Royal Australasian College of Surgeons
Australian and New Zealand Audits of Surgical Mortality

National Case Note Review Booklet

LESSONS FROM THE AUDIT

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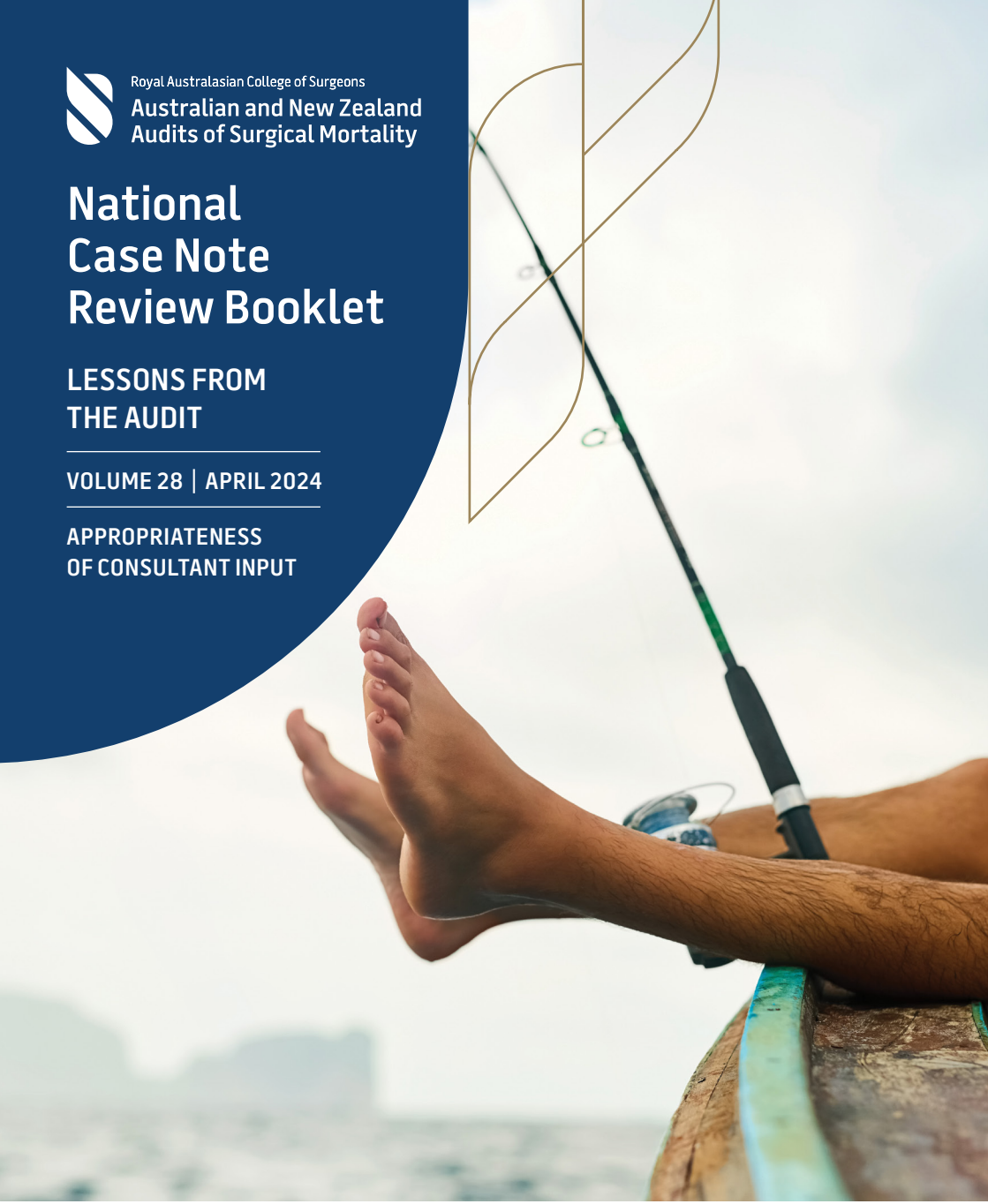
APPROPRIATENESS OF CONSULTANT INPUT



Royal Australasian College of Surgeons

Australian and New Zealand College of Anaesthetists

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists
Excellence in Women's Health

Royal Australasian College of Surgeons
Australian and New Zealand Audit of Surgical Mortality
24 King William Street
Kent Town SA 5067

Telephone: +61 8 8219 0901
Email: anzasm.racs@surgeons.org
Website: www.surgeons.org/anzasm

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Guest Chair's Report

The Royal Australasian College of Surgeon's regular ANZASM (Australian and New Zealand Audit of Surgical Mortality) case note review undertaken by surgical colleagues highlights deficiencies in care that either contributed to or caused the death of a patient in Australia or Aotearoa New Zealand. The intention is that we all learn lessons to prevent replication, thereby ensuring ongoing improvement in surgical care. This edition, volume 28, concentrates on the appropriateness of consultant input.

Of the 14 cases presented, the majority are due to a failure to oversee patient care. In 5 cases, there was a delay in consultant review of new admissions, in a further 4 there was a lack of continuity of care by the consultant. This means that in these cases, Trainees with insufficient experience were left unsupported in making important decisions in the care of a patient. Even worse, was that in 2 of these cases there was also a failure of collaboration between consultants—one an anaesthetist and one a fellow surgeon.

The other 5 cases involved lack of support in theatre. In 3 of these, Trainees were left operating unsupported. The 2 other cases were far more complex than normal and consultant input should have been there from the beginning.

Surgical training and assessment are, by necessity, done on the job. The balance between patient safety and Trainee skill development is delicate. In the now established 'competency-based training', Trainees' abilities in the College's 10 competencies must have been predetermined at the beginning of a training term before they are left to make decisions or to operate. This training and review must be ongoing. These competencies are assessed by entrustable professional activities (EPAs) and procedure-based assessments (PBAs). Trainees learn most of these competencies by consultant modelling. When a case is predicted to be more complex, early consultant involvement is essential both for patient safety and for providing learning opportunities.

The onus of responsibility in patient safety and in training the next generation of surgeons is on the consultant.

Emeritus Professor David Fletcher AM, MBBS, MD, FRACS, GAICD

Case Studies

Case 1: Early consultant review to ensure all treatable causes of sepsis excluded

Urology

CASE SUMMARY

A frail 45-year-old man presented to the emergency department (ED) with painful scrotal swelling. He was diagnosed with epididymo-orchitis with a scrotal abscess. Comorbidities included type II diabetes mellitus, obesity, hypertension, atrial fibrillation, ischaemic cardiomyopathy (ejection fraction 25%) and cirrhosis. On the basis of his ultrasound scan, he was taken to theatre for incision and drainage of the scrotal abscess.

On postoperative day 1, he was hypotensive and developed an acute kidney injury. He was admitted to the intensive care unit (ICU) for inotropic support. On postoperative day 3, the wound was re-explored under local anaesthetic. The wound edges were said to be bleeding. The patient received haemodialysis for the acute kidney injury. On postoperative day 6, haematuria and increased scrotal swelling and tenderness was noted. Inotropic support and haemodialysis continued.

On postoperative day 8, a computed tomography (CT) scan showed mesenteric oedema, low volume ascites, pleural effusion, cholelithiasis and some air adjacent to the right scrotal sac, but no intra-abdominal collection. The first record of a review by the urology consultant was made. The wound was noted to be clean, with no fluctuance and no discharge. Over subsequent days, the wound improved and the patient showed clinical improvement. On day 11, he was weaned off inotropes awaiting ward step-down. He was discharged to the ward under renal physicians on day 14.

