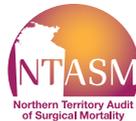
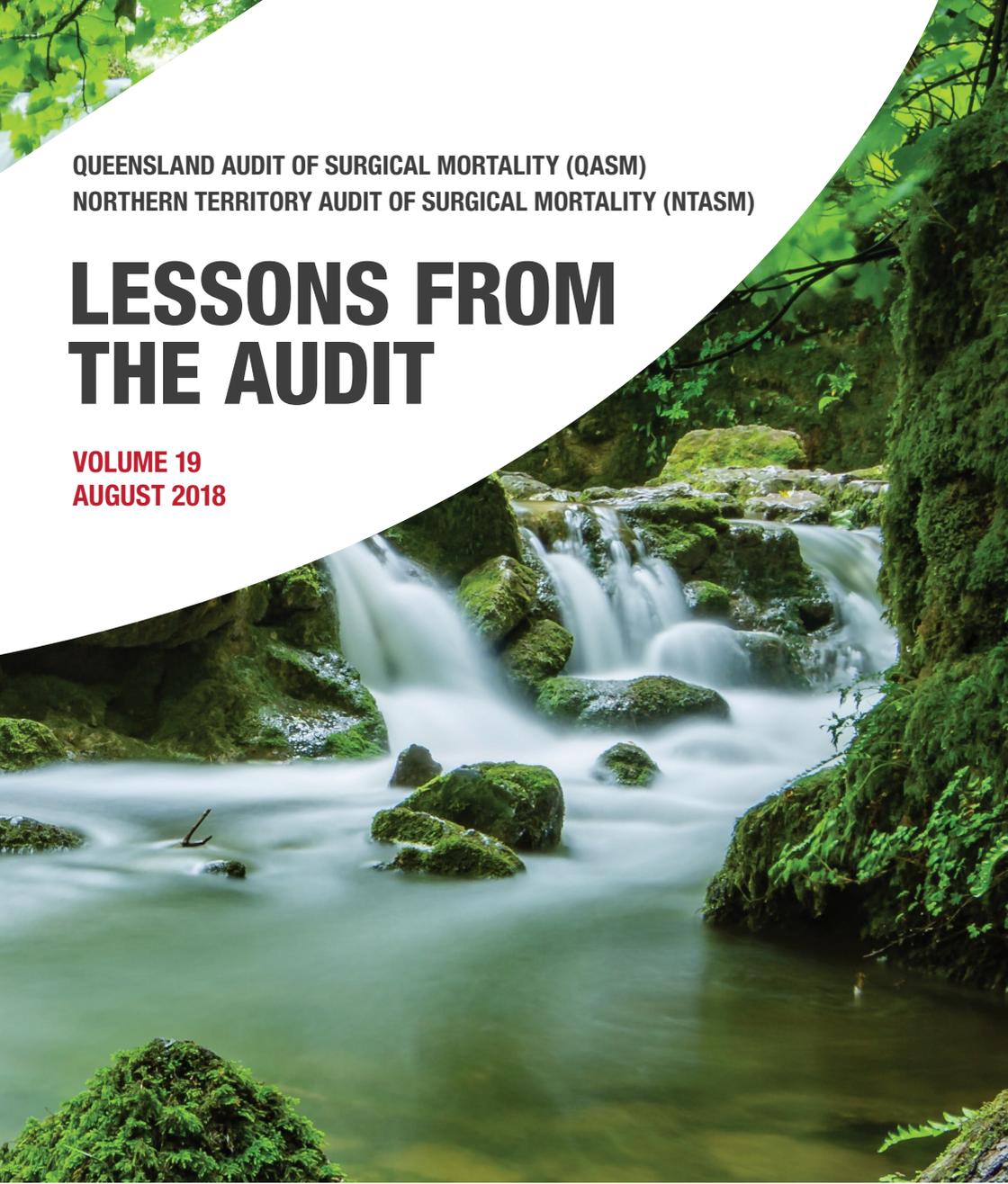


QUEENSLAND AUDIT OF SURGICAL MORTALITY (QASM)  
NORTHERN TERRITORY AUDIT OF SURGICAL MORTALITY (NTASM)

# LESSONS FROM THE AUDIT

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# INTRODUCTION

The *Lessons from the Audit* (Volume 19) presents five case studies from General Surgery.

These case studies have been selected by Dr Daryl Wall upon his recent retirement. QASM would like to thank Daryl for his contribution to surgery in Queensland and for his time in assisting in the compilation of this volume of *Lessons from the Audit*.

To date, QASM has delivered 170 cases studies in this format. To access past publications via your College membership login, please visit [www.surgeons.org/qasm](http://www.surgeons.org/qasm).

