Positive Assessments
A paradigm shift in patient care evaluation

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Introduction

The audits of surgical mortality review deaths that occur while under the care of a surgeon in the public and private hospital sectors.

This edition utilises a positive assessment approach which views the correct handling of clinical management issues as an important learning tool. Just as vital lessons are learnt from the errors made by others, so too can we learn from what others do well. Cases have been selected on the basis that they highlight surgical Fellows, hospitals and a large spectrum of health professionals handling difficult situations appropriately and receiving positive comments from the assessors.

Building a positive assessment behaviour paradigm may initially seem incongruous given that mortality is a key criterion for inclusion in the audit. However, VASM patients tend to be elderly, admitted as emergencies and with other severe health problems. They tend to require more complex surgical procedures that carry a higher risk of complications. In the selected cases, mortality did not result from a system or individual error, but from the combination of medical issues that made survival unlikely. Death resulted despite correct clinical management and there are positive lessons to be had in areas such as problem-solving, active collaboration and the timing of palliative care.

All cases selected have gone through the full assessment process by a Fellow from either the Royal Australasian College of Surgeons or the Royal Australian and New Zealand College of Obstetricians and Gynaecologists. The assessments have been edited to ensure that the patient, hospital, treating surgeon and assessor remain anonymous.

As a result of the audit’s declared quality assurance status, the audit is unable to send feedback to anyone other than the treating surgeon. Hospital management receive indirect and aggregated data on the cases assessed by the audit. Surgeons are encouraged to share this publication with relevant staff ensuring that those responsible for delivering care can reflect on and improve their own processes and procedures.

The audit is an educational exercise and it is recommended for use as a teaching aid. There are encouraging lessons in this publication that will be of great interest to surgeons, hospitals and all who are involved with patient management and care.

*Audit staff would like to take this opportunity to thank all surgeons and hospitals participating in this educational activity.*
Emerging issues and recommendations to VASM clinical stakeholders

In keeping with the positive assessment approach, the emerging trends in this edition reflect case management commonalities which received positive feedback from assessors.

Following protocols where appropriate

- Protocol adherence ensured appropriate management and reduced treatment delays.

Active collaboration and communication

- Health professionals recognised that the expertise of different specialties was required for optimal patient management.
- Patient care was shared and believed to be everyone’s responsibility. Leaders facilitated the process of finding and disseminating resolutions.

Respect and reinforcement of patient centred care

- Institutions and their clinical teams created new incentives to continue with successful behaviour and good patient care.

Adequate and legible clinical records

- Vital to adequately determining the circumstances of a patient's death, in some instances review of the records by the second line assessors’ allayed concerns raised by the first-line assessor.

Recognition of the significance of the deteriorating patient

- Timely intervention resulted from recognition of the significance of the deteriorating patient.

Recognition of the appropriate time for palliative treatment

- Futile overtreatment was avoided by awareness of the appropriate time to move to palliative care.

Informed consent

- Informed consent was not only obtained but documented appropriately.
Case 1: Acute pulmonary oedema secondary to a non-STEMI

Patient profile
Age: Early 70s.
Comorbidities: Hypertension, hyperlipidaemia, renal gout, former smoker and carotid vascular disease.

Clinical details
This patient was admitted with acute pulmonary oedema secondary to a non-ST segment elevation myocardial infarction (STEMI). The patient had significant comorbidities including hypertension, hyperlipidaemia, gout and carotid vascular disease (70% stenosis left side, 50% to 69% right side; vascular surgery consult obtained). The patient also had an infrarenal abdominal aortic aneurysm, anaemia (haemoglobin 79 g/L on admission) and was a former smoker. Most significantly, the patient had end-stage renal failure (creatinine on admission 476 umol/L) secondary to renovascular disease.

The anaemia was corrected a day after admission with a blood transfusion. Intravenous (IV) heparin was also given for 48 hours, ceasing on day two following admission. Aspirin and oral beta-blockers were also administered. The patient did not report any chest pain and had stable haemodynamics. Nephrologists were consulted and were prepared to undertake perioperative haemodialysis (preoperative Permacath placement was contemplated and the left arm was preserved for future arteriovenous fistula). Aranesp was administered preoperatively for the anaemia. An angiogram was performed five days later at which time severe left main coronary artery stenosis and triple vessel coronary artery disease, including severe ostial left anterior descending stenosis, were noted in a left dominant coronary system. Clopidogrel 600 mg was administered prior to angiography according to protocol. Infected IV site noted preoperatively. A transthoracic echocardiogram showed an impaired left ventricle (LV) posterolaterally (old) with ejection fraction approximately 50%, mild mitral incompetence and mild to moderate aortic incompetence.

The case was discussed at the joint Cardiology/Cardiac Surgery conference. Inpatient coronary artery bypass grafting (CABG) was recommended although it was judged to be high-risk. Prophylactic antibiotics (vancomycin) were commenced 24 hours before surgery, 13 days after admission. Surgery was complicated by the discovery of severe ascending thoracic aortic calcification precluding the use of an aortic cross clamp. Quadruple CABG was therefore carried out on the beating heart, on cardiopulmonary bypass (CPB), without aortic cross clamping and without graft attachment to the ascending aorta. The proximal ends of the two saphenous vein grafts were anastomosed to
the pedicled left internal thoracic artery (LITA) which was itself anastomosed distally to two coronary arteries, in sequential fashion. The entire cardiac revascularisation was solely dependent on flow from the LITA. The target coronary vessels were small and heavily diseased.

