CHASM

Collaborating Hospitals' Audit of Surgical Mortality

CASEBOOK2014

NSW GOVERNMENT | Health

Royal Australasian College of Surgeons

CLINICAL EXCELLENCE COMMISSION

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Introduction

Colleagues,

In a study on patient safety related hospital deaths in England, Donaldson et al[1] identify a number of common themes responsible for patient harm, amongst which mismanagement of the deteriorating patient and failure of clinical supervision feature prominently. The cases reported in the 2013 CHASM Casebook mirror the experience in the aforementioned paper.

White zone deterioration

There needs to be more prominence given to the concept of "white zone deterioration", where the patient's vital signs remain within the white spaces of the Standard Adult General Observation (SAGO) Chart, but there is evidence of deterioration from the trending of the vital signs. Medical and nursing staff must be aware of the significance of this "white zone deterioration" trend. To wait till a patient's vital sign(s) enters the yellow zone following "white zone deterioration" may result in a missed opportunity to instigate appropriate resuscitative measures.

Futile surgery

A number of surgeons have reflected in their Surgical Case Forms that, with the benefit of hindsight, they should have more carefully considered the option of not operating rather than proceeding with surgery which was followed by the patient's demise, frequently in the immediate postoperative period. The Second Line Assessor has the disadvantage of not being privy to the dynamics and patient/family conversations as well as the context in which these discussions occurred, which are often in the emergency setting where a decision has to be made in a short time frame. It is however apparent that there have been a number of patients where an operation could reasonably have been considered to be futile.

Grant et al[2], Angelos[3] and Kerridge et al[4] explore the notion of futile surgery and provide useful insights. They all agree in the complexity and the numerous perspectives of decision making.

Quantitative futility where the chances of benefit are rated low can be distinguished from qualitative futility where the intervention does not result in an acceptable functional status. These are in the context of patient autonomy, value judgements, previous advanced care directives, decision of "Not for Resuscitation" as well as religious, symbolic, emotional, psychological factors[4] and ethical considerations of beneficence and nonmaleficence.

The American College of Surgeons' National Surgical Quality Improvement Program (ACS NSQIP) provides a surgical risk calculator and evidence-based data which may assist in discussions with patients and their carers.

All authors agree the most important aspect of care in these situations is the patient/doctor relationship and 'offering an opportunity to re-examine the goals of medical care and to deepen communication between health professionals, patients and carers.'[4] In situations of uncertainty or potential, or realised conflict, a second opinion should be considered and a surgical colleague and/or a palliative care physician are well placed to provide this.

Anticoagulant management

An emerging issue contributing to surgical mortality has been the role of anticoagulants, in particular their mismanagement in all phases of patient care. I am grateful for Dr David Robinson writing a commentary which provides useful guidance and advice.

Pulmonary embolus

This Casebook also reports on a patient who died of a pulmonary embolus following a bilateral knee arthroplasty. The Second Line Assessor did not identify any deficiencies of care and the purpose of including this patient

in the Casebook is to highlight that major complications can occur, even with the best of endeavours and standards of care.

The feedback to surgeons remains confidential and protected by statutory privilege (SP). Surgeons can be reassured that confidentiality is paramount and their information is protected by SP. Local Health Districts receive an annual report of aggregated de-identified data relevant to their district.

I wish to acknowledge the contributions of Professor Allan Spigelman, Dr David Robinson and Dr Lewis Chan to this year's Casebook.

As always, Prof Cliff Hughes AO, CEO, Clinical Excellence Commission has provided wise and sage advice and his continuing close involvement in CHASM has been invaluable.

Paula Cheng, the Program Manger of CHASM, has provided invaluable guidance, advice and support. The staff of CHASM have been wonderful in their dedicated and conscientious engagement with the CHASM program and deserve a lot of credit.

It is the assessors, both first line and second line, who have spent many hours reviewing case forms and clinical charts, to whom I also extend my sincere appreciation. Without their contribution and their considered and professional reflections, this program would not have the success that is now evident to all.

So thank you to all for enabling this program to continue. I hope you find the 2014 Casebook with enclosed case reports and surgical learnings useful.

