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Western Australian Audit of Surgical Mortality (WAASM)  
Tasmanian Audit of Surgical Mortality (TASM)

**Case Note Reviews  
December 2009**

*Australian and New Zealand Audit of Surgical Mortality*

*Royal Australasian College of Surgeons*

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.

## LETTER TO THE EDITOR

Dear Sir

I applaud the work of WAASM in reviewing surgical mortality and bringing to our attention ways that we can improve our practice and patient outcomes.

On occasions however I feel that a very one sided and narrow approach to review of cases is present and I think there should be a forum for discussion and I do not think that the audit loop is closed unless a mechanism is put in place where the review of the WAASM has the opportunity for review itself and I think case note reviews that are posted out to participating surgeons should have a letters to the editor section to provide a forum for discussion.

I am hoping that you might include that in the next addition and that perhaps my letter may be the first that is published in this section.

I would like to review two of the cases presented in the August 2009 case note reviews.

### **Failure To Recognise An In Hospital Fall**

In this case a patient with what is recorded as a garden grade one fracture (impacted valgus angulated femoral neck fracture) was treated with internal fixation. The risk with internal fixation of these types of fractures is that displacement can subsequently occur. Displacement is documented as having occurred in x-rays day nine post fixation and having displaced the fracture has demonstrated itself to be unstable and failing. It would appear that an appropriate decision to continue to observe the fracture despite the fact that it had been displaced was taken actively but subsequently the next day increased pain occurred in relation to a fall in hospital.

From what is recorded in your précis it is highly likely that further displacement of the fracture resulted in mechanical failure of the hip resulting in the patient falling. The subsequent need for the patient to have revision surgery is almost certainly due to progressive mechanical failure of the fixation resulting in the fall rather than the fall resulting in mechanical failure of the fixation. I think it is therefore appropriate that the doctors recorded in their summary of events that the subsequent surgery was prompted by progressive mechanical failure of the fixation rather than the in hospital fall which is likely to have been a consequence of the progressive mechanical failure rather than the other way around.

### **Excessive Use Of Narcotics In The Elderly May Result In Mental Deterioration, Immobility And Death**

In this case an elderly patient underwent manipulation under anaesthetic for a stiff knee following total knee replacement, then developed late respiratory failure.

The summary concludes that "I believe that the final outcome may have been different if spinal/epidural anaesthetic, femoral nerve block and non narcotic analgesics were used instead". I think that is an extremely long bow to draw in terms of criticising of the anaesthetic and post operative analgesia. Manipulation under anaesthetic is a very short surgical procedure and if one were to look critically at potential risks and complications including the consequence of epidural anaesthetic then I am sure that the risk/benefits equation would come down as a much lesser patient risk for a patient to have a short general anaesthetic for this procedure rather than an epidural. It might be argued that an epidural could be continued post operatively for pain relief which can be of potential benefit to the patient but in terms of the risk for the anaesthetic itself the risk would be lesser for a general anaesthetic.

Epidural anaesthetics can be kept in for a short period for analgesia but with increasing time run the risk of increasing sepsis with epidural abscess which although small in number is severe in consequence if it does occur. There are variable recommendations in the literature, and variations in Anaesthetists practice regarding the placement of an epidural catheter.

In general most anaesthetists are not comfortable leaving the epidural in for more than a few days because of risk of sepsis. In this patient's case the patient developed significant respiratory problems about day eight post procedure and it would not be conceivable to maintain a epidural catheter or a femoral nerve block for that length of time following a procedure.

By your own admission in this summary the patient pre-operatively "complained profusely about pain in the knee". If one is hoping to achieve a benefit for improving range of motion after a manipulation it is necessary for a patient to have adequate analgesia to control their symptoms otherwise the patient will not be able to work through with range of motion of the knee and improve that. I believe it is armchair criticism to suggest that adequate analgesia in this patient could have been achieved with non

steroidal anti-inflammatory medications or something other than strong oral analgesia.

Obviously it is unfortunate when any patient dies around the time of their surgical procedure but we need to maintain a balanced view of risks and benefits. Just because an outcome is other than we desire does not mean that the path chosen was incorrect. Whilst it is conceivable that an alternate path may have had an alternate outcome we also need to consider potential consequences had the alternate path been taken.

