

Victorian Audit of Surgical Mortality



Case Note Review Booklet

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Royal Australasian College of Surgeons



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Introduction

The Victorian Audit of Surgical Mortality (VASM) audits deaths that occur whilst under the care of a surgeon in the public hospital sector. As this peer review process is intended as an educational exercise, we have selected a number of cases that bring out specific clinical issues that we feel should be shared among Fellows.

All cases selected have gone through a second-line assessment (case note review) by a College Fellow who has agreed to be a second-line assessor. It is the excellent quality of these assessments that allows us to produce this review.

We take this opportunity to thank all surgeons participating in VASM. We hope you find this publication of value.

The assessors have raised a number of important issues:

- It is difficult to manage patients in a complex environment where there is an increasing lack of continuity in the care provided over the hours and days of a patient's stay in hospital. In cases one, three and seven, death occurred during the postoperative period due to a lack of appreciation of the significance of events leading up to each death and the potential for these events to occur.
- Among the challenges faced by rural clinicians is the need to treat patients who present with time-critical emergencies outside their normal scope of practice and available resources.
- The increasingly fragile nature of many patients presenting to hospital is recognised but not always fully appreciated. Where surgery is not time-critical, careful preoperative evaluation of comorbidity and correction where possible could increase survival. This requires a multidisciplinary team approach not always available in some hospitals.



Case study 1: Postoperative bleed following thyroid surgery for Graves' disease

Summary

A young patient with Graves' disease underwent elective total thyroidectomy after a preoperative course of Lugol's iodine. Following an apparently uneventful procedure, two redivac drains were left in situ.

Postoperative instructions specified the need for a 'thyroid pack' to be available at the patient's bedside. It was further requested that the Resident Medical Officer (RMO)/Honorary Medical Officer (HMO) be contacted if neck swelling or stridor occurred. There were no instructions regarding reportable pulse, blood pressure or oxygen saturations.

As postoperative observations were all satisfactory, the patient was returned to the ward two hours after surgery. An intern review 90 minutes after return to ward noted 'an elevated blood pressure and heart rate, no issues with Glasgow Coma Scale (GCS) and no evidence of stridor'. Drains were said to be 'working well'. Regular daily dose of Propranolol (5 mg) was ordered with a plan to review in one hour. Nursing notes approximately six hours after return to ward state 'blood was noted in the redivac'. Status of other redivac was not recorded. Nursing notes also recorded a respiratory rate of 5-8 resps/minute, but no swelling in the neck or stridor.

When the RMO went to check an adjacent patient, the post-thyroidectomy patient (now more than eight hours since discharge from recovery) was noticed to be bleeding profusely with a 'huge swelling' in their neck. The patient was not breathing and there was no recordable pulse. 'Code Blue' was initiated, clips were immediately removed from the neck and the patient was intubated on the second attempt before being transferred to the operating room. During the operation, bleeding from the right inferior thyroid artery was identified and controlled by clipping. Another minor bleeding point was also controlled.

On transfer to the Intensive Care Unit (ICU) postoperatively, the patient's pupils were noted to be pin point and unresponsive. Over the next few days the patient's conscious state did not improve. A CT scan indicated 'global ischaemia' was present. Over the following nine days, the diagnosis of hypoxic brain damage was established and, in consultation with the family, treatment was withdrawn.

Reviewer's comments

There is a well-recognised increased risk of postoperative bleeding following surgery for Graves' disease. A critical requirement in the management of such patients is early recognition of postoperative haemorrhage. Subtle changes in pulse rate and oxygen saturation can be early signs of bleeding.

- Such patients may benefit from overnight stay in a High Dependency Unit (HDU).
- Postoperative instructions should be expanded to include reportable criteria for pulse, blood pressure and oxygen saturation in addition to neck swelling and stridor.
- Early postoperative review by senior staff (Registrar, Fellow or Consultant) is recommended.



Case study 2: Transfer of patient with a small bowel obstruction

Summary

An elderly patient with multiple comorbidities including congestive cardiac failure, ischaemic heart disease, ataxia and gout was admitted to a small rural hospital (Hospital A) with several days of nausea, vomiting, constipation and left iliac fossa pain. Investigations revealed anaemia (haemoglobin less than 11), moderately impaired renal function (urea greater than 17, creatinine greater than 180) and a small bowel obstruction. Conservative treatment for diverticulitis was implemented.

