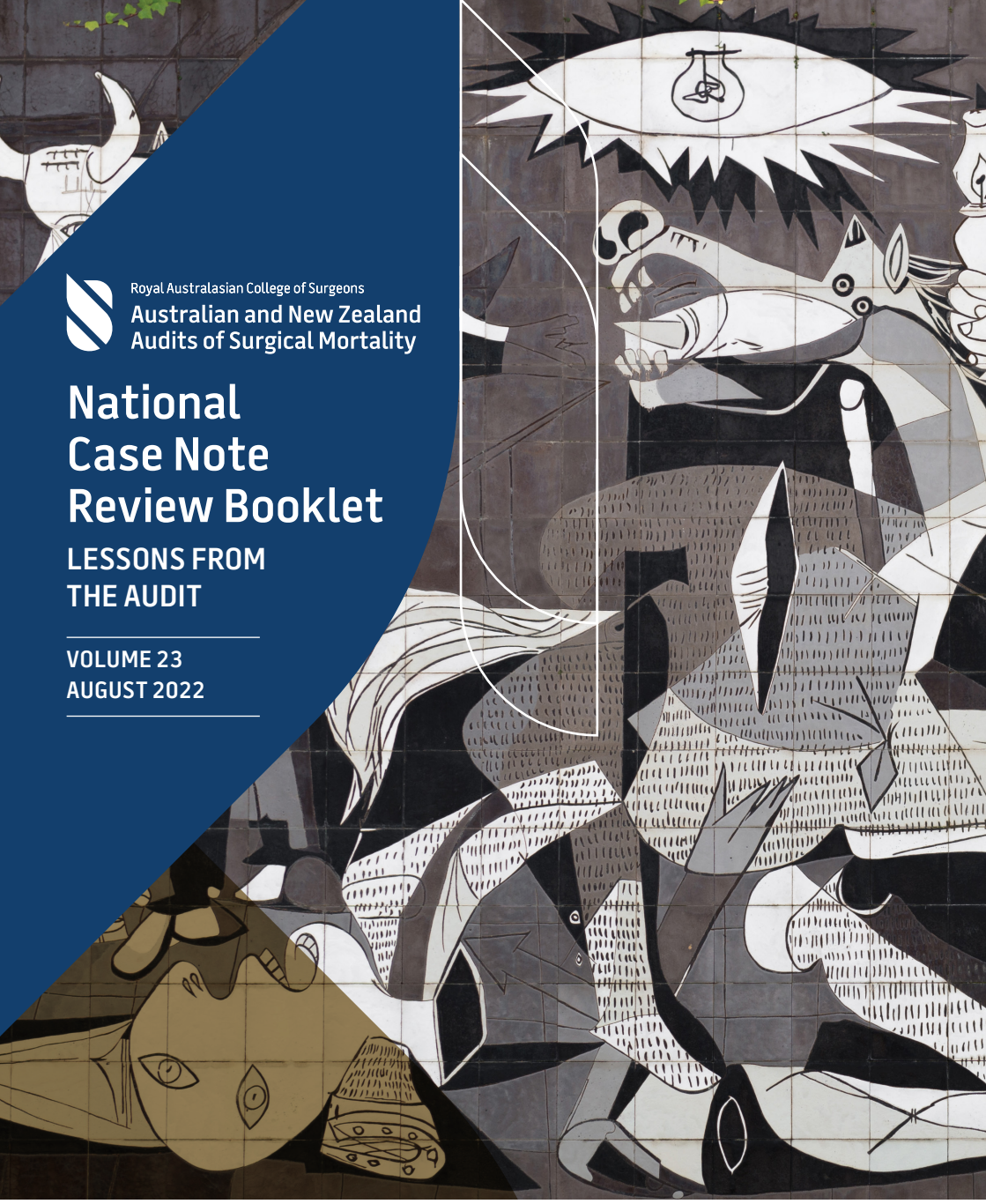

Royal Australasian College of Surgeons
Australian and New Zealand Audits of Surgical Mortality

National Case Note Review Booklet

LESSONS FROM THE AUDIT

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AUSTRALIAN AND NEW ZEALAND COLLEGE OF ANAESTHETISTS

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Contents

Chair's Report

This most recent edition of our Case Note Review Booklet makes for fascinating but alarming reading. It certainly highlights the range of patients being cared for by surgical teams in an urgent or semi-urgent situation. All the deaths within this booklet are situations we have all seen arise over our practising lives which emphasise issues that need continual discussion and debate in the care of our patients, irrespective of whether death is the ultimate outcome.

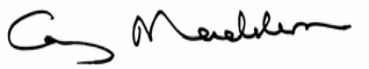
Issues associated with the timing of the surgery sometimes require a conservative approach, or even a palliative one. On other occasions, once the decision is made, the operation should follow as rapidly as possible. In a number of cases, consultant review was slow, the system did not push for the operation that was needed, and the outcome was inevitably disastrous. This, of course, brings to the fore the issues of surgical judgement. Leaving complex decisions to inexperienced junior staff is inappropriate and consultant engagement needs to be obtained. What is sometimes alarming in our public hospitals is that many decisions are made at the registrar level and the consultant is only engaged the following day. This is unsafe and probably all consultations other than the most trivial should be discussed with the responsible senior surgeon.

When decisions are made they need to be clearly documented and, if appropriate, argued within the record. This is also absent in a number of the cases highlighted in this booklet and again highlights the need to document the logic, decisions and information available at the time of decisions being made. This becomes even more important when transfers occur. It has been highlighted over a long period of time the danger of transferring patients and how extra efforts need to be made to ensure that delays and poor outcomes are not the result of transfers which were intended to improve the care provided to the patient.

The final issue that is always highlighted by these concerning deaths is the need for a strong team approach. Relying on other services to provide consultative opinions and action can lead to significant delays which ultimately work against any chance of a successful outcome. If the services of other clinical teams cannot be obtained in a prompt fashion, then it may be that the surgical solution needs to be pursued rather than the time lost in receiving radiology or gastroenterological opinions and action. This is certainly the situation in a number of the cases in this booklet and it is a salutary reminder to us all.

There can be no doubt that much more needs to be done in order to avoid unnecessary deaths from surgical care. Great improvements have been made within Australia, largely responsible to the Audit of Surgical Mortality, but we have by no means reached the desired position we would all wish to achieve.

Any constructive feedback would be gratefully received from these cases or others that are circulated on a regular basis through the Royal Australasian College of Surgeons.



Guy Maddern
Chair, ANZASM

Case Studies

Case 1: Likely bone cement implantation syndrome in fractured neck of femur patient treated with total hip replacement

Orthopaedic

CASE SUMMARY

An 85-year-old woman who was medically well, lived independently and mobilised without a walking aid, suffered a mechanical fall at home and sustained a subcapital fractured neck of femur (NOF). She was brought in by ambulance to the emergency department (ED) where she was assessed to have an isolated injury, with other observation and examination findings being normal. Her medical history included asthma and a previous scaphoid fracture. She was on no regular medications. She was referred to an orthopaedic surgeon who accepted her care, confirming the plan to feed the patient as surgery would not proceed until the following day. She was given a femoral nerve block for analgesia, referred to a physician and appropriately sent to the ward.

The next morning, she was reviewed by the physician, had no adverse signs on physical examination and was noted to have normal routine bloods including full blood count, plasma electrolytes and liver function tests (LFT). She was reviewed by the orthopaedic consultant who documented consent for a total hip replacement (THR) and noted she was an independent mobiliser.

