



ROYAL AUSTRALASIAN
COLLEGE OF SURGEONS

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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.



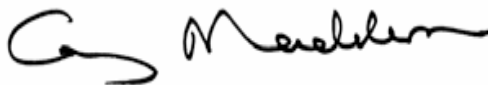
Chairman's report

Since the last edition of the National Case Note Review Booklet for the Australian and New Zealand Audit of Surgical Mortality, a substantial amount of constructive and useful feedback has been obtained. This certainly highlights the value of such clinically related vignettes being widely circulated amongst the surgical community. The Federal Government is certainly strongly supporting this type of audit within the profession and the State Governments, through their continued funding of the National Audit within their jurisdiction, illustrates the value they place on it.

As we have recently completed our Third Annual Report of the national database, publications are now beginning to be generated with some interesting and sometimes puzzling trends being demonstrated. Whilst statistics are always of great value and may, indeed, reveal difficult to detect problems within the surgical system, in the end it does come down to the individual patient and their outcome.

The stories encapsulated in this booklet again bring clear lessons that we can all learn from and hopefully avoid in our practice. As the programme continues to gain momentum with the inclusion now of private hospitals in New South Wales and in the near future hopefully private hospitals in Queensland, we will have a truly national insight into mortality under the care of surgeons.

Any constructive feedback would be most welcome, either through the ANZASM feedback address or by direct correspondence.



Guy Maddern

Chair, ANZASM Steering Committee



ANZASM Clinical Editor's report

This is the fourth national case review booklet, with cases from all states and territories. This is part of the feedback process that is seen as essential for quality improvement processes of the audits of surgical mortality.

A national booklet is produced to assist smaller states who do not have enough cases to produce a useful publication and to assist in the de-identification process. The smaller states (including South Australia) do not publish their own booklet. Some of the larger states will continue to publish their own case note review booklets as well as contributing to the national booklet.

Most of the cases are from general surgery, not because general surgery has a high mortality but because of the sheer number of cases they deal with. In the two years that I have been doing this job, I have re-learnt some of the lessons of my general surgical days, namely that an acute abdomen in an elderly patient is a condition of considerable gravity and that un-recognised ischaemia is often fatal.

As the Australian and New Zealand Audit of Surgical Mortality (ANZASM) office is in the same building as the South Australian Audit of Perioperative Mortality (SAAPM) office, it seemed logical that the final clinical editing process would be done by the Clinical Director of SAAPM on behalf of ANZASM. I must emphasise that I did not write this booklet. The real authors are the treating surgeons, the clinical directors, and the first- and second-line assessors, of the various states and territories. The astute reader may notice quite a variation in writing styles in the various cases. This is because I have elected to leave a lot of the text as written by the treating surgeons and the assessors. I have only altered the text to make the meaning clearer and to improve the readability. To the assessors and the treating surgeons we all owe a debt of gratitude as this publication would not be possible without them.

Glenn McCulloch
Clinical Director, SAAPM
Clinical Editor, National Case Note Review Booklet, ANZASM



Overall recommendations

- In complex cases, there needs to be clear demonstrable leadership in patient management. There should be regular team meetings with all disciplines involved to ensure the treatment plan is understood by all.
- Communication is one of the most essential points in good patient care. This includes communication between surgeons and their junior staff, between various disciplines, and between nursing and medical staff. If you do not tell others what you are thinking or what is happening, everyone will end up functioning in isolation.
- The surgical case form (SCF) record must contain good, accurate documentation. It should be filled out by a team member who was involved in the care of the patient and has sufficient experience to contribute in a useful fashion to the audit process. If junior staff members complete these reports, they must be checked by a consultant or the junior staff must be informed in advance on the salient points to record.
- Where clinical deterioration occurs in a patient with no clear cause, it is important to remember that the cause may be related to something outside of your specialty knowledge base.
- An acute abdomen in an elderly patient is a very dangerous condition and needs careful management to avoid missing visceral perforations, leaking anastomoses and ischaemic gut.
- Consultants should be actively involved in the care of their patients, including the decision making process.



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Case study 1: Gas under the diaphragm

Case summary

A patient in their 70s was admitted to hospital A with “dizziness”, although the nursing record noted central abdominal pain. The patient was admitted under a medical team with a diagnosis of “dehydration and occult bacteraemia”. On Day 2, the patient looked unwell, with generalised abdominal tenderness and guarding. An abdominal x-ray was performed, but there was no record that it was followed up. An abdominal Computed Tomography (CT) scan was performed on Day 3 and reported as showing “free gas”.

Review of the plain x-ray confirmed the presence of free gas in the abdomen. A surgical team was consulted and the patient was promptly transferred to the operating theatre, where a laparotomy, peritoneal lavage and a patch repair of a perforated duodenal ulcer was performed. Postoperatively, the patient was transferred for Intensive Care Unit (ICU) care in hospital B, and it was planned to return the patient to the operating theatre for a further laparotomy. A cardiac arrest occurred before further surgery could be done and resuscitation was unsuccessful.

The second-line assessor commented that the abdominal x-ray was performed over 24 hours before the patient was taken to

the operating theatre and was not followed up.

Clinical lessons

There was failure to follow up the abdominal x-ray, which would have identified free gas in the abdomen. Definitive treatment was delayed.

Results of radiological investigations of acute conditions should be obtained promptly.

Mortality from perforated peptic ulcers increases sevenfold after a 24 hour delay in treatment.

Prompt surgical consultation is necessary for patients who present with abdominal pain. This should be reflected in emergency department protocols. ⁽¹⁾

Case study 2: Further bleeding in multiple trauma

Case summary

A patient in their 70s was admitted to rural hospital A following a motor vehicle accident in which the patient sustained multiple injuries. These included fractures of the pedicle of C2 and the spinous processes of L3 & L4, left rib fractures with a small pneumothorax visible only on chest CT, a splenic laceration, a probable de-vascularised left kidney and free intra-peritoneal blood. Following resuscitation, including the administration of fresh frozen plasma and O negative blood, the



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patient was transferred by air to hospital B (tertiary referral centre). A laparotomy was performed and a retroperitoneal haematoma noted, as was a stable splenic laceration. No major source of bleeding was identified.

Postoperatively, a falling haemoglobin indicated ongoing bleeding. Prophylactic anticoagulation resulted in an elevated Activated Partial Thromboplastin Time (APTT) and International Normalised Ratio (INR). The patient was mildly obtunded. Nasogastric feeding was instituted, despite persisting ileus. Aspiration pneumonitis occurred. The patient died two and a half weeks later.

Clinical lessons

Given that an O negative blood transfusion was considered necessary in hospital A, with a CT scan diagnosis of free blood in the peritoneum, consideration should have been given for a laparotomy at hospital A where there was surgical capability.

Signs of ongoing bleeding following a laparotomy should trigger a repeat CT scan of the abdomen.

Aspiration pneumonitis needs to be constantly considered in a patient on nasogastric feeds with a depressed conscious state. This remains a significant and recurring clinical problem in mortality audits.