If this patient had had an epidural which had been left in for a period of four or five days post operatively on the basis that that was the best way of achieving pain relief without giving narcotics and the patient had developed an epidural abscess, developed paraplegia as a consequence of that, had surgical procedure for drainage of the epidural abscess, developed respiratory problems, urinary infection and pressure sores as a consequence of the paraplegia and died subsequently then someone auditing the case could easily criticize that course of action and say it would have been a much safer alternative to provide reasonable doses of oral analgesia rather than run the risk of an epidural anaesthetic.

I think we need to maintain a balanced and fair appraisal of cases. I think we should “close the loop” of the audit process by allowing discussion of the outcome and conclusions of WAASM and I look forward to my letter being the first in the letters to editor section of your next report.

I have no personal involvement in the above cases and do not have any personal knowledge of them.

Yours sincerely  
Mr MICHAEL WREN F.R.A.C.S  
ORTHOPAEDIC SURGEON

### ***Comment***

WAASM welcomes all feedback and is pleased to publish this letter. Further contributions are welcome. WAASM is your audit!

WAASM does not change the second line assessments it returns to the surgeon. However they may be condensed and de-identified prior to publication in the Case Note Review Booklet. WAASM does not always agree with the opinion in the second line review, but recognises there can be alternative views and that an important part of WAASM’s educational role is to reflect those differences. This is in stark contrast to many

medico legal reports that are often very didactic and may fail to recognise the uncertainty that is inherent in clinical practice, especially when dealing with complex cases, or patients who have medical co-morbidities.

WAASM acknowledges the sentiments expressed in this letter. WAASM encourages both surgeons and second line assessors to recognise and document that there may be quite acceptable alternative explanations for patients deviating from the expected and desired pathway.

RJ Aitken

### **Delay In Recognising Intra-Thoracic Bleeding**

A middle aged patient with three vessel coronary artery disease and well preserved left ventricular function underwent elective coronary artery bypass grafting. Co-morbidities included diabetes and moderate obesity. There is nothing in the notes recording any particular intra-operative problems with the revascularisation procedure, which was done on cardiopulmonary bypass and with cardioplegic arrest.

Post-operatively care was routine except there was noted to be opacification of the left hemithorax in keeping with a haemothorax. There was a moderate amount of bleeding from the chest drains over the first 24 hours and the patient required significant vasopressor agents to maintain a satisfactory blood pressure. Over the next few days the patient's inotrope requirements were maintained or increased but the cardiovascular status deteriorated to that of cardiogenic shock. Recurrent blood transfusions were also required during that period.

Several days after surgery the patient became markedly hypertensive and unresponsive followed by cardiac arrest. Sub-xiphoid exploration was carried out as an emergency with the presumption that the patient had a cardiac tamponade although no pericardial fluid was found and there was no improvement in the patient's condition. Repeat chest x-ray showed increased opacification of the left hemithorax indicating a very large pleural effusion. The patient demised shortly thereafter.

#### ***Comment:***

This patient had an operative risk of less than 1%. There was opacification of the left hemithorax immediately post-operatively and this increased. This was associated with an increase in inotrope requirements and the need for multiple transfusions. It would seem likely that this represents undiagnosed ongoing bleeding in the left chest.

This was a significant contributing factor to the patient's deterioration, and a better outcome may have been achieved by early exploration.

### **Rapid Deterioration And Death Following Thoracoscopic Talc Pleurodesis For Malignant Pleural Effusion**

A very elderly patient was admitted with increasing shortness of breath and left-sided chest pain and finding of a large left lower lobe mass with extensive bilateral hilar, mediastinal,

subcarinal and retrocaval lymphadenopathy. Bilateral pleural effusions were seen with the larger being on the left. The past history included a cerebrovascular accident, and bowel carcinoma. The patient was admitted under a respiratory physician for left chest tube drainage. The patient was on warfarin and digoxin for atrial fibrillation and as the INR was raised, the drainage was delayed. Three days later the INR had fallen to an acceptable level however a catheter was not inserted until the sixth day post-admission.

More than a litre of serous fluid was drained and the patient improved symptomatically with some relief of shortness of breath. A fever developed. The drain was removed as there was minimal ongoing drainage. Shortness of breath recurred two weeks post-admission and a repeat CT showed further recurrence of the left pleural effusion.