The aortic incompetence noted prior to revascularisation was worse afterwards. This compounded the strain on an already compromised LV, the blood supply of which was almost totally dependent on LITA flow. Although initially successfully weaned from bypass, the patient experienced a cardiac arrest just prior to closure of the chest. This required a period of internal cardiac massage, emergency recannulation and rest on CPB for about one hour. Intraoperative transoesophageal echocardiogram (TOE) revealed severe deterioration of the left ventricular function which had initially been satisfactory. Because of acute pulmonary oedema and left ventricular failure, the patient could not be weaned from CPB and central extracorporeal membrane oxygenation was instituted through the open sternum. The patient was transferred to the intensive care unit (ICU) on extracorporeal membrane oxygenation (ECMO) and inotropes (milrinone and noradrenaline).

The patient’s course in the ICU was complicated by bleeding on day one which persisted despite correction with blood factors (patient heparinised for ECMO) and the chest was explored in the ICU for surgical haemostasis. There was significant blood loss, including over 3 litres in the right pleural cavity. Haemofiltration was required for anuric renal failure and urine output returned post operation day one. The patient continued to receive milrinone however the noradrenaline was stopped. The patient displayed evidence of functional ventricular recovery, with a postoperative day one TOE showing LVEF 40% and still moderate aortic incompetence. Combined with tolerance of low flow ECMO, this evidence led to the patient being transferred to theatre on postoperative day two with the aim of ceasing ECMO, removing the cannulae and closing the sternum.

When the ECMO was stopped in order to estimate cardiac output the patient again developed cardiogenic shock and ECMO was recommenced. TOE taken at the time confirmed the moderate degree of aortic incompetence noted previously and precluded the use of the intra-aortic balloon and presaged the inability of the LV to sustain an adequate cardiac output. Ventricular and supra ventricular tachycardia occurred on return to the ICU from the operating theatre, requiring multiple cardioversions plus antiarrhythmics. By day four transoesophageal echocardiography confirmed severe biventricular systolic dysfunction in conjunction with moderate aortic and now mitral incompetence. It became apparent that life could not be sustained without cardiopulmonary support provided by inotropes and ECMO. Following a meeting of the family it was agreed that active support should be withdrawn. Palliative care
was commenced and death occurred on day five, two and a half weeks after admission to hospital. The Coroner’s Office was contacted but autopsy was considered unnecessary.

Comments

This complex case involved a patient with multiple comorbidities, including end-stage renal failure, presenting with myocardial ischaemia. The patient received all appropriate treatments and the surgical and medical decision making was well handled. Documentation in the case notes was exemplary.

The preclusion of aortic cross clamping due to the unexpected calcified aorta was handled appropriately by using the internal thoracic artery as the inflow. However, this made the revascularisation to all four coronary arteries totally dependent on flow from the internal thoracic artery. The extent to which the AI contributed to the myocardial ischaemia is difficult to assess, but it would certainly have put an increased load on a hypertrophied and ischaemic myocardium. A number of possibilities exist for inadequate blood flow down the grafts. They range from plain systemic hypotension (fluid shifts, hypovolaemia and drug reactions, such as to protamine administration) to internal thoracic artery spasm (operative handling, vasoconstrictor administration). The patient was also a vasculopath and a flow limiting stenosis may have been present proximally, for example in the left subclavian artery.

It appears that left ventricular dysfunction at the end of the bypass was ischaemic in origin. The same thing happened when ECMO was ceased, supporting the inadequate graft flow hypothesis. It is questionable whether consideration was given at this stage to check the patency of the grafts with graft angiography, although it would not have affected the outcome. Even if an obstructed or low flow graft was discovered there was no surgical solution, such as regrafting, as the aortic calcification precluded direct aortic anastomosis.
**Case 2: Incomplete distal small bowel obstruction**

**Patient profile**
Age: Early 80s.
Comorbidities: Respiratory, cardiovascular and advanced malignancy.

**Clinical details**
This patient was admitted under surgical care having experienced abdominal pain for one week associated with nausea, vomiting and diarrhoea. There was a known history of inoperable bilateral lung cancer and while the patient had undergone several cycles of chemotherapy any further treatment had been rejected.

Findings on admission did not specifically suggest abdominal pathology however a diagnosis of Clostridium difficile was suggested. Antibiotic treatment was commenced although the patient was believed to be immunosuppressed following recent chemotherapy treatment. A computed tomography (CT) scan did not suggest abdominal pathology and a chest x-ray showed evidence of right mid zone pneumonia.

Over the next week the patient’s symptoms oscillated requiring transfer to the oncology ward at one point. During this time respiratory problems were managed with oxygen and a diuretic for fluid overload. Eight days after admission abdominal distension was noted, and a plain x-ray indicated a mechanical small bowel obstruction. The decision was made to proceed to laparoscopy following anaesthetic consultation.

