PRIVATE and CONFIDENTIAL

Western Australian Audit of Surgical Mortality

Tasmanian Audit of Surgical Mortality

# WAASM
# TASM


# Case Note Reviews

## April 2007

Australasian and New Zealand Audit of Surgical Mortality

Royal Australasian College of Surgeons

# CASE NOTE REVIEWS

The WAASM and TASM audit deaths that occur whilst under the care of a surgeon using the same methods and protocols. All completed surgical proformas returned to WAASM or TASM, are reviewed by a first-line assessor. Where there is an educational point to be highlighted or there appears to be factors that warrant further investigation, a second-line assessment is undertaken. A consultant from a relevant specialty in a different hospital prepares this review. Second-line assessments are based on information provided by the surgeon who completed the surgical proforma, and from the case notes. These reports undergo minor editing if necessary, and are anonymised.

A selection of the case note reviews from WAASM and TASM, some of which have been edited further to decrease their size, are combined here into a booklet and sent to all surgeons for educational feedback.

Correspondence regarding individual cases presented here is not possible, however WAASM and TASM welcome any comments.

## DIAGNOSIS / DELAYS

### Delayed diagnosis of small bowel obstruction contributed to death

SUMMARY

An elderly debilitated female patient was transferred to a rehabilitation unit following repair of a fractured neck of femur. She was cognitively impaired. Her oral intake was less than a litre for each day. Nine days prior to death she developed renal impairment with an associated high K+. She also vomited on this day. Urine output was not monitored. Seven days prior to death her renal failure progressed and she was noted to be unwell. Her bowels were not working, and there were signs of inflammation with a white cell count of 16,000 and a platelet count of over one million.

Six days prior to death she was diagnosed with a small bowel obstruction and treated conservatively with IV fluids and a nasogastric tube. The diagnosis was confirmed on CT scan. However, little attention was paid to the abnormal WCC. No consideration was given to a diagnosis of ischaemic bowel. Three days prior to death, the patient appeared to partially respond to treatment. Her bowels were still not open and the weekend approached. Over the weekend there was little documentation and I am concerned that the patient was never adequately reviewed during this 48 hour period.

One day prior to death she was admitted moribund to a teaching hospital. There was some delay in getting the patient to theatre. However, I believe that by this time it was just too late.

COMMENT

There was inadequate management, planning and review of the patient in the rehabilitation unit following a diagnosis of small bowel obstruction. Slow diagnosis and treatment of renal failure. The obstruction/ileus never appeared to completely resolve and the patient was just left too long before undergoing surgery.

It remains unclear whether she died as a result of an adhesive small bowel obstruction, or ischaemic small bowel secondary to other co-morbidities (e.g. renal failure). Clearly she was a high risk patient, but the delays in diagnosis probably contributed to her death.

### Delay in initial surgery and in recognising post-operative bleeding

BACKGROUND

This patient had an atypical anaplastic meningioma with a recurrence in 2004 which was treated by neurosurgery and radiotherapy. Subsequent to this he developed an infected bone flap which was treated in September 2005 with Vancomycin and anti epileptogenic medication.

The hospital notes provided start on Day 1. The first entry is by a physiotherapist who notes him to be awake and co-operative, although he had weakness on the left side and he required help with sitting and standing. On Day 2 he was seen by a surgical SHR. The time was not noted, however he was complaining of left-sided chest pain at the time. There was no mention of any clinical examination in the notes. However, blood investigations and a chest x-ray were ordered, and he was scheduled to have CT pulmonary angiogram the following day (Day 3). The next entry was by the surgical SHR at 0530 on Day 3. The blood results were recorded, but no other information. At 1520 on Day 3 he was noted to be complaining of abdominal pain and a CT scan was done. At the time the physiotherapist noted he was too unwell for any physiotherapy. No note was made of the CT scan findings and there is certainly a paucity of clinical notes at this time.

The next entry was at 0100 on Day 4. He was noted to have abdominal pain and tachycardia. The CT pulmonary angiogram was reported to be negative. There is also a mention of a urology consult, which was not available. However, it appears that this was not legible any way. The patient had also been told he had lung metastases. However there was apparently no documented evidence of this in the notes. Again, no clinical examination appears to have been done. The CT scan results were then discussed with the general surgical registrar and it was noted there was free gas in the peritoneum, possibly related to a perforated viscous. All of this occurred ten hours after the CT scan was done.

The patient was taken for an emergency operation. A

perforated ulcer of the fundus of the stomach was found together with what looked like a malignant lesion of the adjacent serosa. The lesion was biopsied and the ulcer was repaired with interrupted sutures and patched with omentum. A drain was also placed. This treatment was appropriate under the circumstances. The next entry in the notes was at 0645 on Day 4 when the patient was noted to be shocked. A recommendation was made for 500ml of normal saline and consideration was given to starting inotropes. At 0730 an anaesthetist was called and the patient was found to be hypotensive and oliguric. It seems as though he had only received 500ml of normal saline since leaving theatre, which is grossly inadequate considering his hypotension. The anaesthetist's assessment was that he was shocked and possibly septic. Aggressive resuscitation was instituted together with inotropes. At 0945, some improvement was noted, however his haemoglobin had dropped from 99 to 63 and there was some question of bleeding. Although blood appears to have been cross- matched, no mention was made that the patient ever received a blood transfusion.