She proceeded to surgery and, according to the operative report, the procedure continued as planned until time of cementing of the femoral stem when the electrocardiogram demonstrated bigeminy, which progressed to cardiac arrest over approximately 10 minutes. Closure was completed rapidly, resuscitation commenced and the patient was transferred to the intensive care unit (ICU) where she had a second arrest and, after discussion with family, cardiopulmonary resuscitation (CPR) was ceased and the patient died.

There is no suggestion from the intraoperative notes that the procedure was complicated. There is no documentation of significant blood loss. The procedure time from start to finish was 54 minutes, which would suggest the technical components of the operation went smoothly.

The cause of death was thought to be fat embolism given no signs of anaphylaxis and the temporal relationship between cementing and cardiac event.

DISCUSSION

The first-line assessor expressed concerns about the time taken from fall to the patient being in theatre, and the decision to perform THR and not hemiarthroplasty, given the operative time and blood loss in a setting the surgeon noted had a moderate risk of death.

With regards to the time taken to get this patient into theatre, the Australian Commission on Safety and Quality in Health Care guidelines recommend surgery within 48 hours of presentation to hospital. Surgery was performed on this woman approximately 24 hours post fall, which is well within the standard.

When considering the decision to perform THR as opposed to hemiarthroplasty, THR is a reasonable operative option in a well 85-year-old patient, with no medical comorbidities, who lived independently and mobilised without an aid. Hemiarthroplasty would also have been a reasonable operative option.

The choice of THR in this patient has been supported by a meta-analysis and systematic review by Lewis et al.[1] However, more recent studies have suggested that the functional benefits associated with THR may not be as significant as previously thought.[2] It is possible that the balance will sway towards hemiarthroplasty in this age group in the future.

The surgeon's determination of a preoperative risk of death as moderate for this patient was questionable. In Australia, the average mortality in the NOF population overall at 30 days is approximately 12% (Australian and New Zealand Hip Fracture Registry), and this woman preoperatively was well. The chance of death prior to surgery should have been listed as unlikely although this made no difference to the outcome. Fat embolism (as likely occurred here) may also have occurred in a hemiarthroplasty.

CLINICAL LESSONS

In the setting of possible fat embolism at the time of cementing, the other potential discussion point would be the decision to choose a cemented versus an uncemented femoral stem.

Cemented stems are recommended for fractured NOF patients as per the National Institute for Health and Care Excellence guidelines and multiple other international guidelines. A recent meta-analysis and systematic review by Fenelon et al noted an increased mortality with cemented hemiarthroplasty day 1 and 2 but identical mortality with uncemented hemiarthroplasty at 7 days, 30 days and

1 year.[3] The rate of re-operation with uncemented hemiarthroplasty is higher than cemented, and this procedure has a higher mortality rate. Therefore, a cemented stem remains the implant of choice in this age group.

However, there are published guidelines by the British Hip Society aimed at decreasing the risk of cement implantation syndrome; these guidelines advise modification of third-generation cementing techniques (to pre-wash prior to broaching, cement in late, no pressurisation). The surgeon noted use of third-generation techniques, which may be a templating feature of the operative note for THR; if not, it would be worth reviewing this paper. It is impossible to determine whether this would have made a difference in this case.

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Case 2: Questionable decision to perform major thyroid surgery at the same time as emergent coronary artery bypass surgery

Cardiothoracic Surgery

CASE SUMMARY

An 80-year-old man with known ischaemic heart disease presented to a peripheral hospital with chest pain and a troponin rise. Subsequent coronary angiography showed critical left main coronary artery stenosis, along with triple-vessel coronary artery disease. His echocardiogram revealed moderate to severe mitral regurgitation and mild to moderate left ventricular dysfunction, with an ejection fraction of 40%.

He was stabilised on medical therapy and transferred to an appropriate tertiary hospital. He had ongoing severe chest pains that settled with appropriate medical therapy. He also had significant heart failure and shortness of breath on exertion, most likely related to the moderate to severe mitral regurgitation. There was an appropriate decision to perform urgent coronary grafting. A balloon pump was placed prior to surgery because of the critical left main and triple-vessel coronary artery disease.

He also had a longstanding thyroid goitre that concerned the anaesthetists enough for them to do a computed tomography (CT) scan prior to intubation. The findings of this were not available. In fact, there was very much a paucity of notes in the file, preventing a clear understanding of exactly what happened from there.

It is presumed that a decision was made to get an urgent otorhinolaryngologist consult and then to proceed with thyroid surgery at the time of coronary artery bypass grafting. Despite the large goitre and the anaesthetist's concern, intubation was uneventful. The coronary grafting went as was expected. The patient was weaned from bypass and then the thyroid was attended to.

At this time, the patient became increasingly unstable, ultimately having a ventricular fibrillation arrest, and had to be placed back on bypass, where the right coronary graft was noted to have a sluggish flow, and the top end revised.

After this, the patient did not recover and became increasingly acidotic, which was put down to the balloon pump and gut ischaemia but never confirmed. The patient died in the operating theatre.

DISCUSSION

The decision to perform 2 major operations at the same time in an 80-year old gentleman with moderate to severe mitral regurgitation and critical coronary disease on an emergent basis needs to be questioned. He required a balloon pump preoperatively. Intubation, however, seemed uneventful, and the surgery went as expected, thus the need to proceed directly with the thyroid surgery is questionable.

Subsequent to this, there was low cardiac output, low blood pressure and ongoing ischaemia, resulting in cardiac arrest. The patient would have been better managed in ICU immediately after coronary artery surgery, to allow appropriate management including full assessment of echocardiograms and ongoing ischaemia.

It is of concern that the patient had significant mitral regurgitation that was not dealt with at the time of the bypass grafting. This may also have contributed to the instability of the patient following the coronary surgery and thus the problems with the right coronary graft.

CLINICAL LESSONS

The decision to undertake an additional major operation at the time of an urgent operation for coronary revascularisation is questionable, as is the lack of attention to significant mitral valve disease at the time of coronary bypass grafting. Both may have contributed to the outcome.

It is increasingly difficult for the surgical and anaesthetic teams to manage a patient's instability while another surgeon is performing a thyroidectomy. One would have presumed that it would have been better to delay the thyroid surgery until the patient had recovered from the coronary artery bypass grafting.

ANZASM COMMENT

From the information provided, the patient clinical notes seem to be lacking in any record of discussion with the patient, family and members of the surgical and anaesthetic teams regarding the aims and risks of the planned surgery. What was the nature of the informed consent? Such a discussion should include cardiac surgeons, anaesthetic consultants, geriatrician, general and ear, nose and throat surgeons and intensivists.

Any unusual combination of surgical procedures must have clear goals and assessment of risks. Where a high cardiac risk exists, as in this case, a focus on dealing with the cardiovascular system is needed. Any addition, unless life threatening, is extremely unwise if not foolish. Clear documentation is a vital part of the process.

Case 3: Transurethral resection of the prostate in an elderly catheterised male

Urology

CASE SUMMARY

A 92-year-old man presented to hospital with urinary retention and was catheterised. He had several failed trials of void on maximal medical therapy. He had a number of comorbidities including having been fitted with a pacemaker, 2 prior ST-elevation myocardial infarctions, hypertension (being managed), a 7 cm abdominal aortic aneurysm and thrombocytopenia. However, he enjoyed good quality of life and strongly desired freedom from the catheter. He gave informed consent for elective green light laser prostatectomy.