Open laparotomy after conversion from laparoscopy found dilated small bowel down to the ileum with narrowed distal segment of ileum. A right hemicolectomy was performed. The patient could not be extubated following surgery and was transferred to the ICU. Over the next few days the patient experienced ongoing respiratory issues that required respiratory support in the ICU. At a family meeting it was agreed that treatment should be directed at comfort and invasive treatment stopped. The patient also expressed a desire to have the tube removed and be made comfortable. The patient transferred to palliative care and died three weeks after admission.

**Comments**
The clinical course is very suggestive of incomplete distal small bowel obstruction. There appears to have been little evidence of this on clinical examination or imaging. The initial diagnosis of Clostridium Difficile was not proven however the patient did receive appropriate treatment and referrals to the infectious disease team.

Throughout the clinical course the patient was well supported and appropriate referrals were made. The decision for surgery in
response to symptoms that failed to resolve was appropriate. The CT scan reports for this admission were not available but the excellent clinical notes indicate no evidence of small bowel obstruction.

The surgical procedure was appropriate and while the pathology report was not provided, the operation report gave a good indication of pathology. The management of this difficult case was appropriate and the family and patient were involved in decision making at all times. There was an eight-day gap between admission and diagnosis, as the diagnosis was not obvious and the patient’s respiratory status was problematic. The delay was not inappropriate and would not have affected the outcome.
Case 3: Steps to optimise anaemia

Patient profile
Age: Early 90s.
Comorbidities: Age, cardiovascular and hernia.

Clinical details
This patient presented to the hospital emergency department with abdominal pain, an inguinal hernia and constipation. The bowels were working by the time the patient was seen by the surgical registrar. The patient had been aware of the hernia for 20 years and examination showed it to be a large inguinal hernia with no tenderness, but containing a significant amount of bowel.

A discussion was held with the family regarding a semi-elective operation to repair the hernia and whether this would be in the patient’s best interest. As part of the work-up the patient was found to be anaemic with haemoglobin of 6.7 g/L. A gastroscopy and colonoscopy to investigate the anaemia were planned, and they were to be undertaken prior to contemplating surgery. The patient was also assessed by the anaesthetist as to whether they were fit enough to undergo the procedures. On the fifth day after admission, prior to any procedure, the patient was noted to have a productive cough, some vomiting and had developed respiratory signs.

Oxygen saturations fell and the patient seemed to deteriorate quite quickly. The Medical Power of Attorney was informed of the deterioration and it was agreed that the patient be managed on the ward, and was not for escalation to the ICU or cardiopulmonary resuscitation. The patient was treated with IV antibiotics, omeprazole and oxygen. Despite this the clinical condition continued to deteriorate and the patient passed away early the next morning. The cause of death was acute myocardial infarction, in the setting of a possible aspiration and pneumonia.

Comments
The patient’s care was appropriately managed. There were no areas of concern and the outcome was unavoidable. The treating surgical team made the correct decision in involving the anaesthetic and medical teams to optimise the anaemia rather than rush to surgery. The hernia was quite long standing and was not incarcerated or obstructed. The clinical signs of obstruction (vomiting, lack of bowel actions and abdominal distention) were not present prior to the development of pneumonia, and it was reasonable for the patient to be on a light ward diet. Clinical notes indicate that the chest infection may have predated the vomiting, so aspiration may have occurred after the pneumonia rather than be the cause of it.

The quality of the record keeping was very good. The documentation was legible and all of the important events were clearly documented.
Case 4: Imminent infarction of an intra-abdominal organ

Patient profile
Age: Mid 70s.
Comorbidities: Cardiovascular, respiratory, age and renal impairment.

Clinical details
This patient had significant medical comorbidities and underwent three separate admissions to hospital over a five-month period. The patient underwent five surgical procedures during this time, all of which were performed at two hospitals other than the hospital at which the final procedure took place. The notes for these prior admissions were not made available and a post-mortem was not performed.

The notes for the last admission were provided and form the basis for the second-line assessment and summary of the events leading to death.

Chronology of procedures performed:
- Emergency right hemicolectomy for an obstructing caecal cancer, diagnosed on histology as T4N26;
- Bilateral groin hernia repair;
- Aortic abdominal aneurysm stent graft with an extension of the graft into the right external iliac artery with bilateral renal artery stents and femoral crossover graft;
- Exploratory laparotomy and abdominal washout for haemoperitoneum of unspecified cause;
- Diagnostic colonoscopy to determine the cause of recurrent diarrhoea. This was subsequently diagnosed as ischaemic colitis.

An obstructed groin hernia or critical ischaemia in the abdomen with imminent infarction of an intra-abdominal organ would be an indication to operate on an elderly patient with multiple medical problems and recovering from an emergency colectomy.

It was the intra-abdominal haemorrhage and ischaemic colitis that impacted on the patient’s chances of survival and were the complications that took the patient’s life. These were likely a consequence of the vascular procedure.

If the indication to perform the hernia repairs and the percutaneous endovascular aneurysm repair (PEVAR) procedures were strong and the patient’s cancer had a fair prognosis, estimated at 50% five-year survival, then management of this patient was appropriate. In these circumstances the complications were an unfortunate event.

