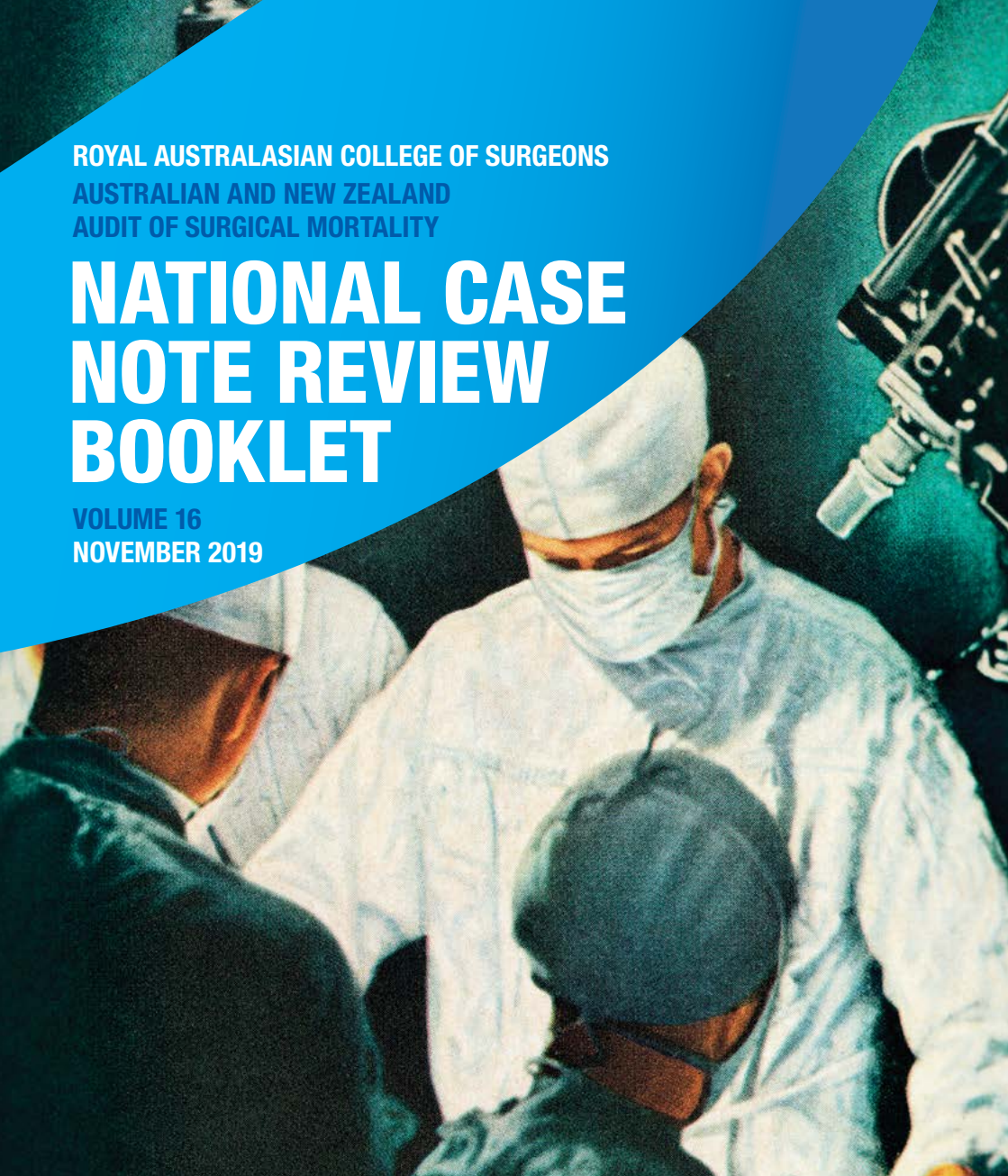


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Excellence in Women's Health





Royal Australasian College of Surgeons
Australian and New Zealand Audit of Surgical Mortality
199 Ward Street
North Adelaide SA 5006

Telephone: +61 8 8219 0900
Facsimile: +61 8 8219 0999
Email: ANZASM.RACS@surgeons.org
Website: <http://www.surgeons.org/anzasm>

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Chairman's Report

The most recent Case Note Review booklet highlights some of the issues that face surgical practice on a daily basis. A number of the cases demonstrate poor communication within the surgical team which lead to fatal outcomes. This can be further compounded by a lack of well thought through coordination of the resources available to help manage patients, particularly as they become complicated and their condition deteriorates, and finally the lack of well kept medical records is a recurring problem identified by the audit.

While all of us try to pursue high quality communication, it is an area that needs constant attention and one should be aware of occasions when this is less than ideal. Poor communication does not always lead to disastrous outcomes but it can be a significant contributing factor. As the surgeon in charge of the care of our patients, trying to coordinate all aspects associated with the optimal outcome is a vital task. With rosters that are often now substantially shorter than in the past, and consultant involvement often very piecemeal particularly in public hospitals, and even in the private sector where in-hospital medical staff are available, the need to coordinate the team caring for the patient is a vital role for the surgeon responsible. Mostly this is done well, but a number of the cases in this booklet highlight the catastrophic outcomes that can occur when it breaks down.