Case study 3: Diverticular disease may not be the only diagnosis

Case summary

A patient presented with a pericolic abscess, presumed to be caused by diverticular disease. The abscess was drained percutaneously. A faecal fistula ensued, which was managed conservatively. The patient was recorded as subsequently visiting the emergency department at two major hospitals and visiting different surgeons, postoperatively.

The patient was re-admitted five months after the initial operation with intra-abdominal sepsis, an established faecal fistula and was malnourished. A Hartmann's operation was undertaken. Histopathology revealed a poorly differentiated adenocarcinoma.

Postoperative respiratory failure developed, from which the patient recovered and was making steady progress until found dead in the ward. An autopsy revealed aspiration pneumonitis.

Clinical lessons

Colonoscopy following percutaneous drainage of a pericolic abscess is important to establish the diagnosis as diverticular disease and to exclude an alternative or co-existing diagnosis, e.g., carcinoma.

Aspiration pneumonitis continues to be a frequently recorded comorbidity contributing to death in surgical patients.



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Case study 4: Radical surgical treatment for bladder cancer or not?

Case summary

This elderly patient, a lifelong smoker, with advanced metastatic bladder cancer causing urinary frequency, urgency, pelvic pain and haematuria, was admitted for a palliative cystectomy. The diagnosis had been made on a previous transurethral resection of a bladder tumour and CT scan of the chest. Surgery had been discussed with the patient and at a urology meeting. The patient underwent a radical cystectomy and formation of ileal conduit following which the patient was admitted to the ICU. Overnight there were issues with bleeding and hypotension requiring transfusion. The patient then developed worsening renal failure and pulmonary function, and died.

Clinical lessons

The case notes are adequate. Preoperative assessment of the patient shows the patient was cachectic (weight 41 kg, albumin 29), in extremely poor health (American Society of Anesthesiology (ASA) IV, pressure sores) and in chronic renal failure (bilateral hydronephrosis and creatinine of 111). It was ascertained that the patient was at extremely high risk of perioperative death and a perioperative anaesthetic assessment was requested. There was no record of a formal assessment until the day

of surgery. Preoperatively the case was discussed with other urologists and radiologists, but it would appear from the medical notes that it was not discussed with clinical oncologists, palliative care and radiation oncology. The patient was admitted to hospital distressed and in severe cancer-related pain.

The records suggest a surgically competent cystectomy, following which the patient was briefly admitted to the ICU and then discharged to the ward. The fall in urine output which followed was treated with repeated boluses of crystalloid. It is not clear from the record if the patient still had a central venous pressure line inserted at this time. It would appear that there was acute renal failure with pulmonary oedema (raised jugular vein pulse, mismatch in fluid input/output) rather than a pneumonic illness. The patient was not overtly septic (normal temperature and blood pressure) despite having a significant neutrophilia. By this stage, however, death was inevitable and palliation was the best option.

A major area of concern in this case was the decision for a radical cystectomy when palliation with an ileal loop diversion, with or without radiotherapy and appropriate analgesia, would have been more appropriate. Involvement of other uro-oncological specialties in a multidisciplinary forum would undoubtedly have resulted in the patient being offered other options than simply a radical cystectomy. This patient was at enormous perioperative risk of death. It does not appear that the patient



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underwent a formal preoperative assessment by an anaesthetist who would have been able to quantify this in real terms to the patient before undergoing surgery. The management postoperatively appears appropriate, although one would wonder whether the discharge from the ICU was somewhat premature.

It is understood it is now standard practice at all hospitals where major surgery is carried out, city or rural, that the patient attends the Pre-Admission Clinic, and has a thorough assessment, including anaesthetic, and if necessary cardiology or other review. If that facility were not available, one would have to question the wisdom of performing such major surgery at that site.

Case study 5: Poor monitoring after subdural haematoma

Case summary

This elderly patient had a past history of congestive cardiac failure, chronic obstructive pulmonary disease, epilepsy and recent cataract surgery. Regular medications included Salbutamol and Aspirin. While out walking, the patient fell and struck their head on the road and briefly lost consciousness. An ambulance was called to the scene and the patient presented at the hospital Emergency Department (ED).

The ambulance officers recorded a Glasgow Coma Scale (GCS) of 15, a left eyebrow laceration/

haematoma, facial droop and 'reduced movement', but there is no specific mention of a paretic limb. In the ED, a CT of the brain and cervical spine was performed and it appears that only a junior doctor examined the patient, working as the overnight surgical ward resident. Shortly before midnight, this junior resident noted: "PEARL Neuro X4 limbs and CNS exam NAD. Some movement limited by pain however" indicating that there were no major neurological abnormalities to be found. (This somewhat cryptic clinical record may be difficult to interpret for a non neurosurgeon but it means "Pupils equal and reacting to light. 4 limbs and central nervous system examination grossly normal. Some movements limited by pain however")

The CT of the brain demonstrated a right-sided (presumably acute) subdural haematoma with a 3.5 mm midline shift and a haemorrhagic contusion of the left frontal lobe. The CT of the cervical spine demonstrated no fractures, but raised the possibility of an epidural haematoma and ligamentous disruption. A note was made that the neurosurgery registrar had reviewed the CT scans and discussed the management with the resident. The patient was to be admitted to the ward on four-hourly neurological observations and kept 'nil by mouth' with CT scans to be repeated the next day, but there was no mention of the need for a High Dependency Unit (HDU) bed or action to be taken if the GCS decreased overnight.

The patient remained in the ED overnight. Shortly after midnight the



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ED recorded the GCS as 15, even though the patient's eyes were closed and there was a question mark as to whether the patient was orientated. Apart from mild weakness of the left leg, the limb strength was recorded as normal. However, at 0215 the patient was recorded with a GCS of 12 and severe right leg weakness and no attempt was made to check the pupils. There is no mention of action taken to notify medical staff of the marked deterioration in neurological status. It seems that the patient was not checked by the nursing staff again until 0700, when the patient was found comatose and asystolic with evidence of having vomited. A code blue was then called and after prolonged resuscitation, cardiac output was regained and the patient was transferred to ICU. By then the patient was too unstable to have a repeat CT of the brain or surgery and was declared dead by around midday, less than 24 hours after the initial head injury.

A coroner's autopsy was performed but the result has not been provided. The recognition and management of neurological deterioration in this patient was significantly delayed until the patient was in an irredeemable state and it is reasonable to suppose that if this had not been the case, the patient would have had a reasonable chance of survival.

Clinical lessons

If all the medical and nursing documentation concerning this patient's admission were provided to the reviewer, then they are clearly

inadequate. There is no entry from the neurosurgery registrar involved in the patient's initial assessment, nor any indication as to whether that registrar personally saw the patient and the CT scans or merely received a verbal account of the patient and the CT results.

The ED nursing staff totalled up the GCS incorrectly, recording a total of 15 instead of 14 and expressed uncertainty regarding the patient's confusion without confirming it one way or another. The only documentation from the nurses were two sets of observations, taken more than four hours apart, and a retrospectively written entry in the progress notes. Even this limited documentation is poor. The resuscitation and ICU notes were the most comprehensive part of the case notes and by then, the patient's death was assured.