The planned date for this procedure was postponed because of the COVID-19 restrictions, resulting in a prolonged period of catheterisation (several months). During this time, he had been treated in hospital for urinary sepsis due to *Pseudomonas* infection associated with the catheter.

The prostatectomy was uneventful from a surgical and anaesthetic perspective. The notes do not indicate a preoperative catheter specimen urine result. He was given cefazolin (2 g single dose) as standard antibiotic prophylaxis for transurethral resection of the prostate (TURP). His postoperative progress was slow but not inconsistent with his age and frailty. There were no acute signs of sepsis perioperatively. He was incontinent on removal of the catheter but mobile on the ward and bright and alert. No antibiotics were given at the time of the catheter removal.

On postoperative day 3, he became suddenly unwell. Following a medical emergency team call, he was admitted to ICU with a diagnosis of urinary sepsis. The causative organisms were not isolated from cultures. All reasonable resuscitative measures were taken, but he rapidly developed multiple organ failure. Following detailed goals-of-care discussions with his family, he died shortly afterwards. It is perhaps slightly unusual that the sudden deterioration occurred 3 days following his procedure; a more usual course would be deterioration within the first few hours.

DISCUSSION

Endoscopic urological procedures are known to be hazardous in the presence of urinary infections, with a high risk of gram-negative septicaemia and death. For

this reason, the urine should be as sterile as possible prior to elective surgery. Patients who have indwelling catheters prior to surgery pose a particular problem because all such catheters will become colonised with bacteria, making complete sterilisation of the urine impossible in this context.

The standard of care for all elective endoscopy is preoperative urine cultures (midstream specimen of urine or catheter specimen urine). Most catheter specimen urine will have large numbers of pus cells and mixed bacterial growth. Sometimes a purer growth is reported.

In this case, it does not appear that the option of extended preoperative and perioperative antibiotics was used. In addition, cefazolin was used as the single-dose prophylaxis at induction; this has very limited antibacterial activity against *Pseudomonas*. The presence or absence of this organism is a moot point, as a preoperative catheter specimen urine is not clearly annotated, but it was certainly referenced in documentation relating to the hospital admission with sepsis in the preceding months.

CLINICAL LESSONS

Urological surgeons should meticulously arrange and document preoperative urine culture status. In cases with an indwelling catheter prior to TURP, antibiotics should be commenced preoperatively. The choice and timing of antibiotics will be determined by preoperative cultures and the patient's comorbidities.

If a specific infective organism is identified, then this would direct perioperative antibiotic choice commencing at least 24 hours preoperatively and continuing until catheter removal. Even if there was mixed or no growth preoperatively, given this man's age, comorbidities and recent catheter-related *Pseudomonas* infections, he should have been administered broad-spectrum antibiotics for at least 24 hours preoperatively; these should have been continued postoperatively until the trial of void.

Case 4: Necrotising fasciitis following percutaneous rhizotomy

Neurosurgery

CASE SUMMARY

A 48-year-old woman presented at the ED of hospital B at 04:00 in pain and unable to sleep, having undergone a percutaneous rhizotomy the day before at hospital A. After waiting for an hour without being seen, she presented to the ED of hospital A, where treatment apparently focused on pain relief. By 11:00, she was transferred back to hospital B by ambulance for expert pain relief. The paramedics noted during transfer that she had a temperature of 38.4°C, a heart rate of 130 bpm and was in severe pain.

Following readmission at hospital B, a CT scan was requested at 13:00 with the report noting gas in paravertebral muscle tissue and thickened fascial planes, indicating the possibility of necrotising infection. The radiologists contacted the neurosurgeons directly, but it is unclear at what time this occurred.

By 15:00, she was admitted under Neurosurgery due to her febrile illness and a suspicion of necrotising fasciitis. Neurosurgical review at 18:00 noted severe pain and loss of function, with a temperature of 38.5°C, heart rate 120 bpm and white cell count (WCC) 19 x 10^9/L. A magnetic resonance imaging scan (MRI) was requested to confirm the suspected diagnosis of necrotising fasciitis.

At 22:00, she was booked for urgent exploration and debridement following consultant review. She was in theatre an hour later undergoing debridement with consultants from 3 specialties present, then was discharged to ICU the following day. While in ICU, she continued to deteriorate resulting in a subsequent bedside debridement taking place at 14:30 that day due to her unstable state.

The following morning at 01:20 death was certified.

DISCUSSION

This is an unusual and tragic sequela to a percutaneous rhizotomy. It is likely the bacterium was introduced at the time of surgery and prospered in the heat-damaged muscle. This implies a possible break in sterilisation or aseptic technique at hospital A. The best chance of retrieving this situation would have been early recognition and early radical debridement. The timeline above shows this may have been possible 18 hours before it did eventually occur. There are no direct records available to the reviewer, but the patient's presentation at 04:00 at

hospital B was likely incorrectly triaged. Her subsequent assessment at hospital B was, from indirect records, also likely to have missed the true diagnosis. At her subsequent arrival by ambulance at hospital B, it is likely the seriousness of her condition was again underappreciated. From the ambulance record, the presence of severe pain, immobility, fever and tachycardia should have suggested the true diagnosis and prompted more rapid and senior review.

The CT gave additional support to the diagnosis. The radiology registrar is to be commended for making the provisional diagnosis (confirmed by the consultant radiologist) and escalating the process with a phone call. Senior surgical review did not appear to have taken place until after 18:00. The review is well documented, thorough and thoughtful. The likely diagnosis is arrived at but not quite believed. The combination of her signs and symptoms, with reinforcement of her WCC and CT could, in retrospect, be taken as conclusive. There was further delay waiting for the MRI. This was unfortunate but at this stage is unlikely to have affected the outcome.

The neurosurgical consultant is to be commended on assembling a team of relevant consultant surgeons for this clearly difficult and worrying case and proceeding with emergency debridement at midnight. The subsequent treatment, further debridement and switch to palliative mode towards the end all seem entirely appropriate.

In addition to the above sequential observations, the 'system' has failed this woman at multiple points. It would seem her last 24 hours prior to intubation were spent in extreme pain. The seriousness of her condition was apparently underappreciated at multiple times in the early stages when a high suspicion leading to the correct diagnosis may have saved her life.

A patient with a recent intervention, acutely presenting with severe local pain, febrile, tachycardia (i.e. sepsis) should be presumed to have intervention-related infection (surgical-site infection) until proven otherwise, especially in the absence of other obvious sources of infection (e.g. urinary tract infection, pneumonia). This patient should have been reviewed urgently, referred for urgent MRI +/- gadolinium (or at least a CT +/- contrast) on presentation to ED and then referred to the surgical team.

There is no mention of her clinical status when she presented to the ED of hospital B (and subsequently the ED of hospital A) except that she was in pain and unable to sleep, but she should have been investigated for spinal infection rather than just pain management when she clearly had other signs of sepsis.

CLINICAL LESSONS

Hospitals should take care to regularly review their aseptic and sterilisation protocols, particularly if there is a suspicion that a patient has developed an infection, in this case necrotising fasciitis, as a direct result of undergoing a procedure. The inappropriate triaging that occurred in this case resulted in inevitable delays in confirming the diagnosis. Highlighting to ED staff the cardinal signs and symptoms for someone presenting with a necrotising infection, and the need for early surgical referral, may be of benefit for future cases such as this.