On postoperative day 15, the wound nurse noted some moist necrosis and non-odorous slough. The following day, the patient had increased scrotal pain, a coffee ground vomit and a supratherapeutic international normalised ratio (INR). A gastroenterology review stated: not for upper gastrointestinal scope. A urology registrar review stated: no concerns.

On postoperative day 17, the patient was hypotensive with melaena. A CT head scan was unremarkable. The medical emergency team (MET) was called. The patient died the next day.

DISCUSSION

The exact cause of this patient's death was not established, but it was related to sepsis and influenced by his multiple other medical comorbidities. It would be unusual for a treated superficial scrotal abscess to be the source of overwhelming sepsis, multiorgan failure and death. This is more commonly seen with sepsis without source control, such as an unrecognised/inadequately treated Fournier's gangrene, an ischiorectal abscess or an infected/obstructed upper urinary tract.

There is no record of a digital rectal examination (DRE) being performed at any stage. An ischiorectal/perianal abscess pointing to the scrotum should have been considered. A preoperative CT scan would have been useful to ascertain any other infective source or communication with the abscess. This may have helped to exclude a deep-seated ischiorectal/perianal abscess or Fournier's gangrene. The surgical registrar requested a CT scan, but radiology performed a scrotal ultrasound instead.

The postoperative course was not routine. Further abdominal imaging was not recorded until day 8, a significant period of elapsed time for a patient so unwell. The first urology consultant review was also recorded on day 8. This seems too long for a critically ill patient to await consultant review, considering he was operated on by a junior non-training registrar and admitted to ICU on postoperative day 1. The first consultant to see the patient was not the admitting consultant.

CLINICAL LESSONS

A complete examination including DRE should have been performed and an early CT scan arranged with consultant review, given the patient's critical state without a clear cause and deterioration despite treatment.

Case 2: Difficult spinal fracture reduction surgery following a fall

Orthopaedic

CASE SUMMARY

An 81-year-old woman was transported by ambulance to a regional hospital ED after a significant fall. She had past comorbidities of renal cell carcinoma, hypertension and macular degeneration.

The patient was assessed at 23:45 in the ED and diagnosed with a C6/7 fracture dislocation with neurological sequalae. There had been reported decreased power to the lower limbs complicated by an associated intertrochanteric femoral fracture. Neurological deficit was detected in the upper limbs (to C5 or C6) consistent with the level of injury at C6/7. After stabilisation in the ED she received urgent transfer to a tertiary referral hospital ED.

Once there, improvement was noted in the patient's lower limb power. She was assessed by the spinal orthopaedic team. The assessment was limited to the right side, which was her non-fractured lower limb. Inexplicably, the limb with the fractured femur was not examined. Power in the upper limbs was deficient to C5 and C6. There was absence of peripheral power and sensation in the upper limbs to the elbow. Urgent surgery was recommended because of the C6/7 fracture dislocation. Following a discussion with the family, consent was obtained for a combined open and close reduction of the C6/7 fracture via an anterior approach at C6/7.

The initial 3-hour operation occurred at 02:00—24 hours after the patient sustained her injuries. The procedure was done by a Fellow undergoing subspeciality training. Reduction was obtained, with confirmation on image intensifier. An interbody cage was placed at C6/7 with anterior plating.

The patient was transferred to ICU postoperatively, where it was noted there had been significant deterioration in lower limb neurology (with absence of sensation or power). Upper limb neurology remained deficient to C5 or C6. The patient was claustrophobic and would not submit to a magnetic resonance imaging (MRI) scan. The state of the cord remained unknown without MRI confirmation. A CT scan of the cervical spine demonstrated recurrent displacement of the C6/7 fracture dislocation. This resulted in a recurrent severe canal narrowing with further cord trauma at that level.

After discussions with the family, the patient returned to theatre for 3-stage revision surgery, including anterior removal of the C6/7 instrumentation, posterior C4–T2 instrument fusion, and an anterior C6/7 cage and C6–T1 plate construct. This provided adequate reduction and stabilisation of the C6/7 fracture dislocation without further displacement.

Following this stable reduction, the neurological deficit persisted and there was no significant improvement in neurology. Internal fixation of the intertrochanteric fracture did not occur because of the patient's poor clinical state. ICU continued to provide supportive measures despite the patient's deteriorating respiratory system. There was difficulty with oxygen maintenance and extubation because of poor respiratory control. The patient died 5 days after admission, due to respiratory failure.

DISCUSSION

The initial emergent treatment and transfer was appropriate. It is inappropriate that the limb with the fractured femur was not examined.

The initial operation achieved inadequate stabilisation of an unstable injury. Presumably the C7 was fractured and could not hold an interbody cage without subsidence/displacement nor hold the screws through the plate. This injury required posterior stabilisation in the same operation to achieve stability. When an anterior column fracture occurs, this indicates that the deformity at the time of injury was such that the posterior elements have failed, whether through fracture or ligament and capsule disruption.

The consultant should have been involved from the first phone call from the regional hospital, to the assessment in the spinal cord injuries unit, through to the initial surgery and decision-making thereafter. The first operation was performed by a spinal Fellow working at the level of a consultant. Less than adequate stabilisation led to a second operation performed by the Fellow together with a consultant. This revision surgery to ensure stable reduction with internal fixation should not have been required. Internal fixation of the intertrochanteric fracture is a quick operation, which ideally would have been performed during the first operation by an additional surgical team. This did not occur because of the patient's poor clinical state.

The postsurgical care of the patient within ICU was appropriate and thorough, despite an MRI not being performed.

Unfortunately, the patient had a persistent neurological deficit. This, combined with comorbidities, led to respiratory demise with a failure of ongoing supportive measures.

CLINICAL LESSONS

At the time of the initial surgery there was some difficulty with reduction. When performing a closed reduction from the anterior approach, some surgeons choose to risk stretching the cord by placing a distractor within the space to perform the reduction of the dislocated facets rather than using the assistance of another surgeon to flex through the dislocated level by lifting and flexing the head, which increases the space available to the cord and enables reduction of the dislocated facet joints.

This surgery should be performed by an experienced consultant or at least a consultant should supervise a Fellow in training. The operation was performed by a spinal Fellow at a consultant level, although undertaking further subspecialty training. Further consultation with the consultant needed to be considered because of the difficulty in the initial reduction. This consultation did not occur and may be an area for improvement. Consultant-to-consultant communication should be the standard for these patients.

This case could be used to bring about change and improve neurological outcomes and survival for patients with cervical spinal cord injury across Australia. In Aotearoa New Zealand and in Western Australia, all peripheral hospitals are equipped with cervical tongs, which can be placed under instruction from a consultant with the spinal service. It is accepted practice that patients from a non-metropolitan hospital with cervical spinal cord injury and expected delay in transfer should be flexed and placed in cervical tongs with traction.

Case 3: Lack of consultant involvement for complicated hybrid carotid endarterectomy and stenting

Vascular Surgery

CASE SUMMARY

A 64-year-old man with numerous comorbidities presented with symptomatic left internal carotid artery (ICA) and common carotid artery (CCA) stenoses. He underwent a hybrid left carotid endarterectomy, patch angioplasty and carotid stenting. Postoperatively, he was reported to have good blood pressure control and appropriate antiplatelet therapy.

The patient was found to have a reduced measurement on the Glasgow Coma Scale (GCS) 2 days post-surgery and a CT angiography showed multiple frontal intracerebral haemorrhages. He gradually deteriorated and died of a postoperative cerebrovascular accident 3 days post-surgery.

DISCUSSION

While the indication for a presumed symptomatic left ICA stenosis was appropriate, several significant areas of concern arise.