The notes indicated that the patient’s cancer was not for further treatment. If the cancer had a poor prognosis, or the indication to perform hernia surgery or the PEVAR was not strong or urgent, then management of this patient may have been different. The decision
may have been to avoid subjecting the patient to further surgery. The level of input the patient received from a range of medical and paramedical services should be commended.

**Comments**

Excellent care was provided to this patient. Appropriate management decisions were made and the patient’s decision not to undergo further surgery was respected.
Case 5: The value of a tube caecostomy

Patient profile
Age: Mid 70s.
Comorbidities: Cardiovascular, respiratory, age, renal impairment and diabetes.

Clinical details
This patient experienced rapid onset of progressive severe abdominal pain and distension following an evening meal. They had otherwise been asymptomatic, although the patient was taking oral medication for diabetes. Symptoms started at about 1900 and progressed until an ambulance was called at 2119. The patient was assessed in the emergency department 50 minutes later. The overall time lapse from symptom onset to assessment was three hours.

On assessment the patient’s abdomen was very tightly distended and they were experiencing respiratory difficulties. The patient had a tachycardia of 164 but with a blood pressure of 155/85 mmHg. Endotracheal intubation was instituted within 40 minutes after which there was a drop in blood pressure. This was stabilised at 90 to 100 mmHg with a heart rate of 127 and oxygen saturation 99%. ICU and surgical staff were notified.

The senior surgeon saw the patient just before midnight. The diagnosis was not clear, but the assessment was of gut ischaemia due to, or associated with, massive bowel distension and presumed abdominal compartment syndrome. The surgeon advised the family that the situation was grave and the only hope was to find a correctable cause at immediate operation.

General anaesthetic commenced at 0100, six hours after the first symptom. The patient had a grossly distended stomach, small bowel and colon up to, but not beyond, the splenic flexure. Patches of ischaemia were noted on the small and large bowel however no mechanical obstruction was apparent. A tube caecostomy was established to decompress the colon and the abdomen was not closed. Abdominal and wound bleeding led to a return to theatre from the ICU within three hours however nothing correctable was found and no further treatment was considered appropriate.

Comments
The performance of all staff involved in this case appears exemplary and there are no issues arising that need to be addressed. The obscure initiating event and rapid progression were mysterious, puzzling and fortunately rare.
An alternative course of action would have been to send the patient to the ICU in order to improve their condition for surgery. This is an attractive option given current skills in improving disturbed physiology and the serious consequences of operating on a poorly resuscitated patient. However, vital signs were reasonable at that time and the patient was receiving ongoing ventilatory and vigorous circulatory support. The logistics and additional time associated with transporting and then treating the patient in the ICU could reasonably have made that the less attractive option. In this case early intervention was probably the best option, as evidenced by the initial observations made during the anaesthetic and the fact that an abdominal compartment syndrome does not improve with time.

The use of a tube caecostomy to urgently decompress the whole bowel is often an unrewarding procedure, particularly using a large Foley catheter. In this case it did not affect the outcome. The compartment syndrome was appropriately managed by leaving the abdominal wall wide open.

Attempting to decompress the caecum was possibly aimed at helping control the ongoing problem of ischaemic gut, endotoxaemia and progressive organ failure; however this is best treated by removal of the affected gut. In this case it was patchy involvement of both the small and large bowel. As the large bowel is by far the greater source of endotoxins there is a strong argument to remove the distended large bowel, even in a very sick patient, and hope the small gut can cope.
Case 6: Ileocaecal junction obstruction

Patient profile
Age: Late 80s.
Comorbidities: Hypertension, diabetes mellitus and rheumatoid arthritis.

Clinical details
This patient was referred by a local medical officer with a week-long history of abdominal pain, vomiting and three days of constipation. Past history included an appendicectomy and bilateral knee replacements. Medications included an immunosuppressant, cardiac suppressants, diuretics and an oral hypoglycaemic.

A diagnosis of small bowel obstruction was confirmed by plain x-rays and abdominal CT scans. Treatment comprised nasogastric suction and IV fluids, and three days after admission the bowels were working and the patient returned to oral intake.

The obstructive signs returned seven days after admission and the patient was taken to theatre. A right hemicolectomy was performed from which the patient made a steady recovery. The medical problems of glycaemic control, fluid balance and renal function became more difficult to control.

Postoperatively the patient spent three days in the ICU followed by 21 days in the surgical ward before being transferred to a medical ward. The patient gradually deteriorated and died from cardiac failure due to renal, diabetic and pulmonary complications 38 days after surgery and 49 days after admission.

Concerns were raised over a perceived delay in operating as well as the preoperative care received by the patient. Both are allayed by recognition that conservative management of the obstruction offered the best chance of survival. The initial abdominal CT suggests an ileo-caecal junction obstruction, most likely malignant, and the patient’s response to conservative treatment was initially promising. If it had continued the patient could have been worked up and the eventual surgery would have had them in better condition.

The initial haematological investigations were satisfactory and the early progress shown by the patient was evidence of a high standard of preoperative care.

Postoperative care was also highlighted as an area of concern however documentation indicates that the patient received a high level of care. The patient had multiple consultations from renal, endocrine, and obstetrics and gynaecology specialists as well as visits from physiotherapists, occupational therapists and rehabilitation specialists.