A decision was then made that the patient should not have further surgery. I cannot be sure if this was the right decision under the circumstances. However if he were bleeding and there were any chance of some quality of life in the short to medium term then an aggressive approach was probably warranted. A decision was also made not to administer further inotropes, but despite this the patient was continued on noradrenalin at 20ml/hour. At 2320 Day 4 it was noted the noradrenalin had been increased to 28ml/hour and despite this his blood pressure was only 65/50. He was also on a Ketamine infusion and intermittent Morphine at the time. The patient died shortly thereafter this entry in the notes.

In essence, this man had a perforated bleeding lesion of the stomach, which on histology was confirmed to be meningioma metastases.

AREAS OF CONCERN RELATING TO MANAGEMENT OF THIS PATIENT ARE

- The paucity of clinical notes, particularly no mention of any clinical examination.
- The significant delay between the CT scan and the discussion of the findings with the surgical registrar.
- Grossly inadequate resuscitation and fluid management following the surgery and the apparent lack of blood transfusions despite significant anaemia.

AREAS FOR CONSIDERATION ARE

- In a patient who is likely to be bleeding from his perforated ulcer, who is shocked, a further laparotomy may have been indicated if there was some chance of quality of life in the short to medium term.

## Misleading Diagnostics for Appendicitis in Aged Patients

SUMMARY

A ninety-four year old underweight (55 kilograms) demented female patient was admitted because of sudden onset of lower abdominal pain. The patient was admitted and received IV fluids and antibiotics for possible cholecystitis. The abdomen X-ray showed dilated small bowel with no free air under diaphragm. An abdominal ultrasound as well as CT of abdomen and pelvis (without contrast) showed no sign of cholecystitis, but small bowel distension. There were no signs of appendicitis or free gas intra abdominal.

On the day following admission patient's condition seemed to improve with no sign of temperature. On day three, her temperature rose and abdominal pain increased and she vomited. On the ward round at noon of day three a request for an abdominal CT of was adjourned to the following day. It then appears the patient deteriorated so the scan was done at 3 o'clock. This showed a thickened appendix with inflammatory change of adjacent fat and small focus of free air and besides this, a small amount of fluid in pelvis.

The covering Surgeon decided to take the patient to theatre. For unknown reasons it was four hours before the operation started. The pre-operative haemoglobin was 92 g/l. There was no blood cross-matched and no packed blood cell units prepared for transfusion.

The operation was started with a diagnostic laparoscopy and converted to an open (limited) right hemicolectomy. The surgeon described a perforation in caecum with appendicitis and generalised peritonitis. After resection of caecum, an anastomosis of the small to large bowel with stapler was done. Abdominal lavage was performed. A Blake drain was inserted. Operation time was three hours. The histology of the specimen showed a perforation at the base of the appendix with acute appendicitis. No signs of malignancy.

The initial post-operative course was uneventful. The post-operative haemoglobin was 83 g/l. The patient's respiration was normal. The abdominal drain showed no significant haemorrhage, antibiotics and I.V. fluids were administered.

On the morning of day four, patient suffered a cardiac arrest. Immediately initiated CPR was unsuccessful. A post-mortem was not performed.

In my opinion it would have been beneficial to have blood cross matched for surgery, knowing the initial haemoglobin of 92 grams per litre. The perforation of the appendix presumably occurred on morning of day three as increase of temperature and of clinical symptoms demonstrated. After receiving the information from the radiologist about the result of the CT it took another four hours to take the patient to theatre. This time frame is not optimal but meets reality. The pre-operative result of haemoglobin (92 grams per litre) should have led to a cross-match of enough units in preparation for surgery.

With the information of a perforated appendix with free air intra-abdominal an immediate laparotomy would have saved some operation time. A diagnostic laparoscopy is not necessary and will not be the safest procedure for treatment of perforated appendix. The limited hemicolectomy seems to be appropriate considering the pathology. The post-operative haemoglobin of 84 g/l underlines the necessity of blood transfusion as the aged heart and cerebrum will not tolerate the anaemia. Whether this facilitated the cardiac arrest remains unknown.

COMMENT

I do not think there has been any major surgical concern in the management of the patient pre-operatively. Unfortunately, misleading results of the initial diagnostic procedures led to a delay in final treatment. This is quite often endured due to lack of symptoms in elderly and demented patients. The moderate delay between final confirmation of the perforated appendicitis and surgical treatment might be due to organisational circumstances. In high-risk cases the safest established surgical procedure should be chosen to shorten the time in theatre. Therefore, the decision for laparoscopy could be discussed.

As the patient was under the surgeon's care the decision not to transfuse blood comes back to him although the Anaesthetist or Intensivist on ICU should have realised the post-operative anaemia.

If a high aged underweight patient undergoes a major surgical procedure she is in a fragile cardiac and cerebral position, which responds rapidly to a lack of oxygen. Whether the transfusion would have changed the fate of the patient is unclear as no post-mortem was done.

