



ROYAL AUSTRALASIAN  
COLLEGE OF SURGEONS

**QASM**

Queensland Audit of Surgical Mortality



Northern Territory Audit  
of Surgical Mortality

# LESSONS from the AUDIT

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## Introduction

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The Australian and New Zealand Audit of Surgical Mortality's (ANZASM) 2013 report states: "the most common post-operative complications recorded were post-operative bleeding, procedure-related sepsis and tissue ischaemia."

When do post-operative complications "begin"?

*Lessons from the Audit* (Volume 15) highlights a range of surgical contexts which may contribute to post-operative complications.

Post-operative complications "begin" in the pre-operative phase of most patient-care episodes. Surgeons need to consider the global status of each patient, including all comorbidities. Having assessed and understood the patient's global status, the surgeon needs to project and communicate possible future outcomes.

Five case studies on post-operative complications follow this introduction. As always, your feedback is welcome.

Yours sincerely

John North  
QASM Clinical Director

**Disclaimer:** This booklet is produced for Fellows of the Royal Australasian College of Surgeons. Information is obtained under a quality assurance activity. Detail that may identify individuals has been changed, although the clinical scenarios are based on real cases.



## Shortened forms

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|             |                                        |
|-------------|----------------------------------------|
| <b>CRP</b>  | C-reactive protein                     |
| <b>ED</b>   | emergency department                   |
| <b>Hb</b>   | haemoglobin                            |
| <b>hpf</b>  | high-powered field                     |
| <b>ICU</b>  | intensive care unit                    |
| <b>IV</b>   | intravenous                            |
| <b>QASM</b> | Queensland Audit of Surgical Mortality |
| <b>VAC</b>  | vacuum-assisted closure                |
| <b>WCC</b>  | white cell count                       |



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## Overall recommendations:

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- Post-operative anaemia associated with hypotension and end-organ dysfunction always requires surgical notification.
- Test results always require review by the team requesting the test. Do it. Review it. Act on it
- Early family discussion (supported by evidence) assists complex decision making.
- Use simple analgesics (where possible) to avoid constipation. Commence stool softeners early.
- Surgical patients identified as high risk in the pre-operative period require collaborative case management strategies (agreed to prior to theatre).





## General Surgery

### Case study 1: *When the surgical patient is bleeding – call the surgeon.*

The QASM assessor stated: “Early post-operative bleeding warrants exploration, especially if there is any sign of end-organ deterioration or a requirement for multi-unit transfusions.”

#### The patient:

- was female (mid 70s).
- was an elective admission. (closure of an end ileostomy and a repair of an incisional hernia).
- had multiple comorbidities (renal failure, a tissue mitral valve and paroxysmal atrial fibrillation).

#### What happened at the hospital?

- Warfarin was ceased prior to admission and she was started on Clexane (enoxaparin sodium) 1 mg/kg twice daily.
- The patient was admitted electively by a cardiologist. The Clexane was a bridge to surgery because she had been on warfarin (15 months prior the patient had an emergency valve replacement with paroxysmal atrial fibrillation and transient ischaemic attacks).
- The Clexane was ceased three days after admission. On the fourth day, she had three hour surgery (laparotomy with division of adhesions, ileocolic reanastomosis and left-sided component separation with incisional hernia

repair). Surgery went well. She required component separating and mesh for her abdominal wall reconstruction.

- Post-operation, she had two drains placed in the abdominal wall and was transferred to the intensive care unit (ICU) for observation.
- There was significant blood in one of the abdominal wall drains on the first night in the ICU and she required several units of blood. The bleeding settled with supportive measures only.
- Early the next morning, it was noted that she was again anaemic and was further transfused. It does not appear that the surgeon was notified during the night.
- Later that morning the surgeon noted that there was 450 mL of blood-stained fluid in the abdominal wall drains. The patient was anaemic and coagulopathic (International Normalised Ratio 1.5, platelets >80,000, on Aramine (metaraminol) infusion). She continued bleeding and required ongoing product support.
- The next morning her bleeding ceased. Her haemoglobin remained stable and she remained anuric (requiring support with Aramine to maintain a reasonable mean arterial pressure). She had abdominal wall swelling.
- A vascular catheter in the left subclavian vein was planned, to assist with management. However, she developed a pneumothorax and required placement of an intercostal catheter.



