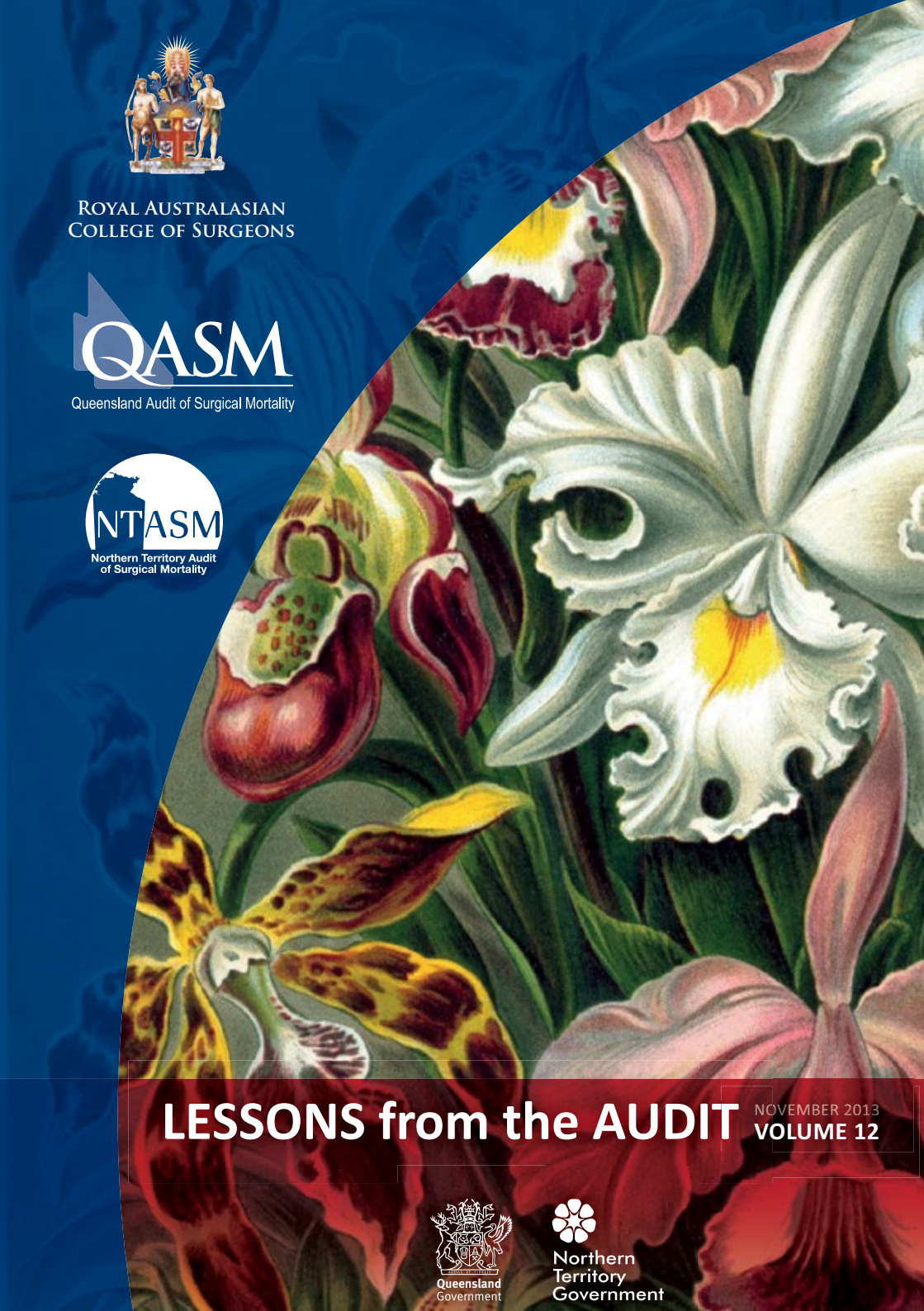


Royal Australasian College of Surgeons

QASM
Queensland Audit of Surgical Mortality

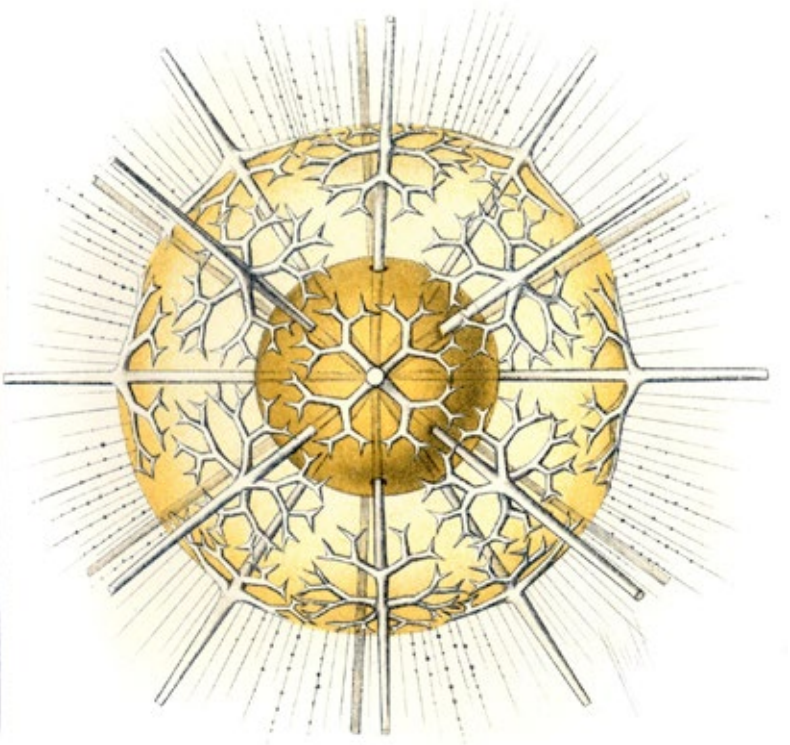
NTASM
Northern Territory Audit of Surgical Mortality

LESSONS from the AUDIT

NOVEMBER 2013
VOLUME 12

Queensland Government

Northern Territory Government



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Introduction

"There is no greater danger than to be the wrong patient having the wrong team treating for the wrong pathology." Queensland Audit of Surgical Mortality (QASM) assessor

Since 2007, QASM has presented 130 case studies in 12 volumes of *Lessons from the Audit.* Of these case studies, the three surgical specialties most represented are general surgery (53%), orthopaedic surgery (15%), and vascular surgery (10%).

In *Lessons from the Audit* (Volume 12), **preoperative management issues** are the main focus.

QASM assessors, as a result of reviewing over 5000 surgically-related deaths, have indicated that 14% of patients had preoperative management issues and that 10% of patients had postoperative management issues.

For you, *Lessons from the Audit* (Volume 12) presents six case studies, each with preoperative management recommendations. As always, your feedback is welcome.

Thank you to all QASM assessors who contribute valuable reports for their peers, thereby creating learning opportunites for all Queensland surgeons.

Yours sincerely

John North
QASM Clinical Director

Shortened forms

ALT alanine aminotransferase

AST aspartate aminotransferase

CBD common bile duct

CSF cerebrospinal fluid

CT computed tomography