## Delay in surgery for an incarcerated femoral hernia

SUMMARY

Day 1: 1432 hours: A 91 year old female presented via A&E with a two day history of nausea and vomiting. She was noted to have a distended abdomen and a tender lump in the right groin. Investigations on admission included abdominal X-ray, US groin and CT abdomen as well as routine U&E and FBP. A diagnosis of incarcerated femoral hernia was made and the patient was referred to the surgical team and was reviewed by the surgical registrar who notified the consultant and surgery was planned for the next day.

Day 1: 2300 hours: The patient was transferred to the surgical ward.

Day 2: Condition deteriorated with patient requiring treatment for AF.

Day 2: 2030 hours: Taken to OT and underwent a modified McEvedy repair of her femoral hernia combined with a small bowel resection. The rest of the small bowel was noted to have areas of patchy ischaemia.

Day 3: Ongoing deterioration with decreased urine output, intermittent AF, increasing abdominal distension and worsening respiratory function. The patient was reviewed by medical, anaesthetic and surgical teams. A laparotomy was contemplated but the patient was not considered fit for further surgery. The family was consulted and requested no CPR or ICU/ventilatory treatment.

Day3: 2400 hours: Patient deceased.

COMMENT

Delay of the patient's operative treatment is the principle area of concern in this case.

While this patient probably had infarcted small bowel on presentation her general condition deteriorated in the time between presentation and operation (~30 hrs). One would expect that a patient arriving in the early afternoon with an obvious incarcerated femoral hernia would be operated on that evening.

Part of the delay appears to be due to a long stay in A&E having unnecessary investigations including a CT of the abdomen and an US of the groin. The principal delay does however appear to be a decision by the consultant to operate the next day. The time of this decision and the reasons are not documented.

While this lady was elderly and at risk due to her presenting with a two day old incarcerated femoral hernia there would have been a greater chance of survival if she had undergone operation on the day of admission.

## Would earlier transfer have helped?

An underweight (50kg) 74 year old man with considerable pulmonary disease (COAD and infection +/- aspiration) who after major liver surgery for cancer (3 years ago) possibly developed an insidious sub acute adhesive small bowel obstruction (chronic intestinal motility problem) that rapidly developed into complete obstruction.

He was admitted to a rural hospital on Friday and managed conservatively over the weekend. He was transferred to a major hospital on Monday where later that night he had a 170 minute operation (gross adhesions) to relieve small bowel adhesive obstruction.

He initially spent four days in ICU and was then sent back to the ward. He was transferred back to ICU 14 days later in marked respiratory distress and poor GIT function. His condition deteriorated over 17 days and died of respiratory failure.

I found all his progress notes to be good and appropriate. He was seen by all the required sub specialists who gave relevant advice. His death was I think inevitable once he developed pneumonia, which was very likely considering his severe ongoing respiratory infective problems.

Perhaps this relentless course was caused by pulmonary secondaries and a post mortem may have helped here.

My only concern was the possible lack of attention given to his preoperative ABG analysis which showed a pH 7.19 and BE-9. Perhaps he should have been more

aggressively resuscitated before OT.

It does not appear that the operative procedure could have been shortened because of the severe adhesions but a considerable amount of time was spent on completing a difficult situation when a damage control procedure possibly could have been contemplated. The letters in the file indicate close contact between the Country GP and the major hospital in dealing with a chronically ill man in the previous six months.

Inadequacies that I found in Surgical case form.

Q6 Hospital transfer distance and name missing.

Q7 No guidance to support inexperience of staff or failure to do correct test.

Q10 Not completed.

Q12 Date and time not complete.

Q16 Should be yes – nosocomial chest infection.

Q17 Preoperative management perhaps more resuscitation before theatre.

Q19 Possible place for post mortem ?Pulmonary metastasis.

Q21 No evidence to suggest delay from Rural Hospital only lack of aggressive preoperative resuscitation apparent i.e. IV drip commenced 3 hours after arriving in A & E and 8 hour delay before surgical team evaluated patient.

If the surgeon responsible feels that the rural hospital should better evaluate and manage an obstructed abdomen then I would suggest that the surgeon amicably conducts a CME session in that hospital.

## Denial of Urgent Surgery because of Unproven "Metastatic Cancer"

### Summary

A man in his late sixties presented with a bowel obstruction four years after resection of a gastric cancer. He had been in reasonably good health and up until the bowel obstruction had been physically and socially active.

A laparotomy was performed the day after admission to a regional hospital. The brief operation note recorded the excision of a 75 cm segment of small bowel and division of adhesions. There was no mention of any other significant finding at the laparotomy, either positive or negative. Although the final pathology report had the phrase '?carcinamotosis' in the clinical notes, later clinical notes commented that the surgeon thought that the adhesions might have been due to 'inflammatory masses'.

After progressing well in the first few days after surgery, he reached the stage of being placed onto a normal diet and was mobile around the ward, the patient then became vaguely unwell with increasing pain and abdominal distension. Abdominal x-rays were reported as revealing "non-specific" fluid levels possibly due to a distal small bowel obstruction. He was reviewed by the attending surgeon and had abdominal girth measurements performed every two hours as well as a 'soap and water' enema. He failed to improve and was transferred by the RFDS to a teaching hospital.