The first concern is consultant involvement. The completed surgical case form (SCF) suggested that a consultant and a fellow were present, but this is not reflected in the operation report, which suggests a SET Trainee was the primary surgeon. There is no clear documentation that a consultant was present at the operation. Given the highly atypical and complex nature of a hybrid carotid endarterectomy and CCA stenting, this should have been a consultant-led operation. It was inappropriate for a SET Trainee in isolation or even as a primary surgeon with a consultant present.

The second concern relates to technique. While the routine carotid endarterectomy performed was appropriate, the nature of the secondary hybrid approach is not a routine or standard practice, even in this situation of a rare surgical technique. The CCA was stented via a femoral approach, although in many cases it is stented from the carotid patch. While the ICA was reported to be clamped, there is no documentation that there was any attempt to de-air or de-clot the carotid patch after—presumably—a significant duration (not documented) of clamping. This is standard practice, as there is a significant risk of clot formation within the stagnant carotid stump.

A third concern was the early reinstatement of apixaban on the first postoperative day. In a complicated case like this, anticoagulation could have been withheld for several days prior to reinstatement. It is most likely that this would have reduced the risk of intracranial bleeding.

The final concern was the treating surgeon stating in the completed SCF that there was 'no definable postoperative complication'. This represents a lack of insight into the nature of this catastrophic postoperative complication. Several areas in this case warrant a root cause analysis.

CLINICAL LESSONS

This case was not suitable for a SET Trainee. In complicated cases like this, consultants should be involved from the very beginning and be vigilant in the care provided to their patients.

Case 4: Substandard care in a large metropolitan hospital for a patient in septic shock with a perforated duodenal ulcer

General Surgery

CASE SUMMARY

An 89-year-old woman arrived at the ED of a major metropolitan hospital with a letter from the referring general practitioner (GP) stating that she had black-coloured stools, was pale, and had an elevated respiratory rate and low systolic blood pressure. The GP wrote: 'I am concerned she may be anaemic and had an upper gastrointestinal (GI) bleed.'

The patient was immediately seen by the triage nurse. The ED diagnosis was '? septic shock'. Relevant observations and blood tests supported that assessment (blood lactate 9.7 mmol/L). Intravenous (IV) ceftriaxone (2 g) was given within an hour.

Over the next 3 hours, the patient progressively deteriorated clinically and biochemically, with several notes recording 'shock'. She was seen only once by the ED consultant. After 4 hours, she was seen by the critical care consultant, who confirmed hypotensive shock and the need for vasopressors. Seven hours after admission, the patient returned from a CT scan (free intraperitoneal air) and was immediately admitted to ICU. The ICU clinical notes drug chart states she was given 2 g ceftriaxone and piperacillin/tazobactam (Tazocin). However, on the drug chart it was recorded that the ceftriaxone was given at 08:00—when she had not even arrived at the hospital at that time. A second dose was given at 14:45.

After discussion with a consultant surgeon and anaesthetist, but not personal review, the patient was transferred to a tertiary hospital where she underwent surgery 13 hours after her initial attendance. A 2 cm prepyloric ulcer was found and patched.

The patient deteriorated over the next 18 hours and she underwent a re-laparotomy by the same surgeon. The patch had failed and the duodenal ulcer was now recorded at 5 cm. The index surgeon requested help from an experienced upper GI consultant surgeon. A gastric exclusion was performed with a retrocolic Roux-en-Y gastrojejunostomy, T-tube duodenostomy and re-repair of the ulcer with patch. The patient progressively deteriorated, including a leak managed conservatively. She died on postoperative day 17.

DISCUSSION

The management of this patient in a metropolitan hospital fell well short of acceptable care. This is a substantial hospital with a busy ED, which undertakes a

lot of major General Surgery, has an ICU and is well able to manage an emergency laparotomy. The ED should have well-established processes to manage a patient who arrives in shock at mid-morning on a weekday.

An abdominal cause of the septic shock was recognised within an hour of the patient's arrival and the surgical team should have been called to the ED. There is no sense that the ED staff appreciated that for septic shock, time is of the essence. This patient's care did not meet the recommended ACSQHC (Australian Commission on Safety and Quality in Health Care) Sepsis Clinical Care Standards.

The tertiary hospital surgeon completing the SCF stated that the patient was transferred because the metropolitan hospital anaesthetist was not prepared to provide an anaesthetic. It is incomprehensible that the metropolitan hospital could not undertake an emergency laparotomy on an elderly patient. There is no evidence from the notes that either the consultant surgeon or the anaesthetist who made the decision to transfer had personally reviewed the patient. This is not an acceptable level of consultant involvement.

The initial operation was a gastric patch for a stated 2-cm hole. It leaked almost immediately, requiring an unplanned return to theatre in <24 hours. This early failure suggests a technical cause, raising the question of whether the initial surgeon should have called for help at the index operation. Patching a perforated ulcer is an emergency operation that any on-call general surgeon must be able to manage. It is a judgement call as to when greater experience and expertise might help. The initial surgeon was not a GI surgeon and had the good sense to involve an upper GI surgeon at the return to theatre. It is likely that the upper GI surgeon was then faced with a more complex operation than would have been required if the first operation had been done differently.

CLINICAL LESSONS

The care by the metropolitan ED, the consultant surgeon and the anaesthetist are individual areas of concern. Taken together, this patient's overall care in a metropolitan hospital amounts to an adverse event. This was definitely preventable and at least contributed to the death. The decision not to request help at the first operation is an area of consideration that contributed to the death and was possibly preventable.

ANZASM COMMENT

This patient was failed by consultants at multiple points in her care. Her initial presentation was not complex or confusing. The failure of a major metropolitan hospital with an ED and ICU to perform a timely operation on a patient presenting with a 'bread and butter' general surgical emergency in hours on a weekday is incomprehensible.

Case 5: Concerning lack of consultant continuity in a 35-year-old presenting with malignant bowel obstruction

General Surgery

CASE SUMMARY

A 35-year-old man presented to a regional hospital with abdominal pain. A CT scan suggested likely bacterial peritonitis as the cause of large-volume ascites. Comorbidities included polysubstance abuse, history of schizophrenia managed with depot antipsychotics, untreated hepatitis C and treatment non-compliance.

The patient apparently discharged himself, only to re-present to the regional hospital a couple of weeks later with ongoing symptoms. A CT scan again showed large-volume ascites suspicious of intra-abdominal malignancy and possible lung metastases. There was comment that the splenic flexure was thickened, there was a transition point in the jejunum suggestive of partial small bowel obstruction (SBO), and CA19-9 (carbohydrate antigen 19-9) was grossly elevated. The patient was transferred to a surgical team at a metropolitan tertiary centre.

The case was discussed with the hepatobiliary team and a paracentesis arranged the day after admission. The patient was reviewed daily but nothing appears to have been done and the medical notes seem to have been 'cut and pasted' from the previous day. On day 4 of admission, vomiting and shortness of breath was documented. A nasogastric tube (NGT) was suggested, but it appears the patient refused. On day 5, the possibility of a colonoscopy was noted, which was booked by a gastroenterology registrar for day 7. This was changed to a flexible sigmoidoscopy and then ultimately cancelled by the consultant gastroenterologist because the patient had high output from an NGT in the preceding 24 hours that had since been removed. The gastroenterologist recommended tissue diagnosis by CT-guided biopsy of omentum. The biopsy was done on day 9. Discussions in the upper GI multidisciplinary team (MDT) recommended likely for palliative chemotherapy.