At this point a biopsy was obtained and a further pleural drain was inserted with close to a litre obtained. A PICC line was inserted and 5-fluorocell was commenced with consequent nausea, tiredness and anorexia. Renal function was deteriorating and oxycontin and methadone prescribed. The patient was referred to the palliative care service three weeks post-admission and a few days later for cardiothoracic surgical opinion. Pleurodesis was felt to be a reasonable option but not without risk and a discussion planned with family. A pleurodesis via left thoracoscopic approach was undertaken about four weeks post-admission, pleural drainage biopsies and talc pleurodesis was performed. That night the patient developed low urine output, a low blood pressure, normal saturations of oxygen and a high respiratory rate. Fluid resuscitation was commenced with recovery of blood pressure but in the early hours of the morning the patient developed hypoxia. The surgeon was contacted and felt that intensive care was not appropriate and further intravenous frusemide was given. The patient was reviewed by the surgeon the following morning and supportive care only recommended. The patient passed away that evening.

#### ***Comment:***

The initial investigations in this very elderly patient revealed extensive malignancy and suggestions made that palliation only would have been appropriate.

The mode of administration of talc is immaterial, but there have been reports of toxicity and systemic response to talc particles, which may

have contributed to the death of this otherwise very ill patient.

### **Delay In Management Of Small Bowel Obstruction – I**

An elderly patient with COPD had previous abdominal surgery some years before this presentation. There were two large incisional hernias one above and the other below the umbilicus. The patient remained well and did not seek to have the hernias repaired.

The patient subsequently presented with a several day history consistent with a small bowel obstruction. Abdominal examination did not reveal any evidence of incarceration or strangulation of bowel within the incisional hernia. There were no groin hernias. Radiology revealed multiple fluid levels and a CT scan the following day reported obstruction of the small bowel with a transition point in the right iliac fossa unrelated to the incisional hernia.

The clinical notes clearly document that the patient was unwell with persistent vomiting after admission. Basal atelectasis developed and the abdomen became erythematous over the incisional hernia in the lower abdomen. A decision was made to operate nearly a week after admission.

Laparotomy revealed a high grade small bowel obstruction with a band adhesion and with free faeculent fluid associated with perforated small bowel. The incisional hernias were not repaired.

The patient was not extubated for several days after surgery and remained in the Intensive Care Unit for over a week. At that time imaging revealed resolution of the small bowel obstruction. However, there were multiple intra-abdominal collections and bilateral basal atelectasis with effusions. There was a subcutaneous multiloculated collection detected by ultrasound on the right side of the abdomen. It could not be effectively drained because of the loculations and the thick 'proteinaceous' nature of the 'fluid'.

The patient gradually deteriorated and a CT scan revealed that the collection to the right of the midline had diminished in size over a week and also a small subphrenic collection was noted. There was no evidence of obstruction or free fluid within the abdomen. A week later sepsis with poor renal output and widespread oedema developed. Investigations showed decrease in size of the subcutaneous collection, and no intra-

abdominal collection or abscess. However there was generalised oedema and the patient died of pneumonia some weeks after surgery.

### ***Comment:***

This patient, because of age and other co-morbidities, was at high risk of a poor outcome. It is a difficult decision whether to operate or not in such a high risk patient; however earlier operation may have been advantageous. Intra-abdominal sepsis was apparent and consideration of reoperation may have helped if anastomotic breakdown was a feature. This was not clear and may have not influenced the outcome.

### **Delay In Management Of Small Bowel Obstruction - II**

An elderly patient, presented to the Emergency Department about one and a half days prior to death. Co-morbidities included, Parkinsonian tremor, hepatitis C cirrhosis following blood transfusion, avascular necrosis of the right hip with a total hip replacement years ago, supraventricular tachycardia with AV node ablation several years ago, depression,  $\alpha$ -thalassaemia and Type II diabetes. Operations included cholecystectomy, hysterectomy and repair of a fractured right humerus.

The initial diagnosis was a sub-acute bowel obstruction. The patient was relatively well and not distressed but some hours later had become drowsy, from being previously alert, and generalised abdominal tenderness was noted with absent bowel sounds but no peritonism or guarding.

Investigations showed a mild microcytic anaemia with a normal lipase and white cell count which increased significantly above normal over 11 hours. Abdominal x-rays showed multiple air fluid levels with dilated loops of bowel although the description did not describe large or small bowel. A small bowel obstruction was diagnosed on review by the registrar some hours later. Assessment of the x-ray described a paucity of bowel gas with no definite air fluid levels and a CT scan was considered. Nasogastric intubation and intravenous fluids had been instigated.