High quality medical records are vital, not only for the care of the patient but also to protect the surgeon from subsequent medico-legal litigation. It is when a poor outcome occurs that the quality of the medical record becomes much more apparent. While copious record keeping is not required, accurate and relevant record keeping is and this is often lacking in many of the cases reviewed by the Audit of Surgical Mortality. Greater care needs to be applied to this and, as many medical defence organisations will tell their members, if it hasn't been recorded then it didn't occur.

Finally, the overall need for a team approach to the care of the patient is becoming increasingly relevant as our interventions become more complex, our patients have greater comorbidities and the options for treatment continue to enlarge. Already surgical care has taken on board the multi-disciplinary team meeting for determining the care plan for complex patients, however this team approach sometimes evaporates as the patient progresses through the hospital stay. The best way to ensure a team approach continues is still not entirely clear, however if one can improve coordination, communication and

record keeping then this will go a long way to ensuring the team responsible for the patient is fully informed and optimal management is occurring.

As always, any constructive feedback is gratefully received and I trust that these Case Note Review booklets provide salutary warnings to us all about the potential problems that can befall our patients if our attention to detail is compromised.

A handwritten signature in black ink, appearing to read 'Guy Maddern'. The signature is fluid and cursive, with a large initial 'G'.

Guy Maddern

Chair, Australian and New Zealand Audit of Surgical Mortality (ANZASM)

ANZASM Clinical Editor's perspective

The 16th booklet again includes cases from various states and territories, and forms part of the feedback process that is seen as essential in the quality improvement processes of the audits of surgical mortality. A national booklet is produced to provide a wider readership for cases from various states and territories. It also assists smaller states and territories that do not have enough cases, or may have difficulty in adequately de-identifying cases, for their own regional booklet.

The broad theme for the cases in this book relates to postoperative care. While the circumstances of each case are different, many of the themes presented are applicable to all specialties.

A recurring problem highlighted by these cases is that of inadequate communication.

Communication problems can be in the form of poor and ineffective recordkeeping, inadequate documentation or the lack of a clear coherent narrative in medical records and can occur between all levels of treatment providers.

The cases highlight the potentially serious effects of poor communication, including delayed diagnosis, leading to delayed intervention, and ultimately contributing to an adverse outcome.

There is an emphasis on the importance of early and meticulous postoperative assessment, thorough daily examination of patients, and clear, accurate communication to ensure early recognition, diagnosis and treatment of postoperative problems and complications. In some cases, assessors felt that early consultant input could have reduced the risk of delays in diagnosis and intervention through more timely recognition of the problems of fluid balance, postoperative bleeding, and leakage of bowel anastomoses.

Some cases have been edited to focus on a few points in a complex story or to reduce the length of the report. There is variability in the writing style as the text is, in general, written by assessors and treating surgeons and not by the editor.

There may be cases where readers do not entirely agree with the assessment and comments, but if we have stimulated you to think about the case we have succeeded in our aim. Correspondence and questions about specific cases

are welcome, and while the ANZASM cannot provide identifying information, we are able to provide more context and detail than we have in this booklet.

The real authors of this booklet are the treating surgeons, the Clinical Directors, and the first- and second-line assessors. It is to them we owe our thanks. Without their contribution, this booklet would not be possible.

Our primary aim has been to promote education and peer-review through the ANZASM, for a thorough knowledge of lessons from the past provides the foundation to protect our future. I encourage you to learn from these cases.



Tony Pohl

Clinical Director, South Australian Audit of Surgical Mortality (SAASM)

Clinical Editor, National Case Note Review Booklet, ANZASM

Recommendations

1. In all cases there needs to be clear, demonstrable leadership in patient management. There should be regular team meetings involving all disciplines to ensure that the treatment plan is understood by all.
2. Time delays are to be minimised, particularly for patients with disabilities and limited physiological reserves. Time delays for these patients can significantly affect the early recognition and appropriate treatment of surgical complications.
3. Communication remains one of the most critical factors in the delivery of safe, high-quality patient care. Good communication between surgical colleagues, other specialists, junior staff, nursing staff and allied health staff remains a cornerstone of quality care.
4. All clinicians should provide clear and relevant records. A clear, coherent narrative in medical records can optimise communication between all levels of treatment providers.
5. Certain surgical patients are more susceptible to developing infection. These patients should be identified and stringent infection control care should be considered. Improvements can be achieved by focusing on strengthening current guidelines for infection control procedures, especially hand washing, revision of existing infection control training and adherence to patient care protocols. Consulting with and following the advice of infectious disease staff is crucial to minimising infection rates and complications.
6. Patients treated with chemoprophylaxis for thromboembolic disease require early, active monitoring to prevent early venous thromboembolism resulting from inadequate treatment, or early or later postoperative bleeding due to overtreatment. Patients should be discharged to and from the ward with comprehensive orders, including preventative measures for reducing complications.
7. Consultants should provide appropriate early postoperative assessment and meticulous daily examination of patients to ensure early recognition and diagnosis of postoperative complications.