- Her hypotension continued (and progressively worsened). She needed significant inotropic support.
- A positive blood culture (gram-negative Bacillus) was grown. Intubation was undertaken before returning her to surgery.
- Surgery found a large abdominal wall haematoma with ischaemic posterior rectus sheath and rectus muscle. This was not resected. The abdomen was left open with a vacuum-assisted closure (VAC) dressing. The next morning the patient deteriorated and died.

### **What issues are highlighted by this case?**

- Post-operative bleeding often relates to pre-operative planning and preparation regarding anticoagulation. The patient was admitted for bridging anticoagulation. Persistent bleeding only added to chronic renal dysfunction. The timing of the last dose clearly contributed to the continued bleeding.
- Post-operative anaemia associated with hypotension and end-organ dysfunction always requires surgical notification.
- The surgeon and the haematologist need to decide when the patient's coagulation profile is acceptable for the patient to have surgery.





## Orthopaedic Surgery

### Case study 2: *You request it. You review it.*

The QASM assessor stated that “this case highlights the possible presence of infection in patients with chronic bladder catheterisations and every effort should be made to identify these patients and treat them as early as possible, especially in the presence of chronic renal failure so as to minimise the risk of septicæmia and other organ failure.”

### The patient:

- was male (late 80s)\*.
- was an emergency admission.
- had multiple comorbidities (chronic renal failure, hypothyroidism, atrial fibrillation, past deep vein thrombosis and depression).
- was on warfarin.
- had a long-term suprapubic catheter which was changed three weeks prior to admission.

### What happened at the hospital?

- The patient was admitted with a fracture of the right proximal femur.
- Results on admission\*: haemoglobin (116 g/L); creatinine (212 mmol/L); and International Normalised Ratio (1.8). Note: admission notes did not document the estimated Glomerular Filtration Rate.

- Surgery was planned once the coagulation profile was acceptable (while warfarin was withheld).
- In the emergency department (ED), 50 mL of urine was drained from the catheter. This specimen was sent for microscopy, culture and sensitivity.
- Pre-operative nursing notes stated that urine was cloudy but no documentation was made whether any action had been taken.
- Surgery was performed two days post-admission.
- Post-operatively, he was admitted to the ICU for one day before being transferred to the ward. Post-operation: haemoglobin (112 g/L) and creatinine (181 mmol/L).
- The patient was reviewed by the visiting medical officer 11 days post-operation. A septic screen ruled out infection: C-reactive protein (77mg/L); white cell count ( $8.1 \times 10^9/L$ ), haemoglobin (99g/L), estimated Glomerular Filtration Rate (22mL/min/1.73m<sup>2</sup>).
- **Note:** The visiting medical officer also noted urine results, from eight days prior, which showed more than 1000 leucocytes/hpf and grew *Pseudomonas aeruginosa*. At that time norfloxacin was started, and a recommendation was made to change the suprapubic catheter. These results were not reviewed.



- A medical emergency team call was made, 16 days post-operation, due to a change in the patient's neurological status. This was again attributed to urosepsis and recommendations for medical reviews were made.
- A family meeting was held and a not-for-resuscitation decision was made.
- The patient's condition deteriorated and he died 18 days post-operation.

### What issues are highlighted by this case?

- Older patients with permanent urinary catheters require urinary specimen collection data and analysis on admission.
- Test results always require review by the team requesting the test. Do it. Review it. Act on it.