A possible small incisional hernia was noted adjacent to the umbilicus. The nasogastric tube continued to drain bile stained fluid and dilated loops of small bowel were now described on the x-ray, and a CT scan performed some hours later on the day of admission. Cirrhosis was noted with splenomegaly and varices consistent with portal

hypertension. A mechanical small bowel obstruction with a closed loop was diagnosed. An hour later the patient was reviewed and a laparotomy was contemplated for the next day. Next morning a deteriorating mental state, hyperglycaemia and falling urine output was noted. Generalised abdominal tenderness was reported and a diagnosis of peritonitis was made and laparotomy recommended. However a conference between the family, the consultant and duty anaesthetist was held and the patient was noted to be moribund and palliative treatment was instituted.

**Comment:**

This patient represented a considerable challenge because of the co-morbidities. However for the best outcome laparotomy performed promptly when the CT scan diagnosed a closed loop obstruction, may have altered the outcome.

**Delay In Management Of Small Bowel Obstruction - III**

An elderly patient was admitted following a syncope episode, where the patient fell on a table and sustained facial and head lacerations. The patient also gave history of not feeling well for the previous couple of days and complaining of not being able to tolerate food, with nausea and vomiting. The patient was referred to a plastic surgeon for suturing of wounds.

Admission notes from the afternoon of the admission day mentioned there was a mass in the right groin. The nursing notes from the evening note that the blood pressure was still low and the patient was complaining of chest tightness. The patient deteriorated during evening with persistent hypotension, slow AF and low urine output.

The patient was referred to surgery the next day with incarcerated inguinal hernia. The patient was taken to theatre in the early afternoon. At that stage the patient had an acute abdomen was acidotic, in shock, renal failure and in AF. The patient was treated with IV fluids, antibiotics and inotrope support. At surgery more than 100 cm of small bowel was resected and a strangulated femoral hernia repaired.

Post-operatively the patient was managed in ICU but died.

**Comment:**

On admission the patient was dehydrated. The cause of the fall was not appreciated, and other pathology missed. Earlier operation may well have produced a better outcome.

**Delay In Management Of Small Bowel Obstruction – IV**

An elderly patient with past abdominal surgery presented with crampy abdominal pain and failure to open bowels for a number of days, but without vomiting or nausea. There was generalised abdominal tenderness and some distension. Plain x-rays suggested small bowel obstruction. The patient was managed conservatively with IV fluids, nasogastric suction and analgesia up until the day of demise several days later. There was occasional opening of the bowels during this time but the patient's general progress did not completely resolve.

Subsequently the patient's condition deteriorated with vomiting and abdominal distension, a high pulse and respiratory rate, possibly the features of endotoxic shock. The patient was resuscitated partly by the Anaesthetist and Intensive Care but surgery was declined because of the risks of death and the patient died within hours.

**Comment:**

More frequent review and more assiduous medical records may have prompted earlier decision to consider operation. However it is not always easy to decide whether a patient who has had previous surgery in the abdomen needs another surgical exploration.

**Delay In Diagnosis Of Septic Hip Prosthesis**

An elderly patient presented with a sub-capital fracture of the neck of the femur. This was treated appropriately by a hemi-arthroplasty, and was subsequently transferred to a Rehabilitation Hospital.

Progress at the Rehabilitation Hospital appears to be one of slow but steady deterioration in wellbeing. It became obvious the patient was septic. There was previous urinary tract infection. The source of the current sepsis was presumed to be the urinary tract and possibly in the abdomen so a CT scan of the abdomen was included in the assessment investigations. Subsequent pus around the hip wound was drained days later but the patient died of sepsis from an unknown source.

**Comment:**

Concern is expressed regarding the apparent lack of recognition of the importance of the presence of a "foreign body" that can act as a focus for infection, either primarily or subsequently secondary to bacteraemia and septicaemia. This failure to recognise the importance of this led to delay in diagnosis and appropriate surgical

treatment, which may have contributed to the patient's death.

### **Operation Should Have Been Cancelled When No HDU Bed Available**

This patient underwent a total knee replacement. There was a significant cardiac history that was assessed by a physician prior to surgery. The suggestion was that the surgery could proceed but that the post-operative care should be in an HDU.

