



ROYAL AUSTRALASIAN
COLLEGE OF SURGEONS

QASM

Queensland Audit of Surgical Mortality

LESSONS from the AUDIT VOLUME 4

DECEMBER 2009

NOT TO BE DISTRIBUTED Copyright Royal Australasian College of Surgeons

 **Queensland Government**
Queensland Health



“The only source of knowledge is experience”

Albert Einstein



Contents

Haemorrhage after laparoscopic cholecystectomy due to a clip slipping off the cystic artery	1
Haemorrhage following colonoscopic polypectomy in a patient on Plavix	1
Urology	2
Abdominal sepsis following elective laparoscopic ventral hernia repair	3
Laparoscopic high anterior resection for carcinoma – ischaemic left colon and perforation of the fourth part of the duodenum	4
Aspiration following elective nephrectomy in a patient on chronic renal dialysis	5
Sepsis following laparoscopic repair of an umbilical hernia	6
Large bowel obstruction with perforated caecum and a competent ileocaecal valve.	6
Mirizzi Syndrome – acute renal failure, sepsis	7
Pseudomembranous colitis – was colectomy necessary?	8
Carotid artery disease precipitating stroke when bleeding post-colectomy occurred	9
Acute anaphylaxis due to intravenous IV Cephalothin	10

This booklet is produced for Fellows and Trainees 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.

Each case described in *Lessons from the Audit* Vol 4 was selected by the Clinical Director in order to highlight a particular surgical problem. Reports by first-line and second-line assessors have informed the descriptions provided.

Dr Jon Cohen, QASM Clinical Director.



Haemorrhage after laparoscopic cholecystectomy due to a clip slipping off the cystic artery

An elderly patient with a history of gallstone pancreatitis was admitted for elective cholecystectomy. The patient was ASA 3 (aortic valve replacement, atrial fibrillation) and anti-coagulated. The patient had a planned admission for cessation of anti-coagulation prior to surgery and an uncomplicated laparoscopic cholecystectomy was performed. A peri-operative heparin infusion had been set up after cessation of warfarin.

The patient was observed overnight in intensive care unit (ICU) and then transferred to the ward; and his initial recovery was satisfactory. On the afternoon of the fifth postoperative day the patient complained of abdominal pain. An abdominal wall haematoma was noticed and fresh blood found in the drain. The patient's haemoglobin that morning was 12.2 gms/L.

The following morning the patient was unwell, the international normalised ratio (INR) was 3.1 and the heparin infusion was ceased. His haemoglobin had fallen and a CT scan found fluid around the liver and an abdominal wall haematoma. A blood transfusion was given and warfarin was reversed, but shortly after the patient had a

cardio-pulmonary arrest and could not be resuscitated.

The coroner's post-mortem found over 1 litre of liquid blood and close to 1 litre of clot in the abdomen and a branch of the cystic artery was no longer clipped with fresh clot adherent to this vessel.

Comment

The assessor felt the case had been worked up correctly and the operation had gone well, but recognition of the extent of the bleeding, and hence cessation of anti-coagulation, seemed to have been delayed. The assessor made the comment that this blood loss would not have been fatal in most patients, but in this patient with serious comorbidities, it was a major event.



Haemorrhage following colonoscopic polypectomy in a patient on Plavix

An elderly patient had a colonoscopy to investigate iron-deficiency anaemia and three polyps were removed from the caecum. Plavix had not been ceased prior to this procedure. The patient was demented and lived in a nursing home. Past history included hypertension and stroke, and an advanced health-care directive was in the patient's file.



Eight days later he had a large bleed from the colon and was transferred to hospital in the ambulance. The patient was given two units of blood which did not improve his haemoglobin level. The patient continued to bleed requiring further transfusion. Early the following morning surgical consultation was sought and a laparotomy and right hemi-colectomy performed. The patient arrested on the table and was transferred postoperatively to the ICU but died 48 hours later after discussion with the family who agreed to withdraw ventilation support.

Comment

Colonoscopic polypectomy with the patient taking Plavix is potentially risky and was probably the cause of the bleeding which led to this patient's demise. This procedure was not carried out by the surgical team who had to perform a right hemi-colectomy because of persistent bleeding.