He only stayed in the teaching hospital for one day before being sent back to the regional hospital, once again by RFDS. The histology report was released on the day of the initial transfer and commented on "fibrotic scar tissue diffusely infiltrated by adenocarcinoma, that is moderate to well differentiated" that was "consistent with gastric cancer". A chest X-ray revealed some nodules in lung as well as basal atelectasis. After a discussion with the family the patient was transferred back to the regional hospital for palliative care.

The patient died ten days later. Within a few days of returning to the regional hospital his wound drained faecal fluid, which sometimes exceeded two litres per day. Despite this he remained comfortable and received strong support from his family.

### Comment

It is unacceptable for a sick patient to be transferred with such undue haste between a regional hospital and a teaching hospital. It is not good for the patient and it is expensive. Since the possibility of "carcinomatosis" was raised on the pathology request form, and the report was released on the day of transfer, it would have been possible to check the pathology report before the patient was transferred. Not to have done so is inept.

More important than this is the labeling of the patient as having metastatic cancer. There are many reasons for a migrant having nodules in the lungs and the surgical staff at the teaching hospital should at least have performed a CT scan of the chest and the abdomen. It is surprising that a patient could be labeled as having widespread cancer so soon after a laparotomy that failed to document any evidence of recurrent cancer other than found by the pathologist within the resected specimen. It must also be appreciated that the patient had been in good health for four years after the initial surgery and that he died because of a leaking anastomosis.

The poor prognosis that generally attends the diagnosis of gastric cancer does not over-ride the need to carefully document the extent of the malignant process before withdrawing active treatment for what was potentially a reversible situation.

## Death From Sepsis Due To Obstructed Infected Kidney

SUMMARY

This patient of 81 years of age presented with abdominal pain and sepsis. There was a past history of metastatic breast cancer, diabetes and airways disease. The patient presented to a tertiary hospital emergency department at approximately midday. At this stage the patient had been unwell for a number of days. Over the course of the next six hours investigations were undertaken and a review was carried out, initially by the general surgical registrar and then the urology registrar. The investigations included a CT scan of the abdomen, which revealed an obstructed right kidney although no cause was identified.

After discussion between the urology registrar, the family and the on-call consultant urologist, a decision was made to attempt to drain the right kidney under local anaesthetic by insertion of a stent.

In fact, in the end the patient arrived in the operating theatre at 0120 hours and a spinal anaesthetic was undertaken. A right sided JJ stent was placed without difficulty. Of note at the outset of anaesthesia the patient was hypotensive and tachycardic. The patient deteriorated rapidly and despite the infusion of Dopamine died in the recovery area at 0530 hours.

COMMENT

Sepsis due to an obstructed infected kidney is a life-threatening condition. It frequently presents in elderly patients and there is often a delay in diagnosis as occurred in this patient who presented approximately five days after the onset of illness.

The major point of concern is that the patient was an elderly frail unstable patient who was taken to the operating theatre eventually at 0120 in the morning.

The confidential inquiry into peri-operative deaths in the UK has for many years concluded that, operating on septic unstable patients late at night results in poorer outcomes than pre-operative resuscitation including elective pre-operative transfer to Intensive Care for maximisation of fluid, resuscitation, antibiotics and if necessary, the use of inotropes in septic patients and then delaying surgery by a number of hours until the patient is stable and can be operated on during normal hours.

It has been policy in my own department for a number of years now not to take obstructed infected patients who are unwell to theatre for decompression immediately although this is, in most departments, standard management. Rather, our patients are admitted to the Intensive Care Unit when necessary for full resuscitation and the taken to theatre some hours later when they are more stable and we believe this leads to less poor outcomes as illustrated in this case.

Having said all of that, the patient was very elderly with a multitude of severe medical problems and it is likely that this patient would have succumbed from the sepsis regardless of the intervention taken.

## Delay in recognizing a deteriorating situation.

SUMMARY

The patient was admitted with the history of progressing headache found due to an intracranial haemorrhage from a site unknown. The subdural components were managed by drainage with a satisfactory outcome. Later, the patient's conscious state deteriorated, which was not appreciated until very late, when it became obvious there had been a re-bleed, for which further surgery was conducted. That patient did not recover from the second operation.

COMMENT

There was a delay between the notification of the patient's deterioration and the treatment (the second operation) during which time the re-bleeding caused significant rise in the intracranial haemorrhage and cerebral oedema. The conduct of the second operation (as with the first) was satisfactory, but there was no brain recovery.

If the deterioration had been communicated earlier, surgery and the outcome may have been different - but whether the quality of life would have been satisfactory is in doubt.

I note that an RCA had been conducted to ensure that the change in observations (deterioration of the level of consciousness) will be better reported (earlier), to enable better outcomes.

In this case, the site of the primary haemorrhage was not able to be found, and it is very likely that re-bleeding (and a fatal outcome) would have occurred, whatever the outcome from the surgical intervention, which was essentially to relieve pressure. In other words, the underlying condition was likely to lead to death.

That as appropriate RCA was conducted was satisfactory, and that communicated within the system.