At the time of surgery the HDU was full. The operation still took place and the patient was nursed on the ward. During the next few days the patient had problems with poor urinary output, hypotension and angina with ST depression. The patient was then transferred to another hospital where there was an HDU bed, but died a week later from cardiogenic shock secondary to an acute myocardial infarct thought to have occurred in the immediate post-operative period.

#### ***Comment:***

This was a high risk patient and a pre-operative assessment recommended that the immediate post-operative care be in an HDU. While it is quite possible a post-operative MI would have developed regardless of initial nursing location it would seem, given the pre-operative assessment, that it was unwise to proceed to surgery knowing there was no HDU bed available.

### **Communication Failure Results In Death From Post-Operative Bleeding**

A middle aged patient with Type II Diabetes, Chronic Obstructive Pulmonary Disease and morbid obesity presented to a regional emergency department with abdominal pain. The pain had been present for several hours prior to presentation and was associated with vomiting and diarrhoea.

Examination findings were of generalized tenderness but the patient was afebrile and observations unremarkable. A plain abdominal film showed some dilated small bowel, an FBC showed a high WCC but CRP of only 12. The patient was held in the emergency department from late evening to the early hours of the morning prior to being transferred to the ward.

Several hours later the patient was febrile, had a tachycardia and was tachypnoeic. Medical review occurred again and noted increased pain in the right iliac fossa but due to widespread wheeze, pneumonia was felt to be the most likely

diagnosis. A surgical review was however requested.

Surgical review took place a couple of hours later and a CT was ordered. Based on this a diagnosis of appendicitis was made and the patient prepared for surgery noting the underlying comorbidities. Antibiotics and salbutamol were commenced. All bloods were repeated the only change being an increase in the CRP and Arterial Blood Gases performed showing a pH of 7.34, pCO<sub>2</sub> 54, pO<sub>2</sub> 94 and a bicarbonate of 29.

Due to scheduling the patient was taken to theatre by a second consultant about four hours later who found a gangrenous appendix without perforation and minimal suppuration. The operation note simply states appendectomy. Intraoperatively an arterial line was inserted and all observations were within normal limits. The operation took approximately an hour and the patient was transferred to recovery, where observations were stable for a further few hours when the blood pressure dropped significantly. No medical documentation of fluid resuscitation is apparent but about an hour later a metaraminol infusion had been commenced with some effect.

The patient was transferred to the high dependency unit and again became hypotensive. Fluid resuscitation was initiated by a member of the emergency staff appearing to have consisted of 500 ml gelofusin stat and 1000 ml of Hartman's over one hour. The metaraminol infusion was increased with little effect and the patient died a couple of hours later.

At no stage was the anaesthetist, admitting surgeon or operating surgeon contacted regarding the post-operative hypotension and the reviewing doctor listed septic shock as the diagnosis.

A post-mortem revealed a large tear in the mesentery between the appendix and terminal ileum associated with well over a litre of blood. There was one stitch in this area. The patient also had significant coronary artery disease but there was no evidence of acute infarction and no evidence of septic shock.

#### ***Comment:***

The diagnosis of appendicitis can be extremely difficult in any group of patients but particularly the obese, where even obvious peritoneal signs can be difficult to detect. Admitting this patient overnight with continual reassessment can hardly be criticised. Even if a surgical review was arranged earlier it would have been inadvisable to take such a patient to theatre in the middle of the night. The approach of fluid resuscitation,

antibiotics and appropriate investigations with an operation by a consultant surgeon and anaesthetist in daylight hours was entirely appropriate.

The operative note simply states "appendicectomy" with no indication of difficulty or bleeding the presumption being it was uneventful, but in view of the post-mortem finding and the stitch in the area there may have been some interoperative difficulties. This is impossible to determine from the documentation provided.

However the post-operative treatment and documentation is poor and reasons for treatment administered not clear. The operating surgeon should have been contacted and the diagnosis of sepsis may have been challenged and the course of events altered. Septic shock from a gangrenous non-perforated appendix is a difficult pathophysiological diagnosis to sustain. No thought into the possibility of haemorrhage seems to have been entertained and the fluid resuscitation was inadequate for the management of either condition.

Why the surgeon involved was not called about his patient who had deteriorated, and subsequently died, is a complete system and communication failure. Whether the outcome would have altered is uncertain.

HDU policies must highlight the importance of communication with the admitting doctor in the management of their patients.