On day 13 of admission, the patient was noted to have an SBO with large-volume vomiting and NGT output. The patient repeatedly pulled out his NGT. He was commenced on dexamethasone to manage the malignant SBO. On day 16, the omental biopsy result showed adenocarcinoma. The following day, the profile was noted to be consistent with a colorectal primary. Plans were made to present the case at the colorectal MDT the following week. Transfer back to the regional hospital for palliative chemotherapy was considered.

The surgical notes state the patient was asymptomatic on the morning of day 19; however, an 'acute team' review that afternoon describes a very unwell patient with severe abdominal distension, ongoing vomiting and lack of any blood tests

for 4 days. A CT scan showed SBO. The patient continued to deteriorate, and a palliative care consultation was sought. On day 21, his care was transferred to the medical oncology service.

On day 22, questioning from the patient's mother of surgical options was noted by the surgical team registrar and mention of a second opinion from another consultant surgeon; however, a colorectal surgeon excluded surgery 2 days later as the disease was considered too advanced. On day 27, the patient was given a cycle of chemotherapy. He was also receiving peripheral parenteral nutrition.

On day 40 of admission, the patient deteriorated. He had a fall and head strike. He was severely hyponatraemic (Na 115 mmol/L) and had been hyponatraemic for the preceding 12 days. Advice was sought from ICU. On day 43 of admission, the patient died.

DISCUSSION

• Inadequacy of SCF

Both the first- and second-line assessors agreed that the SCF had insufficient information to decide if any areas of concern existed. It included very little information, some of which was incorrect. The description of the course to death simply states in 25 words that the patient had advanced malignancy; the final cause of death was unknown. The reviewer found it surprising that so little effort would be put into the SCF for a 35-year-old patient who died after a 43-day admission to hospital.

• Decision not to offer laparotomy

This is an area of concern. The reviewer found it startling that this patient was never offered a laparotomy. It was not until the 22nd day of admission that the possibility of managing a malignant small bowel resection was even mentioned. The initial CT scan showed a partial large bowel obstruction due to a splenic flexure mass. All subsequent CT scans showed large-volume ascites without large amounts of solid peritoneal disease and multiple loops of dilated small bowel. For a 35-year-old patient who had not yet received any treatment, a laparotomy should have been offered with the understanding that it would likely result in a stoma. There was much to gain by relieving a malignant obstruction. It is possible that the patient was offered surgery and declined; however, this was not documented.

• Lack of continuity of consultant care

This is an area of concern. The patient was managed by the hospital's surgical team until transfer to medical oncology on the 21st day of admission. During that time, he was seen by and passed to many different consultants. If a single consultant had managed the patient throughout the admission, it would have been more apparent that conservative management was not working.

• Speed of decisions

It is remarkable how long it took to make management decisions and how little urgency there appeared to be to treat a young patient with advanced malignancy and an acute surgical problem. For example, the omentum biopsy took a full week for results and no management decisions were made during that time.

CLINICAL LESSONS

There appears to be occasions when no decisions were made, pending discussion in a weekly MDT meeting. While MDT meetings are useful, there is a danger they will delay timely surgical decision-making.

Case 6: Bladder perforation leading to necrotising fasciitis

Urology

CASE SUMMARY

A man age 85 was admitted electively for flexible cystoscopy. He had undergone a radical prostatectomy with positive margins many years previously and subsequently received radical radiation therapy to the prostate bed and (likely) whole pelvis. The prostate cancer remained in good remission with prostate-specific antigen consistently close to zero. He later developed a bladder neck stricture for which he had regular surgical admissions for treatment over the next 15 years. His urinary symptoms and incomplete emptying had worsened leading to the current admission.

A pinhole stricture was again noted. This was dilated using S-shaped dilators over a wire inserted through the stricture, allowing passage of the flexiscope. Very turbid infected urine with debris was noted, precluding detailed cystoscopic assessment, but bladder stones were noted and a booking made for readmission for litholapaxy category 2. The patient was discharged home that day without a catheter, with a 7-day course of oral trimethoprim. The urine sample yielded a heavy mixed bacterial growth.

Two days later, the patient was readmitted after a fall. A urinary tract infection (UTI) was diagnosed but the antibiotic cover was not changed or augmented. He was discharged after 48 hours.

Four weeks later, the patient presented with sepsis and necrosis of the thigh and groin skin. He was readmitted to a different hospital with a diagnosis of necrotising fasciitis. *Proteus* and *Enterococcus faecalis* were cultured, and antibiotic treatment promptly and appropriately given. An early debridement was performed, after which he was transferred to a tertiary hospital for ongoing management. CT scanning suggested deep infection including pubic bone osteomyelitis communicating with the groin and thigh wounds and the bladder. Four debridements were performed over 7 days, including inputs from the plastic surgery team regarding possible reconstruction. It was felt that full debridement would require pelvic exenteration and osteotomy, a procedure for which the patient was not fit. Hence ongoing care was conservative, with no further debridement and a regime of antibiotics and dressings. Urine was diverted from the pelvis by the placement of bilateral nephrostomies.

The patient deconditioned thereafter and eventually succumbed to systemic infection, immobility and pneumonia after 62 days.

DISCUSSION

Long-term tissue damage following radiotherapy is universal and bladder neck stricture following surgery and radiotherapy is very common. Multiple procedures (dilations, self-catheterisations and urethrotomy incisions) usually lead to incontinence and chronic and/or recurrent infection.

In this case, the instrumentation (S dilation over a wire) was a reasonable intervention. However, it was performed by a junior registrar with no obvious consultant supervision. A consultant surgeon may have better recognised the associated risks.

Arguably, a more robust antibiotic treatment should have been implemented, particularly in view of the patient's readmission after a fall, with UTI sepsis. It appears likely that a perforation of the post-radiation therapy infected bladder occurred during the S dilation, leading to deep tissue infection and necrosis, eventually pointing at the groin and thigh. From there, the outcome was always likely to be poor, as deep debridement of the entire pelvis was not feasible. Nephrostomy diversion of the urine away from the pelvis and the vesicocutaneous fistula was a sensible intervention.

CLINICAL LESSONS

The principal lesson to be learned here is to avoid operating on the urinary tract if there is infection. And if there is infection, to treat it robustly with appropriate antibiotics and maximise drainage—in this case a Foley catheter at least.

Case 7: Lack of cardiothoracic review in acute deterioration of patient with subacute bacterial endocarditis

Cardiothoracic Surgery

CASE SUMMARY

A 79-year-old man with severe back pain was admitted under a medical team of a private hospital. His C-reactive protein (CRP) was elevated at 116 mg/L and neutrophils at 9.2 x 10^9/L. He had a background of morbid obesity, diabetes and ischaemic heart disease with stents to the circumflex and right coronary artery.

Neurosurgical review on day 2 found no surgical infection. Infectious disease review raised the possibility of infectious endocarditis, but transthoracic echocardiography was unhelpful. IV antibiotics commenced. Blood cultures were positive for *Enterococcus faecalis* on day 3 and transoesophageal echocardiography (TOE) was requested. The patient remained relatively well, with limited mobility because of ongoing back pain. On day 4, CRP had fallen to 69 mg/L.

TOE eventually performed on day 7 demonstrated vegetation (15 mm x 10 mm) on the non-coronary cusp of the aortic valve, with moderate central aortic regurgitation. Cardiothoracic surgery review was requested and undertaken the following day by surgeon 1, who advised continued antibiotic therapy and conservative management. Cardiology review the following day supported this advice. A peripherally inserted central catheter line was inserted on day 11 and repeat TOE demonstrated no major changes. CRP had fallen to 28 mg/L by day 15 and to 18 mg/L by day 19.