Comments
This patient had a serious caecal malignancy that presented with a subacute obstruction. Survival was unlikely given the range of comorbidities which included hypertension, diabetes, rheumatoid arthritis and renal impairment. The care was appropriate and it is testament to the standard of care that the patient survived 38 days postoperatively.
Neurosurgery

Case 7: Implantation of a baclofen pump

Patient profile
Age: Young teenager.
Comorbidities: Dystonia, advanced cerebral palsy, intrathecal baclofen and respiratory issues.

Clinical details

This patient was admitted to hospital due to complications arising from the placement of a baclofen pump with an intrathecal catheter that had been inserted in the lumbar spine approximately two years previously.

A further incident in a long and complex illness, this was a readmission that took place 10 days after a previous prolonged admission. The admission notes indicate that there had been multiple complications from the device, including multiple cerebrospinal fluid leaks and at least four previous reoperations for revisions of the wound. Apparently the patient was known on admission to have a pseudomonas infection of the lumbar wound.

The submission to VASM by the treating surgeon was appropriate however it provided limited insight into the complexity of the situation. In order to fully assess the adequacy of surgical management it would be necessary to review patient care over the full two years, including case selection, operative technique and subsequent management. The comments and analysis made here reflect the relatively limited information available.

The patient had neonatal cerebral palsy of which the underlying cause was believed to be birth asphyxia. Highly aware and without severe intellectual disability, the patient had a severe chorio-athetoid movement disorder. The patient was apparently a second twin and there were perinatal indications of this. The notes indicate that the movement disorder responded positively to the intrathecal baclofen therapy.

In this case there were two conflicting imperatives. The first was to avoid stopping established continuous intrathecal baclofen therapy for fear of serious withdrawal syndromes. The second was to clear an infection by a serious pathogen involving an intrathecal catheter, and this could not be achieved without removal. The treating team tried very hard to avoid removing the pump however it became unavoidable. The patient’s condition steadily declined through multiple rounds of respiratory distress and other complications which were partly contributed to by the need for ongoing sedatives to control the withdrawal effects. The decision to proceed to palliative care was appropriate and beyond reasonable dispute.

Concerns expressed by the first-line assessor that the severe nature of the patient’s disability may have compromised the extent or urgency
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of their care were refuted by careful review of the file. Considerable resources were devoted to the patient’s care over a period of months including multiple admissions to the ICU, intense involvement of neurosurgical and plastic surgical teams as well as various medical teams. The literature was consulted and there was considerable debate by the disability and ICU teams regarding the appropriate pharmacological management of baclofen withdrawal.

Comments

Extensive antibiotic therapy and sophisticated wound reconstruction failed to reverse the underlying problem: infection on the actual catheter of the baclofen pump. The question emerges as to the timing of the infection and whether it occurred early in the postoperative course. If it occurred soon after implantation then early removal of the pump could have been achieved without the severe baclofen withdrawal syndrome that led to the patient’s death.

There is one positive suggestion which may be considered in the management of such a case. The team do not seem to have considered attempting to resite the intrathecal catheter. It is possible to place such catheters in other regions of the spine, such as the occipital-C1 level. That location is used to insert shunt catheters for benign intracranial hypertension. This may have provided an alternative solution to the dilemma of how to supply continuous baclofen therapy, although a lumbar drain may have been required as a temporary cover. A second option may have been to infuse the baclofen into the cerebral ventricles. The literature demonstrates that implantation of a baclofen pump is a difficult procedure, with considerable attention to detail required in order to achieve optimal results. This case has important implications for the hospital involved, raising the question of whether a larger audit and review is required in relation to the management of these cases and the insertion of baclofen pumps.
Case 8: Management of airway emergency

Patient profile
Age: Early 60s.
Comorbidities: Fabry disease (a lipid storage disorder), ischaemic heart disease, hypercholesterolaemia, hypertension, ethanol abuse and smoking.

Clinical details
This patient was admitted to the high dependency unit (HDU) for emergency management of their airway. The primary presentation was stridor due to a suspected laryngeal tumour and this was later confirmed on biopsy.

The patient initially underwent a tracheostomy placement and operative biopsies were used for investigation. This progressed to definitive management in the form of a total laryngectomy and radical neck dissections. All of the procedures were performed in a timely manner and were well documented.

A number of postoperative complications occurred, each of which was known to be associated with the type of procedures performed, a prolonged ICU stay and the type of general deconditioning seen in the patient. Complications included chest sepsis - pseudomonas, salivary fistula and leak, tracheostomy bleeding, colonisation with methicillin-resistant S. aureus (MRSA), diarrhoea – Clostridium Difficile, drug induced rash, and deep vein thrombosis. Nutritional issues, electrolyte imbalances and anaemia also occurred, and these were also not unexpected given that the patient was chronically debilitated and had experienced a protracted hospital stay.

With recovery impacted by the postoperative complications, and following consultation with the patient’s family, palliative care commenced and the patient passed away within 24 hours.