Since 2007, QASM has received over 1200 second-line assessment reports. These reports are an important source of learning for the treating surgeons and the assessors. A special thank-you must go to all second-line assessors for their time and expertise in adding value in this peer-review arena.

I trust the following General Surgery cases will stimulate you to consider best practice processes.

As always, I welcome your feedback.

John North  
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## **Case study 1: *Massive duodenal bleeding with Goodpasture syndrome***

### **SUMMARY:**

This 67-year-old male was transferred from hospital 1 several days after undergoing a laparoscopic oversew of a bleeding and perforated duodenal ulcer. The background was of Goodpasture syndrome (diagnosed a month prior to the surgery) with renal-dialysis-dependent renal failure. He was also noted to be on high-dose steroids. There was a history of well-established ischaemic heart disease and coronary stenting. Four days after admission to hospital 1, a left arteriovenous fistula was created for continuing dialysis. The next day, a repeat gastroscopy and laparotomy was performed in hospital 1 for continuing upper gastrointestinal haemorrhage requiring massive transfusion. The patient continued to bleed and was transferred to hospital 2 for possible embolisation.

The patient became haemodynamically unstable in the emergency department of hospital 2, requiring immediate intubation and direct transfer to theatre. At operation, laparotomy was repeated and a 3 cm duodenal ulcer was noted with haemorrhagic mucosa

surrounding the ulcer. Fresh and old blood was noted. No obvious bleeding was seen. The area was sutured and this appeared to control the bleeding. The patient was transferred to the intensive care unit ventilated.

The patient was initially stable, but continued to deteriorate and was taken back to theatre (within 48 hours) for laparotomy due to increasing bile drainage. It was noted that the right colon had been caught under an omental band and was necrotic, and this required a right hemicolectomy and creation of a double barrel stoma. The patient continued on inotrope support and ventilation in the intensive care unit. There was intermittent bleeding and massive transfusions were required on several occasions.

Further bleeding occurred shortly after the laparotomy and right hemicolectomy. Discussion with several surgeons and the family took place. Radiological intervention with embolisation was performed. Multiple bleeders were found but no single vessel was identified. Although initially stable, intermittent bleeding continued, again requiring significant transfusion.

Despite the interventional embolisation, bleeding continued. Discussions were again held with

the family and they wanted to proceed. Re-laparotomy and distal gastrectomy was then performed. A gastrojejunostomy was fashioned and a duodenal catheter drained the duodenal stump. The patient was intermittently stable but required further support for several days.

Extubation was possible by day 4 after the distal gastrectomy. Intermittent bleeding continued, again requiring extensive and massive transfusion. The patient was taken to theatre for repeat laparotomy. Multiple small bleeding vessels were found but no obvious bleeding could be identified.

The patient was returned to the intensive care unit following this procedure. There was extensive consultation with the family regarding any operative intervention (both with radiology and surgery). It was decided that should further re-bleeding occur, interventional embolisation might be possible but further surgery would not be considered. The patient continued to bleed intermittently, again requiring extensive transfusion, and died several days later.

### CONSIDERATIONS:

- The operation in hospital 1 was a laparoscopic oversew of a perforated duodenal ulcer

in a patient with established Goodpasture syndrome and renal dialysis. Assuming the operator was competent in this procedure, the choice of operation was appropriate.

- Consultation with the **surgical team** in hospital 2 occurred regarding this patient's subsequent re-bleed after the laparotomy in hospital 1. Hospital 1 transferred the patient for angiography to hospital 2 and may well have liaised with the **radiology team**. Documentation was sparse with respect to these conversations.

This patient was complex both before and after transfer and with his subsequent clinical course, a good summary of his underlying problems would have been required by all teams (intensive care, radiology and surgical).

- The choice of operation in this case seems entirely appropriate. Unfortunately, this patient suffered a complication after laparotomy in hospital 2, with an adhesive omental band causing ischaemia of the ascending colon. This doesn't appear to have further compromised issues with the bleeding ulcer. The choice of operative intervention for the bleeding duodenal ulcer



seemed appropriate. There was evidence that good consultation processes occurred in hospital 2, with management opinions sought from the radiology team and several surgeons. Everything was tried before distal gastrectomy was performed in a very high risk patient, but even this did not stem his upper gastrointestinal bleeding.

**COMMENT:**

There is no doubt that this patient was a high-risk candidate from the outset. This case highlights a lack of communication between hospital 1 and hospital 2 in a patient with complex and multiple surgical and medical conditions.