C diff Clostridium difficile

ECG electrocardiogram

ERCP endoscopic retrograde cholangiopancreatography

ESR erythrocyte sedimentation rate

EVD external ventricular drain

GCS Glasgow Coma Scale

GI gastrointestinal

GGT gamma glutamyl transpeptidase

HDU high dependency unit

HHS Hospital and Health Services

ICU intensive care unit

INR International Normalised Ratio

IV intravenous

KTOT keeping trainees on track

MDT multi-disciplinary team

QASM Queensland Audit of Surgical Mortality

QT interval
A measure of the time between the start of the **Q wave** and the end of the **T wave** in the heart's electrical cycle.

RACS Royal Australasian College of Surgeons

WCC White Cell Count

Contents

Case study (1) General

The QASM assessor specifically stated that for this case, "a secondary pathology, such as viral infection, should have been considered on re-presentation. A general medical opinion should have been sought on first admission to assist with recognition of significance and management of comorbidities, namely the patient's diabetes, prolonged Q-T interval, and whether there was another infectious process occurring."

The assessor also commented that "a computed tomography (CT) scan to exclude ascending retro-peritoneal or visceral infection should have been performed sooner", and that "there is no greater danger than to be the wrong patient having the wrong team treating for the wrong pathology."

A summary of the case follows.

The patient:

- was middle-aged
- had co-morbidities (obesity, type II diabetes mellitus, and a significant "underlying cardiac condition")

What happened at the tertiary referral hospital?