### **Delay To Surgery Resulted In Colonic Perforation And Death**

An elderly patient underwent a colonoscopy for a presumed colo-vesical fistula, but the scope could not transverse a 'tight rectosigmoid junction'. A couple of days later a gastrograffin enema revealed a complete obstruction at the upper sigmoid colon through which no gastrograffin passed. The patient was discharged with an elective operation being booked for more than two weeks later. Prior to this date the patient presented with an acute abdomen and at laparotomy (undertaken by another surgeon) the transverse colon was found to have perforated secondary to an obstructing sigmoid cancer. A sub-total colectomy and end ileostomy was undertaken. Over the next week the patient improved in ICU, but then developed a pleural effusion that was resistant to catheter drainage. The first three tubes did not drain the effusion adequately and during insertion of the fourth

catheter the patient had a cardiac arrest and could not be resuscitated.

### **Comment:**

This patient had a complete obstruction to gastrograffin which will normally get through a pin hole. It seems difficult to defend a delay of nearly three weeks to elective surgery. This resulted in the patient having an emergency operation for a perforated colon (CR-POSSUM predicted mortality >61%) *versus* an elective operation (CR-POSSUM predicted mortality 9%).

The patient should have had an urgent operation during the initial admission.

### **Aspiration After A Gastro-Jejunosotmy Fails To Drain**

A middle-aged patient was admitted with gastric outlet obstruction. Several years earlier the patient had undergone a right hemicolectomy for a colon cancer and the resection included a right nephrectomy and small bowel resection. The patient was given adjuvant chemotherapy. The patient now presented with a mesenteric mass involving the duodenum and SMA. After appropriate assessment the patient was offered gastro-jejunostomy to bypass the obstruction. An anterior gastro-jejunostomy was undertaken by a mid-grade trainee. The operation was uneventful.

However, the gastro-jejunostomy did not work. There were persistent high NGT aspirates. Despite considerable efforts by the radiologists two gastrograffin swallows failed to show contrast passing through the gastro-jejunostomy. An upper GI scope revealed the gastro-jejunostomy was widely patent. The patient thus appeared to have a functional rather than a mechanical problem with the gastro-jejunostomy. A NJ tube was placed for feeding.

One evening during the third week after surgery the patient vomited approximately a litre and this was followed by other smaller vomits. Some hours later the patient was found collapsed in the toilet having vomited more faeculant, coffee ground vomitus. CPR failed to revive the patient.

The consultant completing the proforma suggested death was secondary to either an arrhythmia or fatal pulmonary embolus. In the absence of a post-mortem the exact cause of death is speculative, but aspiration would seem a more probable cause of death. I note the patient had heparin given daily. I am not able to find any record regarding the use of TEDs.



**Comment:**

The “root” cause of this patient’s death was the failure of the gastro-jeunostomy to drain. In earlier times when gastric surgery was still the major part of the general surgical workload it was taught that if at all possible a retro colic posterior gastro-jeunostomy should be used and that this should be placed as low in the antrum as possible.

This was because anterior gastro-jejunostomies frequently do not drain and an anterior gastro-jeunostomy cannot be placed low in the antrum.

I do not know if this was based on science or experience, but in Rodney Maingot’s book (in an older edition written by him) he states a preference for a posterior gastro-jeunostomy and specifically emphasises low placement of the gastro-jeunostomy in the antrum. Clearly this is an observation by a doyen of abdominal surgery. Obviously a posterior gastro-jeunostomy can be technically more difficult. Whether the position of the gastro-jeunostomy was a factor in this case or not is impossible to say and it might be worth this being passed on to the trainee who, like most current trainees, will have limited upper GI surgery experience. A second possible reason for the slow drainage could be a so called “Ogilvie’s syndrome” secondary to malignant infiltration of the small bowel mesentery.

**Failure To Give DVT Prophylaxis Leads To Death From Pulmonary Embolus**

This patient was admitted with gangrene and had their first operation (endovascular revascularisation) nearly a week later and an amputation about a week later. The patient had a further endovascular revascularisation about three weeks after admission and died of a pulmonary embolus (PE) the next day.

**Comment:**

The trainee filling in the proforma states “PE despite best medical therapy”. The pink anti-coagulation charts show the Heparin 5000 IU subcut bd appears to have been started about one week post-operatively. It thus appears there was no DVT prophylaxis for the first eight days of the admission and this covers the period of the first two operations. The patient then died of a PE. This has to be considered a preventable death.

