early on day 9. Unfortunately, the platelet count was not available until the evening of day 9 and was 27 (and 22 on repeat 4 hours later). In addition, the management for possible HIT was not clear from the notes. It is noted that subcutaneous Danaparoid (750 units twice daily) was charted. It is recommended to give an IV bolus of Danaparoid. Further haematologist review may be worthwhile to clarify the current management of HIT. This particular situation should be considered a medical emergency. The haematologist consultation should have been more intensive and subsequent management could have been more active to prevent possible multisystem thrombosis.

Case study 13: Death from bleeding following a laparoscopic cholecystectomy

Case summary:

This patient was seriously high risk for intervention due to cardiovascular disease. He was on holiday and passing through a regional area when he saw a GP for a 2 day history of abdominal and back pain. Investigation confirmed gallstones with modest elevation of lipase and bilirubin. The patient was referred to a consultant general surgeon at a metropolitan private hospital for a cholecystectomy.

It is not clear how the patient was admitted to a tertiary hospital, 5 days after his pain commenced. An ED record could not be found, nor did information on whether he was first admit to a metropolitan private hospital. Given his comorbidities, transfer to a tertiary hospital would have been most appropriate. He was prepared for theatre, though this took a further week given his fitness and reversal from Warfarin. It is difficult to ascertain whether this delay was contributed to by a lack of access to emergency theatres. Ideally, with his urgency category he should have been managed within 48 hours of being ready.

His IV fluid therapy during this time and postoperatively was inappropriate, with replacement (high sodium) rather than maintenance fluid used. It is fortunate that he did not go into heart failure. The procedure was straightforward. Postoperatively (despite the high saline intake) he became hypovolaemic. A reoperation within 8 hours demonstrated bleeding from the falciform ligament. Although managed expeditiously, the patient did not survive this haemodynamic event and died 5 days later.

Comment:

The hypovolaemic episode may have compromised the patient's fragile cardiovascular status. However, the decision to operate, the choice of operation and the recognition of the need to reintervene were all totally appropriate. This case demonstrates poor knowledge of fluid and electrolyte therapy by junior staff, who would benefit from education in this area. A change in technique might possibly have identified the bleed at the end of the procedure. Either way, the patient was high risk owing to his comorbidities.

Case study 14: Cardiorespiratory arrest with local anaesthetic use

Case summary:

An elderly patient with a severe cardiac history presented for elective large scalp squamous cell carcinoma excision and skin graft. One month before planned surgery the patient was noted to have severe global left ventricular dysfunction, severe aortic stenosis, moderate tricuspid regurgitation and an ejection fraction of 33% on echocardiogram.

The cardiologist did not think the echocardiogram findings were new but noted new weight loss (17kg over 17 months), poor appetite, unsteadiness and lack of energy and wanted further investigations to be performed. The cardiologist also commented on the patient's abnormal liver function test and renal function.

On the day of surgery the initial manual BP was 80/50mmHg with a heart rate of 88bpm. The preoperative questionnaire mentioned a limited walk distance of 300 metres on the flat without stopping.

The patient was considered fit only for local anaesthetic and sedation. The patient was given 1mg Midazolam, 12mL 0.5% Marcain with Adrenaline to the scalp, and 15mL 0.75% Naropin to the thigh donor site. Gentamicin (40mg) had been given when the anaesthetist noted that the patient was having difficulty breathing. The surgeon noted that the patient had become distressed after injecting the local anaesthetic. The patient subsequently collapsed and died on the table despite full resuscitation measures.

Comment:

The main concern with this case is the patient's underlying background of severe cardiorespiratory compromise. With an initial BP of 80/50mmHg, the decision to proceed with surgery was questionable. Perhaps surgery should have been delayed until the BP was investigated and optimised.

The surgeon reported that the patient became distressed after the completion of local anaesthetic infiltration. There might have been intravascular injection, and given the patient's compromised cardiovascular condition the medical response would have been poor.

Case study 15: A more nuanced approach to DVT risk should be considered

Case summary:

This middle-aged patient had considerable psychiatric (intellectual impairment) and medical comorbidities. An obstructing rectal cancer had previously been treated with a laparoscopy and defunctioning loop colostomy. The patient was admitted for a planned elective abdominoperineal resection without previous neoadjuvant treatment. The operation lasted almost 6 hours. There was postoperative wound and peritoneal infection, but nothing out of the ordinary for such major surgery.