- The patient was re-admitted the day after discharge with continuing painful haemorrhoids and necrotic surface changes (and discharge).
- The patient remained unwell with a low grade temperature (37.9 degrees Celsius), and developed lower abdominal crampy pain and had vomited twice.
- It was noted that the patient had been having anal pain and swollen, bleeding haemorrhoids for two weeks.
- Day-one post-admission, the patient was flushed, with a temperature of 39.2 degrees Celsius, had painful swollen haemorrhoids and had passed loose motions with blood and mucous. There was neither surrounding cellulitis nor malodour.
- The patient was treated with ampicillin, Flagyl, and gentamicin for presumed systemic sepsis.
- The white cell count (WCC) was $7.1x10^9$/L (lymphocytes 17%), erythrocyte sedimentation rate (ESR) 26 mm per hour.
- A CT was "mooted but left in abeyance due to iodine allergy".
- The patient was reviewed by junior staff twice more that day (Clostridium difficile (C diff) assay was negative.)
- At 10pm that night, the patient had a cardiac arrest "and was resuscitated but was left with non-survivable hypoxic brain injury". "Cardiac opinion was that of arrhythmia precipitated by febrile illness in person with prolonged Q-T interval."
- In the patient's history, it was found that a review by a cardiologist in a cardiomyopathy clinic took place six years

prior to this admission and there had been an admission for collapse and loss of consciousness from which the patient recovered spontaneously. A prolonged Q-T interval on electrocardiogram (ECG) was noted.

What issues are highlighted by this case?

- The QASM assessor expressed concern that although "this patient had portal pyaemia, there was a lack of local signs of sepsis/odour that usually are the hallmark of infected necrotic piles. An intercurrent viral illness would fit better with the low'ish ESR and high lymphocyte count. Patient was to undergo non-intravenous (IV) contrasted CT the next day. Unfortunately, the patient's cardiac arrest intervened.

QASM recommendations:

- Early preoperative cardiac consultation and opinion is critical in complex, high-risk morbidly obese patients.
- Preoperative MDT collaboration is paramount when a complex surgical patient is admitted under a non-surgeon.
- Remember that a morbidly obese patient is always a complex surgical patient.

Case study (2) Neurosurgery

The QASM assessor specifically stated that for this case "the history describing the initial event suggests unsurvivable pathology—what was the aim of the transfer?"

The assessor also commented that the "oversight of trainees is challenging" and commended "the treating Consultant's reflection on his/her own experience".

A summary of the case follows.

The patient:

- was middle-aged
- collapsed at home with a cardiac arrest at approximately 8 am (there were approximately 75 minutes of downtime before sustained spontaneous systemic circulation was re-established)
- had a post-resuscitation Glasgow Coma Score (GCS) of 3/15 (pupils were equal and reacting to light)
- was transferred from home to a regional hospital: hospital (1)

What happened at the regional hospital?

- A CT scan was performed showing a Fisher grade 4 subarachnoid haemorrhage with no hydrocephalus.
- A CT angiogram showed a ruptured anterior communicating artery aneurysm.
- The neurosurgical team at hospital (2) (a tertiary referral hospital) was contacted and the decision was made to transfer the patient for further management. Transfer was delayed because, at that time, another critically-ill patient was being transferred.
- The neurosurgical team from hospital (2) offered to fly to hospital (1) to perform the external ventricular drainage (EVD); the offer was not accepted for logistical reasons.
- The patient was later transferred to hospital (2).

What happened at the tertiary referral hospital?

- The patient reached hospital (2) at 8 pm and an EVD was attempted by a senior Fellow who assured the on-call Consultant that the ventricles were slit and that the drain was appropriately located (this was not successful after repeated passes; the patient developed a blown right pupil).
- A CT scan was performed and did not show any re-bleed or significant change in the size of the ventricles. An EVD was reattempted. There was a transient flow of cerebrospinal fluid (CSF), but the flow stopped. The EVD was left in place.
- The on-call Consultant considered going into the hospital to review the scans (the Consultant believed the patient's only chance of survival was to wake up after

CSF drainage) but then the Consultant decided not to go in to assist the Fellow.

- The patient later developed bilateral dilated pupils.
- It was decided not to intervene further, in view of the patient's neurological status which was poor at presentation and continued to remain so.
- The patient was evaluated and confirmed to be brain-dead the following day at 4 pm.

What issues are highlighted by this case?