**Obstructing Rectal Carcinoma In An Elderly Patient**

An elderly patient was found on a sigmoidoscopy to have a rectal carcinoma about 5 to 6 cm from the anal verge. A CT scan showed no distant

spread. The Stomal Therapist noted the patient was reluctant to talk about a stoma formation pre-operatively and refused siting. A low anterior resection was performed.

The patient was returned to the ward and it appears that the bowel function did return but a couple of days after surgery it was noted that the patient was confused and disorientated. Several days later it was noted that the patient’s urine output fell. Approximately one week after surgery it was thought by the covering surgeon, that the patient may have peritonitis. Later that day the patient’s general condition declined further and discussions were made with both the family and other medical practitioners but the patient died.

**Comment:**

It is not entirely clear what the patient did die from. Looking carefully through the records there are no hard signs that the patient had an anastomotic leak. The drain sites were reported to be clear and the patient did pass faeces on a number of occasions right up and to and on the day of demise. However, the abdomen was a bit tender and so it is possible that an anastomotic leak did occur.

Performing a colonic resection on distended bowel with a primary anastomosis is fraught with much danger. I think it might have been wise for the surgical team to strongly advise a stoma. There is some evidence the patient did not want a stoma. If this were the case it should have been clearly written in the notes that a stoma was refused.

Intensive Care or HDU was not used in this patient.

**Comment:**

1. An anastomotic leak may have occurred, but there is no hard evidence.
2. I think the choice of operation was incorrect. Better options would have been a Hartmann’s Procedure, or a resection with primary anastomosis after on-table washout and covering stoma.

**Poor Case Selection And Technical Problems Placing A Vascular Stent - I**

An elderly patient was admitted to hospital, scheduled for an elective endoluminal repair of an infrarenal abdominal aortic aneurysm.

The relevant surgical history:

- Renal transplant (to the left iliac fossa) 16 years ago
- Cholecystectomy 13 year ago
- Distal brachial artery aneurysm repair two years ago
- Bilateral blepharoplasty two years ago
- Removal of BCC one year ago

The medical history included:

- Hypertension
- Vasculitis
- Gastro-oesophageal reflux
- Gout
- Secondary pulmonary hypertension
- Cardiomegaly
- ESRF with calcified aorto-iliac vessels

The patient was taken to theatre the day after admission for a routine elective endoluminal repair of the infrarenal abdominal aortic aneurysm using a Zenith Flex graft.

However, during the post-operative period, the patient became hypotensive and developed a distended abdomen. The most likely differential diagnosis was a rupture of the infrarenal aortic neck or a rupture +/- dissection of the iliac vessels.

A CT angiogram was urgently done and demonstrated a large retro-peritoneal haematoma and could not really identify clearly where the bleeding was coming from.

The patient was returned to the Cath Lab but became unstable and required a great amount of fluid resuscitation and blood to maintain adequate blood pressure but despite resuscitative measures did not respond and died.

**Comment:**

The CT scan did not seem to be helpful in the diagnosis of the cause of the retroperitoneal bleed. I strongly believe that a delayed phase CT scan will have been more helpful.

This complication could have been prevented with careful ballooning of the iliac vessels or probably not ballooning it at all (taking into consideration the vessels calcification). The introducer sheath of the device may have been into the calcium inside the vessel, creating a small perforation of the vessel.

An exploratory laparotomy would have been helpful in diagnosis but detrimental for the

patient. The decision not to operate on this patient was adequate and appropriate.

The patient was adequately managed post-operatively in ICU and the surgeon had communicated well with the family about the patient's condition and probable outcome.

**Poor Case Selection And Technical Problems Placing A Vascular Stent - II**

The elderly patient was admitted for a transluminal angioplasty of the left common femoral artery, left superficial femoral artery and popliteal artery.

The patient had multiple comorbidities including inoperable squamous cell carcinoma of the oesophagus (not considered suitable for radiotherapy), respiratory failure (and was poorly compliant on home oxygen) and was cachectic with renal function described as marginal.

In the afternoon on the day of admission the angioplasty was carried out using an antegrade puncture on the left side. The patient was returned to the recovery area later in the day with the sheath used to perform the angioplasty still in place.

It seems that the sheath remained in situ for approximately an hour.