Urology

1. Inappropriate anticoagulation
2. Catheter size too small to manage clot retention
3. Delay in diagnosing bladder perforation

A middle-age male was diagnosed with hormone refractory advanced metastatic

prostate cancer with probable bone marrow involvement and low platelet count. He was admitted three weeks after transurethral prostatectomy (TURP) with haematuria and clot retention and a haemoglobin of 8.1 gms/L. He was transfused and an indwelling catheter inserted for bladder washout. He was discharged after a successful trial of void 8 hours after his last transfusion.

He was re-admitted 3 days later with hypovolaemic shock and haematuria and was transfused with three units of blood. Catheter bladder drainage and irrigation was performed. Bleeding continued over the next few days requiring further transfusion and two units of fresh frozen plasma (FFP). He was taken to theatre for diathermy of the prostate bed and evacuation of clots.

The following day he was thought to have had a cerebrovascular accident (CVA); he developed receptive and expressive dysphasia and aspirin was commenced as well as heparin 5000 units bd. He had at that stage received 11 units of blood and two units of FFP.

Haematuria persisted and he was initially catheterised with a 14 Fr catheter by the resident who also stopped heparin and aspirin. This was changed to a 20 Fr 3-way catheter with irrigation and when this blocked a 24 Fr 3-way catheter was inserted. Further transfusion was required. A CT cystogram showed a bladder perforation on the left with contrast extravasating into



the retroperitoneum and a laparotomy was performed. A left posterolateral intraperitoneal bladder perforation was found and subtrigonal extension of his malignant prostate. Postoperatively he went to ICU and subsequently back to the ward where he developed chest pain and shortness of breath and died soon afterwards.

Comment

The assessor made the following points:

1. Treating a patient with hormone refractory advanced metastatic prostate cancer with probable bone marrow involvement and low platelet count with aspirin and heparin after he had been transfused 11 units of blood and 2 units of FFP in the previous week in the presence of a normal non-contrast brain CT and no contrast study other than clinical suspicion of an embolic event is less than ideal.
2. The use of a 14 Fr catheter to drain a bladder with haematuria and clot retention is not standard care and may have contributed to the bladder perforation.
3. The patient did not have a CT scan early in the course of his illness to assess the cause of his persistent haematuria in spite of requiring multiple transfusions.
4. Although the prognosis for this patient was poor, the use of aspirin and heparin on clinical suspicion of

CVA with no radiological confirmation and use of a 14 Fr catheter to drain a bladder with haematuria and clot retention may have contributed to the bladder perforation and ensuing surgery.



Abdominal sepsis following elective laparoscopic ventral hernia repair

A middle-aged obese hypertensive man was admitted for elective laparoscopic ventral hernioplasty. This was followed by two days of vomiting, abdominal distension and then in the early hours of the morning of day 3, rapid deterioration requiring admission to intensive care and ventilation.

Flexible gastroscopy on day 4 revealed an ischaemic stomach within a hiatal hernia and laparotomy revealed necrosis of the stomach and strangulation of a knuckle of small bowel in a port site used for laparoscopic repair of the ventral hernia. Resection of the stomach and disconnection of intestinal continuity was required to gain control of the initial abdominal sepsis. Necrotising fasciitis developed in the abdominal wall and subsequent intestinal cutaneous fistulae developed.

A battle with more than 20 further operations over the next 12 months to control abdominal sepsis, resect necrotic



bowel, close cutaneous intestinal fistulae, debride abdominal wall and rejoin jejunum to his oesophagus kept the patient alive. Empyema of both chest cavities and sepsis associated with ongoing intestinal fistulae contributed to the patient's death from multiple organ failure, despite thoracotomy and drainage.

Comments

1. Details of the initial laparoscopic repair at a private hospital were not available.
2. Strangulation of small bowel in a large port site is less likely to occur if the fascia is sutured closed on completion of the procedure.
3. Vomiting the morning after surgery was unexpected and should have led to investigation with plain x-ray of the chest and abdomen, or CT scanning, alerting the clinical team of the presence of bowel obstruction rather than postoperative ileus.
4. The delay in gastroscopy and subsequent surgery until the evening of the fourth day in hindsight contributed to necrosis of the stomach in the chest and infarction of the strangulating small bowel.

The subsequent efforts to control sepsis and repair bowel and abdominal wall are difficult to fault.



Laparoscopic high anterior resection for carcinoma – ischaemic left colon and perforation of the fourth part of the duodenum

A middle-aged obese patient with a history of heavy alcohol intake, smoking, and hypertension was an elective admission for laparoscopic high anterior resection for carcinoma of the sigmoid colon.