- Decisions regarding transfer of neurosurgical patients —"there was an extended delay in transfer because, shortly after presentation, another patient presented to the same regional emergency department; a decision was made to transfer the second patient first—this patient also needed urgent surgery and was more likely to survive and there was only one helicopter."
- The ventricular drain was not in the ventricle due to suboptimal placement of the burr hole. Belated review of scans by the Consultant showed that ventricles were within normal limits—there was a need for more timely Consultant review of the scans and more support (by the Consultant) of a "very tired" Fellow.
- The decision to transfer or not to transfer this patient was critical and complex. It required robust inter-team and inter-hospital communication early after initial admission.

QASM recommendations:

- Preoperative conversations between Consultants, Fellows and Registrars regarding transfer issues are important when developing optimal care pathways for patients.
- Consultants, Fellows and Registrars could benefit from attending the Royal Australasian College of Surgeons' courses on *Complex Decision Making* and/or *Keeping Trainees on Track* (KTOT). (For more information, go to the College website www.surgeons.org)
- Hospital systems are to ensure that working conditions support all staff and allow them the rest they need to function in a professional manner.

Case study (3) General

The QASM assessor specifically stated in this case that "despite the clinical diagnosis being fairly obvious, this patient was sent for a CT scan".

The assessor also stated that the CT scan "in itself would have stressed the patient further and the CT probably was not an absolutely necessary investigation."

A summary of the case follows.

The patient:

- was elderly
- had multiple comorbidities (cardiovascular, respiratory, peripheral vascular disease, diabetes).
- had been suffering pain with a hernia prior to admission
- was an early morning surgical emergency admission for severe abdominal pain (with abdominal distension and vomiting)
- had a known incarcerated para-stoma hernia

What happened at the tertiary referral hospital?

- Clinical examination supported a diagnosis of "perforated colon secondary to mass eroding through colon" or "infarcted bowel in strangulated parastomal hernia".
- Following clinical examination, the patient was sent for CT scan to confirm the clinical diagnosis.
- The patient was taken to theatre in the late evening, on the day of admission.
- At operation, findings were peritonitis secondary to parastomal mesh eroding through large bowel at the stoma site. The descending and sigmoid colon was resected. Old mesh was removed and a new end-colostomy was fashioned in the right lower quadrant.
- The patient was taken back to theatre (day five post-operation) for an abdominal lavage, where some infarcted omentum was removed.
- Post-reoperation, the patient did not progress well over a few days and needed an endoscopy. Bleeding from the bowel was noted and the bowel was ischaemic.
- The patient died the following day.

What issues are highlighted by this case?

- The QASM assessor questioned the need for a CT scan because the clinical diagnosis for this patient was obvious on admission.
- Despite this patient's having a strangulated and perforated large bowel in the parastomal hernia, there was a delay of twelve hours to operation. The patient's chances of survival may have been improved without this delay.

QASM recommendations:

- "To scan or not to scan" preoperatively should be a Consultant-driven decision.

- To go to the operating theatre “on what you know” must be a Consultant-driven decision in the clinical care pathway.
- Hospital and Health Services (HHS) within the Queensland Department of Health are to monitor demands on their imaging services and are to look at their local policies/guidelines regarding sending surgical emergencies to imaging services.

Case study (4) Orthopaedic

The QASM assessor specifically stated that for this case there were concerns around the surgical team's "inability to obtain Consultant physician review on a complex geriatric patient".

The assessor also commented that "it is ideal for elderly neck of femur fracture patients to undergo a medical assessment preoperatively and, therefore, their medical conditions to be managed and co-ordinated by a Consultant-led team in the perioperative and postoperative period."

A summary of the case follows.

The patient:

- was elderly
- had an extensive medical history (ischaemic heart disease, previous cardiac bypass grafting, type I diabetes mellitus, chronic renal failure, chronic obstructive airway disease, cerebrovascular disease, prostate cancer, hypertension, hypercholesterolaemia, gastroesophogeal reflux disease, hyperparathyroidism and osteoporosis)
- was admitted, after a fall at home, to the emergency department via ambulance. The patient sustained a right neck of femur fracture.

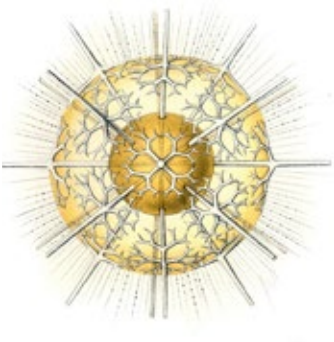
What happened at the tertiary referral hospital?