## Mesenteric Ischaemia

SUMMARY

A 79 year old lady with a past history of COAD, hypertension, and a Hartmann's resection for diverticulitis subsequently reversed, was admitted with a one week history of vague abdominal pains, nausea, vomiting and bloody diarrhoea. She was seen by both the medical and surgical registrar in the afternoon where she was noted to be afebrile, pulse rate of 90 and a blood pressure of 102/52. Both of them felt that there was only very mild peri-umbilical tenderness without signs of an acute abdomen, but her white cell count was elevated at 34, urea 57 and her creatinine 530. She was admitted to the medical assessment unit and IV fluids instituted. Her observation through the night showed a steady decline with a rising pulse rate, falling blood pressure and urine output.

She was reviewed several times by the medical resident who sought another surgical review at about midnight. For some reason this request was not transmitted to the surgical registrar on call nor was it followed up

until he saw the patient early the next morning. By that stage she had generalized abdominal pain and was in shock. She was taken to theatre three and a half hours later where on opening her abdomen there was found to be global ischaemia of her abdominal contents. She suffered a VF arrest on the table for which she was transiently resuscitated, transferred to ICU and died later that day.

COMMENT

I think this lady had almost certainly a mortal condition by the time she was admitted. As is so often the case with mesenteric ischaemia, the abdominal signs did not initially betray the seriousness of the intra-abdominal catastrophe evolving. Nevertheless the very elevated white cell count and acute renal failure should have set off warning bells and it is of concern that her declining physical observations, though well documented over the course of the evening, were not acted upon more aggressively. There was also a failure to press for urgent surgical review for a period of over five hours whilst this deterioration was taking place. Although the documentation of observations and attendance in the notes during this period is adequate there is no documentation of who the second surgical referral was to be made to or at what time it was made.

I am not sure that an earlier surgical review would have in any case led to a different outcome but this is a warning that in other cases we should follow our clinical convictions and press for review by senior colleagues if there is deterioration in clinical observation. It is also a reminder of the old axiom that "nothing good ever came of a white cell count over 25,000". Although there is a culture of "ad hoc" interdepartmental consultations, these should be followed up wherever possible by formal written referrals indicating the time of the referral and to whom this request has been made.

## Late Diagnosis of Fistula and Use of Propylene Mesh in Posterior Vaginal Repair

SUMMARY

An 81 year old woman developed pelvic sepsis following a posterior vaginal repair and the insertion of an Apogee mesh prosthesis. She had had a hysterectomy in 1991 and a vaginal repair in 1992. A recurrent rectocele was repaired again in 2003. A further rectocele recurrence in 2006 was the indication for this operation with the use of polypropylene mesh.

Risk factors in addition to the above included asthma, hypertension, impaired renal function and chronic mild anaemia (Hb 112 & 116g/l three and one month pre-operatively).

A reactionary haemorrhage was seen four hours post-operatively in the recovery room. A haemoglobin of 86 g/l was recorded on the second post operative day and bright vaginal bleeding persisted for several days.

IV and oral antibiotics were administered post-operatively, but despite this there was a low- grade fever. Significant perineal pain developed from the second post-operative day and was treated by a Microlax enema. IV triple antibiotics cover was changed on this day to oral Augmentin Duo Forte.

On the sixth post-operative day a rectovaginal fistula was diagnosed by a proctogram (proctoscopy and PR not performed). She was transfused with two units of packed cells, transferred to a tertiary hospital and the following day a loop ileostomy, removal of the mesh and excision of 1.5 $cm^2$ area of necrotic anterior rectal wall and rectal closure were performed.

Over the ensuing five days despite transfer to ICU for respiratory assistance, treatment of CCF and intensive antibiotic therapy, the patient's condition failed to improve. With the agreement of her family the patient chose to have her treatment withdrawn and she died shortly thereafter.

COMMENT

Most experienced vaginal surgeons will have inadvertently opened bowel during surgery where a repeat rectocele repair is being performed. It is the failure to recognize this that exposes the patient to severe danger. A rectal examination post operatively would have excluded the presence of a suture or tape. In this case it is doubtful that a rectal examination would have been of assistance in detection a rectal perforation perpetrated at the time of dissection of the posterior vaginal wall. An alternative cause for the perforation is discussed below.

The first indication that infection may have been developing was the persistence of "buttock pain" from the first post-operative day. Arthritic pain in the patient's legs and ankles however masked the significance of pain at the operative site. On the morning of the third post operative day at 0630 hrs left buttock pain was noted to be more significant. The 72 hour delay in the diagnosis of sepsis and fistula from this time may have been crucial to the patient's demise. Only a low- grade fever with minimal tachycardia was in evidence even up to the time of the patient's transfer to the tertiary hospital and would not have lead one to suspect that a severe infection was likely. Such are the vagaries in detecting sepsis in old compromised people.

There is no record that the surgeon saw the patient on either of the third or forth post-operative days. An incorrect date was recorded by the nursing staff on the fourth post-operative day when the surgeon was contacted re the need for an enema. Had the surgeon seen the patient on these days he/she missed the significance of the buttock pain. Had the patient not been seen there was no chance in picking up this important symptom and hence the regrettable delay in the diagnosis of the fistula and sepsis. Even when the surgeon was called to see her on the fifth post-operative day this surgical complication went unrecognised until the next day, as a medical condition was thought by the surgeon to be implicated.