The patient reported increasing shortness of breath on day 21. By day 23, his respiratory rate was recorded at 20 beats per minute (bpm). IV furosemide provided some relief. The patient was admitted to the critical care unit the following day, where repeat echocardiography demonstrated severe aortic regurgitation and increased depression of left ventricle function. A repeat referral to cardiothoracic surgery was made, presumably to surgeon 1. Transfer to ICU was necessary the following day, where some improvement was noted on dopamine infusion; lactate was 3.5 mmol/L. Cardiac catheterisation was performed, which demonstrated a 60–70% left anterior descending artery lesion with a fractional flow reserve of 0.8.

On day 27, a new cardiothoracic referral was requested. The patient was seen the following day by surgeon 2. Although the operative risks were considerable, it was viewed that the patient was unlikely to survive without surgery and he was optimised. The operation was arranged for the next day, but during line placement he suffered pulseless electrical activity with akinetic left and right ventricle, and could not be revived.

DISCUSSION

Surgeon 2 completed the SCF and questions why surgeon 1 did not operate 4 weeks earlier. In contrast, the reviewer feels that none of the indications for surgical intervention were present at that time: there was no uncorrected sepsis, severe heart failure or valve regurgitation. The lesion was <2.5 cm* and sessile with no recorded embolic signs and the organism was not *Staphylococcus aureus*.

The initial plan was sound, but it is unacceptable that there was no further input recorded in the notes from surgeon 1, not even during the repeat referral following the patient's severe deterioration on day 23. The actions of surgeon 2 are not criticised.

CLINICAL LESSONS

Surgeons have an ongoing responsibility to patients with whom they have previously been involved. If a surgeon is unable to discharge that responsibly, the patient should be formally referred onward.

*Note: The American Association of Thoracic Surgery guidelines for surgical treatment of infective endocarditis use a cut-off of 1.0 cm, rather than 2.5 cm as recorded by the second-line assessor.

Case 8: Lack of consultant leadership results in multiple failures

General Surgery

CASE SUMMARY

A 72-year-old man was admitted mid-afternoon to the ED of a major metropolitan hospital with a 4- to 5-day history of dull epigastric pain. He had significant comorbidities and had been diagnosed with non-small-cell lung cancer 6 weeks prior to admission. His last dose of chemotherapy was 4 days previously. Medical history included a laparotomy for perforated gastric ulcer, peripheral vascular disease and smoking. A gastroscopy one month earlier was normal.

Regular medications included aspirin, clopidogrel, dexamethasone and esomeprazole. He was neutropenic, with haemoglobin (Hb) 91 g/L and platelets 128 x10^9/L. In ED triage he had systolic blood pressure of 143 mm Hg and a heart rate of 70 bpm. A CT abdomen suggested a contained duodenal perforation. He was reviewed by the on-call surgical team in the early evening. Although 'admitted' he remained in the ED and was reviewed there by the juniors in the surgical team in the morning before transfer to the surgical ward.

Early the following morning (36 hours after admission), a MET call was made for hypotension. The patient had had an episode of blood-stained incontinence overnight. He responded transiently to IV fluid bolus; Hb was 70 g/L, lactate 6.7 mmol/L. He was transferred for urgent repeat CT scan, which demonstrated a stomach full of blood. He had an episode of haematemesis in radiology. He was returned to the surgical ward where there was a second MET call for hypotension and unresponsiveness. A massive transfusion protocol was initiated.

Arrangements were made for a gastroenterologist to perform an endoscopy in the endoscopy suite because the surgeon was occupied performing an elective operation on a different patient. Uncontrollable bleeding occurred and the scope was terminated. The patient was immediately transferred to a theatre on standby for a laparotomy. There were no signs of life on arrival to theatre. Cardiopulmonary resuscitation was unsuccessful. The patient was declared dead before the laparotomy commenced.

DISCUSSION

This patient was admitted to a major metropolitan hospital with a very busy ED and a large General Surgery department with accredited Trainees and all the appropriate supporting services. It should be well able to manage GI bleeding.

The fundamental problem was a lack of consultant surgeon input. There is no record of a consultant review prior to the bleed 36 hours after admission. Indeed, it is unclear under whom the patient was admitted and who was actually responsible for this patient, especially when he acutely deteriorated. From the surgeon's account, it appears that the first time the consultant saw the patient was in the endoscopy suite.

Given the high risk of re-bleeding, the plan to treat the contained duodenal perforation conservatively was certainly debatable. As the risk of failed conservative treatment was high, this should have been a consultant decision with a clear plan documented. Neither of these occurred.

The sudden acute hypotensive episode happened on the background of a known posterior duodenal ulcer, a 20 g/L drop in Hb, an episode of per rectal bleeding, dual antiplatelet use, thrombocytopenia and recent steroid use. The surgeon wrote: 'it was thought he might have developed a free perforation.' It is difficult to understand the basis of that decision. As the surgeon was operating electively on another patient, the opinion regarding the perforation and the decision to undertake a further CT scan was made remotely without seeing the patient.

When the patient had a further haematemesis in radiology, he should have been transferred to theatre not the ward. The likelihood of endoscopic success was poor and although the surgeon wished this to be in theatre, the endoscopist prevailed. This was the wrong decision. The surgeon and anaesthetist(s) should have insisted that the gastroscopy be performed in theatre with the patient intubated in the expectation of converting to immediate laparotomy.

CLINICAL LESSONS

There was a 3-hour delay between the initial bleed and the patient entering theatre. Had the patient been taken to theatre (rather than to the CT scanner) and scoped there, at least 2 hours would have been saved. Whether the final outcome would have been different is by no means certain, but the best opportunity to control the bleeding was undoubtedly lost.

A hospital of this size should have a robust, 24/7 General Surgery consultant-led team with on-call service. It was only by good fortune that the consultant had a break in the elective list so was able to be present at the endoscopy. The hospital must review the care of this patient and undertake a root cause analysis.

Case 9: Laparoscopic adhesiolysis overlooked malignant cause for obstruction leading to colotomy and faecal peritonitis

General Surgery

CASE SUMMARY

A 42-year-old woman with a large bowel obstruction presented to hospital A. She had a history of adenocarcinoma of the gastroesophageal junction and had undergone total gastrectomy 18 months previously. A CT scan 5 months prior (due to symptoms of pain and distension) indicated a hiatus hernia with dilated transverse colon in it and a mottled enlarged mass in the left upper quadrant thought to be the spleen.

CT scan upon admission showed a complete large bowel obstruction with colon in the hiatus hernia. The exact cause of the obstruction was uncertain. The left upper quadrant mass had increased in size from the previous CT scan. The patient was transferred to hospital B where she underwent laparoscopic adhesiolysis. The procedure was prolonged because of dense adhesions and matted loops of bowel in the left upper quadrant. At completion of the procedure the surgeon considered that the large bowel obstruction had been 'released' by adhesiolysis and removal of the transverse colon from the hiatus hernia (which was also repaired).

The patient's initial recovery was satisfactory. On the morning of postoperative day 2, she was given an inadvertent overdose of narcotics, which led to a MET call for management. At this point, the patient's family requested transfer to a private hospital because they 'did not trust' the hospital staff. A transfer to hospital C occurred late in the evening, apparently without assessment of the patient's clinical state by senior surgical personnel at hospital B before the transfer.

The following day, the patient had increasing abdominal pain and distension and became febrile; CRP was 420 g/L in the morning and 480 g/L in the evening. Transfer back to hospital B was arranged and took place the following morning (postoperative day 4). Laparotomy showed faecal peritonitis with a colotomy in the distal transverse colon and a large left upper quadrant mass that was thought to be malignant. Biopsies of the mass subsequently confirmed metastatic adenocarcinoma.