Your feedback would be appreciated and it can be forwarded to Paula Cheng by email: paula.cheng@health.nsw.gov.au

Peter Zelas
Chairman

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Problem with a urinary catheter

CASE 1

An elderly patient presented to the emergency department at a district hospital with frank haematuria. He was taking warfarin and had a poorly controlled international normalised ratio (INR), which was above eight. He was an independent man, without dementia or any major impediments to daily living. His comorbidities included hypertension, bronchiectasis and chronic renal impairment.

The patient was admitted under the medical team. He had a three-way irrigation catheter inserted in the emergency department for continuous bladder irrigation. Over the next 24 hours, there were multiple episodes of catheter blockage. A resident medical officer changed the catheter and recorded that the catheter insertion was 'difficult' (an introducer was not used). The drainage did not improve following the change of catheter and over the next 12 hours, the patient developed increasing abdominal pain. The on-call consultant urologist was not available.

A CT scan demonstrated free gas anterior to the bladder and a large amount of free fluid within the abdomen consistent with bladder perforation. The patient was transferred to a tertiary referral hospital where his condition deteriorated. He was unable to be catheterised, displayed signs of increasing sepsis, developed a paraphimosis and had an episode of aspiration. The surgical team felt that the patient was at exceptionally high risk for a laparotomy and was unlikely to be extubated post laparotomy. The family declined surgery and the patient died the following day.

SURGICAL LEARNINGS

- Urinary catheterisation and management of indwelling catheter problems are often delegated to the most junior medical staff. They should be encouraged to seek the assistance of a more senior clinician under difficult circumstances.
- Early suspicion and/or recognition of catheter complications require escalation to a consultant urologist.
- Good communication and co-operation between medical and surgical teams (at both junior and senior levels) are essential in the management of the frail elderly where significant clinical problems such as blood loss and sepsis may be subtle and not easily recognised even with existing protocols such as 'Between the Flags'.
- Review of the medical records suggested that at the time of diagnosis of the bladder perforation, the patient was in "reasonable" condition for immediate laparotomy. In elderly patients with limited physiological reserves, any time delay such as transfers between hospitals, may significantly affect outcomes.

Acute pancreatitis poses challenges

CASE 2

A young patient was admitted to Hospital A with clinical and biochemical diagnosis of acute pancreatitis, possibly alcohol related. She was managed with analgesia and intravenous (IV) fluids. During the ensuing 36 hours, she received 14 litres of IV fluids but remained tachycardic and oliguric. The poor documentation of fluid intake and output made it difficult to assess her fluid balance. The surgeon did not assess the response to several IV fluid challenges. There was also a delay in reviewing the patient when the surgeon was contacted by nursing staff concerning a fall in blood pressure and continuing poor urinary output.

The patient was subsequently transferred to an intensive care unit (ICU) where she was noted to have metabolic acidosis. An abdominal CT was ordered, however, the patient needed to be transported offsite as the CT at the hospital was not functioning. The CT scan demonstrated severe acute pancreatitis and the patient was transferred to Hospital B.

The patient required intubation prior to transfer and was accompanied by a paramedic to Hospital B. She had a cardiac arrest on arrival at the emergency department of Hospital B. She was resuscitated but had developed cerebral anoxia and died 10 days later.

SURGICAL LEARNINGS

- Acute pancreatitis has varying degrees of severity. There should be an awareness of the significant clinical features which would suggest severe pancreatitis such as persistent pain, tachycardia, low PO_2, failure to respond to fluid challenge, oliguria and metabolic acidosis.
- Treating surgeons should undertake regular reviews of a patient who is unwell and respond to request by nursing staff to see the patient.
- The necessity of investigations such as CT scan needs to be tempered with the benefit that they may show. In this case the patient was unstable, required to be transported off site and the diagnosis had already been made with a reasonable degree of certainty. The CT scan was not going to add anything significant to the patient's management. There were risks in transporting the patient to a facility outside the hospital. The CT scan also delayed the transfer of the patient to Hospital B.
- Transfer of an intubated patient requires medical support.
- It is important to ensure frequent, timely and concise recording of fluid input and output for fluid balance assessment.