It was only on the sixth day that a transfusion of two units of packed cells was ordered. No further blood was administered even after transfer to the tertiary centre. This was probably inappropriate as it does not

appear that the patient's medical condition contraindicated further transfusions. Perhaps a medical opinion should be sought with regard to this aspect of her management.

Polypropylene meshes are recognized as causing erosion into the vagina in over 10% of cases in some series[1,2]. Less common is erosion into the bladder[3], urethra[4] and bowel.

Such an occurrence in the latter however may have fatal consequences as in this case. Many of the propylene meshes in current use have frayed edges with sharp filaments having the potential to perforate mucous membranes. As pelvic tissues fulfil dynamic urinary, coital and defecatory functions the likelihood of mucous membrane perforation should not be surprising. In particular and in view of the dire consequences of infection in the case of bowel perforation or erosion the use of such meshes in the posterior vagina should be re-evaluated by organizations such as the RANZCOG and the Australian Gynaecological Endoscopy Society (AGES).There are other alternatives. Site specific repairs of the recto-vaginal fascia are recommended as the primary procedure[5] and in cases where the fascia is deficient meshes such as SIS porcine mesh and Pelvicol can be used to supplement the repair. These meshes have been recommended for use in the repair of bowel fistulas[6] and would be appropriate in these situations.

### Conclusions

1. The use of polypropylene mesh in the posterior vagina should be re-evaluated.
2. An earlier diagnosis when the patient developed significant pain on the third day may have changed the outcome. Pain was the cardinal pointer to the development of sepsis.
3. The absence of the usual signs of sepsis (viz fever greater than 38°C and a relative tachycardia) in elderly compromised patients is well recognised and should be taken into account in post-operative assessments.
4. There was:- a failure to recognize the importance of this patient's pre-operative anaemia; no attempt to minimize post-operative blood loss by packing the vagina; failure to treat the reactionary haemorrhage; failure to transfuse the patient on the second post operative day when the Hb was reported as 87 g/l. This patient's ability to cope with a serious infection was compromised by her anaemia which should have been prevented and/or treated more expeditiously.

### References


1. Y N Lim, A Rane, R Muller. An ambispective observational study in the safety and efficacy of posterior colporrhaphy with composite Vicryl-Prolene mesh. *Int Urogynecol* J ( 2005) 16:126-131
2. Y N Lim et al. Suburethral slingplasty evaluation study in North Queensland. Australia: The SUSPEND trial. *Aust N Z J O & G* ( 2005) 45: 52-59
3. S D Sweat et al. Polypropylene mesh tape for urinary stress incontinence: complications of urethral erosion and outlet obstruction. *J Urol* ( 2002) 168: 144-146
4. I But et al. Prolene tape in the bladder wall after TVT procedure – intramural tape placement or secondary tape migration. *Int Urogynecol J* ( 2005) 16: 75-76
5. Advances in Reconstructive Vaginal Surgery, SR Kovac & Zimmerman, Pub Lippincott, Williams & Wilkins 2007. Chapter 17, pp 205-209
6. JR Kirkpatrick, Xenogenic Patch Closure of the Small Intestine: A Novel Approach to Fistula Management. *European Surgical Research* (2000) 32: 107-1


## FLUID MANAGEMENT

### IV fluid therapy - a lethal weapon


#### Summary

An 84 year old man, weighing 50 kg, with hypertension and atrial fibrillation, living independently, who "felt quite well in himself", with no chest or abdominal symptoms underwent craniotomy and excision of a tumour (1.7 cm diameter) in the right cerebellum. A preoperative brain scan and MRI suggested a metastasis. Post operatively there was extra-cranial wound infection requiring wound toilet, washout, debridement and surgical drainage. Recovery from this was complete. 24 hours before the craniotomy, CT of chest and abdomen showed enlargement of right heart and prominent IVC, a stenosing lesion of the hepatic flexure of colon and a mid-abdominal mass, 6 cm diameter. Both were considered malignant. Liver and lungs were clear. 24 hours after the craniotomy, patient was referred to the upper GIT/General Surgery team. Colonoscopy confirmed carcinoma of the hepatic flexure obstructing proximal passage of the colonoscope. Upper GI endoscopy showed a single erosion at the squamo-columnar junction and mild antral gastritis.

Three weeks after the craniotomy he underwent an extended right hemicolectomy for the hepatic flexure primary and the central abdominal mass in the transverse mesocolon. Gut continuity was restored by ileo-transverse anastomosis. Seven days after this operation he died from a combination of fluid overload, heart failure and renal failure. Histology confirmed adenocarcinoma of colon. The central abdominal mass and the cerebellar lesion histology were consistent with metastatic malignant melanoma. No known primary.


#### Comments

The quality of record keeping, both medical and nursing was excellent (not withstanding the usual doctor with shocking handwriting!). It has been stated that the quality of nursing in a ward can be judged by a scrutiny of its fluid balance charts. Two wards looked after this patient and both deserve high praise.