This case reveals several issues:

- From the description of the fall, as well as the evidence of eyebrow laceration/haematoma, brief loss of consciousness, and CT findings of a subdural haematoma with midline shift and parenchymal bleeding, this patient had a moderate severity closed head injury. The patient presented to the ED fairly quickly and this should be taken into account in evaluating the clinical condition. There is a well-recognised potential for head injured patients on anticoagulants to keep bleeding intracranially, so while the patient might have



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been neurologically intact early on, there was always a significant potential for deterioration. One presumes that the neurosurgeon had no intention of palliating this patient at the beginning or there would not have been a plan to repeat the CT Scan the next day. Therefore, it would have been more appropriate to continue one- or two-hourly observations throughout the night in a high dependency environment.

- The area of greatest concern is that this patient experienced a significant deterioration in GCS without any medical action being taken until it was too late. One wonders if this was due to inexperience of the nursing staff and/or an inadequate handover from the ED. The normal procedure is for the registrar to be contacted for any fall in the GCS of two or more points or the development of new neurological deficits such as limb weakness.
- Not only was the neurological deterioration in the early hours of the morning not acted upon, but the patient was presumably placed in the non-HDU area of the ward as the patient was not sighted again until the next set of observations were taken, which were more than four hours later. Even if the doctors had not specified nursing in an HDU, the nursing staff should have protocols to admit all patients with moderate or severe head injuries to HDU.

- The final area of concern is the adequacy of neurosurgical assessment in the ED by the nurses and doctors. Inaccurate totalling of the GCS score and glib statements like 'neuro exam grossly NAD, some movement limited by pain' would not have made it any easier for other staff to appreciate a deterioration in the patient's neurological condition.

Subdural haematomas in elderly patients after low velocity injuries are common and there is a tendency to be overly dismissive of them. They are not acutely life-threatening in most cases, and it is reasonable not to operate on them at the time of presentation if the patient has no, or mild, deficits and is stable. However, unless there is no circumstance under which surgery would ever be contemplated, elderly patients with acute subdural haematomas must be managed in such a manner that acute deterioration will be recognised and acted upon promptly.

This is especially so during the night, when the staff on duty may be less experienced and the neurosurgeon or neurosurgical registrar is not constantly onsite. Elderly patients who are operated upon for subdural haematomas while they have mild or no neurological deficits have a reasonable prospect of survival in a good neurological state. Factors that placed this patient at higher risk of deterioration were overlooked, namely the history of anticoagulation, the severity of the head impact, the acuteness of the haemorrhage and the presence of midline shift.



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Case study 6: Bleed after angiogram with inability to contact consultant

Case summary

This case is of an elderly patient who underwent a diagnostic angiogram for an embolising popliteal aneurysm, complicated by postprocedural bleeding requiring two laparotomies. This patient was on therapeutic doses of Clexane and there was a significant delay between the initial exploration and the second one due to a failure in communication. The initial cause of the haemorrhage was a high puncture just above the inguinal ligament, but at the second laparotomy it was felt that it was due to retroperitoneal bleeding from small vessels. As a consequence of the extensive blood loss, the patient suffered multi-organ failure leading to death.

Hospital records provided were adequate and documented all relevant events leading up to the demise of this patient. This elderly patient was initially seen by the vascular unit. The patient had three weeks of ischaemic change in the right leg and had an ultrasound confirming a popliteal aneurysm with possible embolic complications. The patient was a non-insulin-dependent diabetic and hypertensive, with no history of ischemic heart disease or cardiac issues. Furthermore, there was a history of idiopathic thrombocytopenia and the patient

was on Prednisolone and Persantin. On examination, there were pulses present bilaterally apart from a dorsalis pedis on the right, and a palpable aneurysm was present in the right popliteal fossa. According to the nursing record of medications administered, 70 mg of Clexane had been given subcutaneously twice-daily on the day of the angiogram, as well as another dose of 60 mg at 2.25 pm on the same day. It was also noted that the 70 mg dose was to commence after the angiogram, so there is some confusion about the actual timing of the dose the patient received.

In another nursing note, the nurse was instructed to withhold the 70 mg dose until just before midnight, when it was definitely administered; the only Clexane the patient received was the 60 mg dose at 2.25 pm and 70 mg on the day of the angiogram. The patient's weight was estimated around 70 kg on the admission nutritional assessment. There is further confusion about the anticoagulation timing as in the admission notes it stated that therapeutic anticoagulation should be given, but on the admission prescription medicines, the date of commencement was recorded as the day after. However, in the section of the nursing notes where the drugs are administered, it was noted that the Clexane had been given together with all the other medications from the morning. Also on the postoperative orders for the angiography, notes had been made to 'continue Clexane'.

Just before midday, the patient underwent a right femoral



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angiogram with the puncture being made in the right common femoral artery under ultrasound guidance. This revealed that there was a popliteal aneurysm present with probable embolic occlusion of the posterior tibial artery from its origin. The pre-angiogram intention was to treat this by endoluminal stent grafting, but it was then planned that the patient would undergo a bypass after the angiogram. Groin pressure was applied to control the puncture site. Nursing observation showed that there was no change in the patient's haemodynamic condition, but despite a normal pulse and blood pressure it was noted that the leg appeared cool and pale. In the early hours of the morning a Medical Emergency Team (MET) call was made because the patient became hypotensive with a drop in Blood Pressure (BP) to 70 mm systolic and there was a mass palpable in the patient's right lower quadrant.

It was felt that the patient had had a bleed into the retroperitoneal region and an abdominal CT scan confirmed this. The haemoglobin was 9.5 and the surgical registrar had been contacted. The patient remained in the ward until transfer to ICU. Further Clexane was withheld. The patient required intensive fluid replacement, including blood transfusions, but became unresponsive and acidotic with a haemoglobin of 7.7. The patient had been seen by the vascular surgeons at noon and was taken directly to the operating theatre, where the cause of bleeding was found to be a high puncture from the angiogram together with a large retroperitoneal haematoma.

The haematoma was evacuated and the puncture site in the external iliac artery was repaired with a suture. The patient received five units of packed cells, together with other blood products, intraoperatively.

On return to the ICU, the patient was still grossly acidotic with a pH of 7.15. The patient had not passed urine since returning to ICU and required inotropic support to keep BP up. Just before midnight, it was noted that the abdomen was distended, that wounds were oozing and a probable coagulopathy was present. Despite blood transfusions, the haemoglobin continued to fall. An attempt was made to contact the vascular surgeon shortly thereafter with no response, so a message was left to contact the ICU.

Just after midnight, the surgical registrar was contacted, and another CT scan of the abdomen was obtained. This revealed further right retroperitoneal haemorrhage. Again, the original vascular surgeon was uncontactable, so another consultant was informed. The patient's haemoglobin had continued to drop despite repeated blood transfusions, so the patient had a repeat laparotomy.

At this time, there were numerous bleeding vessels in the retroperitoneal region, which were clipped and were thought to be the cause of the ongoing bleeding. Two packs were placed, the abdomen closed and the patient returned to the ICU. Over 20 units of cells had been transfused, together with other blood products. Although the bleeding had now been controlled,



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the patient progressively developed multi-organ failure, with ongoing worsening acidosis, over the next 24 hours and it was felt that no further active management should be undertaken. The patient died shortly thereafter.