Comments
Given the high-stage malignant lesion and comorbidities, the surgical management received by this patient represented their best chance for increased life span and quality, and the time to each operative intervention was reasonable and logical. The documentation throughout the case regarding examination and investigation, including operation reports, was appropriate and consultant surgeon involvement was documented.
**Case 9: Subcapital fractured neck of femur**

**Patient profile**
Age: Mid 90s.
Comorbidities: Leukaemia, emphysema, dementia and advanced age.

**Clinical details**
This patient presented with a right subcapital fractured neck of femur following a fall. The patient was assessed medically and orthopaedically and submitted for a Moore’s hemiarthroplasty.

The preoperative assessment included routine urea and electrolytes and a full blood examination and both were found to be in the normal range for this age group. A chest x-ray was consistent with cardiomegaly and congestive cardiac failure however this appeared to be controlled. The serum troponin excluded an acute myocardial infarction preceding the fall and the fractured neck of femur. A CT scan of the brain and neck was also performed.

An advanced surgical trainee performed the operation with the assistance of the consultant. The operation proceeded uneventfully and the patient returned to the ward. The patient appeared to do well for a short period of time, but was noted to be drowsy at 2125 on the day of surgery. While the oxygen partial pressure (PO$_2$) was above 90% they had low blood pressure. The patient was reviewed by the hospital medical officer where presumably they were deemed to be hypovolemic and IV fluids were continued most likely as a means of resuscitation. At this time the Glasgow score was 14 or 15.

The patient became increasingly drowsy, unresponsive and hypotensive. A medical emergency team was called the following day at 2145 at which time it was considered inappropriate to resuscitate a patient of such advanced age. Palliative care was initiated and the palliative care service met with the family later that night.

**Comments**
Patients presenting with a subcapital fractured neck of femur, a range of comorbidities and who are of advanced age have relatively high postoperative morbidity. Management of this high-risk case was satisfactory and the patient received appropriate preoperative, intraoperative and postoperative care.

The arthroplasty was appropriate and necessary as a pain relieving procedure rather than one designed to prolong life. While indicative of thorough medical assessment the CT scan was unnecessary. There was no obvious indication of central nervous system or cervical injury and it was also unlikely that any findings could have been acted upon from a medical or surgical perspective.
Orthopaedic Surgery

Case 10: Fractured left subtrochanteric femur

Patient profile
Age: Late 80s.
Comorbidities: Atrial fibrillation, deep venous thrombosis, T-cell non-Hodgkin’s lymphoma, myelodysplasia, ulcerative colitis and osteoporosis.

Clinical details
This patient was admitted under a combined orthopaedic and medical unit with a fractured left subtrochanteric femur. The patient was prepared for surgery and a Gamma intramedullary nail inserted for fixation. The surgery was uncomplicated and initial postoperative recovery was satisfactory. The patient experienced low haemoglobin and fluid output in the initial postoperative period however both issues were managed effectively.

The patient was transferred to a rehabilitation unit four days following surgery. Recovery comprised of gradual improvement until two weeks post-surgery, at which time rapid deterioration occurred and the patient was diagnosed with pneumonia. Treatment with IV antibiotics commenced however the patient continued to deteriorate and was diagnosed with febrile neutropenia. Despite receiving aggressive antibiotic treatment for the febrile neutropenia and pneumonia the patient died the following day.

Comments
The level of care given to the patient was appropriate, the case well managed and the quality of record keeping adequate throughout the inpatient and rehabilitation admissions.

Concerns raised by the first-line assessor regarding time to operation are allayed by recognition that the patient was operated on within 36 hours of presentation to hospital. This is within satisfactory limits for a fractured left subtrochanteric femur in an elderly person with significant comorbidities.

A second concern is whether the patient would have benefited from being managed in an ICU or HDU following the deterioration of their condition. In this case an appropriate level of care was able to be provided outside the ICU or HDU, and the patient was promptly seen on two occasions by an ICU registrar.
Orthopaedic Surgery

Case 11: Moore’s hemiarthroplasty

Patient profile

Age: Late 90s.
Comorbidities: Hypertension, polyarthritis, osteoporosis, spinal canal stenosis and macular degeneration.

Clinical details

This patient was admitted to hospital with a diagnosis of displaced subcapital fracture of neck of left femur. They were on multiple medications including Astrix, Betaloc, Lasix, Nexium, and Prednisolone 5 mg daily. The patient was in substantial pain and was initially given IV fluids and appropriate analgesia.

There were concerns about obtaining consent for surgery. It is well documented that this procedure should be performed at an early stage due to the significant risk of deterioration and secondary effects arising from the fracture. A Moore’s hemiarthroplasty was implanted on the day after admission commencing at 2115.

Around midday on the first postoperative day the patient was transferred to the coronary care unit due to a troponin rise. They were also hypovolemic with a low blood pressure but were receiving IV fluids. At 1500 the patient had a blood pressure of 77/33 mmHg and this improved with fluids. At 2100 the patient had a low urine output and this was treated by increasing the infusion rate of the IV fluids. The low urine output received substantial attention during the night. Fluid boluses were given along with intermittent Lasix. This was well documented in an entry by the night hospital medical officer at 0600 on the second postoperative day. The fluid balance was written for the previous three days and blood tests were documented demonstrating a rise in the creatinine. A diagnosis was made of acute renal failure secondary to hypovolemia and this was discussed with the surgical and medical registrars.