## Case study 2: *Tracheostomy troubles*

### SUMMARY:

This 46-year-old man was admitted to hospital for investigation of right hand paraesthesia and weakness. He had a significant psychiatric disability and behavioural problems in addition to mild chronic kidney disease and hepatitis C. During his hospital stay some further acute deterioration in renal function was noted and it was decided a renal biopsy would be appropriate. At the time of the renal biopsy some moderate bleeding was noted, and the patient required transfusion of 2 units of packed red blood cells.

One week later on the ward the patient suffered a massive bleed from the kidney with a hypotensive collapse requiring intubation, ventilation, inotropes and a 10 unit blood transfusion. A laparotomy was performed with a large number of packs positioned over the kidney. Haemodynamic instability and ongoing bleeding continued postoperatively. An attempt at angio-embolisation was made but repeat laparotomy and nephrectomy was required 24 hours later. At that time the descending colon was injured as it was dissected from the kidney. The injury was oversewn.

The patient made a good recovery over the subsequent 2 days before suffering a significant deterioration with sepsis, severe hypotension, abdominal distension and a high inotrope requirement. This critical state persisted for more than a week before a computed tomography (CT) scan was performed. This revealed extensive free gas and a large collection. At laparotomy there was a very large infected collection in the left renal bed, 3 litres of purulent fluid in the abdomen, and a large amount of blood within the stomach with a possible gastric ulcer that was oversewn. The following day he remained unwell and a revision laparotomy revealed extensive faecal peritonitis with an obvious defect in the descending colon. A Hartmann's procedure was performed. Further re-look laparotomies and washouts were required over the next 3 days.

A tracheostomy was performed. The clinical course was relatively uncomplicated and he was stable for a period of time. Unfortunately, he had major problems with the tracheostomy that were certainly contributed to by his psychiatric illness and behavioural problems. Multiple tracheostomy tube repositionings were required and he suffered a paratracheal false passage and bleeding. There were frequent episodes of retained secretions,



hypoxia, hypercarbia, low blood pressure and near arrest.

Over a period of several weeks, the combination of respiratory infection, deconditioning, malnutrition and multi-organ compromise culminated in the decision to withdraw active treatment. The patient died several days later.

### **CONSIDERATIONS:**

This complex patient with significant competing comorbidities suffered a catastrophic bleed from his left kidney 1 week after renal biopsy. This ultimately required a nephrectomy and unfortunately the patient suffered a second iatrogenic complication with a bowel injury.

After this bowel injury he suffered a very significant deterioration that should have prompted earlier intervention with cross-sectional imaging or surgery. It does appear that the delay in this intervention of more than 1 week may have contributed to his ultimate demise.

### **COMMENT:**

In summary, this complex patient who unfortunately suffered several significant complications from invasive procedures may have benefited from earlier active intervention after his nephrectomy and bowel injury.

### Case study 3: *Transplant patient in trouble*

#### **SUMMARY:**

This 71-year-old male, like many other renal transplant patients in Queensland, suffered from multiple ongoing skin cancers of the face and limbs. He had yearly inpatient surgery for their removal. On this occasion he was scheduled for removal of eleven lesions including skin grafting under general anaesthetic.

His past history included two renal transplants (1980 and 1990) following immunoglobulin A nephropathy. Current renal status was satisfactory. There were cardiac comorbidities with ischaemic heart disease (coronary artery bypass graft in 2000), transient ischaemic attacks, and ongoing atrial fibrillation that necessitated clopidogrel and Aspirin administration. Other medications included Prazosin, Metoprolol, Cardizem, Calcitriol, Cyclosporin, Cellcept and Neotigason.

Clopidogrel was ceased 1 week prior to the procedure and the routine surgery and general anaesthetic were performed without incident. However, 18 lesions were removed with a total intraoperative time of 4 hours.

Surgery was at registrar and resident level.

His initial postoperative course was complicated by the early and relentless development of ileus/ obstruction of varying intensity, further complicated by initial dehydration and pre-renal renal failure. Medical management at consultant level was early and ongoing. Oral immunosuppressives and intravenous access were troublesome.

The patient continued to deteriorate slowly with further development of sepsis involving bladder, gut, donor sites and intravenous access lines. Bacterial sepsis was followed by fungaemia of the lungs with *Candida albicans*. His cardiac condition deteriorated with episodes of rapid atrial fibrillation and cardiac ischaemia. Despite broad clinical consultation and involvement, the patient's organ systems did not respond and he succumbed nearly a fortnight after surgery.

#### **CONSIDERATIONS:**

This case highlights the known association between operative morbidity and operation length. While the surgery and anaesthetic were uneventful, the wisdom of subjecting a patient with known and significant multiple comorbidities to 4 hours of elective surgery is questionable.