Pain intervention procedures are never without risks and, as highlighted in this case, are not as 'benign' as often perceived. In this case, a middle-age patient had a procedure for a non-life-threatening, non-paralysis-threatening condition with limited long-term evidence of benefits, and subsequently died.

Case 5: Large bowel obstruction is a surgical emergency

General Surgery

CASE SUMMARY

A 79-year-old man was brought to a major teaching hospital at 21:00 with a 4-day history of increasing abdominal pain and distension with constipation despite laxatives. Although communication was difficult (as he spoke little English), his family reported he had become increasingly confused in recent months, suggesting mild dementia. His medical history included atrial fibrillation, a possible mild cerebrovascular accident, gait ataxia, vitamin B12 deficiency and hyperparathyroidism. He was on apixaban for stroke prophylaxis.

An abdominal CT scan revealed a large bowel obstruction secondary to a sigmoid volvulus. It was reported the CT scan showed no evidence of perforation or ischaemia although the caecum and sigmoid were both very distended (>10 cm). He was not assessed as having sepsis or shock despite a persisting tachycardia (140 bpm) and a venous lactate of 5.9 mmol/L.

The patient was reviewed by the surgical registrar at 01:00 and was referred to the on-call gastroenterology registrar for colonoscopic decompression of his sigmoid volvulus. General fluid resuscitation and medication to slow his atrial fibrillation was commenced. He was reviewed by the on-call gastroenterology registrar 5 hours later, and plans were made for colonoscopic decompression. He was admitted to ICU at 09:30 for supportive care and rate control of his atrial fibrillation.

At 17:00, he underwent colonoscopic decompression and was found to have a gangrenous sigmoid colon. At 19:30 (22 hours following admission), he underwent a laparotomy and his sigmoid was confirmed to be non-viable as was the whole of his colon, proximal to the sigmoid. He was also found to have a gangrenous gallbladder. A subtotal colectomy and end ileostomy was performed as well as a cholecystectomy. Operating time was approximately 4 hours.

The postoperative course until death was long (40 days). From the time of his operation to death, there was no management decision that could have contributed to his death. He remained confused and agitated throughout. He frequently pulled his nasogastric tube (NGT) out and required restraints much of the time to avoid injury to himself. He had sustained high output from his ileostomy. He was intermittently septic, requiring antibiotics. He was always dependent on a combination of intravenous (IV) fluids, total parenteral nutrition and enteral feeding via an NGT.

On admission, goals-of-care discussions with his next of kin indicated that his family wanted all possible interventions. As the days went on, he became frailer and more malnourished. He was always to some extent delirious. Seven days before his death, there was a revised goals-of-care discussion with his next of kin. It was agreed there was no prospect of recovery, and a palliative course was agreed on. All supportive treatment was ceased and medication limited to treatment of symptoms. The palliative care team was consulted, and regular morphine and midazolam was administered. The man's condition and level of consciousness gradually declined, and he died 40 days following admission.

DISCUSSION

The area of concern raised in the surgical case form was the delay between admission and definitive treatment. Much of this delay seemed to be the wait for the gastroenterology team to perform a colonoscopic decompression.

While it is not ideal to have urgent treatment unavailable for nearly 20 hours, I would question the decision to ask for this treatment in the first place. The patient had been unwell for 4 days with abdominal pain and distention. His CT scan showed an established large bowel obstruction with a 10 cm-plus distended caecum (10 cm is generally considered a danger sign for caecal distention). His venous lactate was elevated. He had hard-to-control rapid atrial fibrillation. All these suggested his sigmoid colon may have already been unviable.

CLINICAL LESSONS

Consideration should have been given to immediate laparotomy. It is possible that his colon proximal to his sigmoid may have been viable if his operation had taken place as soon as possible after his admission. While his risk of death was high from the outset, it is possible he may have survived if he had undergone his laparotomy 12 hours earlier.

It is difficult to determine at what stage his bowel viability changed, but with a lactate of 5.9 mmol/L , caecal distension of 10 cm and pulse of 140 bpm, urgent definitive treatment was indicated. One would probably have expected to see changes on CT scan (such as intramural air, air in portal venous system or free intraperitoneal air) if the bowel was not viable on arrival.

Use of a NELA (National Emergency Laparotomy Audit) model or similar models are useful to predict outcome, inform family and all medical teams involved.

Case 6: Anticoagulant management in a shoulder surgery patient

Orthopaedic

CASE SUMMARY

A 63-year-old man was admitted to hospital for elective shoulder surgery on a background of having a previous rotator cuff repair and failure and was a candidate for reverse shoulder replacement. He had a medical history of an acute cardiac event the previous year with 2 drug-eluting stents, severe aortic stenosis, gross obesity, poorly controlled diabetes, hypertension, dyslipidaemia and obstructive sleep apnoea (although not requiring a continuous positive airway pressure machine). He was on aspirin and clopidogrel. Unfortunately, 2 days after his procedure he was found unresponsive in his bed.

The patient was advised to stop his clopidogrel anti-platelet treatment on the 10th day prior to admission; his aspirin was continued up until the day of surgery and afterwards. On the day of admission, he underwent anaesthesia with a regional block for reverse shoulder replacement. It appears the procedure went according to plan with an operative time of approximately 2 hours. During the recovery period, the patient was hypertensive, which was managed with both IV fluids and calcium gluconate. Subsequently, the patient was admitted to the normal ward (as opposed to the ICU). Aspirin treatment was continued but clopidogrel was not restarted. He continued to have an unremarkable recovery, but on day 2 at 20:00 he was found unconscious and without pulse by the nursing staff. Following an attempt at resuscitation by the emergency response team, he was declared deceased.

DISCUSSION

Perioperative management of anticoagulant therapy for those at risk of cardiac and cerebrovascular events is an area of controversy. Risk of excessive surgical bleeding needs to be considered against the risk of occlusive vascular events. The usual recommendation is cessation of anticoagulant/anti-platelet therapy 5 to 7 days prior to surgery. Clopidogrel, in particular, is associated with prolonged suppression of platelet function (approx. 5 days). In this case, clopidogrel was stopped for 9 days prior to surgery. Given this patient's history of cardiac stenting within 12 months of surgery, they would be at higher risk of stent occlusion. Cardiology opinion on the anticoagulant management should therefore have been sought prior to surgery.

It is difficult to assert (and is a benefit of hindsight), but with their cardiovascular condition, this patient would have benefited from being admitted to the high dependency unit (HDU) for the first 24 hours following their surgery. Having said that, the patient did not have any problem within the first 24 hours, so even if this was implemented it is most likely the patient would have been discharged from HDU after 24 hours regardless, and this event could still have occurred in the 48-hour period.

A common recommendation is to recommence the patient on clopidogrel and aspirin the day after the operation, which did not occur for this patient. A study by Nandi et al evaluated perioperative use of clopidogrel and incidence of postoperative events in 116 patients undergoing hip and knee surgery.[1] They concluded that ceasing clopidogrel 5 days preoperatively and starting it immediately the day after surgery does not increase the risk of bleeding. Whether this holds for those taking multiple anticoagulants is not known. Further, whether later cessation and/or earlier recommencement of clopidogrel would have prevented the subsequent event is impossible to be certain about. Finally, the nature of the postoperative event causing death in this case is unknown. However, this is an area of consideration and perhaps an area for improvement when managing these types of patients in the future.

CLINICAL LESSONS

Given this patient's medical history and comorbidities, a more conservative approach to cessation of anticoagulant therapy should have been considered, along with whether (precautionary) escalation of care would be required in the immediate postoperative period.