\*Reference ranges for this adult male:

Haemoglobin: RR 130g/L or higher

Creatinine: RR age dependent >60 years – see laboratory

International Normalised Ratio: *the therapeutic interval for oral anticoagulant therapy varies according to the clinical indication.*

C-reactive Protein: RR < 5mg/L

*Estimated Glomerular Filtration Rate: RR >90mL/min/1.73m<sup>2</sup> – normal GFR*

WCC: refer to laboratory reference range

Ref: <http://www.rcpamannual.edu.au/>



## Neurosurgery

### Case study 3: Consultant to consultant discussion and then referral, please!

The QASM assessor stated: “it would appear that despite the patient having strong evidence of progressive respiratory failure, there was a reluctance of intensive care to have the patient transferred to their unit for intubation”.

#### The patient:

- was male (early 70s).
- was an emergency admission.
- had a four week history of confusion and headaches.

#### What happened at the hospital?

- A computed tomography scan (before transfer to the tertiary referral hospital) showed a right parietal lesion with surrounding oedema.
- Magnetic resonance imaging, on admission to the tertiary referral hospital, confirmed the right parietal lesion. There were also two other lesions (one at the right postcentral gyrus and one at the right temporal lobe).
- The oncology team requested tissue biopsy before starting further treatment.
- Surgery was performed (biopsy of the tumour) and was uneventful.
- Post-operatively, the patient had a Glasgow Coma Scale score of 15.

- Day one post-operatively (morning), the patient’s oxygen saturation rate decreased to 91% (on four litres of oxygen) but remained afebrile. The first code blue was called that morning. A chest x-ray was performed suggesting right-sided pneumonia and a request was sent to the senior intensive care registrar to review the patient. The neurosurgeon consultant also suggested review by the intensive care specialists.
- Day one post-operatively (afternoon), the patient deteriorated and was reviewed by the neurosurgical registrar which led to discussions with the intensive care consultant. The consultant advised to continue the current treatment in the ward (antibiotic, physiotherapy and high flow oxygen).
- The patient was deemed not appropriate for ICU.
- The patient’s condition continued to deteriorate.
- After family discussions, a palliative care pathway was initiated and the patient died the following morning.

#### What issues are highlighted by this case?

- Best care (gold standard) referral is consultant to consultant.
- Transfer for biopsy was appropriate.
- Early family discussions (supported by evidence) would have assisted with complex decision-making for this patient.



## Plastic Surgery

### Case study 4: *Examine the groin in elderly patients with abdominal pain.*

The QASM assessor stated that this case “represents a common scenario of age, comorbidities, and skin cancer surgery. Surgery was a routine affair. However, there was mild post-operative bleeding with VAC and post-operative wound infection with graft failure.”

#### The patient:

- was male (late 80s).
- was an elective admission.
- had multiple comorbidities (ischaemic heart disease, atrial fibrillation, left inguinal hernia, hypertension and dyslipidaemia).

#### What happened at the hospital?

- The patient was admitted electively for wide excision of a squamous cell carcinoma on his left lower leg.
- A large (8 cm x 7 cm) squamous cell carcinoma was removed and the defect was covered with meshed split skin graft and a VAC dressing.
- Post-operatively, the patient seemed to have some wound bleeding (as noticed in the VAC canister). As a result, the VAC pressure was eliminated and a pressure bandage was applied. This resulted in successful control of this bleeding.
- Day five post-operation: the graft was checked and the wound was found to

be sloughy.

- Day seven post-operation: the wound was also noted as foul smelling with graft failure.
- On day 10, the patient developed abdominal pain and oliguria (large hernia was suspected). An indwelling catheter was inserted.
- On day 11, the patient developed shortness of breath with reduced oxygen saturation. Aspiration pneumonia was suspected. Ventilation/perfusion (scan) was ordered to rule out pulmonary embolus.
- Acute gastric dilatation was relieved with nasogastric tube and the patient was managed with intravenous (IV) fluids.
- On day 12, the suspicion of incarcerated hernia was again considered, and surgery was advised despite the high risk (mainly because of the patient’s poor respiratory status).
- On day 14, a hernia repair was performed under spinal anaesthetic.
- The patient continued to have sluggish post-operative recovery from aspiration pneumonia. He presumably had loss of consciousness secondary to hypoxia and died on day 22.