The major adverse event in this



patient's case was the development of ileus and obstruction. The question should be raised as to whether the operative length, and therefore the anaesthetic length, may have contributed to its development.

Otherwise, the management of this patient with a challenging clinical scenario could not be criticised.

#### **COMMENT:**

In summary, awareness of the development of multiple comorbidities in long-term transplant patients is important, as is careful consideration of operation length when elective procedures are performed on such patients.

## Case study 4:

### *Carefully consider the “decision to operate” in every case*

#### **SUMMARY:**

This 51-year-old woman was admitted for a Whipple resection for a cancer of the head of the pancreas. This was scheduled as an elective procedure.

She had diabetes, was overweight and had aortic stenosis. These facts are of significance in the patient’s management and final outcome.

A thorough preoperative assessment of the patient’s cardiac status was not performed. According to the report many of the investigations were “inconclusive”, but the ejection fraction was 70%.

The patient had the Whipple procedure as scheduled. This was followed by complications that included: bleeding from the gastroduodenal artery, pancreaticojejunum anastomotic leak, tracheostomy, wound debridement, sacral pressure ulcer, pulmonary emboli and intra-abdominal sepsis.

#### **CONSIDERATIONS:**

By all accounts this was a high-risk patient for a Whipple resection, and it is somewhat debatable as to whether

this procedure should have been undertaken in the first place. There were many co-morbidities present that should have been considered before surgery.

It was not clear whether this patient had been discussed at a multidisciplinary team meeting. The question arises as to whether the operation was indicated given that the patient had multiple comorbidities and was categorised as American Society of Anesthesiologists (ASA) 3.

The second-look operation was done by a Fellow. The notes do not indicate whether the consultant was present. The presence of blood at the pancreaticojejunum anastomosis was a good clue for possible breakdown of the anastomosis, and should have been carefully reviewed.

There is no difficulty in accepting the indications for the second-look operation.

#### **COMMENT:**

Pancreatic cancer carries a high morbidity and mortality rate, with overall disease-free survival less than 10%. The histology report clearly indicates that this patient would have died, possibly within 6 months, even if she had survived the Whipple procedure.



## Case study 5: *Trainee in trouble*

### SUMMARY:

A well female patient (aged 70 years) died unexpectedly due to complications following a laparoscopic cholecystectomy carried out by a Trainee.

She was admitted electively for laparoscopic cholecystectomy in the management of cholelithiasis. The patient had been well previously, with the exception of an episode of bile duct obstruction due to choledocholithiasis. The choledocholithiasis was managed successfully at another hospital prior to the laparoscopic cholecystectomy.

The patient underwent laparoscopic cholecystectomy by a Trainee with the consultant assisting. A cholangiogram was not carried out.

The patient was reviewed by the consultant surgeon approximately 20 hours postoperatively. On review, the patient reported having severe left shoulder tip pain (no notes were made about the presence or absence of peritonitis). The treatment plan was mobilisation, morphine and normal diet. No diagnosis was provided, no general observations were made and no investigations were recommended. As the patient failed to progress and follow the

established clinical pathway she remained in hospital.

However, because there were no surgical beds available she was transferred from a postoperative ward to a rehabilitation ward. On the rehabilitation ward she deteriorated, with increasing abdominal pain, increasing tachycardia and decreasing body temperature. A nurse-initiated ward call precipitated a review at which it was found that the patient had signs of severe systemic inflammatory response syndrome and generalised peritonitis. The patient was then reviewed by the supervising consultant who ordered an urgent CT scan. Four hours later the patient collapsed in the radiology room. The combination of the preoperative systemic shock plus the CT scan contrast probably precipitated renal failure.

Four hours later the patient underwent emergency second laparoscopy and laparotomy. No antibiotics were administered. The patient was in renal failure. Bile peritonitis was confirmed at operation. This was associated with an offensive odour, however no perforation was found; the source of the bile may have been the cystic duct stump. No necrosis of bowel was described. No formal culture was taken from the peritoneal cavity. The duct stump was ligated and

drains were placed in the abdomen. The patient was admitted to the intensive care unit and treated with intravenous adrenalin infusion for hypotension and antibiotics for bacterial peritonitis.

The patient progressed into multi-organ failure. Dialysis was started. Postoperative discussions led to the decision of re-operation to look for continuing intestinal leakage. The on-call consultant surgeon refused to see the patient. The original consultant visited the patient and decided that she was too unstable to benefit from surgery. The patient continued to decline. On day 4 post-operation, a third-look laparotomy/laparostomy showed patchy ischaemia of the small bowel/large bowel, omentum and liver. The patient continued to decline and died 5 days after the laparoscopic cholecystectomy.