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The new anticoagulants… take note!

CASE 3

An elderly patient was admitted via the ED with a diagnosis of small bowel obstruction. A CT scan confirmed the diagnosis and a possible transition point. The comorbidities included an anterior resection for colon cancer, diabetes and atrial fibrillation for which Pradaxa had been prescribed.

The patient was initially managed conservatively. Over the ensuing days, the patient experienced continuing abdominal pain with nausea and vomiting requiring analgesics and antiemetics. His abdomen was noted to be distended. His vital signs showed temperature spikes, tachypnoea and tachycardia on occasions, a white cell count of 32×10^9/L (reference range $3.7 – 9.5 \times 10^9$/L) and an elevated C-reactive protein. No serial imaging studies were done. It is unclear from the clinical notes whether there was regular consultant input. The anticoagulant was not ceased.

The patient became acutely unwell on Day 10 at which time a laparotomy was undertaken. A small bowel resection was required but it was complicated by sepsis and uncontrollable bleeding intra and postoperatively. The patient never recovered and died the following day.

SURGICAL LEARNINGS

- The management of anticoagulants, especially the newer brands which have the problem of monitoring and the inability to return levels to normal, needs to be very carefully considered at the patient's admission.
- When to operate in a patient with small bowel obstruction is frequently a difficult decision. However, in this patient, there was clear evidence of failure to progress with conservative management and an operation earlier would seem to have been prudent.

Anticoagulants and surgery

Increasingly, patients presenting for surgery are on some form of "blood thinner", either in the form of anticoagulants or antiplatelet agents. The management of these patients in the perioperative period can be difficult, and the appearance of the novel oral anticoagulants (NOACs) has made this even more challenging. As surgeons, our goal is to perform surgery safely, minimizing the risk of bleeding while balancing this against the potential for thromboembolic complications related to ceasing anticoagulation.

Patients' clinical charts reviewed in CHASM have increasingly noted complications related to anticoagulants, either contributing to or being a major factor in the patients outcome. Often these events are due either to medications being overlooked in the history, or due to supratherapeutic heparin infusions as a result of inattention to the results of activated partial thromboplastin time (APTT) testing.

Oral anticoagulants

The number of people on oral anticoagulants has increased substantially. This is due to a combination of factors, including ageing of the population, more intensive surveillance for risk factors related to thromboembolic problems and liberalisation of indications for anticoagulation. The percentage of the whole population on warfarin is around 1 per cent, although in patients over 80 this figure edges closer to 10 per cent1. Warfarin is still by far the most commonly prescribed drug in this group although the appearance of the NOACs (see next page) is likely to change this.

Warfarin

Warfarin is most commonly prescribed for atrial fibrillation, mechanical heart valves or venous thromboembolism (VTE), and the perioperative management of patients on warfarin depends on the assessment of the risk of bleeding versus the risk of VTE. This will be influenced by the indication for anticoagulation, a history of any thrombotic events, and the type of surgery, especially taking into account risks associated with bleeding as a complication (for example, in neurosurgical patients).

An assessment of the risk for thromboembolic events related to ceasing anticoagulation is the initial step in the perioperative management of these patients, and numerous guidelines are available to assist that assessment2,3. The majority of these are based on some variation of the CHADS2 score (congestive heart failure, hypertension, age >75, diabetes, prior stroke or TIA) or whether there has been a recent episode of VTE. In those patients deemed to be at low risk of VTE, ceasing the warfarin several days before the surgery may be acceptable, while in those considered at higher risk of thromboembolic events some form of bridging therapy is usually required. Patients are rarely admitted to hospital for heparin bridging now as almost all of these patients can be managed adequately with low molecular weight heparins (LMWH) in the community, although obviously patients with a significant risk of bleeding may be more safely observed in the hospital setting.

In those patients on warfarin requiring urgent surgery, the approach will depend on the urgency for intervention and the indication for anticoagulation. Those patients with a mechanical heart valve are at high risk of thromboembolic complications in the absence of anticoagulation, and the refractory state induced by Vitamin K is difficult to reverse. In this situation, treatment with either fresh frozen plasma (FFP) or prothrombin complex concentrate (PCC) may be preferable.