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Case 7: Prolonged admission with subsequent deep vein thrombosis and pulmonary embolism

General

CASE SUMMARY

A 48-year-old woman, following a 140 kg weight loss (gastric sleeve operation) and with a BMI of 28.5 and a residual weight of 96 kg, was admitted for an elective medial thigh lift. She underwent a relatively straightforward vertical medial thigh lift with a horizontal component anteriorly. There was significant excision of skin and fatty tissue; of note, the postoperative photos are of a T-junction lift.

It would appear from the notes that she had thromboembolic deterrent (TED) stockings on (presumably below-the-knee TED stockings), and foot compression devices were used perioperatively and at least until the first day postoperatively. However, on admission to the ward it was felt that, due to the size of her legs, a TED stocking was contraindicated. Enoxaparin was prescribed for her first night on the ward but was not given until the second night.

There was a discrepancy between the handwritten notes from the chart and the separate clinical pathway notes. It appears that the biggest problem was pain in the postoperative period. The pain, combined with high patient anxiety, resulted in significant mobilisation issues. The admission was prolonged, the pain was certainly out of proportion with the operation performed and the patient did have wound breakdown, but at no stage was she returned to the operating theatre to either wash out or explore a cause for this pain. It would appear from the notes that the treating doctor made efforts to manage the patient's pain and anxiety. The nurses also made every effort to mobilise the patient postoperatively but had little success. The lower legs became quite swollen. From the notes, it appears that while the TEDs were removed within 24 hours of surgery, the A-V Impulse™ foot compression remained in situ intermittently.

The patient developed an *Escherichia coli* urinary infection on the fourth postoperative day and was started on appropriate antibiotics, therefore the indwelling catheter (IDC) was removed to assist with the treatment. Unfortunately, this meant that she was trying to use a 'Shewee' or a pan, and this may have contributed to her wound infection although she was dressed with a topical skin adhesive, which should have blocked this. Those dressings were changed on day 7 as they were visibly soiled and odorous. The groin area was very excoriated on the removal of the dressings. From that point on, the patient complained of burning pain in her mid-thigh muscles. The patient was tended

appropriately by the visiting medical officer (VMO) who ordered further pain relief as an intramuscular dose.

Unfortunately, the patient then developed a wound breakdown, which resulted in an IDC being reinserted. The A-V Impulse™ and TED stocking were documented as being on, as was the topical skin adhesive on the wounds.

On day 9, a vacuum-assisted closure (VAC) dressing was applied with absorbent foam dressing and combined around the buttock for protection. The patient was very reluctant to mobilise and required her partner to help her, which limited her movement.

On day 12, she had further wound breakdown and also mild cellulitis on the left thigh. Dicloxacillin was commenced but she developed right-buttock-area breakdown on day 13. Further discussions were had with the VMO regarding pain management that same evening, which resulted in no further orders being given. Again, the patient became distressed and requested a review at 19:00, but the VMO was unable to attend. The next morning, the patient required the staff to lift her legs because she felt she was unable to do that due to the pain.

On day 15, she was prescribed gabapentin, increased diazepam and regular oxycodone/naloxone due to a need for greater pain relief. The VAC dressings were taken down and changed to a simple dressing. The wounds were apparently much better, and the patient was further encouraged to mobilise. The physiotherapist noted that she had tightness in her right calf and was struggling with movement. An additional dose of pethidine was administered in addition to her regular medications that evening due to a further dehiscence of her right posterior suture line.

On day 16, the patient requested a transfer to another hospital (hospital B). On review by the VMO, the wounds had split a little further, and the patient was screaming with pain and had extremely poor mobility. The following day, the VMO referred her to the rehabilitation unit.

On day 18, there was an extended discussion with the patient. She declined an offer to stay at the hospital or transfer to a rehabilitation unit and insisted on discharge by private ambulance to hospital B. The patient was clearly very distressed with suicidal ideation, increased pain and further splitting of the buttock wound. The following day, she was discharged via ambulance to hospital B although there was a rehabilitation bed organised.

The admission notes of hospital B describe a complicated postoperative course, where the patient had increased pain (deemed neuropathic in nature) and foul-smelling discharge. It was noted that she was seen by another surgeon at the original hospital; this surgeon thought that the patient should be taken back to theatre for further debridement and closure. However, the patient decided on

transfer because she was desperate to get closer to home. The records from the original hospital had no mention of this consultation and recommendation.

The surgical registrar noted that the patient had clean wounds but required a CT scan to exclude deep infection. The scan was apparently done but no record of the results was in the chart. The major focus of the admission was acute pain services and psychiatric review due to her mental state. Regular dressings were continued and pain relief altered with minimal mobilisation despite regular review with the physiotherapist. The patient remained distressed and, while reviewed multiple times a day, there is no clear indication of consultant review.

She died on day 26 from what was thought to be a pulmonary embolism after a collapse on the ward.

DISCUSSION

The clinician preoperative assessment was not in the chart nor was there mention of the preoperative travel arrangements for a patient from out of town. Preoperative medical records are an essential part of the patient care in a private hospital environment. The preoperative nursing assessment (conducted by phone) indicated that the patient was a high-functioning project manager. This is inconsistent with the postoperative description of a highly emotional and dependent personality. It would appear from the notes of the nursing staff that the patient struggled with the extent of the surgery, and it is hard to tell if she was aware of this preoperatively. Certainly, she had previously undergone a body lift, and the description from the site liaison assessment does not fit with her being a person who would have the personality that was as passive as it appears from the chart.

Deep vein thrombosis (DVT) prophylaxis was prescribed but from the notes seems to have been inconsistent. In an overweight patient with a history of lymphoma, breast and ovarian cancer, having lower-limb surgery to tighten her skin, it may have been prudent to maximise the DVT prophylaxis even further. Unfortunately, the risk of DVT remains in a high-risk patient like this even with appropriate attempts at reduction.

Clearly, her mental state did not assist with her postoperative recovery as the pain became unmanageable very rapidly. With uncontrolled pain that worsened 2 to 3 days postoperatively, it may have been prudent to re-explore the wound and clean out the necrotic tissue to accelerate recovery, as these patients have minimal reserves and with the gastric sleeve have no ability to increase their caloric intake, so wound issues can overwhelm their capacity to heal. A second opinion was not recorded but one would wonder, since this pain was more severe than was expected, whether a further look to ensure that there was not an entrapped nerve or other cause for her pain may have been prudent, but this is unclear from the notes.

Unfortunately, as the patient's admission progressed she lost confidence in her surgeon who had attempted to organise ongoing care.

CLINICAL LESSONS

On transfer to the second hospital, it is unclear from the notes whether or not this woman was ever reviewed by a surgical consultant. Inter-hospital communication is important and needs to be consultant-driven. TED stockings and twice-daily heparin were prescribed as DVT prophylaxis in her inpatient stay. There is no indication in the notes that the pain could have been coming from a surgical complication as the patient's emotional overlay seemed to dominate the management. The dominant plan involved wound management, acute pain service and psychiatric review. It is important to remember that alternative diagnoses need to be considered and excluded, especially those that can lead to serious adverse consequences, even in a patient who was thought to have predominantly psychosocial issues.