This death was most unexpected. A request was made to the coroner for a coronial investigation and post-mortem.

### **CONSIDERATIONS:**

As the occurrence of death after laparoscopic cholecystectomy in a patient categorised as ASA 1 or 2 is less than 1:10,000, this patient's death was cause for great concern.

- The precipitating event was an injury to the patient's biliary or gastrointestinal tract. Based on the findings of the three operations, it is likely that the bile duct leak precipitated the cascade of misfortune and delayed intervention.
- Bile leak is surgical misadventure, and it is likely that operator experience was a factor in the leak. However, there was delayed diagnosis of the life-threatening bile peritonitis. The consultant identified the problem but did not initiate appropriate investigations, even though it was clear that the patient was not progressing on the clinical pathway. The clinician lacked proactive recognition and response, and showed a lack of pre-emptive management.
- The patient's safety was severely compromised when she was placed in a nonsurgical area for further management of the ongoing bile peritonitis. The placement of the patient in the rehabilitation unit probably delayed the diagnosis of bile peritonitis by another 12 hours.
- The decision to place the patient in a low acuity clinical environment was inappropriate and should not have happened. The consultant usually has the



power to direct the postoperative level of standard of care to the patient. Regrettably, in modern hospital management the proper hierarchy of consultant responsibility is lost. Other decision makers who do not have the experience, responsibility or wisdom may corrupt the patient's rapid postoperative management. This renders the patient liable to further dangerous delays in care.

- The further postoperative deterioration of the patient was consistent with the onset of severe inflammatory response syndrome associated with generalised peritonitis. Again there was further delay in definitive surgical intervention.
- The obvious diagnosis of peritonitis was overlooked and a CT scan was requested. This caused substantial delay in transfer to theatre. It also precipitated renal failure, as the patient was not provided with the intravenous antibiotics and intravenous fluids that would have protected the kidneys from the damaging effects of radiological contrast. Bisphosphonates may have aggravated this deterioration.
- At operation, the surgeon failed to obtain a culture from the

peritoneal cavity. Postoperatively, when the patient went into multi-organ failure, the surgeon missed the opportunity to seek another opinion regarding a possible third operation. This could reassess the possibility that the intestinal tract was the source of the contamination. Once again the patient was denied the opportunity to receive the benefits of early re-operation.

- Delaying the operation further was a failure of team work between the surgeons at the hospital, with the on-call surgeon refusing to visit the patient. This event raises questions about the quality of leadership, supervision and teamwork within the surgical service. The patient's further care fell to the staff of the intensive care unit, who were not in a position to return the patient to theatre in time to save their life. The structure of surgical services must ensure that intensive care staff always have access to skilled, confident and determined surgeons when necessary (through a second-opinion protocol).

At the second re-operation the patient was found to have ischaemic liver and bowel. The liver function tests suggest the liver had undergone massive infarction,

and it is likely that this was due to the combination of hypotension, overwhelming sepsis, portal pyaemia and maximum noradrenaline infusion. The patient was administered Xigris\*, and its role in her deterioration is unknown; however, it is important to recognise that this drug has been found to have no benefit for serious sepsis and it is known to precipitate coagulation disturbances.

Ischaemic changes in the liver and the bowel were evident only at the second operation. Therefore, the major deterioration was directly related to the onset of systemic inflammatory response syndrome followed by serious sepsis syndrome, both of which would have been medicated by early administration of appropriate antibiotics. It is likely that both of these deadly disorders would not have progressed had proactive care been commenced when the first clinical opportunity arose. A delay of 4 hours in the administration of antibiotics in serious sepsis syndrome is associated with a 40% increase in mortality.

\*Xigris (*recombinant form of human activated protein C*)

## COMMENT:

In summary, this patient suffered an uncommon but predictable complication of a laparoscopic cholecystectomy. The subsequent management of the patient was inadequate, with the sequence of delayed diagnosis, delayed intervention and delayed therapy administration contributing to the patient's death.

However, it is important to recognise that on occasions, despite the best possible timing and the best possible care, a systemic inflammatory response syndrome is set in motion that results in an irreversible terminal cascade. As such, this patient may still have died even with the best possible timing of interventions.

That notwithstanding, the chances of this patient surviving would have been greatly improved had staff followed the guidelines set out in the Care of the Critically Ill Surgical Patient (CCriSP) program established by the Royal Australasian College of Surgeons.

<https://www.surgeons.org/for-health-professionals/register-courses-events/skills-training-courses/ccrisp/>



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