Otherwise, a combination of titrated Vitamin K, FFP and PCC should be administered, usually in consultation with a haematologist.

Novel oral anticoagulants (NOACs)

This group of drugs has recently come to market, and their mechanism of action is either through direct thrombin inhibition (dabigatran[Pradaxa]) or factor Xa inhibition (rivaroxaban[Xarelto] and apixaban[Eliquis]). In the absence (to date) of effective antidotes for these drugs, the management of them in the perioperative period is challenging, especially in those patients requiring surgery on an urgent or semi-urgent basis. In general terms, once again the approach is to balance the risk of bleeding against the necessity of the surgery. If the surgery is purely elective, an algorithm similar to that for warfarin can be followed – in patients at a relatively low risk of thrombotic complications, the NOAC can simply be stopped four to five days preoperatively, while those at higher risk would generally need some form of bridging therapy. In the emergency setting, management of these medications is more difficult. Where possible, surgery should be delayed for at least 12, and preferably 24 hours, after the last dose, especially if there is impairment of renal function. If this is impractical then consideration can be given to administration of PCC, in addition to consultation with a haematologist. In patients on dabigatran who require urgent surgery, haemodialysis may be helpful. It is worth emphasising that in the absence of experience with these drugs in the setting of acute surgical interventions, there is little to direct us in the way of guidelines at this time and local experience and consultation with colleagues is important.

Antiplatelet agents – aspirin and Plavix

The indication for antiplatelet agents will vary, with a majority taking these for coronary stents, in addition to secondary prevention or for vascular indications. Once again, the percentage of the population taking these agents is increasing, and depending on the population being considered, the incidence of people taking these drugs may approach 75 per cent.

The use of aspirin in the perioperative period is controversial. Some studies have demonstrated no benefit in terms of coronary events, along with an increased risk of bleeding, while others have found a survival benefit with no increase in clinically significant bleeding. The consensus is that continuing aspirin through the perioperative period is safe unless there is a further significant risk associated with postoperative bleeding (e.g. in neurosurgical patients).

Patients with recently implanted coronary stents are at risk of stent thrombosis if their antiplatelet agents are ceased prematurely, and even then there are reports of late stent thrombosis occurring after the recommended time frame. Liaison with the treating cardiologist is always advisable, especially if there is some question as to what type of stent has been implanted. In those patients with a bare metal stent at least six weeks of dual antiplatelet therapy is indicated before it can be ceased safely for elective surgery, while in those with a drug eluting stent (DES), dual antiplatelet therapy is indicated for a year. Patients requiring emergency surgery are best treated on a case-by-case basis in consultation with their cardiologist.

Patients on aspirin or Plavix for peripheral arterial disease have problems that are usually more amenable to ceasing the antiplatelet

for elective surgery. The only consideration is those patients with certain stents, such as Viabahn or DES in the tibial circulation. These stents usually have a recommendation to continue dual antiplatelet therapy for at least several months after implantation – consultation with the treating vascular surgeon is appropriate when planning interventions.

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Fatal pulmonary embolus still occurs despite appropriate precautions

CASE 4

A male patient with a body mass index (BMI) of 26 underwent a bilateral total knee arthroplasty (TKA). The surgery was performed under current accepted standards of anaesthesia to minimise venous thromboembolism (VTE).

The medullary canals were instrumented only on the femoral side and the procedures were not overly extended, with tourniquets used in an acceptable sequential manner.

Tranexamic acid was used to minimise bleeding postoperatively, with a postoperative haemoglobin of 124 g/L.

The documentation was of a high quality and all accepted precautions were taken.

The patient had a thorough work up and there were no risk factors for deep vein thrombosis or increased bleeding. Clexane 40mg daily was commenced postoperatively together with TED stockings. The patient collapsed 52 hours postoperatively and could not be resuscitated. A pulmonary embolus was suspected.