Case 8: Delayed diagnosis of a perforated peptic ulcer

General Surgery

CASE SUMMARY

An 85-year-old woman presented to the ED at 14:00 with a 5-day history of abdominal pain and diarrhoea. Her comorbidities included cardiovascular disease and atrial fibrillation, for which she was prescribed warfarin. She was reviewed in the ED and was hypotensive with a temperature of 37.7°C. She was also dehydrated and on beta blockers. Her pathology results showed: WCC 16.6 x 10^9/L, neutrophils 13.8 x 10^9/L, raised lactate 1.79 mmol/L, decreased albumin 24 g/L, decreased potassium 3.4 mmol/L and a raised international normalised ratio (INR) of 5.8. She was appropriately rehydrated. However her pain worsened and around 17:30 an abdominal CT scan was organised.

The CT scan was reviewed at 19:00, indicating a perforated viscus necessitating surgery. She rapidly deteriorated with atrial fibrillation and septic shock, and urgent surgery was organised. A laparotomy was performed at around 21:00, at which a perforated duodenal ulcer with gross peritoneal contamination was identified. The ulcer was oversewn and patched. The peritoneal cavity was irrigated with copious fluids. The patient was unstable intraoperatively and required inotropic support. Interhospital transfer to a tertiary care facility occurred the following morning at 01:00 for postoperative care. She progressed to multiple organ dysfunction syndrome despite all efforts by the ICU team. A not-for-resuscitation order was implemented. She died on the fourth day of admission with overwhelming abdominal sepsis.

DISCUSSION

The patient arrived at the ED at 14:00 and the time to theatre was more than 7 hours. An earlier plain X-ray in the ED may have identified free air and highlighted the need for surgical intervention much earlier than waiting on a CT scan. This case serves as a red flag to alert the need for expeditious X-ray to help facilitate earlier CT scan and subsequent surgical referral. Treatment could have been optimised in the ED with an initial X-ray to identify the abdominal pathology in this elderly patient where time is critical.

When the patient arrived at the hospital, she was hypotensive with abdominal pain and she had a raised WCC, raised neutrophils, decreased potassium, raised INR and her temperature was 37.7°C. Consideration of IV antibiotics and early surgical referral could have been made. Repeat blood tests in the ED were

warranted to monitor the potassium, INR and C-reactive protein (CRP).

The preoperative discussions between the surgeon and the patient's family were not documented. The patient was high risk, and it is unclear whether any non-operative options were discussed with the family. It is always best to document all discussions, including care option reviews. The transfer to ICU is commendable, along with good ICU documentation, including the family discussions.

CLINICAL LESSONS

This case highlights the importance of early intervention in an elderly patient when a serious condition may not be obvious at initial presentation, with irreversible organ damage a risk as the disease progresses. Earlier investigations and surgical referral of this patient in the ED may have helped establish a diagnosis sooner. There was progressive deterioration and treatment delays may have been alleviated with the implementation of an appropriate care pathway. The importance of a simple X-ray cannot be overemphasised. If this was done sooner, it could have resulted in escalated care and earlier surgical intervention. Surgeons, although on very busy schedules, should keep all discussions/interventions documented and up to date.

Case 9: Missed opportunity for patient-centred palliative care

General Surgery

CASE SUMMARY

A 94-year-old woman was admitted to hospital for a planned 3-day admission for a laparascopic loop ileostomy (performed by surgeon B) in order to palliate her malignant bowel obstruction. She had comorbidities of dementia (requiring her to live with her daughter), chronic renal insufficiency, emphysema, hypertension, depression and a history of transient ischaemic attacks. Seven years prior, she had undergone a resection for a transverse colon carcinoma, performed by surgeon A, from which she recovered well. She was reviewed by surgeon B with her daughters (who held power of attorney) although she was under the care of surgeon C.

No letter to indicate the matters considered in the planning was filed in the patient notes. Subsequent inpatient medical notes seem to indicate that surgeon B was in fact her primary surgeon, despite the admission officially being under surgeon C.

Preoperative workup included anaesthetic history and examination, an echocardiogram and routine blood tests, performed 12 days after she was reviewed by surgeon B. The notes included 'prefer an open op'. No comment is made about her preoperative albumin of 27 g/L, nor her WCC of 12.5 x 10^9/L with neutrophilia. There is a brief nursing admission note, taken by telephone the following day after her preoperative workup.

Nursing notes later in the admission record that the daughters reported a deterioration in her wellbeing over the week prior to admission, with little oral intake.

She was admitted on the day of surgery, 6 days after the brief nursing admission note was recorded. Abnormal urine analysis was noted but apart from a catheter urine specimen being sent from theatre, no further comments were made. Only a single dose of prophylactic antibiotics was given. The laparoscopic loop ileostomy was performed by surgeon C, assisted by surgeon B, and it took 90 minutes.

The patient's recovery was complicated by sepsis from a urinary tract infection, renal failure, atrial fibrillation, refeeding syndrome, prolonged ileus and aspiration pneumonitis. Her albumin plummeted to 17 g/L, causing generalised oedema which was addressed with a peripherally inserted central catheter ostensibly to administer total parenteral nutrition. Her care involved intensive care physicians and 3 medical emergency team calls. Nursing notes document the patient's wishes to be allowed to die.

On postoperative day 9, a discussion with the family resulted in a decision to withdraw active treatment and refer to the palliative care service, which occurred on the following day. She died peacefully 2 days after being transferred to the palliative care ward.

DISCUSSION

The consent form, signed by the patient's daughters, indicates that complications including infection, leak, perforation, bleeding, cardiorespiratory and thromboembolic events had been discussed. However, there is no record in the inpatient notes that consideration of the palliative nature of the procedure was appropriately considered. Both medical and nursing staff made decisions suggestive of using a surgical protocol for dealing with issues such as post-procedure recovery, sepsis and fluid balance, with little regard for the patient's goal of palliation.

CLINICAL LESSONS

Given the patient was elderly and had multiple comorbidities, a multidisciplinary approach from the outset and involvement in the postoperative care (if it had been decided to proceed) may have improved the quality of this woman's last month and may have been more comforting for her surviving daughters.

It is possible that this multidisciplinary approach was taken but, due to the discontinuity between outpatient and inpatient care, this information is not available. It is important for context – for the caregivers on the ward and also the case reviewer.

Case 10: Rapidly evolving necrotising fasciitis causing death

Plastic Surgery

CASE SUMMARY

A 48-year-old woman was transferred from a regional hospital to a major teaching hospital. The patient had fallen at a racetrack, where she had been an employee, the previous day. In the fall, she had sustained a laceration over the anterior aspect of her knee, which was significantly contaminated with dirt, mud and water. She attended a local regional hospital where the wound was washed out under local anaesthetic and then stapled. There was some possible delay in commencing oral antibiotics due to the pharmacy being closed, but she was placed on flucloxacillin at that time.

She reattended the ED of the regional hospital the following day with increasing pain, redness and reduced range of motion of the leg. Her pain was significant, and it was noted that there was cellulitis extending to the thigh. She was transferred to the tertiary hospital via the Royal Flying Doctor Service with IV cefazolin being instituted.

Her arrival at the tertiary hospital was at 21:30 that same day. She was seen by an orthopaedic registrar at 23:50 the same evening and was noted to have cellulitis that had spread since her review at the regional hospital, significant pain and reduced range of motion. It was noted in the file by the orthopaedic registrar that she was at increased risk of necrotising fasciitis. Her IV antibiotics were changed to piperacillin/tazobactam. The plan was to keep her fasted and perform a CT scan of the leg in the morning, or earlier if there were worsening signs. Theatre for debridement of the wound was planned for the morning.