Clinical lessons

There were a few major problems in the management of this patient. Initially, there appears to have been a possible over-anticoagulation following the angiogram. This would probably not have been an issue if there had not been a high puncture of the femoral artery (despite using ultrasound guidance for the puncture). The high puncture was the cause of the initial bleed. There also appears to have been a significant inability to contact the vascular surgeon at multiple points during the crisis.

After the MET call, when the haemorrhage was first diagnosed, it was decided to leave this patient in the ward in the early hours of the morning. This patient would have been much better managed in a high dependency or ICU setting. Once the retroperitoneal bleeding had been diagnosed in an anticoagulated patient, aggressive surgical repair should have been undertaken. The first note of a vascular surgeon seeing this patient was at noon. Again when the patient was re-bleeding, it was quite obvious that, despite the best efforts of the ICU, no vascular surgeon could be contacted, so again there was delay in performing the second laparotomy. The delay resulted in such massive blood loss that the

patient became coagulopathic and this provided the setting for multiple organ failure and death of the patient.

The main error in this patient's care was the delay in communication with the treating consultant because the staff could not contact the responsible surgeon. The overuse of Heparin may have been a factor, but the primary reason this patient had a complication was the initial incorrect puncture of the artery, and the adverse outcome was directly because of delays in its surgical repair.

Postoperative haemorrhage occurred and required surgery. This was delayed, and resulted in a coagulopathic state. This event was avoidable and the adverse outcome was the result of multifactorial issues. High punctures of the femoral artery are not uncommon and are well known to cause retroperitoneal bleeding. The recommended treatment of this complication is early surgical repair when diagnosed. The chief issue was the inability to contact the vascular surgeon involved in the patient's treatment. The delays in treatment of the different phases of this patient's complicated course are quite extreme and should be addressed as a matter of utmost urgency. They were the cause of this patient's demise from a potentially easily correctable complication of an angiogram.



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Case study 7: No wake up

Case summary

This elderly patient, a resident in a nursing home, fell four days prior to admission. There was a sub-capital fracture of the hip. There was a past history of dementia and hypothyroidism. Operation was performed on the day of admission and consisted of a cemented hemiarthroplasty. The procedure was uneventful, both from the surgical and anaesthetic point of view. However, the patient did not wake up in the recovery room.

There was no evidence of drug sensitivity, or a prolonged drug action, or of a cardiac event. Although a detailed neurological examination was not performed, nor a neurological opinion obtained, there were no gross signs, such as pupillary inequality. After discussion with the family, no further treatment was instigated and the patient died the following day.

Clinical lessons

This is a puzzling case of an elderly patient who presented with a fractured hip following a fall. The patient had a past history of dementia, gastroesophageal reflux disease (GORD) and hypothyroidism. The operation (cemented hemiarthroplasty) and anaesthetic was uneventful. The patient simply did not wake up after the general anaesthetic (GA)—the exact cause was not apparent. The anaesthetists were certain that it was not a drug effect.

The thought was that it may have been a cardiac event, but in the notes supplied there was no evidence of cardiac investigations (as is so often the case, the lab results were not included). One would have to assume that appropriate investigations were done to ascertain if there had been an acute cardiac event and that the laboratory results were simply not in the notes. The increasing carbon dioxide levels despite increased oxygen was seen as a possible cardiac event.

There was one entry that seemed to imply a neurological event. The observation chart records severe weakness in the arms and extension movements in the legs. There is only one recording on the sheet and no other mention of this finding elsewhere. Possibly this indicated a brain stem stroke.

No coroner's autopsy was done and so one cannot be certain of the cause. However, the assessor was certain that there was no surgical misadventure contributing to the death.

Case study 8: Relatively well octogenarian with incarcerated hernia

Case summary

A patient in their late 80s, with relatively insignificant past medical history, was admitted with a four-day history of abdominal pain, obstipation and abdominal distension. The ED doctor diagnosed a small bowel obstruction and



obtained an erect abdominal X ray which showed multiple air fluid levels. Intravenous (IV) fluids and nasogastric (NG) aspiration were commenced and a surgical review requested. Amiodarone infusion was also started to control newly discovered atrial fibrillation (AF).

The Surgical Registrar diagnosed small bowel obstruction of uncertain causes, given the virginal abdomen. He felt an inguinal mass, but excluded hernia as there was no cough impulse. A CT with oral (gastrografen) and IV contrast was requested after discussion with the Consultant. The scan was done 15 hours after admission; ischaemic bowel in the abdomen and the hernial sac identified. The patient was hypotensive, oliguric and dehydrated with persistent fast atrial fibrillation

Laparotomy was performed 21 hours following admission and two large segments of small bowel were resected with appropriately performed stapled anastomoses. Postoperative management was in the ICU where the patient received inotropes, antibiotics, ventilatory support and alimentation. There was a significant systemic inflammatory response syndrome (SIRS) contribution, with peripheral and pulmonary oedema, resulting in the patient's demise a week after admission.

Clinical lessons

The key concern is the delay in getting the patient to the Operating Theatre—21 hours after admission. Several factors contributed to this:-

- The reluctance on the part of the Radiology registrar to perform a CT when requested. Was the Surgical Registrar assertive enough?
- Resultant delay of over 12 hours to do an investigation that would have changed the management.
- The Surgical Registrar's inexperience—the registrar spotted the inguinal swelling but thought it inconsequential. In defence, the case was discussed with the Consultant, including the need for CT. Was the inguinal swelling mentioned?
- There is no record of a Consultant Surgeon seeing the patient before surgery. Would the consultant have waited for CT had a diagnosis of incarcerated hernia been made early in the morning?

As a consequence of the delay, the patient was noted preoperatively to be oliguric, hypotensive and dehydrated, probably as a result of inadequate fluid resuscitation or sepsis or both. Once the decision to operate was taken, the management thereafter cannot be faulted. The patient was brought to the hospital, triaged, and reviewed by the Surgical registrar without any delays.

An earlier, lesser operation through a herniotomy would have been better tolerated by a relatively well preserved elderly patient and the outcome may well have been different in spite of the advanced age.



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Case study 9: Renal failure following delayed treatment of diabetic foot sepsis

Case summary

A patient in their early 60s was transferred from hospital A to hospital B where the patient had been admitted for collapse, right foot cellulitis and a Methiciline Resistant Staphylococcus Aureus (MRSA) bacteraemia. The patient had an extensive previous history of vascular disease with previous left forefoot and right third and great toe amputations, and at least three major vascular procedures on the legs. The patient was also a type II diabetic which had been complicated by nephropathy and retinopathy, and had undergone coronary artery bypass grafting with an Implantable Automatic Cardioverter-Defibrillator (IACD).

On admission, the patient was haemodynamically stable and afebrile. There was evidence of sepsis in the right forefoot, with a small area of inflammation and a central punctum. On presentation the patient's urea was 15.3 and creatinine 165, with an Estimated Glomerular Filtration Rate (eGFR) of 37. The wound swab had grown MRSA and Pseudomonas, Random Vancomycin on admission was 55 and intravenous Vancomycin continued.