The following day, the patient's condition had worsened, with multiorgan failure and increasing inotrope requirements. A relook laparotomy did not identify a reversible cause. The patient subsequently developed bilateral external iliac thromboses requiring embolectomy and fasciotomy. These interventions did not reverse the downward trend. The patient died on day 7 after the first operation.

DISCUSSION

By the time of the second operation (the laparotomy on the 4th postoperative day), the die had been cast and death was inevitable. None of the interventions from this point onward warrant comment or scrutiny. There are 2 aspects of the earlier care that, if handled differently, may have led to a different outcome.

The first, was the decision to persevere with a laparoscopic approach in a complex obstructed situation with multiple matted loops of bowel in the upper abdomen. This led to 2 inadvertent sequelae:

- diagnosis of adhesional or hernia-related large bowel obstruction when the likely cause was, in fact, a large malignant mass in the left upper quadrant
- serosal tears, one of which led to a full thickness colotomy and faecal peritonitis, worsened by the fact that the distal obstruction had not been dealt with.

Both the cause of the obstruction and the serosal tears would have been more likely to have been recognised and managed by an open approach in this complex case.

The second issue of note was the transfer of the patient—at the family's request—to a private hospital while she was still unstable in the postoperative recovery phase. The case notes show no indication of a clinical review by a senior member of the surgical staff prior to this transfer being approved. That the patient had a CRP of 420 g/L the following morning, clearly implies that she had been unwell and deteriorating for quite some time. She should have been reviewed more thoroughly in hospital B. The transfer to the private hospital led to a lack of continuity of care, which probably delayed recognition and management of the peritonitis. The need to transfer the patient back to hospital B further delayed definitive surgical treatment.

CLINICAL LESSONS

A decision to discharge a postoperative patient to a private hospital should only be made by a senior member of the surgical staff and should not occur until it is almost certain that the risk period for life-threatening surgical complications has passed.

Case 10: Tracheostomy in a frail patient with poor prognosis after a fall

General Surgery/ENT Surgery

CASE SUMMARY

A woman in her early 90s was admitted to the ED after an unwitnessed fall at home. Among her comorbidities were ischaemic heart disease with cardiomyopathy, atrial fibrillation and type 2 diabetes mellitus. She sustained injuries to her face, including a laceration of the left eye and cheek. She was found by her daughter approximately 2 hours after the fall and was brought to hospital by ambulance and admitted shortly after midnight. A significant language barrier between the patient and the hospital staff required the presence of the daughter or son for translation.

On admission, the patient presented with GCS 15. She recalled the fall and hitting the ground. She immediately underwent a CT trauma pan scan, which indicated:

- extensive prevertebral soft tissue swelling with prevertebral haematoma (38 x 15 mm)
- rib fractures 7–11 with a small pleural effusion on the left side, thought to potentially be haemothorax
- no acute intracranial pathology
- significant chronic vascular pathology without acute exacerbation.

Subsequent MRI confirmed this pathology. The patient was provided with multidisciplinary care, where the frailty of the patient was noted by all groups and the overall impression formed that the patient was at significant risk not to survive hospital admission. She was provided with patient-controlled analgesia (fentanyl) for pain management. A medication error occurred whereby she received 50 mcg boluses of fentanyl instead of 10–20 mcg, resulting in administration of 160 mcg within 1 hour. This complication was discussed with the family and open disclosure occurred. The medication error did not directly contribute to the death of the patient.

The occurrence of intermittent hypoxia prompted consultation with the otolaryngology, nose and throat (ENT) team on the day of admission. It is likely that this was related to the rib fractures and hypoventilation secondary to analgesia rather than airway obstruction. On the basis of radiological enlargement of the prevertebral haematoma there was concern about possible airway obstruction. After discussion with the family (without the consultant present) highlighting the risks of conservative management versus surgical intervention,

the family opted for surgical tracheostomy, with the patient booked for the procedure to occur that evening. This was carried out by 2 ENT registrars without a consultant in theatre (the consultant was remote according to the operation notes). Prior review by a senior ICU registrar had reached agreement that the patient would be admitted for postoperative observation, with a clear plan for transfer back to the surgical ward the following day. It was decided that the patient should not receive CPR or invasive ventilation. A return to ICU for postoperative complications was not planned.

Following discharge from ICU the patient deteriorated. Approximately 22 hours after surgery this deterioration culminated in a new onset of seizures and airway concerns. A code blue was called and the patient readmitted to ICU. It was subsequently decided to provide comfort care only. The patient died in the early morning of postoperative day 2. A cause for the deterioration was not established.

DISCUSSION

This was a frail patient with a significant trauma who suffered from several comorbidities. It appears that everyone involved in the patient's care had concerns regarding her prognosis.

The frailty of the patient was multifactorial and a ceiling of care needed to be established prior to any intervention (as was the case). Whether prolonged ICU treatment after surgery would have resulted in a better outcome is unlikely.

Despite the involvement of several specialties in this patient's care and assessment, the documented findings do not allow for determination of a clear cause of death after surgery.

The decision-making process around the surgical procedure raises several concerns:

- The indication for surgery is stated to be 'airway obstruction' and the family's fear that the patient might 'suffocate'. There is no obvious finding in the patient's notes that a risk of suffocation or serious airway compromise was observed. The patient was not tachypnoeic and did not manifest stridor.
- The patient was correctly identified as being at significant risk of surgical mortality. One must then ask: Why was the consultant ENT surgeon not in theatre when the surgical tracheostomy was performed? And: Why was the consultant ENT surgeon not present when the decision to operate was discussed with the patient's relatives?

- In view of the significant surgical risk, a lengthy and very detailed consenting process for this procedure would be expected; however, no consent for the tracheostomy appears in the patient's notes and it appears from several entries that the family was unaware of the consequences of the procedure. It was not clear to them that the patient would be unable to speak and most likely unable to return home.

CLINICAL LESSONS

Notwithstanding the prevertebral haematoma demonstrated on the pan CT scan, there appeared to be no impending airway obstruction. Thus, the indications for the procedure are difficult to determine, never mind that the impact of the tracheostomy on the patient's future function (speech and ability to return home) appear to be inadequately documented. It seems that the treatment was directed at a radiological abnormality rather than clinical evidence of airway obstruction.

Evidence of proper informed consent is lacking. The absence of on-site consultant input to either the decision-making or the surgical procedure is concerning. There was also a lack of appropriate documentation covering the period of deterioration.

Case 11: Delayed intervention and obscure consultant involvement for a patient presenting with large bowel obstruction

General Surgery

CASE SUMMARY

A 71-year-old man was admitted to hospital A with a history of abdominal pain and unopened bowels for 4 days. Comorbidities included hypertension, high cholesterol and a body mass index of 30. A CT scan showed a stricture in the sigmoid colon with dilated large bowel proximal to the level of the caecum. After acceptance by the on-call specialist colorectal consultant at hospital B, the patient was transferred that day.

At hospital B, the patient was admitted under the care of the specialist consultant involved in the initial discussions. He was seen by the on-call team on arrival and his case was discussed with the Fellow, during which the CT result was specifically noted. A decision was made to perform a colonoscopy. This was attempted unsuccessfully 2 days later, secondary to poor preparation. A second attempt occurred 2 days later, only for the colonoscopy to be subsequently cancelled. Initially, there were no clinical signs of concern, but by the 6th day of admission the patient had developed marked right lower quadrant tenderness. He was prepared for theatre the following day.