Over the next four days the patient's condition deteriorated with an x-ray confirming worsening small bowel obstruction. This precipitated transfer to a major rural hospital (Hospital B).

In Hospital B, a gastrograffin contrast study confirmed marked distension with a distal small bowel obstruction. Despite intensive treatment with improvement in renal function, the patient developed atrial fibrillation and signs of peritonitis. At induction of anaesthesia for surgery within 24 hours of transfer, the patient became hypotensive and required inotropes to maintain blood pressure. At laparotomy, the findings were of a grossly distended small bowel with serosal tears and ischaemia due to a single tight band. The patient had a ventricular fibrillation arrest during the procedure and could not be resuscitated.

Reviewer's comments

Judging when to transfer patients to a higher level of care is not easy. This patient with multiple comorbidities, unresolving small bowel obstruction and clinical deterioration might have benefited from earlier transfer for surgery. The cause of the small bowel obstruction appears to have been a solitary band adhesion.



Case study 3: Postoperative bleed following a laparoscopic posterior hiatal hernia repair, partial fundoplication and cholecystectomy

Summary

An elderly patient with a symptomatic and very large hiatus hernia and cholelithiasis underwent an uneventful laparoscopic posterior hiatal hernia repair, partial fundoplication and cholecystectomy. The thorough preoperative multidisciplinary assessment confirmed the procedure was clinically necessary and should proceed despite the significant comorbidities of ischaemic heart disease, hypertension, permanent pacemaker, respiratory impairment, renal impairment and controlled pernicious anaemia. The initial postoperative phase was managed in HDU.

The patient's recovery was uneventful until late on the sixth postoperative day when a Medical Emergency Team (MET) call was initiated after the patient became hypotensive and collapsed in the toilet. Intravenous fluids, morphine and antiemetics were given and appeared to have good effect. The episode was considered to be a vasovagal event and no further investigations or treatments were initiated.

Four hours later, a second MET call was prompted by a further episode of severe hypotension. The response this time required endotracheal intubation in addition to intravenous (IV) fluids and inotropes. Investigations at this time indicated blood loss (haemoglobin less than three grams per litre) to be the cause of the hypotension. The surgical registrar was contacted who, in turn, contacted the consultant one hour after the second MET call. An immediate return to the operating room was organised, but the patient died within 30 minutes.

Reviewer's comments

The patient suffered a hypotensive collapse on the ward and died around five hours later. There is strong clinical evidence that the collapse and subsequent death were due to internal bleeding, the recognition and management of which was grossly delayed. More aggressive investigation and resuscitation at that time may well have altered the outcome. By the time the surgeon was notified, a fatal outcome was unavoidable.

When a postoperative patient has a significant hypotensive event, the diagnosis of vasovagal attack should only be considered after other conditions, including blood loss, have been excluded.

It is noted that the hospital's documentation carries the advice: 'If this patient has more than two MET calls in 24 hours, the ICU and treating consultant MUST be notified'. It might be more appropriate if the treating consultant is notified of all MET calls.



Case study 4: Preoperative assessment and management of patient with a femoral neck fracture

Summary

An elderly patient was admitted with a pertrochanteric fracture of the left femoral neck following a fall. Comorbidities included: chronic renal failure, hypertension, gastroesophageal reflux, bipolar disease and osteoporosis. The patient was a heavy smoker with a high alcohol intake. The patient's medications included: Alendronate, Asasantin, Astrix, Coversyl and numerous psychotropic drugs.

Initial laboratory investigations indicated urea and creatinine were elevated, low normal haemoglobin and low platelets. International Normalised Ratio (INR) was reported as 1.1. The patient proceeded to open reduction and internal fixation with a short Gamma Nail 10 hours after admission to the emergency department. Appropriate reduction and positioning were ascertained and image intensifier and thromboprophylaxis commenced.

10 hours after surgery, blood loss from the operative site required reinforcement of dressings. Two hours later, hypotension and decreasing conscious state of the patient (oxygen saturation very low) led to a MET call, intubation and transfer to ICU. Blood was noted in the nasogastric tube and haemoglobin was significantly reduced below normal. Gastric ulcers noted at endoscopy were injected with adrenaline.

The patient's renal function and conscious state deteriorated. Following discussion with the family, treatment was withdrawn and the patient died four days after admission.

Reviewer's comments

A lack of adequate preoperative assessment by the orthopaedic and anaesthetic teams is evident in this case.