The following day the patient required a laparotomy because of a deteriorating clinical condition; and at this operation an ischaemic left colon was excised and a perforation on the fourth part of the duodenum repaired. Feeding jejunostomy was also fashioned. A high output duodenal fistula developed and continued sepsis with necrotising fasciitis extending into the retroperitoneal plane. The patient was found to be hepatitis C positive with pancytopenia and extensive haemophagocytosis.

Consultation with haematology and gastroenterology resulted in treatment with methylprednisone and the patient's condition improved sufficiently to leave ICU on day 45. His blood picture improved as he was weaned off steroids, but on day 66 a large haematemesis produced rapid deterioration and a CT angiogram showed no site of bleeding. The patient was transfused and endoscopy performed but no accurate diagnosis could be made. As



the patient's condition deteriorated further, a laparotomy was performed and a 2cm necrotic ulcer with a bleeding vessel in the base was found in the posterior wall of the duodenum. The patient died on the operating table.

Comment

The surgeon acknowledged that this case had led to a review of the surgeon's technique of laparoscopic anterior resection. The surgeon felt that the endoscopy and laparotomy could have been instituted sooner in an effort to diagnose the bleeding duodenal ulcer which was the ultimate cause of death.



Aspiration following elective nephrectomy in a patient on chronic renal dialysis

A middle-aged patient with chronic renal failure had a failed renal transplant more than 10 years prior and had been successfully maintained on chronic haemodialysis. The patient developed bilateral renal cell carcinoma and an uncomplicated right nephrectomy was performed. The elective left nephrectomy was undertaken with appropriate pre-operative arrangements in regard to dialysis and medical and anaesthetic assessment.

The patient's postoperative course was slow and although passing flatus there had not been no postoperative bowel action. On the eighth postoperative day an abdominal x-ray showed copious faecal loading but it was not judged that bowel obstruction was present. On the ninth postoperative day the patient vomited a large amount of fluid and was vomiting for a period of 3 minutes. Following this episode the patient had an apparent cardiac arrest from which the patient never recovered.

Comment

The assessor felt the patient had died from aspiration. There seemed to be a lack of diagnosis of what was probably a paralytic ileus with increasing pain and gastric dilatation. A realisation of the significance of the malfunction of the gastrointestinal tract would likely have led to the insertion of a nasogastric tube, gastric emptying, and prevention of a likely terminal event of aspiration pneumonitis. The assessor acknowledged the difficulty given that the patient was obese with underlying chronic renal failure necessitating haemodialysis. A CAT scan may have clarified the severity of the gastrointestinal hold-up or gastric dilatation.





Sepsis following laparoscopic repair of an umbilical hernia

An elderly hypertensive patient had a laparoscopic intraperitoneal mesh repair of an umbilical hernia with a 3cm diameter defect. The patient did not progress well postoperatively and was thought to have a respiratory problem and was transferred to a second hospital on day 4. CT pulmonary angiogram was negative and abdominal pain and distension and fever continued.

A CT of his abdomen revealed multiple fluid- and gas-containing collections and a 'difficult laparoscopic removal of infected mesh and washout' was performed. The patient made slow progress but continued to be septic, and several weeks later a CT scan suggested pulmonary emboli and he was treated with Clexane.

Just over a month later, the patient suddenly collapsed with a drop in haemoglobin to 4gms/L and laparotomy was performed. Purulent fluid was drained deep to the umbilicus and a large volume of dark blood was found. The patient died on the operating table in spite of intensive efforts at resuscitation.

Comment

1. Repair of a primary umbilical hernia with a 3 cm defect by the laparoscopic route is not recommended. It is only indicated for a very large ventral hernia with loss of domain of the abdomen. When a complication of a laparoscopic

procedure occurs the question arises whether a repeat laparoscopic procedure or an open laparotomy should be performed.

2. The use of low molecular weight heparin which can't be monitored by pathological testing in the presence of intra-abdominal inflammation has to be questioned. The alternative therapy would have been heparin infusion. The postmortem did not reveal evidence of pulmonary embolism.

The last two issues are secondary, however, to the initial operation and to the delay in recognising the complication of it.



Large bowel obstruction with perforated caecum and a competent ileocaecal valve.

An elderly patient male was admitted with an initial diagnosis of bowel obstruction subsequently diagnosed as constipation. The patient had a distended abdomen with pain in the hypogastrium, and had noticed a reduction in flatus and slow swelling of his abdomen.