Laparotomy found a non-viable right and transverse colon with caecal micro-perforation secondary to a sigmoid obstructing malignancy. Sub-total colectomy with end ileostomy was performed and the patient was returned to the ward. At approximately 09:00 the following day, he developed acute onset of dizziness and sweating with hypoxia. A MET call, then a code blue were called. The patient died at 12:00 despite maximal treatment. A postmortem indicated no surgical complications, with cause of death attributed to coronary artery disease.

DISCUSSION

This patient had been in hospital with a large bowel obstruction for a week before clinical deterioration occurred mandating emergency surgery. Documentation of a clear recognition and strategic planning related to the diagnosis of a large bowel obstruction would have helped confirm the best clinical path for this patient.

Colonoscopy for diagnosis of the cause may not have been possible and—indeed—may have exacerbated the clinical progression. Early consultant involvement could have helped, perhaps allowing a change to CT with rectal contrast, or implementing a clinical decision after imaging and patient review for planned

surgery following preoperative work-up. At best, this course of action may have prevented death; at worst, it may have led to conservation of the colon with a Hartmann's procedure. If death still occurred, it then would have been more apparent that all had been achieved to optimise the outcome. It is possible that preoperative work-up may have revealed no relevant information. But if it had, it is possible that a different course could have been taken, including investigation, optimisation and/or more intensive postoperative monitoring.

The model of care under which this patient was admitted is not known. There is no documentation of handover from the acute team of the day, suggesting that the patient was under a single consultant. It is unknown if the lack of documentation regarding conversations with the consultant or review by the consultant means that the consultant was unaware of the admission under their care. Consultant experience is important in the context of decision-making. In this case, the outcome may not have differed but if the above factors had been considered and documented it would have been easier to say that all that could have been done, was done.

CLINICAL LESSONS

Extremely busy clinical pressures exist, but a social history and documentation of conversations including consent and concerns is important. This is not the responsibility of the junior team alone, but the individual doing these tasks. Consultants have a responsibility to be aware of and review patients under their care, and the junior staff have a responsibility to make consultants aware of these patients.

Case 12: Consultant disagreement delayed intervention for a patient presenting with haematemesis

General Surgery

CASE SUMMARY

A 70-year-old man presented with haematemesis on a background of multiple medical comorbidities including recurrent lower respiratory tract infections, bronchiectasis, diffuse scleroderma, gout, osteoarthritis, hypertension and recent unintentional weight loss. His medications included mycophenolate, prednisolone, meloxicam and pantoprazole.

Plasma Hb was 82 g/L on admission, so he was given 2 units of packed red cells. Gastroscopy on the day of admission found a large volume of semi-solid blood with poor views. A second gastroscopy the following day demonstrated erosions in the proximal gastric body with some altered blood. An adrenaline injection was placed into a gastroesophageal junction lesion and EndoClot™ was applied to the gastric erosions. Views of the duodenum were poor due to blood.

A MET call occurred at 17:05 on day 4 of admission for further fresh haematemesis and haemodynamic instability (Hb 48 g/L). The patient was intubated on the ward at 17:30 and transferred to ICU at 17:52. Documentation following this is sparse. There appears to be no running documentation from the medical or surgical registrar, who presumably were involved to assess and liaise with the surgeon and on-call surgeon. There is only a retrospective note from the reporting surgeon summarising a disagreement with the on-call surgeon (who refused to be involved) as to who should be responsible for the care of this patient.

A third gastroscopy—performed by a gastroenterologist at 19:00—found a large-volume clot in the proximal stomach. The duodenum was visualised to be normal. The assessment was a large proximal gastric bleed not amenable to endoscopic intervention due to adherent clot despite extensive wash and repositioning of the patient. A multidisciplinary discussion between the consultant surgeon, the gastroenterologist and the intensivist concluded that surgical intervention with proximal gastric surgery would be inappropriate in this patient, given his comorbidities. The patient subsequently died overnight from ongoing bleeding.

DISCUSSION

The standard of care prior to the time of deterioration appears appropriate. The patient had management of bleeding medically and endoscopically in a timely fashion. The deterioration was also clearly recognised on day 4, for which another endoscopy was required.

The issue pertains to who was responsible for performing the procedure and the communication surrounding this. The delay to the third endoscopy—caused by the lack of a clear plan for who would perform the gastroscopy—is an area of concern. The surgeon who had been involved with the patient's care felt that the on-call surgeon should perform the procedure. The on-call surgeon reportedly did not want to be involved, as the reporting surgeon had performed the 2 previous endoscopies. Communication could have been improved in this setting.

There was a 3-day interval before re-bleeding occurred and a changeover of the on-call consultant surgeon in the meantime, probably involving a different skill set. Nevertheless, the delay to endoscopy of approximately one hour may not have made a difference to the outcome in this case, given the pathology did not appear to be endoscopically manageable.

CLINICAL LESSONS

It would have been clear at the time of admission that this patient was not a candidate for gastric surgery. A limit to care should have been established at some point prior to the acute deterioration, in the form of an advanced care directive. Earlier involvement of gastroenterology might have been considered.

Case 13: Fungal infection of a sternal wound in a patient undergoing urgent coronary artery bypass surgery

Cardiothoracic Surgery

CASE SUMMARY

A 77-year-old man was transferred from a rural hospital to the care of the cardiology team. He presented with 3 days of chest pain following several weeks of breathlessness and orthopnoea. He had a background of chronic renal impairment (baseline creatinine 150 μmol/L), chronic obstructive pulmonary disease (COPD), bronchiectasis, depression and hypertension, and was an ex-smoker. He had previously been living at home independently with his wife.

The patient was found to have had a non-ST elevation myocardial infarction (NSTEMI). He had developed type 2 respiratory failure (in the setting of acute pulmonary oedema combined with an infective exacerbation of COPD; treated with IV steroids and broad-spectrum IV antibiotics) and was experiencing acute on chronic renal failure. He remained on the ward over the weekend with ongoing intermittent chest pain despite IV heparin and glyceryl trinitrate. Due to breathlessness, he was unable to lie flat for an angiogram; however, escalating chest pain led to an urgent angiogram on Monday morning, which revealed triple vessel disease with critical left anterior descending (LAD) and circumflex artery disease. After discussion with the cardiothoracic team, he was immediately taken to theatre following the angiogram. Preoperative TOE showed severe left ventricular (LV) dysfunction with ejection fraction approximately 20%.

The patient underwent triple coronary artery bypass grafting (left internal mammary artery – LAD, saphenous vein – first diagonal artery, saphenous vein – obtuse marginal artery 2) and was admitted to ICU on inotropic support (noradrenaline, milrinone and adrenaline). He was extubated on postoperative day 1, was weaned completely from inotropes by postoperative day 2 and discharged to the ward by postoperative day 4.

Progress on the ward was slow for the first week, as the patient felt generally unwell and had an elevated white cell count (WCC) although he was afebrile. There was no sternal pain and the wounds were clean. A chest CT on postoperative day 7 showed no mediastinal or retrosternal collection, although mild sternal separation inferiorly. Clinically, there was still no pain, ooze or instability of the sternum. Lung consolidation on CT prompted continuation of broad-spectrum IV antibiotics (in consultation with infectious diseases) for a presumed lower respiratory tract infection as the source of the increased WCC. The following day the sternum became unstable, with new onset of pain and a cough. The patient was taken to theatre for a sternal washout and placement of a vacuum-assisted

closure (VAC) dressing. No frank pus was apparent and the wound was clear of fibrinous debris. Samples subsequently grew *Candida albicans*.

Five further VAC changes were carried out. On one occasion there was purulent material in the pericardial cavity. This cleared and the wound again became clean but atrophic. Plastic surgery was consulted for debridement and planning for flap closure; infectious diseases was consulted for ongoing antifungal management. Further TOE at the time of VAC change again showed severe dilated cardiomyopathy with poor LV function.