A forefoot amputation was planned and the patient remained reasonably stable. However, the theatre was cancelled and rescheduled for

the following day. The patient complained of shortness of breath and the patient's saturations were reduced to 92% on room air, but the lung fields were clear. The patient was noted to have pedal and sacral oedema and was given 20 mg Lasix. Theatre was again organized, but theatre was again cancelled. The patient remained afebrile and haemodynamically stable, whilst oxygen saturations improved. Theatre was again planned but once again was cancelled. This was the third time in three days that the theatre had been cancelled.

Up until this point, the renal function had deteriorated, with urea rising from 15.3 to 25.1 and creatinine rising from 165 to 211. Potassium had risen from 4.8 to 6.5. No real documentation of any Vancomycin levels was noted in the chart. The patient received 1 gm Vancomycin daily, 500 mg twice daily and then once daily, after which it was ceased.

Renal review was organized and the patient was again planned to have theatre on this day, but again it was cancelled. Renal review felt that the patient was suffering from acute kidney injury on top of chronic renal disease secondary to hypovolaemia, hypotension, sepsis and drugs, including angiotensin converting enzyme (ACE) inhibitors and Vancomycin. It was noted that there was difficulty with the patient's fluid balance due to the underlying presence of left ventricular failure due to the ischaemic heart disease. An echo had been noted to show moderate left ventricular dilatation with an ejection fraction of 25%. Potassium level responded to

Resonium treatment. The patient complained of shortness of breath again and was given a stat dose of Lasix. It was noted that the patient was for amputation of the right foot next week. His renal impairment had improved slightly with a Creatinine of 181 and a Potassium of 4.9.

The patient eventually underwent a right forefoot amputation in the treatment of diabetic foot and abscess formation. Good bleeding was noted at the time of operation. The fascia of the amputation site was closed with 3/0 Vicryl, and a Yeates drain was inserted. It appears the skin was left open. The patient was stable several days postoperatively when it was noted that the patient had shortness of breath on exertion and while lying flat. Pitting pedal oedema was noted bilaterally to the groin crease, with significant sacral oedema as well.

The patient became hypotensive with renal function beginning to deteriorate with Urea of 24.7 and a Creatinine of 190. The patient was reviewed by the medical team, who at this time commenced a Lasix infusion and a one litre fluid restriction. The patient's weight had increased from 95.6 kg on admission to 104 kg, where it was noted that the patient was experiencing worsening cardiac congestive failure on a background of ischaemic cardiac myopathy. Renal function was noted to subsequently deteriorate over the next few days and there appeared to be problems with the patient not abiding to the one litre a day fluid restriction.

At this stage, there was no record of how the wound was progressing

postoperatively. It was noted that the medical team was happy to take care of the patient once the vascular unit was happy with the wounds. The wound was reported as being clean, the Yeates drain was removed, and the vascular team was happy for the general medical team to take over the patient's care. The patient's renal failure subsequently deteriorated further, to the point where dialysis was required for a number of days. The patient was noted to be Vancomycin-Resistant Enterococci (VRE) positive. Shortly thereafter the wound was noted to have some increasing dehiscence with mild erythema, but no purulent discharge or offensive odours. It was dressed with Curasalt and consideration was given to a Vacuum Assisted Closure (VAC).

There was, subsequently, a continuing balance between effectively managing his congestive cardiac failure and his renal failure. The patient became hypotensive and was noted to have ongoing fluid overload. The patient arrested later that day and an endotracheal tube was inserted. Cardiopulmonary resuscitation (CPR) was commenced and the patient was cyanotic. Laryngoscopy showed the endotracheal tube to be in the oesophagus, which was then replaced and the correct position in the trachea was confirmed with auscultation. There were four cycles of CPR with Adrenalin and Atropine given, but there was no documentation of the rhythm that the patient was in. There was no return of circulation and after 20 minutes CPR was ceased.



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Clinical lessons

While there is no doubt that this patient was at quite high risk of succumbing during this hospital stay due to the pre-morbid conditions of diabetes, ischaemic cardiomyopathy and chronic renal failure, the fact is that the patient had to wait 11 days before the diabetic foot sepsis was treated, during which surgery was cancelled five times by the emergency board. During this time, the mild chronic renal failure deteriorated significantly. This was an adverse event. In the chart there was no documentation of the responsible consultant ever having seen the patient during the whole admission. This was also an adverse event.

In reading the surgical case form, there is a concern about the accuracy of the information provided. This includes the belief that Hospital A is 80 km away from Hospital B and that the decision to operate was made by a consultant, even though this was not ever documented in the chart. Indeed, it is not ever documented that the case was discussed with the consultant. It is hard to believe that one could answer Question 16 on the surgical case form—“Was there a definable postoperative complication?”— in the negative, when indeed the patient subsequently succumbed to renal failure, which was significantly aggravated by the sepsis related to the foot and the operation.

At no stage in the case form was it suggested that the patient’s operation was delayed. In fact, to quote from it:

The patient was admitted and treated with IV antibiotics and developed worsening renal function and fluid overload shortly after admission. This was managed by the medical unit and renal unit. Once stabilized the patient underwent forefoot amputation to remove the necrotic foot infection.

In fact, the patient had been on the emergency board five times while supposedly awaiting stabilization and whilst renal function continued to deteriorate.

There is no doubt diabetic foot infections, particularly on a background of the accompanying co-morbidities such as chronic renal failure and ischaemic cardiomyopathy, represent a high risk group of patients, both for amputation and mortality. However, if they have any chance of surviving this, then quick and efficient treatment of foot sepsis is vital, which clearly did not happen in this case. Furthermore, there is no evidence that the responsible consultant was even aware of the patient at all. This was not helped by insufficient detail on the surgical case form.

Case study 10: Recurrent rectal cancer is a challenge

Case summary

A patient in their early 70s had a diagnosis of recurrent rectal cancer after a previous Ultra-Low



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Anterior Resection about six years previously. Several colonoscopies were performed over an 18-month period with similar findings, namely high grade dysplasia at the anastomosis site. A decision to operate was only entertained after extensive discussion with the patient and family. There was a medical history of poorly controlled Insulin-dependent Type II Diabetes, moderate chronic kidney disease, hypertension, atrial fibrillation and reflux.

The patient underwent a laparotomy and abdominoperineal resection. The operation lasted over six hours. Extensive adhesions were noted. The neorectum was densely adherent to the sacrum at the site of the previous anastomosis. Four litres of blood loss occurred intra-operatively. Elective admission to ICU was organized prior to surgery. The ICU stay was seven days.

Postoperative management was complicated by congestive cardiac failure, atrial fibrillation, respiratory failure and worsening chronic renal failure. The perineal and midline laparotomy wounds both developed superficial wound infection and superficial dehiscence requiring negative pressure dressings. Progressive deterioration occurred despite appropriate medical consultation, and death occurred on the 28th postoperative day.

Clinical lessons:

Pelvic surgery for recurrent rectal cancer is difficult and carries with it significant risk. Surgery for recurrent rectal cancer should not be performed in hospitals which lack

appropriate expertise in colorectal and redo pelvic surgery.