The CT scan of chest and abdomen was done 24 hours

before the craniotomy and the report typed on the day of this operation. This assessor is not a neurosurgeon but would like to be convinced that the brain lesion warranted priority over the CT abdominal findings.

The main area of concern, however, is the management of IV fluid therapy. In the 12 hours after the abdominal operation this 50 kg patient was in positive fluid balance of 3.4 litres. In the next 24 hours, another 4.5 litres in positive balance giving a total of almost 8 litres excess water in 36 hours which he had not lost and did not need. On the third day medical notes stated "?overload" and "appears overloaded". Yet he received another 3.4 litres IV fluid with a positive balance of 0.8 litres only because of good urinary output this day. The next day was the only day he was in negative balance of 1 litre followed by a positive balance of 0.3 and 1.2 litres on subsequent two days. A total of over 9 litres was now in his subcutaneous tissues but more importantly in his lungs, brain and presumably everywhere else.

It appears that initially the aim was to increase the urine output by a high fluid input. It should have been recognised very early that this was not working and when it became obvious that he was overloaded not enough was done to correct the error by severe restriction of input and to remove excess fluid with diuretics.

- the status of IV. fluid therapy needs to be raised very much higher in the mindset of surgical team members and led by the Consultant.
- the solution needs to come from within the surgical team. In an at-risk or sick patient it cannot be desirable that vital changes in treatment be undertaken by staff not associated with continuing care of that patient especially when this occurs at a time of crisis. The surgical team has the entire clinical picture so necessary for continuity of good patient care.
- there is need to recognise the at-risk patient and mark him/her for special and sustained attention. Among other conditions this group will include the elderly patient requiring major surgery whose cardiac, pulmonary and renal function (and reserve) will need assessment before the operation.
- in the case cited above it was clear from the notes that fluid therapy was geared towards correcting a presumed deficit of intravascular volume. There was no deficit. Measurements of central venous pressure would have been helpful.

## Unclear Radiology report may have led to unnecessary surgery

A 75 year old male patient was transferred from a peripheral hospital to a teaching hospital after suffering a fall and diagnosed with a fracture of neck of femur. A proximal femoral nail was inserted and the patient developed respiratory failure and died two days later.

There are two problems related to this assessment. One is the question of fluid overload. The patient always had a good urinary output and although he had seven litres of Saline in the 72 hours prior to death there was only a positive balance of three litres. However a pre-operative cardiac assessment showed that the patient had significant problems with cardiac muscle and the biochemistry suggests that haemo-dilution was occurring. I feel that in the 24 hours prior to death more vigorous use of intravenous Lasix and reduction of fluid would have been appropriate.

The other major problem we have with this case is that it is unclear from the Radiology reports as to whether this patient actually had a fracture which required internal fixation. There was certainly a fracture of the greater trochanter, but there is confusion as to whether there was an inter-trochanter or sub-trochanteric fracture.

There was a handwritten report from the Radiologist suggesting that there was an undisplaced fracture in the sub-trochanteric region, but a typed report on the same CT scan that there was no fracture and obviously the operation in a frail elderly patient with ischaemic heart disease is a major precipitating factor in the patient's death.

## Possible incorrect diagnosis and problems with fluid management contribute to death.

SUMMARY

A 92 year old lady who maintained a semi independent lifestyle at home presented with a one week history of feeling unwell. She had non-specific symptoms of nausea, vomiting and abdominal pains. Her bowel had not been opened for the last four days. Her other past medical history included hypertension, bilateral total hip replacement and gallstones. She was also known to have a reducible left inguinal hernia. On examination at admission, this was non-reducible and she also had a tender and distended abdomen.

X-ray confirmed the presence of prominent faecal loading throughout the large bowel with a distal small bowel obstruction. She also had evidence of acute renal failure with a raised creatine of 244. A diagnosis of incarcerated left inguinal hernia was made. She was taken to theatre that evening by the Surgical Registrar. At operation viable small bowel was noted. This was reduced and an on-lay prolene mesh repair was carried out.

Post-operatively, her recovery was slow. Urine output seemed to be a problem and the patient continued to complain of nausea and vomiting. She continued to be constipated and the bowels were not opened for more than six days. An abdominal x-ray carried out showed air under the diaphragm with a dilated small bowel loops. At laparotomy, perforation of the sigmoid colon with pus in the pelvis was noted. There was evidence of sigmoid diverticulitis and the colon was loaded with faecal material. A Hartmann's procedure was carried out. She then returned to the ward. Her recovery on this occasion was complicated by hypertension, atrial fibrillation and again poor urine output. Her situation never quite improved from that point. She later

developed acute renal failure and also an ischaemic right foot. The family was informed with regards to this patient's poor outlook and she passed away nine days post admission. The histopathology of the resected sigmoid colon confirmed the presence of sigmoid diverticulitis with evidence of abscess formation and presumed perforation from an area of diverticulitis. No malignancy was noted.