- Patient on platelet inhibitors with liver and renal disease did not have clotting or liver function investigated.
- No referral was made to the medical or renal unit prior to surgery.
- Postoperative care in an HDU might have led to earlier recognition of complications.
- Is the trend to early streaming of frail emergency admissions into subspecialties like orthopaedics inappropriate? Medical staff in these units do not always possess the appropriate level of knowledge to manage such patients optimally.

This case highlights issues of elderly patients with femoral neck fractures. They frequently have significant comorbidities and are on multiple drugs. Although it is recognised that surgery is best within 48 hours, careful preoperative assessment and management by appropriately experienced clinicians is essential. This medical care should be continued throughout the postoperative period. All health services involved in the management of the elderly with orthopaedic fractures must have a system in place which allows expert and timely medical care of these patients.



Case study 5: Spiral fracture of the femoral shaft in patient during operative procedure

Summary

An elderly patient sustained a femoral neck fracture following a fall. A basicervical fractured neck of femur was diagnosed by the orthopaedic registrar. Comorbidities, including mild dementia, severe osteoporosis, a permanent indwelling catheter, a permanent colostomy and chronic excoriation of the skin in the genital region, led to an American Society of Anaesthesiologists (ASA) rating of three.

An operation was commenced by the registrar on the day of admission. The patient was placed on a traction table and the fracture reduced and checked with image intensifier. During internal fixation, a spiral fracture of the femoral shaft developed. An attempt to fix the fracture with a 12-hole plate was unsuccessful because the screws were not supported by the osteoporotic bone. All fixation devices were then removed and some control of the shaft fracture was achieved with the use of four cable cerclage. A Steinmann or Denham pin was inserted into the upper end of the tibia and light (7 lbs) traction applied.

Despite careful management in the postoperative period, the patient developed severe pulmonary sepsis and died two weeks after surgery.

Reviewer's comments

- It would seem this patient almost certainly sustained the spiral fracture at the time of the operation due to de-rotation of the femur in a very osteoporotic femoral shaft.
- Recognition of the presence of osteoporosis requires increased care in the initial placement of the patient and reduction of the fracture.
- It should be recognised that femoral neck fractures in an elderly patient is a very serious situation and is associated with an high in-hospital mortality of greater than 10%.

This case demonstrates why reduction and internal fixation of an orthopaedic femoral neck fracture in elderly patients are important if the patient is to survive. In the elderly patient with severe osteoporosis, however, one has to be very careful that further fractures do not occur during the treatment program. In this case, there is the suggestion that the spiral fracture of the shaft of the femur occurred when the basicervical fracture was manually reduced on the traction table; it must be constantly remembered that bones, especially osteoporotic bones, are extremely weak 'in torsion'.



Case study 6: Transfer of patient with a bleeding aortoiliac aneurysm

Summary

An emergency repair of a bleeding aortoiliac aneurysm in an elderly patient was performed by a general surgeon in a peripheral hospital. The patient was known to have extensive arterial occlusive disease and was on Warfarin for atrial fibrillation. Despite massive transfusion, return to theatre for abdominal decompression, and overnight care in the ICU, the patient remained anuric and obtunded.

The following day the patient was transferred to ICU at a second hospital under the care of a vascular surgeon. A colectomy and abdominal closure were performed after 72 hours. After three weeks of anuria, coma, haemofiltration, tracheostomy, sepsis, wound breakdown and bedsores, circulation failed and the patient died soon after the family requested cessation of treatment. No autopsy was done.

Reviewer's comments

- The outcome was determined by the extent of the rupture and the blood loss.
- Without the decision of the general surgeon to proceed to surgery, the patient would have died immediately.

Timely access to appropriate specialist medical care is difficult to achieve, particularly in our distant and widespread rural communities and even, on occasion, in some regions of major metropolitan areas.

The emergency room physician and general surgeon initially assessing the patient with a ruptured abdominal aortic aneurysm may have the unenviable task of deciding upon either an immediate operation in a centre without adequate backup support in an attempt to save the patient's life, or the transfer of a stable patient to a distant centre with a fully trained and available on-site 24-hour vascular surgical service, with an assumed expectation of a better outcome for the patient.

The community mortality of ruptured abdominal aortic aneurysm, in and out of hospital, approaches 80%. Many patients die prior to reaching hospital, though some will have known of their abdominal aortic aneurysm and have made the decision not to intervene electively or in the advent of rupture.