SURGICAL LEARNINGS

- This patient was at low risk for VTE.
- Bilateral TKA carry a substantial risk, which is increased by the bi-laterality and possibly the use of tranexamic acid, although the risk of reaction or complication from blood transfusion makes this an acceptable alternative.
- The use of Clexane and Xarelto at prophylactic doses was entirely appropriate, as was the use of stockings and early mobilisation.
- This patient's management falls within the guidelines released by the Arthroplasty Society of Australia[1] in 2013.
- The use or non-use of tourniquets has no high quality evidence to make a recommendation.
- The use of sequential devices intra-operatively would not be commonly practiced when both legs are prepared and exposed for surgery.

[1] The Arthroplasty Society of Australia, under the auspices of the Australian Orthopaedic Association, released its guidelines in 2013, after synthesising the guidelines of the National Health and Medical Research Council, the American Academy of Orthopaedic Surgeons, the Royal Australasian College of Surgeons and the American College of Chest Physicians.

- The use of post-operative sequential devices has low quality evidence. It is recommended for high-risk compliant patients but can create issues for early mobilisation of patients.

- The number of academic, regulatory or clinical bodies providing guidelines reveals few if any areas of total agreement. The corollary for patients and orthopaedic surgeons are cost benefits, compliance and increased risk of haemarthrosis. The US Medicare data places the risk of infection in [pre-operatively] warfarinised patients undergoing TKA, at seven times that of a normal patient.

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Consider option of not operating

CASE 5

A patient in the ninth decade of life resided with their partner in a nursing home and required full time care. The patient had multiple comorbidities, was wheelchair bound, suffered from dementia, had residual left leg weakness resulting from a cerebrovascular accident (CVA) 12 months previously, diabetes and impaired renal function. A Carotid Doppler Scan following the CVA had demonstrated 80-99 per cent stenosis of the left internal carotid artery for which aspirin had been prescribed. The patient was diagnosed with a near obstructing carcinoma of the sigmoid colon. An abdominal CT scan demonstrated a large tumour with a partially obstructed left ureter. A decision was made to attempt to resect the tumour and aspirin was ceased one week preoperatively.

The operation consisted of a Hartmann's procedure with a small bowel resection. It was technically difficult with adhesions from previous surgery and the tumour attached to the pelvic wall, left ureter and small bowel. A tumour/sigmoid perforation occurred during mobilisation. Postoperatively the patient developed a major CVA on Day 1 from which a neurologist advised that recovery was unlikely. The patient then developed pulmonary atelectasis, became septic and died on Day 7.

SURGICAL LEARNINGS

- Alternatives to major surgery should be considered in a patient with significant comorbidities. In this patient consideration could have been given to a colonic stent or a defunctioning colostomy (which could have been done under local anaesthesia). Perhaps no treatment at all was an option to be considered. The patient's and family's wishes, of course, need to be considered. However, the surgeon is in the best position to provide direction.
- Consultation with a colleague or a palliative care physician may have been of benefit.
- Cessation of aspirin has been a contentious issue in this and similar clinical contexts. Here the patient was elderly with multiple comorbidities, so elective carotid artery surgery would have carried a significant risk. Cessation of the aspirin per se, probably had no influence on the development of the CVA as there may have been other contributing factors such as intra- or post-operative hypotension.

Re-establishing a tracheostomy… a cautionary tale

CASE 6

A patient underwent a hemiglossectomy, bilateral neck dissection, dental extraction and tracheostomy with reconstruction with a free flap for a squamous carcinoma of the floor of the mouth. He had two uneventful postoperative days and was decannulated. Three days later, his intraoral wound was noted to have dehisced.

A plan was made to return to the operating theatre (OT) and re-suture the wound. The patient was described to have a "bull neck" in the clinical notes. The plan was to re-establish the tracheostomy by railroading a bronchoscope into the semi-sealed tracheostomy site. An otolaryngologist was not present in the OT.

In the anaesthetic bay, manipulation caused the patient a sudden period of coughing followed by vomiting and aspiration. There was a resultant respiratory arrest with the airway finally established by an ICU consultant. The patient was hypoxic for 15-20 minutes. He was transferred to ICU postoperatively. He had anoxic brain damage and eventually died of pneumonia and respiratory failure.