There were further medical entries during the morning of the second postoperative day. It was considered that the acute renal failure was most likely because of hypotension due to cardiac problems, although the diagnoses of sepsis and Addisonian crisis were considered. A bladder scan was performed to ensure that there was no catheter blockage and a renal ultrasound showed no abnormality. Consideration was given to using haemofiltration.

Over the next few days the patient was regularly reviewed by the renal, cardiology and orthopaedic teams. By the sixth postoperative day attention was focused on pain relief and the case had been discussed by the palliative care team. On the seventh postoperative day at 1300 there was an entry by the palliative care team documenting the analgesia required. The patient deteriorated and was pronounced...
dead on the seventh postoperative day.

The drug chart indicates that the patient was written up for Clexane 20 mg daily and this was administered on the first and second postoperative days at 0800 but was then ceased.

Comments

This patient was well managed and the outcome could not have been improved. The patient suffered a cardiac event after surgery for a neck of femur fracture which resulted in hypotension. This caused acute renal failure which was managed expertly and with compassion by the teams involved. The patient had an extremely unfortunate outcome following an uncomplicated procedure.

The standard of this patient’s management, care and documentation was of the highest quality and there was appropriate history taking. The patient was asked about their cardiac status and at no point did they describe any chest or heart pain prior to surgery. The examination and investigations raised no suspicion of previous cardiac events. Patient management was good and no system-based changes to the preoperative assessment would have produced a better outcome. The patient received good care following the hip replacement and in the ICU following the first cardiac arrest.
Vascular Surgery

Case 12: Limb threatening ischaemia and sepsis

Patient profile
Age: Late 80s.
Comorbidities: Cardiovascular, diabetes, renal and age.

Clinical details
This patient was admitted to hospital, under the care of a physician, suffering from congestive cardiac failure secondary to an acute myocardial infarction. Shortly after admission the patient showed signs of sepsis and it was noted that the patient had ulceration, infection and gangrene in the right foot. Referral was made to a vascular surgeon who believed an arterial reconstruction along with an amputation was required. It was noted that the procedure carried a high risk of death due to the possibility of further cardiac problems following major vascular reconstructive surgery.

The procedure was performed and the patient managed in the ICU. While initially stable, the patient soon deteriorated and developed cardiogenic shock. Despite aggressive medical treatment the patient did not respond and subsequently died.

Medical documentation prior to the referral to the vascular surgeon was insufficient, consisting of a few illegible words from the treating physician. The physician’s notes did not mention the condition of the foot or the presence of limb threatening ischaemia and sepsis. The medical notes from the surgeon were clear and concise, clearly documenting the presence of gangrene and sepsis. Support was provided by the nursing documentation which also noted the presence of infection and gangrene.

Comments
The level of care given to the patient was appropriate and of a high standard, with death of the patient due to their poor medical condition. The threat to the leg meant that the decision to perform major surgery on this patient was entirely appropriate and reasonable.
Case 13: Macroscopic haematuria

Patient profile
Age: Mid 70s.
Comorbidities: Cardiac arrhythmias including episodes of recurrent ventricular tachycardia, congestive cardiac failure, chronic renal failure, diabetes, chronic obstructive pulmonary disease and hypothyroidism secondary to amiodarone.

Clinical details
This male patient was admitted with persistent macroscopic haematuria in the context of locally advanced carcinoma of the prostate. The patient had a significant number of medical issues, placing him in the high-risk category for surgical intervention. The patient had been taking warfarin although the international normalised ratio was within the normal range at 1.2 at the time of admission.

His relevant urological history relates to carcinoma of the prostate. He was staged with a bone scan, which was negative for metastases and was commenced on endocrine therapy in the form of goserelin acetate. A recent prostate specific antigen was 0.6 ng/ml.

The patient had a flexible cystoscopy three weeks later, presumably for haematuria at that time, and it was noted that he had friable tissue, with contact bleeding, extending into the bladder base consistent with locally recurrent prostate cancer. There is no documentation of whether any imaging was performed of his upper tracts, although this would be fairly standard in the assessment of a patient with macroscopic haematuria.

At presentation to the emergency department he had experienced two days of heavy macroscopic haematuria. It was noted in the nursing admission that the patient wasn’t complaining of any discomfort and managed to void on arrival. His haemoglobin was 95 g/L and the patient had a slightly elevated white cell count of 14.1 x 10^9/L with a neutrophilia of 11.8 x 10^9/L. His creatinine was 152 mmol/L, consistent with mild chronic renal impairment. The patient was catheterised and continuous bladder washout commenced.

A urological assessment was made and a plan established for cystoscopy, evacuation of clot and possible resection of prostatic tissue. Continuous bladder washout continued over the next two to three days with variable levels of haematuria noted. A physician’s review was obtained and there was general agreement that the patient would be suitable for theatre but was at high risk. The situation deteriorated with catheter blockage and bypassing, and a
decision was made to operate. Despite the ongoing bleeding the patient’s haemoglobin was relatively stable at this stage, advocating the initial conservative approach.

Evacuation of clot and resection of the prostatic tissue that was invading the trigone was performed however the situation continued to deteriorate. Frequent catheter blockages occurred and multiple blood transfusions were required over the subsequent days. A repeat cystoscopy and diathermy was performed. Despite this the bleeding was continuous and the patient died from multiple organ failure.