8. Consultants should be actively involved in the care of their patients, including the decision-making process. They have an obligation to make personal entries in the case records of the reasoning behind their decisions.
9. Consultants should ensure that optimal fluid balance is maintained in patients through accurate monitoring of all fluid intake, measurement of urinary output by means of urinary catheterisation when necessary, and early review of vascular observations to prevent missed or mistaken postoperative diagnoses.

Case Studies

Case 1: Poor communication complicates management of a small bowel obstruction

General Surgery

CASE SUMMARY

A female patient in her early eighties with a history of hysterectomy, appendicectomy and right hemicolectomy was admitted for surgical treatment of a small bowel obstruction, following five previous episodes which had all been managed conservatively. An initial computed tomography (CT) scan of the abdomen indicated a dilated small and large bowel proximal to a lesion at the splenic flexure, and a barium enema suggested the presence of carcinoma. At laparotomy, adhesiolysis as well as ileocolic and small bowel resections for an obstructing carcinoma of the splenic flexure were performed, and the patient was subsequently admitted to the intensive care unit (ICU).

Following two days in ICU, the patient was discharged to the ward, reporting intermittent periods of abdominal pain through to 12 days postoperatively. A CT scan indicated an anastomotic leak, which was treated conservatively. By 14 days postoperatively, the patient had become short of breath, hypotensive and tachycardic. An emergency laparotomy revealed faecal peritonitis with faecal leak from the ileocolic anastomosis. A further bowel resection and the formation of an end ileostomy was performed, and the patient was returned to ICU. Following this last operation, the patient developed a right-sided hemiplegia as well as ongoing systemic sepsis. After discussion with the family, palliative care was undertaken with the patient dying shortly after.

CLINICAL LESSONS

This patient was admitted with a bowel obstruction from a radiologically-documented carcinoma of the splenic flexure. Despite that radiological diagnosis, the patient was further investigated but did not undergo surgery until seven days after admission. There was no obvious reason for the delay in surgery, nor was it clear why the patient should have a bowel preparation despite the radiological evidence of a large bowel obstruction with small bowel fluid levels.

When considering the first operation, one would question the decision to perform an anastomosis given the length of time that the patient had been obstructed, and the operative findings of a grossly distended small bowel verging on ischaemic. A resection with end ileostomy would have been the most appropriate procedure.

Conservative treatment of intraperitoneal anastomotic leakage, unless associated with a well-established fistula, is not associated with positive outcomes. The reluctance of the patient to undergo further surgery was noted, however the patient was prepared to undergo surgery when predictable failure of conservative therapy occurred. The consequences of the decision not to operate should have been more strongly discussed.

A clear hierarchical decision-making pathway for this case was not evident. The reason for the delay to surgery was not evident and an absence of detailed medical records complicated evaluation of these issues.

Case 2: Inappropriate anticoagulation following periurethral injection precipitates development of periurethral haematoma and necrosis

Urology

CASE SUMMARY

A patient in her late eighties was admitted to a regional hospital on an elective urology list for a suprapubic catheter (SPC) change. Several weeks previously the patient had been over-anticoagulated in response to a urological procedure she had undergone, resulting in the development of a haematoma and pressure necrosis injury to her urogenital tract, which required the insertion of an SPC. The procedure was carried out seemingly without further incident and the patient discharged.

The patient re-presented to the regional hospital emergency department (ED) later that same evening at 11:00pm. An abdominal CT scan demonstrated a ruptured viscus and the SPC lying freely within the abdomen. By 4:30am the following morning the patient had been accepted for transfer to a metropolitan hospital. Transfer was not arranged until business hours. Upon arrival at the ED of the metropolitan hospital, the patient was admitted by the on-call general surgeon *in absentia* having been informed that the transfer was agreed to by the treating urologist, and that the patient was haemodynamically stable.

Following admission, two phone calls were made to the general surgeon by urologists from the regional hospital requesting urgent review of the patient, as the CT scan images were inconsistent with a ruptured bladder. Subsequent review by the general surgeon determined the patient to be suffering from peritonitis and haemodynamically compromised. She had been poorly resuscitated and in septic shock. The patient was resuscitated and taken to theatre.

Laparotomy revealed that the patient had four quadrant faeculent peritonitis resulting from a perforated sigmoid colon with the SPC outside the bladder and lying freely within the pelvis. A Hartmann's procedure was performed, and bladder repair undertaken together with the original treating urologist. The patient was stable throughout and was discharged back to the regional hospital ICU.

Upon admission to the regional hospital, the patient began to deteriorate despite the efforts of the ICU staff, and the decision was made (in consultation with the family) to commence palliative care. The patient died the following day.

CLINICAL LESSONS

The initial assessment of this case suggested that the management of this patient's incontinence was appropriate. However, the subsequent problems seem to have occurred largely due to the erroneous decision to recommence anticoagulation following a periurethral injection and the subsequent delay in communicating this to the consultant surgeon. Once the patient started bleeding, insertion of an SPC was inevitable, precipitating the subsequent events.

The initial lack of effective communication between the various parties hampered the effective management of this patient. Communication issues between the surgical registrar and the treating surgeon from the regional hospital were apparent, as were communication issues within the regional 'team' (i.e. general practitioners and regional hospital) in identifying and informing the treating surgeon of the development of bleeding issues in the patient following her initial procedure.