A further group will obviously be unable to undergo emergency repair because of existing comorbidities such as: extremely poor cardiac, respiratory or renal function, and/or gross instability with severe hypotension or cardiac arrest.

Some retrospective reports and data suggest that travel to a vascular centre with a consequent delay in operative treatment is not detrimental to the patient's outcome if the patient is stable (in-hospital mortality varies from 20-50%).

Prior to transfer and operative intervention, fluid restriction is advised to prevent an increase in blood pressure and fatal aortic haemorrhage. This approach of permissive hypotension is advocated and widely practised.

The final decision to transfer or operate on a patient must be made by the on-site surgeon, based on the patient's condition and local experience with managing patients with abdominal aortic aneurysm and perhaps in communication with a vascular unit.

Postoperative transfer of a stabilised patient may also be required, based on local experience and availability of appropriate intensive care and backup facilities.[1, 2]



Case study 7: Blood loss in patient following angiography and stenting

Summary

An elderly patient with peripheral vascular disease and increasing rest pain was admitted for angiography and stenting. Two tight stenoses in the distal (left) superficial femoral artery were confirmed and angioplasty was performed via the common femoral artery. Pre-procedural anticoagulation was appropriate and the procedure was uncomplicated. The patient's intra-procedural blood pressure was significantly elevated.

Forty minutes after the removal of the six Fr femoral catheter in recovery, there was a dramatic drop in the patient's blood pressure. There is no record of medical staff being notified of this. There was spontaneous improvement in blood pressure to low normal, prompting a return to the ward. Fifty minutes later, the patient's blood pressure had dropped significantly and abdominal distension was noted. This precipitated a MET call.

Following assessment by an intern, fluid resuscitation was initiated and a Computed Tomography (CT) scan arranged. Haemoglobin on a blood gas sample was reduced below normal (normal preoperatively). A CT scan demonstrated active bleeding from the common femoral artery and a large retroperitoneal haematoma. The vascular registrar attempted, but was unable, to contact the vascular consultant. The radiologist then placed a covered stent in the common femoral artery with good result. Despite ongoing resuscitation in ICU, the patient remained profoundly acidotic and died within a few days.

Reviewer's comments

- Failure to act on the initial dramatic fall in blood pressure immediately following an interventional procedure.
- 50-minute time gap until the next set of observations.
- Apparent inability to contact the vascular consultant.
- The decision to send an unstable patient for a diagnostic study without input from a more senior clinician.

Blood loss is a known and anticipated consequence of arterial cannulation, using sheaths of varying sizes, which allow endovascular diagnostic and interventional procedures. Blood loss following such procedures is not uncommonly hidden in the retroperitoneum, often without external evidence of bleeding, groin swelling or visible bruising. Elderly patients undergoing these procedures often have multiple medical comorbidities and poor tolerance of blood loss.

Proactive clinical evaluation of vital signs and abdominal examination will usually lead to the recognition of blood loss, allowing expeditious resuscitation and closure of any bleeding site. This can be achieved either by open exposure and lateral suture, or endovascular placement of a covered stent.

Post-procedural orders need to be specific and conveyed both in writing and verbally to the recovery room and ward staff. Deviation from the expected course should prompt early patient review and possible escalation of patient care. The expected course needs to be detailed, with observation of vital signs, type and frequency, with reportable limits on observation and escalation of criteria. Postoperative orders need to be specific and in particular specify the doctor to be notified of breaches in the written observable limits. Tachycardia may not be evident, as many of these patients are on long-term beta-blockade medication.



Case study 7 continued...

Both junior and senior medical staff must have readily available lines of communication and be available for consultation, clinical assessment and, if necessary, clinical intervention. All invasive procedures should be covered by postoperative orders, detailing vital signs, their type and frequency, special observations and reportable limits on observations and escalation criteria. Deviation from the expected course should prompt patient review and possible escalation of patient care.

Abbreviations

ASA	The American Society of Anaesthesiologists Grades
CT	Computed Tomography
Fr	French
GCS	Glasgow Coma Scale
HDU	High Dependency Unit
HMO	Honorary Medical Officer
ICU	Intensive Care Unit
INR	International Normalised Ratio
IV	Intravenous
MET	Medical Emergency Team
RMO	Resident Medical Officer
VASM	Victorian Audit of Surgical Mortality

References

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