#### Notes:

- (1) The patient did have an asymptomatic and uncomplicated large inguinoscrotal hernia. Patient was given oxycodone.



Constipation with oxycodone is well known and may precipitate borderline obstruction with secondary aspiration. The subsequent events really were complications of the aspiration pneumonia and, coincidentally, obstructed inguinal hernia. It is most likely that the poor recovery from his aspiration pneumonia was the major contributing factor in his sudden final event.

- (2) The patient's lower limb was splinted. Ambulation was not advised (to protect the skin graft). This could have indirectly contributed to the constipation. Infection in ulcerated skin cancers is a common complication. Although VAC dressings are commonly used for maximising the chances of success in such difficult areas, in this situation it had to be discontinued because of early post-operative bleeding. The post-operative bleeding complication contributed to a reduced chance of skin graft success and enhanced the risk of infection in the wound.

### **What issues are highlighted by this case?**

- Use simple analgesics (where possible) to avoid constipation. Commence stool softeners early.
- Splint limbs to protect skin grafts.
- Maintaining mobility in elderly patients should be a priority.



## General Surgery

### Case study 5: *Poor team work leads to poor decision making.*

The QASM assessor stated: “the fluid management of the patient in the post-operative period was always critical; the QASM surgical case form records ‘iatrogenic fluid overload’ related to care within the ICU as a major cause of the patient’s poor outcome.”

#### The patient:

- was male (early 70s).
- was an emergency admission.
- had multiple comorbidities (acute renal failure, anaemia, early dementia, cachexia and anorexia).
- had recurrent bowel obstruction.

#### What happened at the hospital?

- He was admitted for recurrent vomiting and abdominal pain (possible bowel obstruction).
- In the ED, his overnight observations were stable with no evidence of strangulation (no peritonitis, tachycardia, acidosis or raised white cell count).
- Plain x-ray demonstrated a small bowel obstruction and this was confirmed on a computed tomography scan.
- Surgical review described him as “clinically and haemodynamically stable with good urine output”.
- Conservative management followed (nil by mouth, IV fluids, strict fluid balance).

- He failed to improve and three days postadmission a decision was made to operate (adhesiolysis, stricturoplasty of the terminal ileum, and open gastrostomy tube).
- The findings were of an obstructed distal small bowel with collapsed terminal ileum and a constriction at the point of obstruction.
- Post-operatively, the high dependency unit admission notes record the first reference to “limit treatment” (following discussion with his spouse) and “not for resuscitation”; “not for intubation”; “not for haemofiltration”.
- Despite the post-operative directions to leave the gastrostomy tube on free drainage for 24 hours, and the patient’s having absent bowel sounds, he was commenced on gastrostomy feeds at 10 mL/hour.
- He was transferred to the ward, on 40 mL/hour of gastrostomy feeds, 100 mL/hour of IV Plasma-Lyte and fentanyl patient-controlled analgesia.
- On admission to the ward, he was “alert and having a chesty cough”.
- Day 2 post-operation, he was confused and had a productive cough. That afternoon, physiotherapy suctioned bile from his mouth and the dietician recommended total parenteral nutrition. That evening, he had coarse crackles throughout both lungs with evidence of overload on chest x-ray.



- He was given frusemide (40 mg) with poor result. Venous blood gas demonstrated a worsening metabolic acidosis.
- An ICU admission was requested but was declined.
- The following day he developed multiorgan failure with worsening urine output, increasing oxygen requirements, hypotension, and a deteriorating level of consciousness. Another ICU review took place and a decision was made for comfort care. The patient died the following evening.

### **What issues are highlighted by this case?**

- Pre-operatively identified high-risk surgical patients require collaborative case management strategies that are agreed to prior to theatre.
- Always have appropriate pre-operative discussions with the patient, the next of kin, and relevant medical team members regarding perioperative risks, expectations and limitations of care.
- Post-operative enteral feeding should be discussed with the surgical team prior to commencement.
- A physician could help with fluid balance issues.















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