The pre-operative surgical management is questionable, specifically the fact that multiple colonoscopies were performed prior to the diagnosis being made. This undoubtedly led to a delay in intervention. However, the pathology report on the multiple biopsies was high grade dysplasia, not frank adenocarcinoma.

One cannot comment on pre-operative locoregional staging and the consideration of use of neoadjuvant chemoradiotherapy as this information has not been made available.

This patient is predictably high risk based on the pre-existing medical conditions. Anaesthetic and ICU management was appropriate.

Appropriate referral to a specialist colorectal surgical unit in a tertiary hospital may have permitted better surgical technique to reduce the length of the procedure and morbidity/mortality risk.

Case study 11: Massive duodenal bleeding with Goodpasture syndrome

Case summary

A patient in their 60s was transferred from hospital A several days following a laparoscopic oversew of a bleeding and perforated duodenal ulcer. Goodpasture syndrome was diagnosed a month



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prior to the surgery, with renal-dialysis-dependent renal failure. It was also noted that the patient had been on high-dose steroids. There was a history of well-established ischaemic heart disease and coronary stenting. A left arteriovenous fistula was created for continuing dialysis. This followed a repeat gastroscopy and laparotomy for continuing upper Gastrointestinal Tract (GIT) haemorrhage requiring massive transfusion. The patient continued to bleed and was transferred to hospital B for possible embolisation.

On transfer, it was noted that the patient became haemodynamically unstable in the Accident and Emergency (A & E) department of hospital B, required immediate intubation and was directly transferred to theatre. At operation, a laparotomy was repeated and a 2-3 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, which appeared to control bleeding. The patient was transferred to the Intensive Care ward post-laparotomy and ventilated.

The patient was initially stable, but continued to deteriorate and was taken back to theatre for laparotomy due to increasing bile drainage. It was noted that the right colon had been caught under a omental band and was necrotic. This required a right hemicolectomy and creation of a double barrel stoma. The patient continued in the Intensive care unit on inotrope support and ventilation. Intermittent bleeding meant massive

transfusions were still required on several occasions.

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

Despite the interventional embolisation, bleeding continued. Significant discussions were then again held with the family and they were keen to proceed. Re-laparotomy and distal gastrectomy was then performed. A gastrojejunostomy was fashioned and duodenal catheter drained the duodenal stump. The patient again remained stable intermittently, but required further support for several days.

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

The patient was returned to Intensive Care following this procedure and extensive consultation regarding any operative intervention, both with radiology and surgery, was discussed with the family. It was decided that with any further re-bleeding, interventional embolisation may again be possible, but no further



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surgery contemplated. The patient continued to bleed intermittently, again requiring extensive transfusion, and then died several days later.

Clinical lessons

1. The operation in hospital A was of a laparoscopic oversew of a perforated duodenal ulcer in a patient with established Goodpastures syndrome and renal dialysis. Assuming that the operator was competent in this procedure, the choice of operation was appropriate.
2. The issue of consultation with the surgical team in hospital B was raised on this patient's subsequent re-bleed after the laparotomy in hospital A. There are no notes available of any consultation with the surgical team. Hospital A transferred the patient for angiography and may well have liaised with the radiology team.

However, in this particular case, consultation with the on-call surgical team at hospital B would be both professionally and clinically responsible. This patient was complex, both before transfer and subsequent to clinical course, and a good summary of the underlying problems would be required by the receiving Intensive Care unit, as well as the Radiology and Surgical teams.

3. The choice of the operation in this case seems entirely appropriate. Unfortunately, this patient suffered a complication

after laparotomy in hospital B, with an adhesive omental band causing ischaemia of the ascending colon. This doesn't appear to have had a further long-term issue with the bleeding ulcer. Regarding the operation for the bleeding duodenal ulcer, the choice of operative intervention seemed appropriate. There is evidence of good consultation in hospital B with the radiology team and the involvement of several surgeons to increase opinions in management. Everything was tried before distal gastrectomy was performed in a very high risk patient, but even this did not stem the upper GIT bleeding.

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

Case study 12: A difficult paediatric heart condition

Case summary

This patient was a newborn who became unwell in a rural hospital and was subsequently transferred to a tertiary paediatric institution. The child was diagnosed with double outlet right ventricle, transposition



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of the great arteries with associated coarctation, aortic arch hypoplasia and a single coronary artery. The child was admitted to the Intensive Care Unit and over the subsequent day required intubation and ventilation.

Whilst being worked up for surgical management of what is an extremely difficult Taussig-Bing anomaly, further complications occurred, including the development of significant renal failure requiring renal replacement therapy with the use of peritoneal dialysis catheter. Whilst awaiting the possible return of renal function, in the situation of managing the difficult and complex physiology of maintaining adequate but not excessive pulmonary blood flow, the patient developed necrotising enterocolitis. Both these complications necessitated changes in surgical plan.

The patient was discussed at length. The opinion of the surgeon was that the child would not survive a full repair in its current situation and that any initial surgery should be aimed at buying time to see if the renal function would improve and allow definitive surgery to be performed later.

The procedure of choice was a new procedure which consisted of banding of the main pulmonary arteries and the insertion of a stent into the ductus arteriosus. The initial surgery went well and the patient was transferred back to the Intensive Care Unit in a stable condition.

The first-line assessor was critical of the high $p\text{CO}_2$ in the postoperative

period but this is not unusual. It is extremely difficult to get adequate pulmonary blood flow whilst maintaining systemic blood flow with banding of small pulmonary arteries, and it is not unusual to have to revise the procedure. The decision to take the patient back to the operating theatre the next day was appropriate, despite comment by the first-line assessor about the levels of $p\text{O}_2$ and $p\text{CO}_2$ at the end of the first procedure.

The revision procedure was appropriate and the patient was in a good condition at the end of that procedure. The ultimate dictator of the outcome of this child was the renal failure. Perhaps the decision to withdraw care was inappropriate as expressed by the treating surgeon. However it may well be that this child had been in established renal failure for several weeks with no outlook for return of renal function, and no further escalation of therapy was available in neonates with renal failure.

Clinical Lessons

In summary, this is an extremely difficult situation at the best of times, but is usually well managed by the dedicated Surgical and Medical Teams. This patient's outcome was dictated by the development of renal failure, which was almost certainly not preventable in the pre-operative period. The timing of the surgery was then further dictated by the development of necrotising enterocolitis, and any surgical intervention was likely to be with considerable risks. It is a credit



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to the Surgical and Medical Teams that the patient did so well after the first procedure, at least initially. Unfortunately, sometimes one cannot achieve positive outcomes because of the complexity of the underlying cardiac pathology.

There were no issues with regards to the decision to operate on this child. There is probably no surgical team in the world that would not have taken this child to theatre to at least attempt to get a manageable situation that would lead to a reasonable long-term outcome.

Unfortunately, sometimes the outcome for patients with critical congenital cardiac disease is more dictated by the underlying anatomy and the presentation than it is by the ability of the Medical Team to manage the patient.

Case study 13: Probable iatrogenic gastric perforation.