SURGICAL LEARNINGS

- When returning a patient to the OT or when managing in an ICU and planning to re-establish a tracheostomy, there should be a team approach with an anaesthetist, otolaryngologist and ICU consultant on hand as the re-intubation of a tracheostomy can be technically very demanding.
- The CHASM assessor commented that there always needs to be a "Plan B".
- The NSW Health Policy Directive, Tracheostomy Clinical Management (ADULT) recommends the following clinical competency:

  i. Patients with a tracheostomy must be cared for in clinical environments where staff are competent in the general management of tracheostomy and tracheostomy emergencies.

  ii. All clinical staff providing direct care must be trained and assessed on tracheostomy management policies including the clinical emergency response to airway emergencies.

  iii. Tracheostomy education resources and clinical protocols are to be made readily available in the clinical environment.

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Intravenous fluids... attention to detail!

CASE 7

An elderly patient underwent a laparotomy, small bowel resection and anastomosis for small bowel obstruction. The patient's comorbidities included developmental delay and schizophrenia. Postoperatively, the patient developed left lower lobe consolidation and was unable to be extubated. He was commenced on total parenteral nutrition (TPN) and transferred on the fifth postoperative day to a tertiary referral hospital.

At the tertiary hospital, the patient was noted to be hypernatraemic (160 mmol/litre) and hyperchloraemic (129 mmol/litre), resulting in an encephalopathy. There was evidence of fluid overload, associated underlying renal failure and continuing evidence of pulmonary consolidation. The patient was managed in ICU where he gradually improved except for the residual oral and pharyngeal dysphagia due to the encephalopathy. He remained on nasogastric feeding but suddenly deteriorated in the ward, possibly due to aspiration. Following discussions with the family, it was agreed to withdraw active treatment.

Review of the fluid charts at the initial hospital demonstrated that the patient had received a total of 38 litres of intravenous fluids in seven days, of which 27 litres were either normal saline or Hartmann's Solution, 4.5 litres were TPN and the remainder 5% dextrose and three units packed cells. There had been daily measurements of electrolyte levels which demonstrated steadily increasing sodium and chloride levels, however, no comment regarding this significance was evident in the clinical charts.

SURGICAL LEARNINGS

- Intravenous fluid requirements must be carefully reviewed, especially in an elderly and ill patient.
- Surgical staff should ensure that they review the results of tests that they have ordered and respond appropriately to abnormal results.

Cellulitis… but could it be something else?

CASE 8

A middle-aged obese patient with liver metastasis from renal carcinoma presented to an emergency department at 1700 hours with history of right lower abdominal pain ("8 out of 10"), diarrhoea and discharge from "below". The patient had a high fever, tachycardia and tachypnoea with tenderness in the right lower quadrant of the abdomen. A provisional diagnosis of abdominal wall cellulitis was made and the patient was transferred to a tertiary referral hospital at 0036 hours. There was no immediate examination of the perineum. A CT scan was performed at 0126 hours and reported as "source of sepsis is obviously the right sided subcutaneous inflammation/abscess …". It is unclear from the clinical notes exactly what information, and to whom it was communicated. The visiting medical officer (VMO) was formally informed of the patient's diagnosis at 0745 hours when it was noted that the patient was very unwell with evidence of sepsis, a tender and indurated right lower abdominal wall and a sinus on the right labia majora with a malodorous discharge. A pelvic examination had not been undertaken until this stage.

Diagnosis of necrotising fasciitis (NF) was made as the clinical picture and CT scans were disproportionate to the diagnosis of abdominal wall cellulitis. The patient underwent extensive debridement in the OT later that day and the procedure was repeated twice on the ensuing days. The patient remained septic and the NF progressed. In the context of associated metastatic disease, the family indicated that they did not want any further active treatment. The patient died shortly thereafter.