Upon the patient's arrival at the metropolitan hospital, a number of delays in diagnosis and subsequent treatment also occurred which can in part be attributed to poor communication. There was an approximate 4-hour delay between the CT scan findings being available and the initial call with the general surgeon, and a 10-hour delay between the arrival of the patient and eventual surgery. Amidst all this, it was documented that a verbal CT scan report had been provided to the general surgeon but that this did not affect the final timeline of this patient.

Once a formal diagnosis had been made and surgery initiated, the management of this patient was entirely appropriate. Regrettably, by the time of the patient's final procedure her physiological reserve had been exhausted.

Case 3: Coordination of care

General Surgery

CASE SUMMARY

An elderly male was admitted following a three-day history of abdominal pain and vomiting, related to a small bowel obstruction caused by a strangulated inguinal hernia. The patient had been seen six months earlier with a symptomatic hernia and a decision was taken at that time not to proceed with surgery. He had significant comorbidities, including atrial fibrillation for which he was on dabigatran.

Upon surgical review, the patient was scheduled for surgery the following morning undergoing a laparotomy for small bowel resection and repair of the inguinal hernia. The patient was discharged to the high dependency unit (HDU) without incident.

Postoperatively the first few days were uneventful. The patient then developed an ileus and vomiting with aspiration. On the seventh day postoperatively, surgical recovery was progressing satisfactorily, but severe fluid overload was evident with congestive heart failure. Dabigatran, having been ceased preoperatively, was recommenced. Several days later, locum physician review of the patient resulted in the dose of frusemide being doubled to 80mg intravenously twice a day. A single dose of gentamicin (320mg) was administered for gram negative organisms identified in a sputum culture. This precipitated acute nephrotoxicity over the ensuing days during which the patient remained on the usual dose of dabigatran.

Five days later, the patient's blood pressure fell and a melaena stool was passed shortly thereafter. The patient became haemodynamically unstable, prompting a gastroscopy which detected no abnormality. The patient developed severe coagulopathy and bleeding continued. Following discussion with the family, who said they wanted everything possible done, the locum surgeon on call undertook a laparotomy for resection of the anastomosis and performed an ileostomy. However, postoperative bleeding continued, and the patient died the following day.

CLINICAL LESSONS

Following appropriate resuscitation, surgery for a strangulated hernia should be undertaken promptly and not deferred until the following day.

Communication between treating teams is important to ensure coordination of care and that everyone is 'on the same page'. In this case, communication between the primary treating clinicians and the locum clinicians, who were overseeing care at the weekend, was of particular importance and less than ideal.

Management of anticoagulants should be meticulous and appropriate protocols must be followed, including daily review of the patient's coagulation status and anticoagulant requirements. At various times, the patient was receiving both dabigatran and subcutaneous heparin.

Opportunities should be taken to initiate early discussions regarding resuscitation and end-of-life considerations with the patient and family and/or carers, when this is considered appropriate.

Case 4: Delay in draining infected haematoma following revision hip surgery

Orthopaedic Surgery

CASE SUMMARY

A female in her late seventies with multiple medical comorbidities underwent revision hip surgery for recurrent dislocation, at a tertiary teaching hospital. One week postoperatively, she was transferred to a metropolitan hospital for ongoing rehabilitation. She was known to have a haematoma which was being treated with intravenous antibiotics via a peripherally inserted central catheter. Seventeen days post-admission, a 75ml collection of bloody fluid was drained from around the hip under ultrasound guidance. The patient appeared to be slowly settling clinically and she was discharged home 11 days later with ongoing antibiotic therapy.

One week after discharge, she was readmitted to the same metropolitan hospital via primary care, being febrile and tachycardic. Although the hip wound was noted to be healed and not erythematous, it was warm to touch. An initial diagnosis of pyrexia of unknown origin was made and a series of investigations were carried out. The following day, an ultrasound of the hip revealed a large collection of fluid around the hip joint. Later that night, two medical emergency team (MET) calls were required as the patient was increasingly febrile, hypotensive and tachycardic.

The patient was resuscitated overnight, and the following morning was transferred to the original tertiary teaching hospital where a prompt washout of the hip joint was carried out. The patient was managed in a critical care unit (CCU) postoperatively but died four days later from multiple organ failure.

CLINICAL LESSONS

The decision to wash out a haematoma around a hip is not always a straightforward procedure in high-risk patients. This patient did appear to be making slow but steady clinical progress with a relatively conservative approach which would support this initial management. Upon readmission almost six weeks after the revision hip replacement, the patient was clearly unwell with a high temperature and tachycardia, and in the absence of any other source of clinical infection the hip joint would have been the likely source

of the sepsis. A prompt early transfer to the tertiary teaching hospital may have enabled an earlier washout of the infected hip, providing the possibility of a more positive outcome.

Case 5: Inadequate review and communication by junior medical officer following a change in clinical condition

General Surgery

CASE SUMMARY

A male in his mid-seventies was admitted electively to undergo an Ivor Lewis Oesophagectomy due to his oesophageal cancer. The patient had a history of gastric reflux and Barrett's oesophagus, multiple carcinoids, Parkinson's disease, hypertension and atrial fibrillation, pulmonary embolism, and had previously been operated on for a hernia repair. The procedure was uneventful, and the patient was discharged to the ward where his recovery progressed smoothly for the next 10 days.