Shortly, before the planned discharge (approximately 16 days postoperatively), the patient collapsed on the ward. A MET call was instituted. A pulseless electrical activity cardiac arrest was confirmed and prolonged resuscitation failed. The case was notified to the coroner. A postmortem examination identified a massive PE as the cause of death.

During surgery the patient had appropriate DVT prophylaxis with sequential compression devices and TED stockings. Postoperatively this treatment continued and Heparin (5,000 units) was given twice daily.

Comment:

There was no evidence that extended prophylaxis using Clexane or prolonged anticoagulation was planned in the discharge care. It had not been started in the days leading up to death or planned discharge.

There was no major deficiency of care in this case. It may have been appropriate to use a more potent DVT prophylaxis with Clexane, rather than 5,000 units twice daily of Heparin.

The guidelines would recommend extended prophylaxis in this case. This does not appear to have been instituted but as the patient died in hospital this probably had no bearing on his death.

Case study 16: Fatal splenic injury caused by colonoscopy

Case summary:

A very elderly patient was transferred to a private hospital from a large tertiary hospital following admission for anaemia, fatigue, epigastric pain and possible melena. The patient had extensive comorbidities of congestive cardiac failure, ischaemic heart disease, cerebrovascular accident, diabetes and lived alone at home managing independently with her daily activities.

The haemoglobin on admission was 75g/L. Following transfusion an abdominal CT scan showed no cause for the anaemia and the patient was transferred to the small private hospital for further investigation of the anaemia.

The patient was admitted under a gastroenterologist who subsequently performed a gastroscopy and colonoscopy at the same session. The gastroscopy was normal. The colonoscopy report states that the scope was passed easily into the caecum, a small polyp in the caecum was removed and extensive diverticulosis was present in the left colon.

In recovery, the patient complained of abdominal pain and had a syncopal episode. This was attributed to “gas pain”. Later that evening her full blood count was checked and her haemoglobin had dropped to 60g/L. An ultrasound scan followed by a CT scan demonstrated a large haemoperitoneum with contrast extravasation from a splenic injury. Following transfusion the patient was transferred to a different tertiary hospital (i.e. her third hospital).

On arrival at this hospital the patient was initially haemodynamically stable. After discussion between the surgical team, the ICU, radiology, patient and family, the decision was made to perform an angiogram and embolisation. If this was not successful, patient and family elected not to proceed to laparotomy.

After embolisation the patient was admitted to the ICU. There were ongoing pain management issues from the splenic infarction, acidosis, and renal impairment requiring continuous veno-venous haemodiafiltration, and inotropic support. The patient eventually died.

Comment:

The management by the surgical team at the third hospital was entirely appropriate. Given the patient’s age and comorbidities the chances of survival after a splenic injury were poor.

The multiple interhospital transfers endured by this elderly patient do seem inappropriate, in particular the initial transfer from the first tertiary hospital. The patient should, have been appropriately investigated and managed at that location, rather than being transferred to a smaller private hospital.

Given the initial presenting history, performing a gastroscopy was clearly indicated. The need for a simultaneous colonoscopy was not so clear. Given the age and comorbidities this was fairly high risk and the history and symptoms were more suggestive of an upper gastrointestinal cause. Perhaps just the gastroscopy should have been performed and then a more considered decision made subsequently as to whether a colonoscopy was worth the risk.

SHORTENED FORMS

AAA	abdominal aortic aneurysm
BP	blood pressure
CPR	cardiopulmonary resuscitation
CRP	C-reactive protein
CT	computed tomography
DVT	deep vein thrombosis
ED	emergency department
GP	general practitioner
HDU	high dependency unit
HIT	heparin-induced thrombocytopaenia
ICU	intensive care unit
INR	international normalised ratio
IV	intravenous
MET	medical emergency team
NGT	nasogastric tube
NIDDM	non-insulin dependent diabetes mellitus
PE	pulmonary embolism
RMO	resident medical officer
TASM	Tasmanian Audit of Surgical Mortality
TED	thromboembolic disease
TIPS	transjugular intrahepatic portosystemic shunt
WCC	white cell count
WAASM	Western Australian Audit of Surgical Mortality.