On examination, the patient had a firm distended abdomen, and a plain x-ray showed large bowel distension with a competent ileocaecal valve and some faecal loading. A diagnosis of large bowel



obstruction at the recto-sigmoid junction with a competent ileocaecal valve was made.

The following morning he was examined and had passed flatus and his abdominal pain had settled somewhat. In spite of mild dissension of the abdomen, the patient was allowed to go home and given laxatives.

The patient was readmitted 6 days later with generalised abdominal pain, distension, and the patient's bowel had not been opened since discharge from hospital. A chest x-ray showed a large pneumoperitoneum and the patient was transferred to another hospital for surgical management.

Laparotomy was performed that evening and revealed a stricture in the sigmoid colon and a perforation in the caecum with faecal peritonitis. Subtotal colectomy and ileostomy was performed. The patient recovered well from this procedure and 3 weeks later, while awaiting transfer to transitional care he had a sudden arrest and could not be resuscitated. It was thought that a myocardial infarction was likely.

Comment

Large bowel obstruction with a competent ileocaecal valve carries a high risk of perforation of the caecum and surgery to relieve the obstruction is urgent. Failure to recognise this in the presence of mechanical obstruction at the rectosigmoid junction led to a delay and subsequent perforation of the caecum.



Mirizzi Syndrome – acute renal failure, sepsis

An elderly lady was admitted as an emergency with biliary obstruction. The patient had multiple co-morbidities including ischaemic heart disease and asthma and developed painless obstructive jaundice.

An ultrasound confirmed the presence of gallstones and the possibility of Mirizzi Syndrome was considered and subsequently confirmed on the magnetic resonance cholangiopancreatography (MRCP). Admission bilirubin was 143 µmol/L, renal function was normal and the patient was not anaemic.

An attempt was made to organise endoscopic retrograde cholangiopancreatography (ERCP) and stenting pending definitive treatment but this could not be performed at the admitting hospital and was subsequently done at the private hospital in the same town.

Several days went by with no procedure being done while the patient's jaundice gradually deepened. The plan to proceed to surgery was thwarted because of the lack of an anaesthetist; eventually, an ERCP was performed confirming Mirizzi Syndrome and a plastic stent placed in the bile duct. The patient became sweaty and weak afterwards requiring intensive care and it was noted that the patient's bilirubin was elevated after ERCP and that the patient's lipase was



1400 U/L. There had been a doubling in creatinine from between 100 $\mu\text{mol/L}$ and 130 $\mu\text{mol/L}$ to 250 $\mu\text{mol/L}$. The patient required intubation, inotropic support and subsequently started haemofiltration because of anuria.

A few days later inotropes were still required and the bilirubin remained at 5 times normal. The decision was taken to operate to relieve her biliary obstruction because it was appreciated that the biliary stent was not working. A subtotal cholecystectomy was performed and the obstructing stone removed. The patient's postoperative course was stormy, with increasing inotropic requirements and ongoing anuria and finally torrential melaena possibly related to disseminated intravascular coagulation (DIC) with bleeding from her previous ERCP sphincterotomy. After a family conference, the decision was taken to withdraw therapy and the patient died later that day.

Comment

Obstructive jaundice due to Mirizzi's Syndrome in an elderly patient is a very serious situation. While these patients often appear deceptively well, they are prone to developing severe complications of biliary obstruction, namely acute renal failure and sepsis. Timely relief of biliary obstruction is of paramount importance.

Due to problems with accessing anaesthetic support and accessing ERCP services, it was not possible to proceed with this patient's definitive treatment sufficiently quickly. Had

biliary drainage happened sooner, it is more likely that the patient may have survived this illness. Lack of resources prevented the surgical team from being able to offer the treatment that was needed.



Pseudomembranous colitis – was colectomy necessary?

An elderly patient was admitted as an emergency with a 5-day history of diarrhoea and 48 hours of vomiting and abdominal pain. The patient was hypotensive and clearly unwell. The patient also had multiple comorbidities and several recent hospital admissions for cellulitis on the patient's legs for which she was given oral clindamycin.

On examination, the patient was hypotensive with generalised abdominal distension, tenderness and rebound. Her comorbidities included type 2 diabetes and a past history of abdominal aortic aneurysm (endovascular repair), sigmoid colectomy, cholecystectomy and appendicectomy. The patient was thought to have peritonitis and a laparotomy performed on the day of admission. The only abnormality identified was gross dilatation of the transverse colon, but no evidence of peritonitis or ischaemic large or small bowel. The patient was maintained in ICU on ventilatory support



but deteriorated over the next few days with metabolic acidosis and progressive multi-organ failure.