- The patient was admitted with a right neck of femur fracture.
- On the day of admission, a preoperative review, by both the orthopaedic and the medical registrars on call, took place.
- An assessment was made and it was decided that the patient was able to have surgery (a day after admission, the patient underwent anaesthetic review which confirmed this decision).
- Two days after admission, the patient had surgery.
- Perioperatively, no complications were noted.
- Postoperatively, the patient developed low urinary output and a cough (two days post-operation). The cough suggested a respiratory tract infection, which was confirmed via clinical examination and a chest X-ray. Aspiration pneumonia was suspected.
- Also, during the postoperative period, the patient suffered deterioration in renal function and developed acute-on-chronic renal failure. Cardiac failure also ensued and an upper gastrointestinal (GI) bleed was identified.
- This constellation of medical conditions created a situation which was difficult to manage. The patient died two weeks post-admission.

- The patient was managed by the orthopaedic team in consultation with medical registrars, intensive care unit (ICU) staff, and allied health staff. The patient did not have an ICU or high dependency unit (HDU) admission.

What issues are highlighted by this case?

- Considering the patient's age and multiple medical comorbidities, it is reasonable to expect that this patient would have been at high risk of developing a complication relating to their medical conditions in the setting of a neck of femur fracture.
- The role of the multi-disciplinary team (MDT) approach is to pre-empt the expected medical deterioration that would be reasonably expected to occur in particular scenarios.
- If junior staff have difficulty obtaining the support they require on a consultation basis with other medical disciplines within a hospital, then it is reasonable for the Consultant surgeon to involve themselves directly to facilitate the involvement of other experienced Consultant staff.



QASM recommendations:

- Preoperative fluid balance review in the elderly is critical.
- Preoperative MDT discussions to be a priority for elderly patients with extensive medical co-mordidities.

Case study (5) General

The QASM assessor specifically stated that for this case "probably more attention should have been given to significant radiological/haematological results and follow up" and that there was "a rather short period of observation for a potentially seriously life-threatening condition".

A summary of the case follows.

The patient:

- was middle-aged
- was morbidly obese
- was admitted with an incarcerated parastomal hernia and small bowel obstruction
- had (10 years prior) a similar incarcerated inguinal hernia with perforated right colon and faecal soiling which had led to a right hemicolectomy and ileostomy. This complicated laparotomy had been treated initially with laparostomy and later by the application of a skin graft for closure, leaving behind a large incisional hernia.

What happened at the tertiary referral hospital?

- The patient was admitted with parastomal pain and no output from the stoma.
- The abdomen was tender and distended.
- Radiology confirmed a small bowel obstruction with tapering towards the hernia and distension of bowel loops to a diameter of 8.5 cm.
- The WCC was high at 27 x 10^9/L.
- On the day of nasogastric suctioning and rehydration, the obstruction clinically improved, the pain settled, and the stoma output returned.
- During a further 36 hours of observation, the patient remained asymptomatic and was discharged with a future abdominal CT booked.
- On discharge, the WCC was still high (20 x 10^9/L).
- Later that evening, after discharge, the patient was re-admitted with renewed onset of abdominal pain and progressive septicaemic shock. This led to intubation and several episodes of cardiac arrest, which were successfully reversed.
- The patient then underwent laparotomy, complicated by abnormal anatomy, adhesions, and several internal hernias.
- Incarcerated small bowel was returned from the parastomal hernia.
- Faecal soiling was present and more than one metre of necrotic bowel was resected.
- Progressive cardiovascular instability ensued despite maximum support.
- Following several episodes of arrest requiring active resuscitation, the consensus was to end further attempts.

- The autopsy confirmed the cause of death was due to “intra-abdominal sepsis and septic shock” and stated that “severe morbid obesity was obviously a significant factor in this patient’s death”.
- The patient died two days post-admission.

What issues are highlighted by this case?

- The need for careful review with the difficult diagnosis of intra-abdominal pathology in the morbidly obese, especially when it is complicated by difficult anatomy or pathology and by conditions that can progress to intestinal ischaemia.
- After alarming clinical test results, patients with potentially life-threatening conditions need further investigation and observation.

QASM recommendations:

- Preoperative investigation for the morbidly obese must include comprehensive clinical, haematological and radiological assessments.
- Don’t discharge the apparently “asymptomatic” patient who has a high WCC or any other significant abnormal pathology.