Case summary:

This patient, in their early 70s, was admitted to hospital with massive haematemesis which was demonstrated at endoscopy to be from an erosion at the oesophagogastric junction. No other cause for the bleeding was seen and the erosion was injected with adrenalin solution. The patient had a history of having coronary bypass graft surgery about seven years previously, type 2 diabetes mellitus, hypertension and hypercholesterolaemia, and

had a high alcohol intake. Current medications were Clopidogrel, Aspirin, Ramipril, Frusemide, Atenolol and Simvastatin. The patient was managed overnight in ICU, transfused, and then managed in the ward. Three days after admission the patient was found collapsed requiring resuscitation. Endoscopy was repeated, but views were made difficult by the presence of blood clots and a definite cause was not seen.

Transfer to hospital B was initiated and the patient arrived at hospital B in the early hours of day four. Upper G.I. endoscopy was repeated and a gastric perforation visualised. The patient then underwent laparotomy, where the tear in the posterior stomach was repaired with mobilisation of the greater curvature and exploration through an anterior gastrotomy. The patient was subsequently managed in ICU. A second laparotomy with gastrectomy, roux en y and oesophagojejunostomy was performed on day five. This was a planned procedure as the stomach was noted to be ischemic at the previous operation. The second operation was done by an upper G.I. Surgeon. The patient continued to be managed in ICU and returned to theatre on day seven for delayed primary closure of the abdominal wound. The patient's condition gradually deteriorated and died on day 12.

Clinical lesson

There are four events occurring in hospital A which come into question:



1. The role antiplatelet agents had in the continued bleeding. The question of whether or not the patient had Clopidogrel after admission is not available in the notes provided, but Aspirin was given, with the explanation that the serum troponin level had risen. Either, or both, drugs could have exacerbated the haemorrhage, and the initial endoscopic findings were not of a severe condition, although the patient was anemic and was transfused. All hospitals need to have guidelines for the management of gastrointestinal haemorrhage with both surgeons and gastroenterologists in acceptance. The guidelines need take account of local expertise and should be reviewed every few years.
2. Gastric perforation. It is likely that this occurred during the second endoscopy but wasn't recognised.
3. Transfer process. According to the Surgical Case Form completed by hospital B, there was a lack of communication from hospital A about the transfer. The comment was made that surgery to stop the bleeding needed to be done at hospital A. This is a valid point and is backed up by the patient being in a critical condition during the difficult transfer.
4. The surgical management at Hospital B. The decision to repeat the endoscopy with the surgeon in attendance was good

as this provided information before the laparotomy that the tear didn't breach the oesphagogastric junction. This allowed for an abdominal only approach, which proved to be a difficult procedure with the stomach rendered ischemic following closure of the tear, the anterior gastrotomy and mobilisation of the greater curvature of the stomach. This necessitated a second operation (gastrectomy) which was done by the upper GI Surgeon the following day.

The subsequent demise, with anastomotic leak, is not surprising and reflects the high mortality expected in a patient with major gastrointestinal haemorrhage, a posterior gastric perforation probably iatrogenic, with significant comorbidities, including ischemic heart disease, diabetes type 2, antiplatelet therapy and high alcohol intake.

Case study 14: Poor communication resulted in head injury death

Case Summary

This is a tragic case as it involves a young patient who should have survived a bad head injury but did not because of poor communication regarding deterioration of the level of consciousness. As is so often the



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case, the initial injury was alcohol fuelled and caused by young bravado—riding on the back of a utility. The very detailed surgical case form describes events:

The history provided was that the patient had allegedly been consuming alcohol and had fallen off the back of a ute. The patient was found at the scene about 20 minutes later and first reported GCS was 9/15. Two hours later the patient was sedated, paralysed and intubated because of vomiting and concern regarding maintaining the airway. Transfer to a regional neurosurgical unit occurred; a computed tomography (CT) head was done. This showed bilateral frontal contusions and small (2 mm) subdural haematomas. The basal cisterns were not compressed and sulcal pattern generally undistorted given the young age, except for some localized frontal oedema. There were also occipital and basal skull fractures. The patient was weaned off the ventilator and woken in the ICU and able to be extubated the afternoon after admission. The patient was GCS 14/15 when the neurosurgery team were first able to assess the patient.

This was about 30 hours after the injury and about 24 hours after admission. The patient was then transferred to the neurosurgical ward. The case notes suggest that the observations in the ward were no more often than three hourly. There is a GCS observation recorded

at 1020 hours and another one at a time that is not clear. The next observations were recorded at 1615 hours, implying 3 hourly observations. That afternoon things went badly wrong. The nursing record states that at 1500 hours the patient was “confused to time, place and person” but no formal GCS was done. The notes also state that at the start of the shift the patient was “alert and talking”. At 1600 hours the patient is recorded as “asleep”. At 1615 the patient is recorded as “blown pupils and no eye opening to pain”. The neurosurgical team were not aware of these events until 1615 hours. There had also been a CT scan performed at noon with the appearance of worsening of the cerebral oedema. Again, this was not communicated to the treating team.

An emergency bifrontal decompressive craniectomy was done without any improvement and the patient was declared brain dead 60 hours after the injury and 28 hours after being GCS 14.

Comments

This case demonstrates two areas of poor communication. The neurological observations on the ward were inadequate, both in their frequency and quality. A patient with a head injury may be deteriorating due to an intracranial mass and not simply “sleeping”. Worsening cerebral oedema in a head-injured patient is matter of concern; the radiologist should have informed the clinical team of this significant alteration.



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Case study 15: Late prosthetic valve endocarditis

Case summary

This is a patient in their seventies with a remote history of an aortic valve replacement who presented to another hospital with a history of fever and feeling unwell. Investigations at that hospital revealed a severe paravalvular leak due to partial valve dehiscence and signs of endocarditis. The patient was transferred to a hospital with cardiac surgery services.

The patient spent some weeks being treated with IV antibiotics, with evidence of some left ventricular failure (LVF) and slowly worsening renal function. Surgery was delayed until some five weeks after admission on the basis of no obvious sepsis and stable cardiac failure. Surgery was planned to be aortic valve replacement (AVR) and mitral valve replacement (MVR), but only AVR was done (Possibly due to lessened mitral reflux [MR] on intraoperative transoesophageal echocardiography [TOE])

The immediate postoperative course was marked by bleeding, with massive transfusion and two returns to theatre for control. The patient remained intubated and ventilated in ICU for quite some days. He had slow atrial fibrillation (AF), complete heart block (CHB) and was VVI paced via external wires at a rate of 60. After being extubated, the patient developed type II respiratory failure and was re-

intubated after 14 days. A few days later, a surgical tracheostomy was performed to facilitate weaning. The patient was deconditioned and had problems with sputum retention. The patient was also noted to be auto-anticoagulated with INRs > 2 and elevated activated partial thrombin time (aPTT) on minimal heparin.

Two weeks later, a transthoracic echo showed satisfactory function of the aortic bioprosthesis, severe mitral reflux (MR), moderate mitral stenosis (MS). The patient was slowly weaned from the ventilator and had an uncuffed tracheostomy tube in situ. Again, about two weeks after this, there was an unplanned decannulation. The patient had been coping, so recannulation and re-intubation was not needed.