Comments

The patient was managed appropriately and the assessment process revealed that death was unavoidable. Documentation by the treating physicians was good, multiple consultants were involved and family members were kept informed of developments.

This patient represents a very difficult management dilemma that is occasionally seen in patients with locally advanced, poorly differentiated prostatic carcinoma. Haematuria is often resistant to most, if not all treatments. Other therapeutic options exist, such as radiotherapy or intravesical agents aimed at reducing bleeding, however they often prove ineffective. The risks in this situation were exacerbated by the patient’s considerable comorbidities.

Potential issues raised by the first-line assessor were found not to be areas of concern. The reason for the flexible cystoscopy prior to the AV node ablation presumably related to intermittent macroscopic haematuria. It would seem very appropriate to perform this under local anaesthetic using a flexible cystoscope in a patient who has considerable comorbidities, is anticoagulated and awaiting significant cardiac procedures for tachyarrhythmia. A general anaesthetic may well have been contraindicated at this stage. The decision was appropriate to resect the area of friable tissue if there was more troublesome haematuria.

The timing of the intervention with rigid cystoscopy and evacuation of clots was appropriate. At that stage the patient’s haemoglobin was stable and it only began to decline the day of the decision to operate. For a patient with serious anaesthetic risks it gave time to establish whether conservative treatment with bladder irrigation could save intervention and the risks associated with anaesthesia.
Case 14: Transitional cell carcinoma of the bladder

Patient profile
Age: Early 90s.
Comorbidities: Peripheral vascular disease, former smoker, deep venous thrombosis (in 1977), asthma and heart disease.

Clinical details
This patient was admitted to hospital for management of known transitional cell carcinoma of the bladder and recurrent heavy haematuria necessitated cystoscopy. A flexible cystoscopy had been undertaken for more definitive transurethral resection approximately three weeks prior to admission. The patient had experienced significant changes to overall health during the 12 months prior to the latest admission. They admitted to periodic dizziness and unsteadiness to the point of falling on occasion, necessitating the use of a walking frame or stick for support. The patient had also experienced confusion and anxiety, and was occasionally incontinent of urine and faeces. Behavioural issues had been noted over the previous month by the family, in light of which they requested that the patient was not for resuscitation or intensive care management.

Medical history revealed that the patient was a smoker until 1977 and had a range of comorbidities. The patient had a coronary stent placed in 2001 and a pacemaker in view of atrial fibrillation, which also necessitated anticoagulation with warfarin therapy.

The patient underwent surgery the day after admission and an invasive carcinoma of the bladder was identified and resected in part. The procedure was undertaken with the patient under spinal anaesthesia and sedation, and with appropriate antibiotic cover. No complications were experienced and the procedure went according to plan. Subsequent to the procedure the patient experienced a slow progressive deterioration. There were no acute or severe episodes and death occurred 13 days later. Case notes from the operating surgeon and hospital reveal a high standard of patient care, with the operating surgeon and perioperative physicians appropriately involved in decision making. All attempts were made to manage the patient free of IV fluids and also urethral catheter drainage. While there was no apparent fluid overload or bleeding the patient continued to deteriorate mentally. The patient had already experienced changes to their mental state over the previous 12 months and, as is common in persons of this age, the stress of managing the bladder cancer will have contributed to the progression of the confusion. The patient demonstrated
borderline renal function with an estimated glomerular filtration rate of 61 mL/min. However this was consistent with the patient’s age and known vascular disease and there was no convincing evidence of urosepsis.

Nursing notes outlining daily patient management were of high quality. Following removal of the catheter, bladder volume was monitored with a bladder scan to exclude overflow retention contributing to urinary incontinence. While vital signs, biochemistry and haematology continued to be satisfactory, the patient developed faecal incontinence and progressively demonstrated less interest in fluids and food as they became drowsier.

**Comments**

This patient received high quality, appropriate care. Invasive bladder cancer combined with the age of the patient meant that no alternative treatment could have been reasonably considered, nor were there any alternative strategies for patient management.
References


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<tr>
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<tr>
<td>AI</td>
<td>Aortic Incompetence</td>
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<td>Left Internal Thoracic Artery</td>
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<td>LV</td>
<td>Left Ventricle</td>
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<tr>
<td>MRSA</td>
<td>Methicillin Resistant Staphylococcus Aureus</td>
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<tr>
<td>PEVAR</td>
<td>Percutaneous Endovascular Aneurysm Repair</td>
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<tr>
<td>PO₂</td>
<td>Oxygen Partial Pressure (tension)</td>
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<tr>
<td>STEMI</td>
<td>ST Segment Elevation Myocardial Infarction</td>
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<tr>
<td>TOE</td>
<td>Transoesophageal Echocardiogram</td>
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Notes

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Notes
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The information contained in this Positive Assessments Booklet has been prepared by the Royal Australasian College of Surgeons Victorian Audit of Surgical Mortality Management Committee, which is a declared quality improvement activity. The Australian and New Zealand Audit of Surgical Mortality, including the Victorian Audit of Surgical Mortality, also has protection under the Commonwealth Qualified Privilege Scheme under Part VC of the Health Insurance Act 1973.