Case study (6) General

The QASM assessor specifically stated that the "decision to operate should have been delayed or postponed indefinitely as the patient was asymptomatic at the time of discharge". This "decision to do a laparoscopic cholecystectomy was made in the ward before the patient's discharge by a junior member of the surgical team without assessing the benefits and risks; there was no evidence of consultation or discussion with a responsible senior member of the surgical team."

A summary of the case follows.

The patient:

- was middle-aged
- had Child's B cirrhosis of the liver
- was admitted as an emergency patient with probable severe gall-stone pancreatitis.

What happened at hospital?

- On admission, the patient presented with lipase 17 600 units, bilirubin 68 µmol/L, WCC 23x10^9/L, international normalized ratio (INR) 1.9, albumin 36 g/L.
- The patient had received previous pelvic surgery through lower midline incision.
- An endoscopic retrograde cholangiopancreatography and removal of common bile duct (CBD) stone was performed on day three with insertion of biliary stent (a delay of 72 hours). "Duodenal mucosa and ampulla become more oedematous and haemorrhagic making the procedure difficult with poor identification of structures – mainly ampulla and subsequent bleeding."
- A repeat ERCP was performed on day ten and again on day 11 for bleeding. Clips were applied to bleeding spots.
- Liver function test and coagulopathy improved after ERCP.
- On day 25, the patient was reviewed on the ward by junior surgical staff and booked for elective laparoscopic cholecystectomy without consulting senior staff. At this review, the patient had no ascites or encephalopathy.
- On day 30, the patient was reviewed by a specialist physician (INR 1.5, Na 133 mmol/L, K 4.2 mmol/L, Albumin 33 g/L, Bilirubin 61µmol/L, gamma glutamyl transpeptidase [GGT] normal with mild elevations of alanine aminotransferase [ALT] and aspartate aminotransferase [AST]). There was no evidence of oesophageal varices on endoscopy. The patient weighed 62 kilograms. The patient was discharged.
- One month after being discharged, the patient was readmitted and had an elective laparoscopic cholecystectomy performed by a registrar with a Consultant surgeon assisting (surgery #1). There were initial problems with open Hassan entry due to adhesions from previous lower midline abdominal

surgery: an optical entry was made through the left upper quadrant and cholecystectomy was performed without any difficulty.

- There was concern regarding bleeding and bowel injury during the initial entry so a mini-laparotomy was performed with division of adhesions; enterotomy was identified and repaired. There was continued bleeding around this site so the wound was packed and the patient returned to ICU on the ventilator.
- The bleeding continued so the patient was taken back to the theatre early in the morning to have repeat enterotomy on entering the peritoneal cavity (surgery #2). The bowel was divided and both ends were stapled. The peritoneal cavity was repacked.
- The patient continued to bleed with abdominal distension and had difficulty in ventilating so was taken back to theatre day-four post-operation and the abdomen was reopened (surgery #3). All packs were removed, the bowel was anastomosed and abdomen closed.
- The surgical team decided that the patient was not suitable for a further laparotomy.
- After consultation with the patient's family, treatment was withdrawn.
- The patient continued to deteriorate and died on day 14 post surgery #3 with ICU support. The multi-organ failure, driven primarily by decompensation of liver disease with hepatorenal failure, and sepsis was the cause of death.

What issues are highlighted by this case?

- ERCP could have been performed sooner after admission with suitable resuscitation. Duodenal mucosa and ampulla became more oedematous and haemorrhagic, making the procedure difficult. The patient did recover well and was asymptomatic. The patient's prolonged stay in hospital initially was due to the morbidity from pancreatitis and bleeding from sphincterotomy complicated by a compromised liver function.
- Decision to do a laparoscopic cholecystectomy was made in the ward before the patient was discharged. There was no evidence of consultation or discussion with a senior responsible member of the surgical team.
- If cholecystectomy had been indicated, the team should have opted for an open cholecystectomy through a subcostal incision over the gall bladder. This would have involved minimal dissection and distance from the lower abdominal scar and adhesions.
- Was it wise to perform an intra-operative cholangiogram when an ERCP has been performed and mapped the biliary tree? Small residual stones and debris, if present, could have been dealt with at the time of removal of stent when the patient was well.