SURGICAL LEARNINGS

- Alternative diagnoses should be considered when the clinical picture is not consistent with the provisional diagnosis. NF remains a condition where the diagnosis is frequently delayed, probably at least in part because it does not appear in the differential diagnosis and has an associated high mortality.
- The second line assessor commented that 'clinical assessment is the most important step in diagnosing an acute surgical problem by both ED staff and surgical registrars.'
- This case demonstrates the importance of ensuring clear lines of communication and recording of "who said what to whom."
- Whether operating on this patient 12 hours earlier would have made a difference is debatable, but nevertheless, more aggressive initial management may have altered the eventual outcome.

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Ankylosing spondylitis... high risk of vertebral column fracture

CASE 9

An elderly patient was admitted to a metropolitan neurosurgical unit having sustained a fall. He was known to have a history of falls, a previous myocardial infarction and ankylosing spondylitis. On examination, he demonstrated weakness of both upper limbs and extensor plantar responses. An initial imaging of cervical spine revealed no fracture, but on later review, a fracture through the superior endplate of C7 was identified. He was discharged after seven days in hospital.

The patient was readmitted 24 days later having had another fall. On this occasion, he was paralysed from below T4. A repeat CT scan demonstrated displacement of the C7 fracture, now involving the posterior inter-spinous ligament and also an unstable fracture at T8. The patient was transferred to an acute spinal injuries unit.

At the second hospital, an anterior and posterior fusion of the C6/7 level and fusion of the T8 fracture were performed. In view of the poor prognosis and following family discussion, it was decided to withdraw active treatment and the patient died six days following admission to the second facility.

SURGICAL LEARNINGS

- The second line assessor commented that spinal fractures in patients with ankylosing spondylitis are well known to be highly unstable. Even minimal movement of the fracture site results in high probability of major spinal cord injury. Urgent surgical stabilisation of a fracture is recommended.
- The presence of a myelopathy in a patient who has sustained a fall places the patient at increased risk of further falls, especially in an unsupervised environment. There should be a high index of suspicion of a fracture and, either urgent surgical intervention undertaken at the primary hospital or immediate transfer to a spinal injuries unit should be considered.

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Upper gastrointestinal bleeding... high risk of re-bleeding requires close monitoring

CASE 10

An elderly patient presented to a rural hospital with major upper gastrointestinal (GI) bleeding. Following resuscitation, the patient was transferred to a rural referral hospital after consultation with the receiving surgeon. On arrival at the referral hospital, the patient was hypotensive and tachycardia. The surgeon advised further resuscitation and to be notified if there was progressive bleeding. The patient had evidence of continuing bleeding as demonstrated by unstable vital signs but the surgeon was not notified. The patient died five hours after admission.

SURGICAL LEARNINGS

- Consideration could have been given to a more active intervention when the patient arrived at the rural referral hospital. As per the pre-endoscopy scoring system[1], the patient was at high risk of re-bleeding.
- In the context of a high risk of re-bleeding, frequent surgical review is the responsibility of the consultant as well as the junior staff.
- Could the patient have been transferred to a tertiary hospital given that he was stable at the time of the initial transfer?
- Review of criteria for managing patients with GI bleeding and ensuring that appropriate notifications occur when there is evidence of continuing bleeding.

REFERENCE

1. Grainek IM, Barkum AN, Bardon M. Current concepts: management of acute bleeding from a peptic ulcer. N Eng J Med 2008; 359:928-37. DOI: 10.1056/NEJMra0706113.

Aspiration on induction of anaesthesia

CASE 11

An elderly patient was admitted to hospital with a large bowel obstruction due to malignancy. X-rays showed multiple loops of dilated small bowel. The patient was managed conservatively while awaiting surgery. There was an entry in the clinical notes: 'nasogastric tube if patient starts vomiting significantly.' The patient was passing some flatus, but complaining of nausea and occasional vomiting. He was allowed clear fluids orally.

The patient had surgery three days following admission. On induction of anaesthesia, the patient had a major episode of vomiting with consequent aspiration. A bronchoscopy showed "soiling bilaterally". An oral gastric tube was placed and 2.5 litres of fluid was aspirated. A laparotomy and colonic resection proceeded uneventfully. Postoperatively, the patient developed marked systemic inflammatory response syndrome, septic shock and an acute kidney injury. Following an initial improvement, the patient developed hospital acquired pneumonia. After discussions with patient and the family, there was agreement to limit active treatment. The patient died three weeks after surgery.