On the morning of the tenth day postoperatively the patient complained of abdominal pain which upon examination was found to be unremarkable, and blood test results were normal. That afternoon, the patient developed hypotension, but again appeared otherwise normal and was asymptomatic (no tachycardia or tachypnoea). No overnight monitoring of the patient took place. In the early hours of the eleventh morning there was a MET call, as the patient was hypotensive, and had developed tachycardia and tachypnoea. There was no evidence of an abdominal examination being performed by the evening medical officer, nor any discussion about hypotension with a senior doctor. Subsequent chest X-ray identified free gas under the diaphragm, and the patient was readmitted to the operating theatre for emergency laparoscopy. Intraoperatively it was observed that the patient had a perforated jejunum, with small bowel contents present in the abdomen. A small bowel resection was performed, and the patient discharged to the ICU.

Despite being managed with supramaximal doses of vasopressors and placed on dialysis, the patient continued to deteriorate and remained hypotensive, profoundly acidotic and in acute respiratory distress. In this instance the patient had an advance care directive in place, therefore active treatment was withdrawn, and the patient quickly succumbed.

CLINICAL LESSONS

This case was characterised by inadequate communication between medical personnel, lack of consultant input, and was exacerbated by poor and ineffective record keeping. Upon assessment it was reasonable, given the superficial nature of the case notes, to question whether the patient was adequately reviewed prior to night handover. Additionally, there was no evidence of junior doctors seeking senior clinician input. Of significant concern was the patient's change in clinical condition and the failure of treating staff to determine the differential diagnosis.

The outcome for this patient may well have been different had diagnosis and management occurred significantly earlier than 12 hours after the first hypotensive episode.

Case 6: Decision to perform carotid endarterectomy following neurological deterioration

Vascular Surgery

CASE SUMMARY

A male in his early eighties presented to a regional hospital having experienced left facial droop, and expressive and receptive dysphasia for the past 24 hours. He had a medical history that included peripheral arterial disease and chronic lung disease. It had also been noted that there was a recent history of slow progressive personality change and worsening gait over time.

He was subsequently transferred to a tertiary metropolitan hospital where, upon admission, he was found to be haemodynamically stable, and oriented as to time, place and person. There was no evidence of facial droop at this time, nor of hemiplegia or hemiparaesthesia. An admission CT scan demonstrated a right parieto-occipital cortical and subcortical hypodensity, suggestive of subacute ischaemia or infarct. Consequently, the patient was commenced on aspirin, clopidogrel, and atorvastatin. The following day it was confirmed that the patient had suffered a middle cerebral artery stroke but was otherwise neurologically stable.

Over the next two days, a CT angiogram identified the presence of bilateral high grade stenoses of the internal carotid arteries and a right parietal infarct. Additionally, an echocardiogram revealed posterior akinesis with mild systolic dysfunction and mild mitral regurgitation. The patient was scheduled for surgery, where he underwent a right carotid endarterectomy and polyurethane patch angioplasty. He was discharged to ICU without incident.

Upon admission to ICU, the patient became hypotensive and subsequently experienced an acute myocardial infarction. Intravenous heparin was administered. The following day the patient appeared neurologically stable, though still requiring significant inotropic support. Some difficulty in swallowing was noted. The patient was changed from heparin to subcutaneous enoxaparin.

The patient's swallowing difficulty worsened, and a nasogastric tube was sited, while prolonged drowsiness was noted over the next several days. A follow-up echocardiogram indicated a mild decrease in left ventricular function, and cardiology review noted that the patient had experienced a non-ST-elevation myocardial infarction (NSTEMI) and was tentatively scheduled for an angiogram.

The patient's drowsiness alleviated over the following days, though episodes of transient confusion were noted, as well as hallucinations and ongoing delirium. By the tenth day post-admission, the patient had developed left-sided weakness and a decline in speech. A CT scan revealed extension of the infarct in the penumbra region, but no evidence of an acute bleed.

By day 12 post-admission, the patient was discharged to the ward. Coronary angiogram indicated moderate three vessel disease which could be managed conservatively. By day 15 post-admission the patient's conscious state had further deteriorated and a repeat CT scan revealed the presence of a new infarct in the right centrum semiovale. It was noted at this time that the patient was 'not for resuscitation' in the event of acute deterioration. The patient's clinical state remained unchanged for the next several days, and by day 21 the patient (in consultation with the family) had been transitioned to full palliative care. On the 26th day post-admission, the patient died.

CLINICAL LESSONS

This patient suffered a progression of his stroke symptoms on day four postoperatively, the risk of which is higher when operating on acute carotid pathology. It seems clear that this progression was related to unstable cerebral perfusion and his pre-morbid status.

Postoperatively, after the patient had deteriorated neurologically a coronary angiogram was still performed despite the fact that he was obviously unstable neurologically with propagation of a (preoperative) cerebrovascular accident postoperatively. The potential benefits of this angiogram are dubious, given the risk to the patient. He subsequently deteriorated following this procedure.