The patient gradually deteriorated over this period, eventually developing cardiogenic shock and ischaemic end organ dysfunction. Treatment with dobutamine was briefly trialed before the patient and family withdrew consent for active treatment and opted for palliative care. The patient died on postoperative day 26.

DISCUSSION

Initial assessment of this case queried the preoperative preparation and whether more could have been done to minimise the risk of sternal wound infection, and the decision to operate and its timing.

Review of the case files is relatively reassuring on these grounds. The patient was transferred from a rural setting after 2 weeks of breathlessness (treated with oral amoxicillin/clavulanic acid, then steroids and IV cephalosporin and azithromycin prior to transfer) and was found to be in pulmonary oedema with ischaemic electrocardiogram (ECG) changes. Angiography was performed and showed critical left-sided coronary disease that was ostial. There was no mention of percutaneous options, but in such a high-risk patient (poor LV function, acute renal failure, chronic lung disease, ongoing ischaemia) this would have almost certainly been considered and discounted as unachievable on the basis of coronary anatomy. Had a percutaneous option been feasible, clearly this would have been preferable and may have avoided death. It is reasonable to assume it was not, hence the decision to operate is likely correct.

As the patient had ongoing chest pain and ECG changes and minimal reserve, there was urgency, which limited preoperative preparation. This would have been aimed at skin commensal *Staphylococcus* rather than fungi, anyway. The risk of fungal infection was significantly increased by the use of several antibiotics in the days before surgery.

More troubling, however, is the lack of evidence for direct involvement of any senior cardiothoracic surgeon in the care of this high-risk patient. For the reasons described, this is a case that would have been at the higher end of the risk spectrum for an experienced surgeon, whatever the technical difficulty or lack thereof of the bypass procedure itself. The surgery was performed by a Fellow

assisted by a Trainee, which seems inappropriate for such a case. Factors such as speed, aseptic technique, tissue handling and lack of tissue trauma, care in minimising sternal devascularisation, use of skeletonisation techniques, graft location and anastomotic quality, and closure technique all may be experience-dependent to varying degrees. The risk of mediastinitis and poor postoperative cardiac function (contributing to multiple organ failure) may have been reduced by a more senior surgeon.

During the postoperative care, despite the Trainees repeatedly writing 'discussed with …' and the names of 2 surgeon colleagues appearing repeatedly in the file, there is no record of a consultant ever seeing this patient, and no record of a consultant review, even in family meetings when the patient was being assessed for palliation.

The typed operation reports are not supplied, but handwritten notes suggest limited removal of metalwork and vacuum dressing application, which would be unlikely to be adequate for fungal mediastinitis. If the presence of fungi was unknown at the first re-exploration, once identified, a more aggressive consultant-driven debridement could have occurred. In particular, the wound debridement needed to be sufficiently aggressive to remove all dead or de-vascularised tissue and to properly wash out the mediastinum on day 10 to eliminate the nidus for *Candida*. This sometimes involves some bold mobilisation of the heart and pericardial space to ensure no pockets of infection are left unirrigated or undrained.

CLINICAL LESSONS

Low cardiac output is linked to a bad prognosis after an acute coronary event and is a hidden cause of sternal wound infection. This patient was suffering from low cardiac output since transfer and remained so over the weekend: '…ongoing intermittent chest pain despite IV heparin and glyceryl trinitrate' is the evidence. An angiogram should have been done immediately. Unsurprisingly, the patient's preoperative ejection fraction was 20%. Direct involvement of a senior surgeon in this case may have altered the outcome.

Case 14: Lack of geriatrician input for an elderly patient presenting with fractured neck of femur

Orthopaedic Surgery

CASE SUMMARY

An 87-year-old man was admitted from a nursing home after an unwitnessed fall resulting in an undisplaced fracture of the right femoral neck. In addition to dementia, his comorbidities included congestive heart failure and atrial flutter, mild chronic renal failure and COPD. He was on a factor Xa inhibitor (apixaban) in addition to other medications.

A CT scan upon admission indicated no head or spinal injuries from the fall but identified a minimally displaced basicervicular fracture of the right neck of femur along with marked degenerative disease of both hips and signs of diffuse osteopenia. A routine preoperative workup was conducted without the involvement of a geriatrician or medical physician. The workup identified the pre-existing medical conditions. It was decided, after consultation with family members, that he was 'not for resuscitation'.

The patient underwent palliative fixation of the fracture the next day using anti-rotation cannulated dynamic hip screws. The anaesthetic involved a local block and a general anaesthetic. During the procedure, the blood gases showed PO_2 (partial pressure of oxygen) of 66 kPa with PCO_2 (partial pressure of carbon dioxide) of 47 kPa (saturation 94%). At completion of the procedure there was difficulty extubating the patient and getting him to breathe spontaneously.

After assessment that he was unable to breathe by himself, it was decided—in consultation with the family—to leave the endotracheal tube in place and transfer the patient to ICU where his family could farewell him. He died soon after removal of the endotracheal tube.

DISCUSSION

Survival after a fractured neck of a femur is helped by early operative intervention followed by early mobilisation. This was adhered to in this situation.

Two questions arise regarding the management of this patient:

- whether he should have been assessed by an appropriate physician preoperatively
- whether he should have had surgery in the first place.

Given his age and that he was essentially immobile, and taking into account his physical conditions, it would have been appropriate for this patient to be assessed preoperatively by a geriatrician/medical physician. This may have assisted in deciding if surgery was indicated. Overall, it is extremely unlikely that this patient would have survived the effect of the fall.

CLINICAL LESSONS

Orthogeriatric consultation and early involvement in management has been shown to significantly reduce morbidity and mortality for fractured neck of femur and is now considered standard care. Combined orthogeriatric care in cases such as these can help in achieving the best possible outcomes for patients and their families.

Abbreviations

ACSQHC	Australian Commission on Safety and Quality in Health Care
ANZASM	Australian and New Zealand Audit of Surgical Mortality
CCA	common carotid artery
COPD	chronic obstructive pulmonary disease
CRP	C-reactive protein
CT	computed tomography
DRE	digital rectal examination
ECG	electrocardiogram
ED	emergency department
ENT	otolaryngology, nose and throat
EPAs	entrustable professional activities
GCS	Glasgow Coma Scale
GI	gastrointestinal
GP	general practitioner
Hb	haemoglobin
ICA	internal carotid artery
ICU	intensive care unit
INR	international normalised ratio
IV	intravenous
LAD	left anterior descending
LV	left ventricular
MDT	multidisciplinary team
MET	medical emergency team
MRI	magnetic resonance imaging
NGT	nasogastric tube
NSTEMI	non-ST elevation myocardial infarction
PBAs	procedure-based assessments
PCO_2	partial pressure of carbon dioxide
PO_2	partial pressure of oxygen
SBO	small bowel obstruction
SCF	surgical case form
TOE	transoesophageal echocardiography
UTI	urinary tract infection
WCC	white cell count

Notes

Notes

Royal Australasian
College of Surgeons
Australian and New Zealand
Audit of Surgical Mortality

24 King William Street
Kent Town SA 5067

Telephone:
+61 8 8219 0901

Email:
anzasm.racs@surgeons.org

Website:
www.surgeons.org/anzasm

Royal Australasian College of Surgeons
Australian Capital Territory
Audit of Surgical Mortality

CHASM
Collaborating Hospitals' Audit of Surgical Mortality

Royal Australasian College of Surgeons
Northern Territory Audit
of Surgical Mortality

Royal Australasian College of Surgeons
Queensland Audit
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