QASM recommendations:

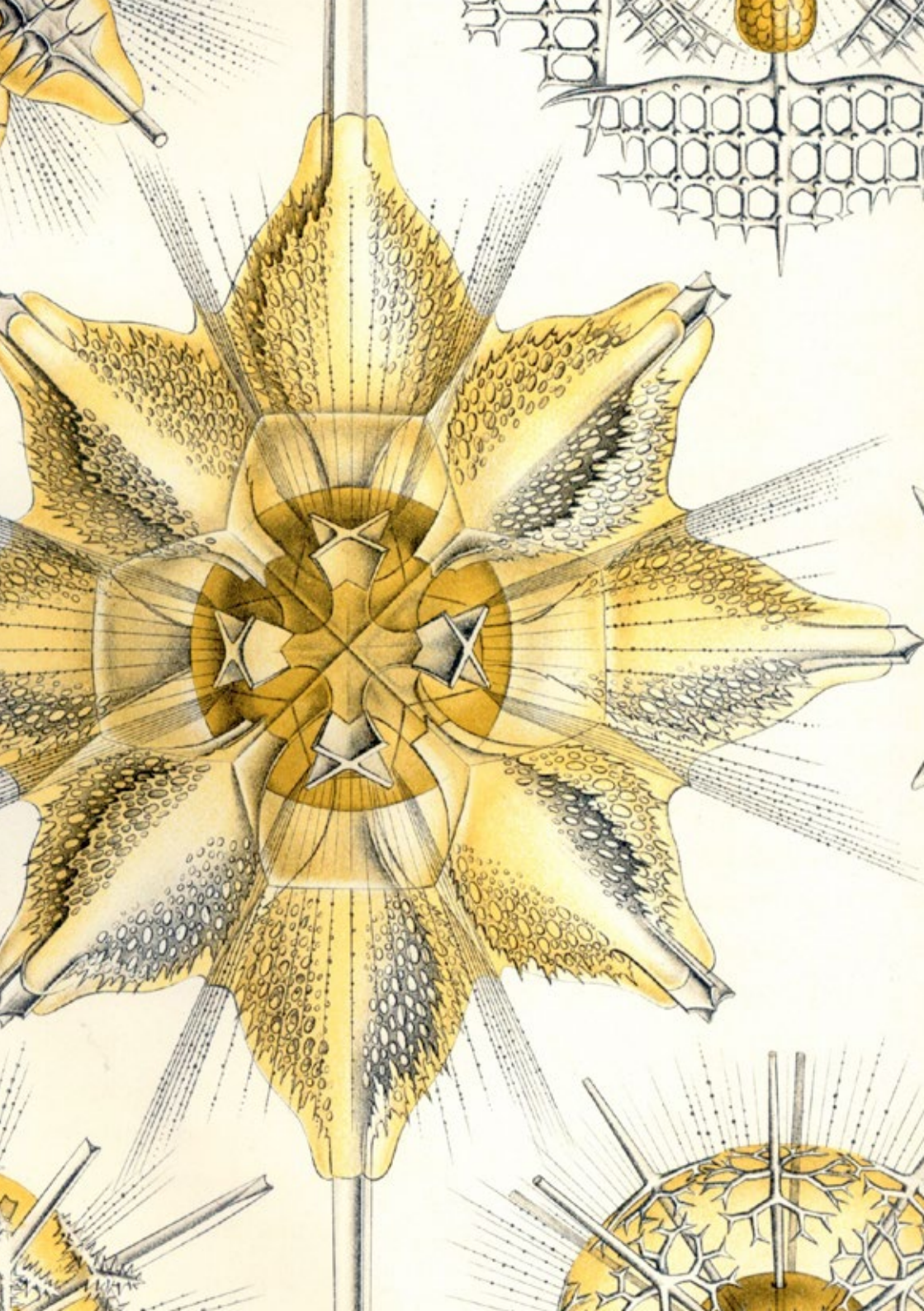
- "All elective surgical bookings" must be discussed with the Consultant surgeon.
- Senior surgical staff should be involved in all decision-making in complex patients.
- Health advocacy for the patient remains a Royal Australian College of Surgeons core competency for all surgeons.

Reference Intervals for adults:

Bilirubin (total)	<20 µmol/L
Sodium	135-145 mmol/L
Potassium	3.8-4.9 mmol/L
Albumin	32-45 g/L. Varies with age
White Cell Count	(3.5 - 11.0)x10^9/L

Ref: The Royal College of Pathologists of Australasia, RCPA Manual website.

http://www.rcpamanual.edu.au/index.
Accessed 21.11.2013



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