At approximately 02:30 the morning following admission, there was a medical emergency team call to the ward to address the patient, who had suffered a hypotensive episode and was showing signs of haemodynamic instability. She was resuscitated and then an urgent CT scan was performed, which showed circumferential swelling of the thigh with thickening of the subcutaneous tissues and loss of clear planes between the muscle groups. There was no obvious gas evidence on the scan.

A decision was made to start IV vancomycin, clindamycin and meropenem, and a request was made for a review by Plastic Surgery at 03:00. The Plastic Surgery registrar reviewed the patient and felt that urgent operative intervention was required due to the unstable nature of the patient's blood pressure and deteriorating vital signs. At 05:00, she was taken to the operating theatre by the

Plastic Surgery registrar and Plastic Surgery consultant. It was noted there was turbid fluid within the lateral leg and anterior knee. In the left lateral thigh, there was a large area of unhealthy fatty tissue and some necrotic fascia. The posterior compartment muscles were dark in colour and there was 'dishwater fluid noted'.

Following the procedure, the patient was transferred to ICU at approximately 09:00. By 12:00 there was a further deterioration in her general condition with blood pressure that needed to be maintained with inotropic support. She had started to develop a coagulopathy, renal failure and abnormal LFT. A review of the wound showed increasing necrosis of the muscles. A further CT scan was performed to ascertain the level of spread of the infection and then at 15:00 she was taken to the operating theatre again by the Plastic Surgery consultant and Plastic Surgery registrar, where a high transfemoral amputation took place.

Following this procedure, the patient continued to deteriorate and developed multi-organ failure and metabolic acidosis in the ICU, as well as continuing deterioration in her haemodynamic status. At 04:45 the morning following the first debridement, the patient passed away. Organisms isolated from the wound became noted approximately 12 hours after the first debridement and proved to be predominately *Aeromonas* species.

DISCUSSION

This patient had a rapidly evolving and deteriorating clinical condition as a result of necrotising fasciitis. There certainly was some initial delay between her first review by the orthopaedic registrar and the first debridement under the care of the Plastic Surgery team but, given the rapid deterioration, it is quite likely that the end outcome would have been the same regardless of the timing of debridement once she had arrived at the tertiary hospital.

This obviously is a tragic outcome for an otherwise fit and healthy 48-year-old woman, but it would not appear that any steps in her management had been missed, and it is unlikely that more expedient surgical intervention would have made any huge difference.

CLINICAL LESSONS

Given that the patient had been noted to have fallen over into a muddy puddle at a racetrack, which was likely going to be contaminated with more than *Staphylococcus*, a broader spectrum of antibiotic coverage may have been more suitable. However, it would appear that the transfer of the patient was expedient to the tertiary hospital once the spreading nature of the cellulitis had been noted, and the patient ultimately was in the operating theatre within 5 hours of her arrival at the tertiary hospital for her first debridement.

Case 11: Delayed diagnosis of mesenteric ischaemia due to concerns regarding contrast nephropathy

General Surgery

CASE SUMMARY

An 81-year-old man with multiple comorbidities, including atrial fibrillation and type 2 diabetes, presented with several days of worsening abdominal pain. A small bowel obstruction was initially suspected, and abdominal CT was performed at 23:30. This showed severe aortic atherosclerosis, no transition point and no evidence of ischaemia. The patient was noted to have an elevated lactate and this, coupled with the atherosclerosis shown on CT and the atrial fibrillation (without anticoagulation), led the surgical team to suspect mesenteric ischaemia. A request was made for CT angiography at 02:00. The radiology trainee on duty that night was concerned that a further dose of contrast could precipitate contrast nephropathy and declined to perform the CT angiogram.

The following morning, the lactate had increased further despite fluid resuscitation, and CT angiogram was re-requested with the consultant radiologist. This was performed at 08:30 and demonstrated thrombus within the proximal superior mesenteric artery. There was also evidence of mesenteric ischaemia, with the development of pneumatosis intestinalis.

A combined General and Vascular Surgery procedure was undertaken in which a superior mesenteric artery thrombectomy was performed and 190 cm of ileum was resected.

A planned second-look laparotomy was performed the next day, and a further section of ileum was resected. A planned third laparotomy was performed 2 days later and at this procedure, the remaining small bowel was seen to be viable and was re-anastomosed.

The patient was initially managed in ICU and then transferred to the ward and appeared to be recovering well. On the fourth day after the third laparotomy, he was unexpectedly found collapsed on the floor adjacent to his bed. The patient had stated, during a goals-of-care discussion, that he did not wish to receive CPR in the event of an arrest. In keeping with his request, resuscitation was not commenced and the patient was certified as dead.

DISCUSSION

The standard of surgical care appears to have been excellent in this case. The only area of consideration was the delay in obtaining the CT angiogram. The radiology registrar was wrong in their assessment of the competing risks to this patient – those risks being contrast nephropathy vs delayed diagnosis of mesenteric ischaemia. Contrast nephropathy is of concern in a diabetic patient. However, estimated glomerular filtration rate was 61 mL/min/1.73m^2 at presentation and with adequate fluid resuscitation the risk would not have been particularly great in this case. The risk of mesenteric ischaemia, however, was very high after assessing the clinical situation (atherosclerosis, atrial fibrillation and elevated lactate). Any delay in treating mesenteric ischaemia is to be avoided. It is arguable whether this delay of about 6 hours would have made any difference to the extent of the small bowel resected.

It seems unlikely that the delay in surgery was a factor in the patient's sudden collapse and death, which occurred a week following their first operation and 4 days following their last.

CLINICAL LESSONS

When the radiology registrar declined to carry out CT angiography and the surgical registrar remained seriously concerned about mesenteric ischaemia, discussion at consultant level would have been appropriate, even in the middle of the night. In planning surgery, the information obtained nowadays from this readily available investigation is invaluable.

Case 12: Delayed postoperative antibiotic therapy in a patient admitted for elective JJ stent removal

Urology

CASE SUMMARY

A 56-year-old woman residing in a high-level-care nursing home with multiple comorbidities including morbid obesity (BMI 60), schizophrenia, type 2 diabetes and chronic lymphoma was electively admitted for removal of left-sided JJ stent and ureteroscopy/stone extraction. The patient was admitted 4 weeks prior with pyelonephritis/sepsis with left mid-ureteric calculus and a JJ stent was inserted. At the time, the patient was quite unwell with pyelonephritis, and the urinary culture isolated extended spectrum beta lactamase (ESBL) in addition to a preadmission-identified *Candida* infection.

The patient was given IV fluconazole and piperacillin/tazobactam at induction and underwent ureteroscopy and pyeloscopy, but the previously reported ureteric calculus was not identified. Debris was encountered. Ureteroscopy was reported as uncomplicated. A decision was made not to reinsert the JJ stent in view of the patient's mental health and body habitus, and it was deemed that she would not be able to tolerate a flexible cystoscopy (in stirrups) under local anaesthesia for stent removal. Instead, a ureteric catheter was placed attached to an IDC. Of note, postoperative antibiotics were not continued.