At the time of laparotomy when no surgical pathology was identified, a presumptive diagnosis of pseudomembranous colitis was made. Several days after the patient's admission, a stool specimen taken at the time of her admission identified *Clostridium difficile* toxin, and the diagnosis of pseudomembranous colitis was confirmed. At this point, the broad spectrum antibiotics were ceased and oral metronidazole administered along with vancomycin enemas.

Comment

At the time of admission it was not recorded that the patient had been on oral clindamycin, although it was clearly recorded in the outpatient notes and a letter to the patient's general practitioner. Clindamycin is well-recognised as the cardinal antibiotic causing pseudomembranous colitis and is more likely to do so in the elderly and the diabetic. Proton pump inhibitors, which were being taken, may also increase the risk of pseudomembranous colitis. The decision by a remote infectious disease physician to recommend oral clindamycin for this patient without personally reviewing them was perhaps not the best course of action.

It is apparent that the patient had pseudomembranous colitis from the outset

and their initial hypotension responded promptly to fluid resuscitation. The management of this condition is not, in the first instance, surgical and a working diagnosis should have been established.

At the completion of the surgical procedure when a presumptive diagnosis of pseudomembranous colitis had been made, it was unfortunate that broad spectrum antibiotics were still continued in the ICU.

The correct diagnosis of pseudomembranous colitis may well have been made by an appropriately taken history to include all medications, and confirm by the simple performance of rigid sigmoidoscopy demonstrating pseudomembranes at which time a stool specimen could have been sampled for subsequent laboratory confirmation of presence of the *clostridium difficile* toxin.



Carotid artery disease precipitating stroke when bleeding post-colectomy occurred

An elderly patient presented with carcinoma of the rectosigmoid junction. The patient was recorded as having occlusion of the right carotid artery and 50 per cent stenosis of his left carotid artery and was taking Clopidogrel and aspirin.



Laparoscopic anterior resection was performed and was uneventful, but early the next day he required flexible sigmoidoscopy and endoclipping of a bleeder on the staple line. This produced significant hypotension and required transfusion.

Postoperatively the patient was found to have had a stroke, and as they had an advanced plan indicating they did not desire aggressive treatment, was referred to palliative care and died 2 weeks later.

Comment

The question arises whether the patient's carotid artery disease should have been dealt with prior to major surgery for colorectal cancer. Although the operation was uneventful, the complication of bleeding in the early postoperative period led to hypotension and precipitation of a cerebrovascular accident.



Acute anaphylaxis due to intravenous IV Cephalothin

A middle-aged patient was admitted for elective aorto-bifemoral bypass graft. In the prep room an arterial line, epidural, and prophylactic antibiotics (IV Cephalothin) were given. The patient was wheeled in to the operating room, placed on the table and about to be induced when the

patient became suddenly hypotensive, flushed and the anaesthetist was unable to restore the blood pressure. Cardiac arrest ensued and the patient was defibrillated and resuscitated. He remained hypotensive and was transferred to the ICU without operation.

A diagnosis of acute anaphylaxis due to Cephalothin was made and he continued to be hypotensive in ICU. The patient's left leg became severely ischaemic but the patient was not considered fit enough to return to theatre until about 10 hours after his cardiac arrest. Thrombectomy via a femoral approach was performed and thrombus removed. In spite of poor inflow the patient was considered unfit for an aortic procedure or even for an axillo-femoral bypass. Subsequently a left above knee amputation for an infarcted left leg was performed followed by a revision and progressive infarction of both buttocks consequent to aortic thrombosis. Multi-organ failure developed and the patient died 10 days after the initial procedure.

Comment

The adverse event in this case was an anaphylactic reaction to intravenous Cephalothin and the management was appropriate and timely. The cascade of deteriorating events which followed was not able to be corrected or prevented.







“From the errors of others, a wise man corrects his own”

Publius Syrus 42 BC



ROYAL AUSTRALASIAN
COLLEGE OF SURGEONS



Queensland Government
Queensland Health

QASM

Queensland Audit of Surgical Mortality

Telephone: 07 3835 8671

Facsimile: 07 3236 9320

Email: qasm@surgeons.org

Address: 50 Water Street,
Spring Hill QLD 4000

Post: PO Box 79, Spring Hill QLD 4004

Web: www.surgeons.org/qasm