The current recommended role of acute intervention for symptomatic critical carotid disease is to prevent early stroke but it carries a higher perioperative risk. Given this, the (inappropriate) use of postoperative coronary intervention in a patient with deteriorating neurological status associated with vascular instability should be considered with caution.

Case 7: Postoperative pulmonary embolism following resection of rectal carcinoma

General Surgery

CASE SUMMARY

A male in his late seventies had been diagnosed with rectal carcinoma with liver metastasis nine months prior to his death. At the time he underwent formation of a transverse colostomy and subsequent chemotherapy and radiotherapy, resulting in complete clinical response in local disease and partial clinical response in distal disease. Six months later, he developed local recurrence of the disease, while his liver disease remained stable. It was determined that a palliative abdominoperineal resection of the local disease would be performed for symptomatic control. The procedure was performed without incident, although the patient was noted to be hypotensive in recovery, requiring a bolus admission of crystalloid fluids on three occasions, delaying discharge to the ward for eight hours.

During the procedure a sequential compression device and thromboembolic deterrent stockings had been used. Subsequently unfractionated heparin was prescribed upon discharge to the ward. The patient's postoperative clinical course was uneventful until the third day, when the patient complained of chest pain, as well as displaying tachycardia and tachypnoea. Electrocardiogram (ECG) was unchanged. By that evening, the patient was clearly agitated, resulting in a MET call being made. Despite complaining of pleuritic chest pain, cursory examination indicated that the patient was seemingly normal with no diagnosis being made nor treatment initiated. Early the following morning the patient's chest pain became severe, and morphine and nebulised salbutamol were prescribed. Subsequently, a Code Blue was called, and the patient died shortly after.

CLINICAL LESSONS

In this particular case there was no evidence of any issues associated with the decision to perform this procedure, nor with the patient's pre- or intraoperative care. Although the death was reported to the Coroner at the time, no postmortem examination was ordered. However, it seems highly likely that the cause of death was pulmonary embolism. Given the short time between symptoms first appearing and the patient's subsequent demise, it seems

improbable that any reasonable intervention could have altered the course of events. In the context of palliative surgery, invasive treatment of pulmonary embolism would not have been appropriate, and anticoagulation alone would not have prevented an event which occurred only hours later (appropriate prophylactic measures had been taken).

In retrospect, the diagnosis was relatively clear at the time of the MET call, when pleuritic chest pain was noted, and a cardiac cause had been excluded. Although treatment initiated at this time would not have altered the eventual outcome for the patient, it might have done so in a different situation. Even in the presence of appropriate prophylaxis, venous thromboembolism remains a significant postoperative risk, and clinical suspicion of this problem must remain high in this scenario.

Case 8: Anticoagulants require careful monitoring

Cardiothoracic Surgery

CASE SUMMARY

A male in his mid-seventies was admitted to hospital for removal of three basal cell carcinomas on the leg, foot and arm, for which he underwent a 60-minute general anaesthetic. The patient had undergone a coronary artery bypass graft 25 years prior, with graft occlusion noted on an angiogram one year previously. Recent cardiac evaluation demonstrated an ejection fraction of 33% and moderate global impairment of systolic function. The patient was taking warfarin for atrial fibrillation, which was ceased four days prior to admission. The operation proceeded uneventfully.

On the morning following surgery, the patient was seen by the surgeon and was feeling well. Enoxaparin (40mg) was administered subcutaneously. Shortly after, the patient complained of left-sided chest pain, which together with an abnormal ECG, was consistent with angina. Following cardiology review, he was commenced on clopidogrel (300mg) and aspirin (300mg). A heparin infusion was commenced that afternoon with a bolus of 5000 units followed by a continuous infusion. The initial activated partial thromboplastin time (aPTT) was 180 seconds, but there was uncertainty as to its validity as the blood was taken from the arm with the heparin infusion. A repeat aPTT an hour later was 119 seconds, and the rate of heparin infusion was reduced. Around this time, plasma troponin levels were found to be elevated.

A few hours later in the early evening, the patient became verbally aggressive and restless and was further reviewed, settling following a phone conversation with his wife. By late evening the patient's condition had markedly deteriorated, and he was readmitted to ICU where he continued to deteriorate. A brain CT scan showed a massive cerebral haemorrhage with significant midline shift. The patient died in the early hours of the following morning.

CLINICAL LESSONS

Review of this case was complicated by the lack of a clear and coherent narrative in the medical records. Documentation was inadequate with some clinical notes being written in retrospect.

The inadequacies with regards to medical record keeping may have contributed to the problems that eventuated with attempts at anticoagulation. Heparin dosage did not follow protocol, while enoxaparin, aspirin, and clopidogrel all were administered within one hour of each other.

When considering the administration of heparin, it is important to consider baseline haemoglobin, platelet count, coagulation profile and renal function before proceeding, and to tailor the dose accordingly. Vigilance in the monitoring of the coagulation levels is required, as well as prompt attention when levels are inappropriate. This should be accompanied by regular and careful ongoing review of the medical and medication charts.

Case 9: Elective right hemicolectomy: look before it is too late

General Surgery

CASE SUMMARY

A female in her mid-sixties was admitted to hospital electively to undergo a right hemicolectomy for a recently diagnosed carcinoma of the right colon. She had previously undergone a radical hysterectomy and chemotherapy for ovarian cancer, and had comorbidities of hypothyroidism, asthma and chronic airways disease, chronic kidney disease, type 2 diabetes, and was morbidly obese.