When the sheath was withdrawn the patient complained of significant groin pain and within half an hour of removal the blood pressure significantly dropped. A Femstop device was applied to the groin with initially some effect but the patient remained shocked. Several hours later, in spite of the infusion of a unit of Gelofusine there was a further major fall in blood pressure and at this point the emergency medical team was called. An hour later the patient was returned to the catheter lab and an interventional radiologist inserted a covered stent through a right common femoral puncture. This appeared to successfully control the bleeding from the left external iliac artery.

The patient was admitted to the intensive care unit that evening, but was drowsy and oliguric in renal and respiratory failure. The patient had an ischaemic left leg with total occlusion of the common femoral artery, and died two days after admission.

**Comment:**

*Areas for Consideration*

I preface my remarks with the obvious statement that it is easy to be wise after the event. However

I would question interventions such as this in an elderly patient who had not only inoperable squamous cell carcinoma of the oesophagus but is not even considered for radiotherapy. In addition to the terminal malignancy the kidneys were described as marginally functional although was not yet on dialysis. The patient was in respiratory failure and required home oxygen but was apparently poorly compliant.

The procedure was performed because of a painful leg. I wonder if adequate narcotics and adequate sedation might not have been a better management for this patient's problems.

#### *Areas of Concern*

As stated in the report provided to me, the retroperitoneal bleed from a high puncture when the distal part of the external iliac artery rather than the common femoral is punctured is a known complication and is particularly likely to occur in thin patients. Many operators will now use a closure device such as an Angio-Seal or a StarClose to seal the arterial puncture and this will certainly minimize the problem but will not totally eliminate it.

The practice at the hospital concerned appears to be to send patients back to the Recovery room with a sheath present and at some time after the procedure the sheath is withdrawn. I would imagine that the APPT is measured and when it gets to an appropriate level it is then withdrawn. The withdrawal of the sheath and digital pressure on the puncture site appears to be the responsibility of the nursing staff in this institution. In many institutions the operator withdraws the sheath and puts pressure on the puncture site at that time.

After removal of the sheath the patient complained of severe groin pain. This was followed fairly rapidly with a catastrophic fall in systolic blood pressure. The cause was correctly recognised and at this point in time a Femstop was ordered and applied to the groin. In my view the Femstop is not the ideal treatment here as I do not believe that you can get good pressure on the external iliac artery with a Femstop. A Femstop is satisfactory for a pressurable inguinal ligament but with a puncture which has gone through the tissue of the inguinal ligament in a thin patient I think that it is difficult to get adequate control and indeed control was not achieved in this case. Also a significant amount of time seems to have been spent trying to obtain platelets for transfusion. I personally do not believe this is a solution for a bleeding arterial puncture and I would consider that some form of intervention needed to be undertaken fairly urgently.

I think in this case that the warning signs were probably apparent after the sheath was withdrawn when the patient was continuing to bleed. At that time a definitive intervention was going to be required if the situation was not going to deteriorate.

At this time, according to the notes, a ward doctor was called and commenced 500 ml of Gelofusine. In my view at this point in time the patient required resuscitation with oxygen, measurement of urine output, etc, while arrangements were made to deal with the ongoing bleeding. In my view this would have been an appropriate time to call the Medical Emergency Team which was not however called until some 90 minutes or so later. As far as I can ascertain from the notes, prior to the Medical Emergency Team being called the patient received two units of Gelofusine and adequate fluid resuscitation was not commenced until the Medical Emergency Team arrived.

In relation to dealing with the puncture wound in the external iliac artery, there are two acceptable ways of managing this if bleeding is continuing. The first is a covered stent and the second is a direct surgical approach with suturing of the puncture.

I believe that the selection of the covered stent is perfectly appropriate provided that the operator has sufficient skills and experience to perform the procedure fairly expeditiously. This was the method selected in this particular case and appears to have been successful in stopping the bleeding.

The alternative method is to simply make a small groin incision, divide the inguinal ligament and suture the puncture site directly. This is usually fairly straightforward. The principal problems in this case appear to have been:

1. A lack of adequate IV fluid resuscitation once the problem was recognised;
2. A significant delay of over two hours in taking any definitive measures to deal with the problem during which time the patient developed multi-organ failure.

#### *Recommended Changes in Practice*

1. Active involvement of the operator in removing the arterial sheath.
2. A willingness to ask for help and institute early and active resuscitation measures.
3. While resuscitation is being established make arrangements to return to the Catheter Lab or operating theatre for definitive treatment.