A few days later, the patient's level of consciousness deteriorated. A CT brain scan showed multiple old infarcts and a new bleed. This resulted in a revision of the anticoagulation strategy. The patient was returned to ICU with further respiratory failure, secondary to LVF, and a pleural effusion. Re-intubation was required a few days later, possibly as sepsis also became apparent. More brain imaging showed further bleeding and the tracheostomy was reinserted. At about this time, a family conference was held and, with the patient's agreement, further extra-ordinary measures were ruled out. A one-way wean was agreed. At this stage, the patient was showing signs of increasing Type II respiratory failure and after more than 90 days in hospital, he passed away.

Clinical lessons

The Second-Line Assessor made the following comments:

- The patient's course was well documented in the chart, which facilitated this review. There are a number of issues to be considered. Whether any of these may have altered the outcome of course is less certain.
- Time from diagnosis to surgery. This was quite prolonged. There was evidence of ongoing cardiac failure and renal impairment. Despite the apparent control of sepsis, the patient had aortomitral discontinuity with a severe paravalvular leak. I believe early surgery, after a few days of appropriate antibiotics, was probably indicated here ². This may have also contributed to the conduction disturbance.
- Ongoing bradyarrhythmia. I note the reluctance for insertion of a permanent pacemaker (PPM), but also either failure of the epicardial wires or lack of use. Pacing at around 90, especially postoperatively, may have improved the cardiac performance. The reluctance to insert a PPM is also an issue. The proximity of the conducting system to the site of infection should have raised some concern, and the development of a high grade block expected.
- Residual significant cardiac pathology. The patient was

left with haemodynamically significant MR and MS after his operation. This, I believe, was a major contribution to the outcome. I acknowledge the risk of double valve replacement in this situation was greater, but the risk of a poor outcome was raised even more by failing to correct the mitral pathology. A TOE under a general anaesthetic (GA) is very artificial and needs to be carefully considered before accepting that as the usual situation.

- With the advantage of hindsight, given the relatively recent history of a cerebrovascular accident (CVA) and the difficulties with swallowing, a CT brain scan preoperatively (I am unable to find record of one) may have altered the strategy. The multiple bleeds in the latter part of the patient's stay certainly contributed to the outcome.
- Anticoagulation. Again, maybe avoiding anticoagulation, despite the ongoing AF, may have helped. Just aspirin may have been adequate.

Prosthetic valve endocarditis is a challenge for the whole team that manages such cases. This case demonstrates nearly all of those challenges. My comments, I trust, are seen as a positive critical appraisal of this case, and highlight areas where maybe a different approach may have altered the result. Overall, the management was appropriate and well documented.



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Case study 16: A nasty squamous cell carcinoma (SCC)

Case Summary

A patient in their early 80s was admitted with a 3 cm fungating SCC of the right temporal region infiltrating the parotid and the posterior margin of the mandible with two positive jugulodigastric nodes identified on CT scan. The patient had significant medical comorbidities, including hypertension, chronic obstructive pulmonary disease (COPD), smoking history, atrial fibrillation, moderately severe aortic stenosis, cardiac failure and renal impairment. Regular medication included Warfarin, prednisolone, antihypertensives and bronchodilator therapy.

Pre-operative assessment delineated the extent of the primary lesion and nodal disease. A CT chest had shown no evidence of metastatic disease. Pre-operative planning appears complete, but there was an unresolved issue of an exophytic lesion of the upper pole of the right kidney which was identified but not further investigated at the time. A comprehensive pre-anaesthetic assessment was performed which gave the patient an ASA 4 grading. The patient was advised that they were a high surgical risk and a resuscitation directive was obtained.

Standard preparations were made, including arrangements for elective admission to intensive care, awake fibre-optic intubation, and insertion of arterial line and

central venous catheter. The surgery was performed by two teams. The Ear, Nose, Throat (ENT) Unit performed the primary excision, as well as total parotidectomy with sacrifice of the facial nerve, posterior partial mandibulectomy and right, modified neck dissection. The Plastic Surgical Team repaired the defect with an anterolateral thigh flap reconstruction. It appears from the notes that the patient's progress under anaesthesia was as anticipated and, at the conclusion of the procedure, the patient was transferred to the Intensive Care Unit. The following day, the patient was extubated and his condition was noted to be good, under the circumstances. Late that afternoon, the patient was transferred to the ward. The nursing notes during the early evening expressed no particular concerns. However, at approximately 00:50 hours, the patient's observations deteriorated. An ECG was arranged and 15 minutes later a code blue was called. The patient did not respond to resuscitation. It appears that no postmortem was performed.

Clinical lessons

There is the philosophical question of how best to manage a patient who has a diabolical surgical pathology, that is also at very high risk of surgical mortality. It appears from the notes that all these factors were well appreciated prior to taking the decision to manage the patient surgically.

There is always the question of when to discharge a patient from the protective cocoon of the Intensive

Care Unit. Based on the notes, the patient had been extubated the next morning, appeared well and the observations were stable. The patient was transferred to the ward that afternoon with one-on-one nursing care. There are records of the flap being examined on an hourly basis and it seems unlikely that intensive care procedure would have provided a significantly better buffer against the outcome. In any event, the notes suggest that the patient suffered a rapid cardiac collapse, which is not unexpected with his collection of pathology, particularly aortic stenosis, and I suspect the same event would have occurred had he remained in the intensive care unit.

So, in summary, I do not think the peri-operative management can be subjected to criticism. The outstanding question is whether the patient was best served by having such a surgical procedure. Whilst the particular collection of medical co-morbidities is well known to cause death at short notice, he may have lived some time with optimum medical management. A fungating 3 cm SCC invading the facial structures is a particularly unpleasant disease. There is no mention in the notes as to whether the patient attended a multidisciplinary Head and Neck Clinic to consider other therapeutic options.

I think that, with the known comorbidities, it would have been optimal to have formally considered all management options, such as limited resection and radiotherapy. I suspect the final decision would still have been to proceed, but formal

consideration and documentation would have given all parties concerned the reassurance that the outcome was unavoidable.



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References

1. Kum CT et al. Elderly patients with perforated peptic ulcers: factors affecting morbidity and mortality. J Royal Coll Surg Edinburgh. 1993; 38:344-347.
2. David T., "Cardiac surgery in the adult", Cohn, L. 3rd edn. 2007. New York: McGraw-Hill Medical.

LVF	left ventricular failure
MET	medical emergency team
MR	mitral reflux
MRSA	Methiciline Resistant Staphylococcus Aureus
RACS	Royal Australasian College of Surgeons
SCC	squamous cell carcinoma

Shortened forms

AF	atrial fibrillation
ANZASM	Australian and New Zealand Audit of Surgical Mortality
APTT	Activated Partial Thromboplastin Time
ASA	American Society of Anesthesiology
BP	blood pressure
CPD	Continuing Professional Development
CPR	cardiopulmonary resuscitation
CT	computed tomography
ED	emergency department
GI	gastro-intestinal
GCS	Glasgow Coma Scale
HDU	high-dependency unit
ICU	intensive care unit
INR	International Normalised Ratio
IV	intravenous



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