While on the ward, the patient became unwell with symptoms suggestive of sepsis at 05:00 with tachycardia and rigor. The on-call doctor was notified, and the patient given IV ceftriaxone and fluids. A COVID-19 test was negative. The Urology team later saw the patient and changed her antibiotics from IV ceftriaxone to IV fluconazole and piperacillin/tazobactam. By this stage, the ureteric catheter had fallen out. The patient's condition continued to deteriorate, and she was transferred to ICU for inotropic support later that afternoon. Sepsis was treated with IV meropenem, fluconazole and caspofungin. A CT intravenous pyelogram was performed. The treating team documented that there was absence of obvious obstruction and a JJ stent was not reinserted. The formal report identified mild left-sided hydronephrosis in the ureter and the stone was not observed. It was reported that there was 'relative reduced enhancement of the left inferior pole in keeping with renal obstruction'. However, the patient's condition continued to deteriorate and in the early hours the following morning, the patient was taken to theatre for stent reinsertion. Over the ensuing days, the patient's condition deteriorated further. Eventually, the family requested palliative care rather than further medical intervention, and the patient later died.

DISCUSSION

Given the patient's significant comorbidities and the fact that she was quite sick upon her initial presentation 4 weeks prior with pyelonephritis and ESBL cultured from urine, it would have been prudent in this case for the patient to have been observed very closely postoperatively and given appropriate postoperative antibiotics for at least a period of 24 hours. In this case, the patient was only given antibiotics during induction and when she became septic. The on-call team did not know the patient's previous history and did not prescribe the appropriate antibiotics, delaying the patient's treatment at the onset of sepsis, which may have been critical.

The decision not to replace the JJ stent post ureteroscopy and the desire to avoid another procedure in view of the patient's comorbidities was understandable. However, given the patient's history of pyelonephritis, ureteroscopy and pyeloscopy, it could be argued that, to err on the safe side, a JJ stent should have been inserted and may have prevented the sepsis and death that eventuated. Clearly, there is no guarantee that a replacement stent could have changed the outcome for this patient.

The surgical team were probably concerned enough regarding the possibility of obstruction to warrant placement of a ureteric catheter. This concern could have prompted reinsertion of a JJ stent at this point.

Once it became obvious that the patient was becoming septic, one could argue that a JJ stent should have been reinserted without delay. This could have altered the chain of events that followed. There appeared to be discrepancy as to whether there could have been an element of obstruction or not based on the formal CT report and what was interpreted by the Urology registrar and the consultant concerned.

CLINICAL LESSONS

The patient had died from sepsis as a result of what appeared to have been a simple ureteroscopy/pyeloscopy. However, the patient did have very significant comorbidities. Although the mortality was not inevitable, it was probably not unexpected under the circumstances. The question as to whether a JJ stent should have been inserted at the time of the initial ureteroscopy or whether it should have been reinserted very soon afterwards when the patient was becoming septic is debatable. Appropriate IV antibiotics postoperatively with careful monitoring of the patient on the ward may have prevented severe sepsis subsequently leading to death.

Case 13: Death from untreated large bowel obstruction

General

CASE SUMMARY

A 57-year-old woman was transferred from a regional hospital to a tertiary centre with a large bowel obstruction. CT scans demonstrated a large pelvic mass. She had undergone a laparoscopic resection with endometrial cancer followed by postoperative brachytherapy to the vaginal vault 6 months previously. The patient was morbidly obese with a BMI of over 40. She was given aperients in the tertiary centre and her bowels had started to work. She was transferred back to the regional hospital for consideration of a workup with colonoscopy.

While at the regional hospital, she remained obstructed and developed fevers with signs of sepsis. There was a suggestion she may have had a pulmonary embolism, and she was transferred back to the tertiary centre around 48 hours later.

Upon return to the tertiary centre, a CT pulmonary angiogram excluded pulmonary embolism. She was found to have clostridial bacteraemia and IV antibiotics were commenced. The patient was slowly prepped for a colonoscopy, which was performed 2 days following her readmission at the tertiary centre. The colonoscopy report showed that the surgeon (using a paediatric scope) found no mucosal abnormality, but there was a submucosal lesion causing compression within the rectum. The scope could not be safely passed above this area due to compression. The surgeon, in the notes, advised that the patient could continue with a light diet and arranged for an MRI of the pelvis. An operation was being considered for the following week based on the imaging obtained. A gynae-oncology review was obtained, and a note from an oncology Fellow stated that it was unlikely the pelvic mass was related to the previous endometrial malignancy.

The following day, the patient had increasing abdominal pain. She was sent for a chest X-ray, which was not performed at that time as the patient was unable to lie down because of severe pain. A chest X-ray performed later did not show any free gas to suggest a perforation. An MRI scan was also performed although no formal report was available until 4 days later. Over the next few days, there were notes made by junior medical staff showing increasing pain relief required to help with the abdominal pain. The patient's bowels continued to work intermittently. WCCs gradually increased over the week and the CRP, which was 161 mg/L at readmission, had risen to 329 mg/L 4 days later. The patient described severe pain when moving and turning in bed, which was noted on a ward round report.

One week after initial presentation, the patient rapidly deteriorated. She was transferred to ICU where a provisional diagnosis was made of septic shock, presumably from bowel perforation. Despite intensive treatment, the patient never recovered to the extent that an emergency operation could be considered. A note was made that a postmortem report stated the patient died from bowel obstruction although there was no perforation or ischaemic gut identified.

DISCUSSION

This patient should not have died. From reading the notes and pathology reports, a picture is apparent of a patient who had an unrelieved bowel obstruction with increasing abdominal pain and symptoms of peritonitis. Her WCC and inflammatory markers were steadily increasing throughout the time of her admission. There is little doubt this patient suffered a recurrence of her uterine cancer, leading to bowel obstruction and clostridial bacteraemia.

There are many aspects of this woman's care that could have been improved upon.

Firstly, the patient should not have been transferred back to a regional hospital while there was still a working diagnosis of a large bowel obstruction due to an image-detected pelvic mass. A colonoscopy should have been attempted on the first admission to the tertiary centre.

Secondly, when the patient returned to the tertiary centre, there appears to be a concerning lack of oversight by consultants. After reviewing the patient's admission in the week preceding her demise, one can only see one documented time where a consultant saw this patient. This was when the colonoscopy was performed. It is not documented whether consultants did review this patient at other times.

It was also concerning to note that the formal report for the MRI scan performed upon readmission to the tertiary centre was not available until 4 days after the imaging had been completed despite the seemingly urgent request for the imaging in the context of a deteriorating patient with an evolving large bowel obstruction.

CLINICAL LESSONS

This patient would not have been easy to assess. Despite her complaints of increasing pain, her baseline parameters (including pulse, blood pressures, temperature) remained unchanged up to her collapse. Her biochemical and inflammatory markers, however, tell a much different tale. There is no doubt that this patient would not have died during the episode of care if a defunctioning stoma was brought out soon after her attempted colonoscopy. The lack of consultant involvement with this patient's care is concerning, as is the lack of

escalation of care for the patient who complained of increasing abdominal pain and who had increasing WCCs and a markedly abnormal CRP. The hospital's inpatient management practices should be reviewed, especially consultant oversight and the ability of more junior doctors to recognise deterioration and escalate care as required.

Abbreviations

BMI	body mass index
CPR	cardiopulmonary resuscitation
CRP	C-reactive protein
CT	computed tomography
DVT	deep vein thrombosis
ED	emergency department
ESBL	extended spectrum beta lactamase
HDU	high dependency unit
ICU	intensive care unit
IDC	indwelling catheter
INR	international normalised ratio
IV	intravenous
LFT	liver function tests
MRI	magnetic resonance imaging
NGT	nasogastric tube
NOF	neck of femur
TED	thromboembolic deterrent
THR	total hip replacement
TURP	transurethral resection of the prostate
VAC	vacuum-assisted closure
VMO	visiting medical officer
WCC	white cell count

Notes

Notes

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