The procedure was initiated laparoscopically through a previous midline laparotomy scar, with extensive adhesiolysis performed. A standard right hemicolectomy was performed, and an anastomosis performed between the terminal ileum and the right colon without incident. It was noted that there was a haematoma present in the small bowel mesentery. The patient was discharged to the ward without incident.

Over the course of the first two days postoperatively, dropping plasma haemoglobin levels resulted in two separate CT scans which were unable to identify any obvious problems. During this period, the patient was transferred to ICU due to her deteriorating clinical condition. The patient's condition failed to improve, requiring dialysis and re-intubation, and on day 11 a tracheostomy was carried out. A raised white cell count and an absence of bowel sounds contributed to the decision to undertake a re-look laparotomy, which identified the presence of ischaemic bowel and peritonitis. The patient died later that day.

CLINICAL LESSONS

The main lesson from this case is that a return to theatre should have been considered earlier. If a patient is failing to progress after one week with absent bowel sounds, then it would be best to return to theatre promptly.

A CT scan performed five days prior to her eventual return to theatre reported an apparent increase in subhepatic fluid, pleural effusions, and potential signs of ileus or ischaemia. This patient was a high-risk candidate from the outset, however this case may have been salvageable by an early return to theatre. Leakage rate following right hemicolectomies is approximately 4%, increasing with risk factors such as prior surgeries, smoking, previous malignancies and chemotherapy, all of which had afflicted this patient.

Case 10: Fluid balance issues in an elderly patient requiring emergency surgery

Ophthalmology

CASE SUMMARY

A ninety-year-old female presented to the ED in the morning following a fall in her nursing home. She had severe trauma to one eye with a ruptured corneal graft and associated extravasation of ocular contents. The patient's comorbidities included dementia and atrial fibrillation with a fluctuating heart rate. Upon admission, it was intended that she stay in the ED until such time that her atrial fibrillation was brought under control, subject to anaesthetic review. In the meantime, intravenous fluids and digoxin were administered.

Later that same day, anaesthetic pre-assessment observed that the patient had received 5L intravenous fluids and was consequently experiencing fluid overload and acute pulmonary oedema. That evening, the patient was taken to theatre where she arrested upon induction of anaesthesia. Upon resuscitation, it was determined to proceed following Sub-Tenon's block and mild sedation.

Postoperatively, the patient was observed to be experiencing heart failure with fluid overload and respiratory acidosis. Discussion with both ICU and cardiology consultants deemed her unsuitable for admission to either unit, thus she was discharged to the general medicine ward for bilevel positive airway pressure (BiPAP) therapy and telemetry.

The patient was maintained on strict fluid control and BiPAP therapy for the next couple of days, whereupon she had a seizure, deteriorated rapidly with further seizures and developed hypotension. On the fourth day post-admission the patient died of respiratory failure.

CLINICAL LESSONS

This case was plagued by inadequate record keeping with regards to fluid balance and intravenous therapy, particularly as it pertains to a patient with rapid atrial fibrillation. While there was no doubt that this patient required emergency surgery, there were significant comorbidities present which increased the risk of anaesthesia and development of postoperative complications. The limited physiological reserve of this patient was further compromised by poor management of fluid resuscitation. In this instance,

it is possible that the patient had suffered an oculocardiac crisis which was managed inappropriately through intravenous fluid resuscitation, with ultimately fatal consequences.

Case 11: The geriatric polytrauma: postoperative bleeding after a proximal femur fracture

Orthopaedic Surgery

CASE SUMMARY

A female in her nineties was admitted to hospital following a mechanical fall resulting in a spiral subtrochanteric fracture. Her comorbidities included chronic obstructive pulmonary disease, type 2 diabetes and hypertension. The patient underwent open reduction of the subtrochanteric fracture and stabilisation with an intramedullary nail under spinal anaesthesia 15 hours following her initial admission. The procedure occurred without incident, though it was noted that 2L of Hartmann's solution was administered with total blood loss not being documented. The patient was discharged to the ward.

By 10 hours postoperatively, the patient was observed to have had a significant drop in blood pressure, was displaying oliguria, and was hypothermic. An initial diagnosis of mild dehydration coupled with acute renal impairment was made and, following consultation with the medical registrar, treatment was initiated including bolus intravenous fluids, warm blankets, and 50% dextrose solution to address low blood sugar. ECG and plasma troponin ruled out the presence of acute myocardial infarction.

After two hours when the patient's condition had failed to improve, a subsequent diagnosis of fluid overload and hyperkalaemia was made. Intravenous fluids were decreased, then ceased altogether following a MET call. A chest X-ray was ordered, and came back normal, though blood tests indicated decreasing haemoglobin levels. The patient continued to deteriorate, therefore fluids were reinitiated with a subsequent diagnosis of dehydration and hypovolaemia. Geriatrician input was sought. An eventual diagnosis of metabolic acidosis, hypotension and hypothermia was reached. Despite continued attempts at fluid resuscitation, including transfusion of two units of blood, the patient succumbed 26 hours following her surgery.