CASE 12

An elderly patient presented to hospital with small bowel obstruction due to a strangulated umbilical hernia. A nasogastric tube was removed by the patient while en route to the operating theatre. It had been draining faeculant material.

Despite an appropriate rapid sequence induction using cricoid pressure, the patient aspirated during intubation. Appropriate airway toilet was performed and surgery proceeded.

The patient returned to ICU where there was evidence of progressive deterioration of respiratory function and a decision was made to withdraw active treatment.

SURGICAL LEARNINGS

- Aspiration continues to be a major contributing cause to surgical mortality. These two cases demonstrate the importance of ensuring that a nasogastric tube is in place in any patient undergoing a laparotomy for bowel obstruction.

Care does not end at the Hospital Exit sign

CASE 13

A late middle age patient with a history of obesity, depression and a chronic pain syndrome underwent an uneventful elective laparoscopic cholecystectomy and operative cholangiogram (normal) at 4pm. The patient was observed in hospital overnight. He was reported to have pain for which aspirin was prescribed. Tachycardia and hypertension noted during the evening, prompting a full blood count which demonstrated a normal haemoglobin and a white cell count of 23×10^9/L. The symptoms had settled by the morning and the patient was discharged. The discharge instructions could not be located in the notes.

On post-operative Day 3, the patient developed increasingly severe abdominal pain, necessitating a visit to the general practitioner. Opioid medication was prescribed. The patient became unresponsive at home on Day 4. He was taken by ambulance to hospital and died that day.

Post mortem showed biliary peritonitis, stemming not from a major duct but presumably from the liver bed.

SURGICAL LEARNINGS

- Discharge instructions should clearly state what the normal pattern of recovery is expected to be and what patients should do and who they are to contact in the event of unanticipated symptoms such as increasingly severe pain, even if the problem is perceived to be minor.
- Consideration should be given to the routine contacting of patients within 48 hours following discharge from hospital. This practice has been established in a number of local health districts with positive results, including the appreciation of patients who have been contacted, the ability to modify some aspects of management, especially related to postoperative pain and most importantly, the early identification of unexpected, potentially serious complications.

We know who audits surgeons, but who audits management?

CASE 14

An elderly man was admitted with generalised faecal peritonitis. The patient waited for four hours for a CT scan and two hours later, surgery was booked on an urgent basis. Despite the multiple requests and protests from the surgical team, an operating theatre was not made available for the next eight hours and surgery began at 2.30 am. The patient survived the operation but died in the ICU five days later.

CASE 15

An elderly patient was admitted to hospital with a fractured neck of femur. He was living at home with his son but required high level of care. A cardiology assessment requested by the anaesthetist cleared the patient for surgery within 24 hours. The patient fasted on Day 2, Day 3 and Day 4 following admission. An operation was undertaken on the evening of Day 4 at which time the patient had chest symptoms and poor urinary output. The patient deteriorated postoperatively. Atrial fibrillation became uncontrollable and multi-organ failure ensued.

CASE 16

An elderly patient was admitted with acute stroke and treated successfully with thrombolysis. A carotid CTA demonstrated 70 per cent internal carotid artery stenosis consistent with symptoms and carotid endarterectomy planned for 13 days after presentation (within the Unit protocol of 14 days). The operation was cancelled on day of surgery (no reason documented in the clinical record) and rescheduled for the following week. The next day, the patient developed a significant stroke and an urgent carotid endarterectomy was undertaken two days later. Postoperative recovery was poor with extension of the neurological deficit and the patient died in hospital.

SURGICAL LEARNINGS

- All three patients were adversely affected by the delay in receiving their appropriate and timely operation.
- There needs to be a process to prioritise urgency of surgery and defer less urgent operations.
- Management needs to empower clinical staff to open extra theatres when clinically indicated, despite the short term financial cost.
- A wait of four hours for a CT scan is dangerous for a patient with faecal peritonitis.

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