CLINICAL LESSONS

This case highlights 'geriatric polytrauma', the difficulties in recognising it, and the importance in seeking senior clinician input in a timely manner.

Elderly people, due to the presence of comorbidities and concomitant medications, do not have the same physiological reserve as younger patients. This patient was displaying the 'triad of death', being the signs of advanced shock: she was hypothermic, acidotic and hypotensive. In compensating for the metabolic acidosis by hyperventilating, she unfortunately presented as though she were suffering from fluid overload, rather than hypovolaemic shock.

During the immediate postoperative period, the patient's haemoglobin levels were normal, and it was only after approximately 24 hours had passed that they dropped significantly (resulting in the decision to initiate blood transfusions). During acute haemorrhage, plasma haemoglobin and haematocrit levels may be misleading, as the values do not deviate from normal until redistribution of interstitial fluid into plasma occurs; usually after 12-14 hours. In addition, any fall in haemoglobin is usually secondary to crystalloid infusions and re-equilibration of extracellular fluid into the intravascular space. This patient had received 2L of crystalloid fluids intraoperatively and a further 1.5L postoperatively, rendering standard measures of blood loss unreliable.

Had senior consultant input been obtained following initial review (i.e. 10 hours postoperatively), it is possible that these issues may have been identified earlier.

Case 12: A series of unfortunate incidents: death post-cystectomy

Urology

CASE SUMMARY

A male in his late seventies with a history of gastroesophageal reflux disease, dyslipidaemia, obstructive sleep apnoea and recently diagnosed dementia was admitted for surgical treatment of a muscle invasive bladder cancer. The patient underwent radical cystectomy, bilateral lymph node dissection and an ileal conduit with a Bricker ureteric anastomosis, and drains were inserted. The patient was discharged to the ward without incident and no nasogastric tube was sited.

On the first postoperative day, the review by the urology team noted that the patient was febrile, however there were no records of further examinations taking place. The ongoing orders were for 5000 units twice-daily heparin to commence, and for potassium and magnesium to be kept at optimum levels to prevent a postoperative ileus. Subsequent reviews by the acute pain service, physiotherapist, and stoma nurse documented that the patient appeared confused, was unable to participate in exercises because of pain, and had coughed up a small amount of black sputum. By the third postoperative day, the patient had developed abdominal distension, vomited, and was febrile. Insertion of a nasogastric tube on the ward was attempted unsuccessfully before the patient was transferred to radiology for a second unsuccessful attempt. During this period, the patient vomited a second time and was subsequently admitted to ICU with a diagnosis of aspiration pneumonia.

Treatment commenced with tazocin and a nasogastric tube was finally inserted. The patient developed acute pulmonary oedema and was intubated. Meanwhile, urinary cultures grew *Enterobacter* and his antibiotics were changed to meropenem, without improvement. By the third day in ICU, he was noted to have a tender abdomen, with CT scans revealing an incisional hernia containing small bowel. The following day the patient was returned to theatre and his hernia closed before being discharged back to ICU. However, the patient subsequently developed atrial fibrillation, acute respiratory distress and declining renal function. In consultation with the patient's family he was palliated, and quickly succumbed.

CLINICAL LESSONS

An elderly patient scheduled for a cystectomy would always be considered high-risk, though few would criticise the decision given the terrible course of death that bladder cancer entails. Although this patient had a few comorbidities, the most relevant to his postoperative course was his dementia, which influenced his cooperation with treatment. A relevant example of this was the notably unsuccessful attempts (due to lack of cooperation from the patient) at inserting a nasogastric tube, exacerbating the risk of aspiration. The omission of a nasogastric tube at the time of operation was unfortunate.

Of concern was the seemingly superficial nature of urological review and insufficient documentation in the immediate postoperative phase, and subsequently the time when the surgical team were informed that the patient had left upper quadrant pain. In such a high risk patient undergoing the most morbid urological operation of all, it would be expected that thorough examination occurs daily.

Ultimately the patient succumbed to aspiration pneumonia secondary to a postoperative bowel obstruction, though it is unclear in this case as to when the latter occurred. It is entirely possible that the incisional hernia identified by the CT scan was an early postoperative event, going unrecognised due to inadequate postoperative assessment.

Abbreviations

aPTT	activated partial thromboplastin time
BiPAP	bilevel positive airway pressure
CCU	critical care unit
CT	computed tomography
ECG	electrocardiogram
ED	emergency department
HDU	high dependency unit
ICU	intensive care unit
MET	medical emergency team
NSTEMI	non-ST-elevation myocardial infarction
SPC	suprapubic catheter

Contact details

Royal Australasian College of Surgeons
Australian and New Zealand Audit of Surgical Mortality
199 Ward Street, North Adelaide SA 5006

Telephone: +61 8 8219 0900

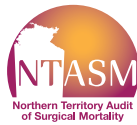
Facsimile: +61 8 8219 0999

Email: ANZASM.RACS@surgeons.org

Website: <http://www.surgeons.org/anzasm>

Notes

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Royal Australasian College of Surgeons
Australian and New Zealand Audit of Surgical Mortality
199 Ward Street
North Adelaide SA 5006

Telephone: +61 8 8219 0900

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