This case of a 92 year old lady certainly highlights some of the issues faced with assessment of such a patient, both in a diagnostic sense and management. The diagnosis of an incarcerated left inguinal hernia on admission cannot be disputed because of the clinical findings on examination. However, looking at the history that was provided, this lady had been feeling unwell for the past week - associated with nausea, vomiting, abdominal pains and constipation. The precipitation of a reducible left inguinal hernia to one that is incarceration, perhaps in hindsight, could be related to sigmoid diverticulitis associated with an ileus causing abdominal distension and hence small bowel incarceration into the hernia sac. There was no mention of this in the operative notes except for viable small bowel. The chase to decide which scenario is correct is fruitless except to understand that in a learning experience, it is a possibility.

I will dispute the surgeon's comments that fluid balance was not an issue in this case. One just needs to look through the notes to identify problems with fluid balance. In particular, low output following the first procedure and later in the second procedure. The patient ended up with acute renal failure. However, despite her age, she was transferred to the ward after her Hartmann's procedure, I suspect, HDU would be more appropriate.

Hindsight is obviously clear sight. However, it is important to review our diagnosis and in certain situations the outcome is obviously depending on making the right diagnosis at the earliest possible time.

## FROM SURGEON TO SURGEON

### The perils of transferring patients under waiting list pressure from one surgeon to another

SUMMARY

An 83 year old man with a history of significantly impaired respiratory function: emphysema, COAD, and a right upper lobectomy 12 months previously (for non-malignant, non-specific inflammatory disease), requiring home oxygen; hypertension, and atrial fibrillation, was admitted for elective surgery for a 4.8 cm AAA, and right common iliac aneurysm. He had stopped smoking 26 years previously.

The patient had previously been on the waitlist for surgery of vascular surgeon A and was admitted under this consultant's name. However, he was operated on by vascular surgeon B, who had no previous association with this patient, and did not have the opportunity to fully evaluate him under his own principles of vascular surgical practices prior to surgery.

The patient subsequently underwent surgery, under general anaesthesia, and a Talent endoluminal trouser graft was introduced *via* bilateral transverse groin incisions, and the right internal iliac artery was ligated via a retroperitoneal approach. Subsequently, his blood pressure could only be maintained with repeated fluid boluses, with a good initial response, but the blood pressure continued to fall to 60-70 mm Hg systolic. There was clinical evidence of an apparently increasing haematoma in the right iliac fossa. Hb fell from 10.6 to 8.2, INR 1.5 to 1.7, platelets 87 to 65. He was transfused three units packed cells, four units FFP, and one unit of platelets. He was then returned to the operating theatre and re-exploration of the previous right retroperitoneal iliac fossa operation site revealed only 100-150 ml of clotted blood with no active bleeding point. The patient was readmitted to ICU, with cold peripheries, he was also acidotic and hypoxic – pO2 - 47. He had rapidly developing type 1 respiratory failure and haemodynamic instability requiring escalating medical therapy. The patient remained hypotensive and anuric despite noradrenaline, dopamine and dobutamine. He subsequently deteriorated and died in the early hours of the next morning.

At autopsy there was no evidence of any significant internal haemorrhage or haematoma. There was, however, evidence of fluid overload, with pulmonary oedema, and congestion, bilateral pleural effusions, pericardial effusion, as well as the pre-existing changes of marked emphysema, anthracotic change, pulmonary adhesions, and an enlarged and dilated heart with significant coronary atheromatous stenosis and congestive splenomegaly.

COMMENT

The experienced vascular surgeon B who operated on this patient stated "this patient was on home oxygen. If this was clarified to me pre-operatively, I would have made sure that the operation was to be done under regional anaesthesia, not general anaesthesia..."

It is generally accepted that for AAA of 5.5cm or larger the risk of observation is appreciably greater than elective operative intervention. This patient's AAA measured 4.8 cm at time of operation.

There is no doubt that this patient died primarily from respiratory failure (and consequent multi-organ failure), following major surgery and general anaesthesia. This may have been avoided if the operating surgeon had access to/and been able to be fully aware of the medical profile of the patient he was operating on, so as to make an appropriate decision, as to whether to operate at all with an AAA of only 4.8 cm, and then, if so, that regional anaesthesia, and not general anaesthesia was indicated.

This case exemplifies the very significant dangers associated with policies/procedures, which move patients from one surgeon's waitlist to another's. All the appropriate information regarding the patient's

medical/surgical condition may not be available to the operating surgeon, before he is scheduled to operate on the patient. The chance of human error is significantly increased to the patient's disadvantage.

Finally, surgeons of any specific speciality have developed their own criteria for their own specialised sub-speciality procedures, often after many years of experience, which may differ from other surgeons in their own specialty category. Patients being transferred from one surgeon's waitlist to another's, who may be operable by their original surgeon's experience and criteria, may not qualify for any operation at all under their new surgeon's specifications!

## Perforated diverticulitis following sigmoidoscopy in acute diverticulitis but a surgeon not familiar with the case

### Summary

An 87-year-old female was admitted as an emergency because of a heavy acute PR bleed. She had had intermittent milder bleeding for a month or so, as well as a few months history of diarrhoea and some associated incontinence. She lived independently in a retirement village. Co-morbidities: hypertension. She had had a colonoscopy a year previously for a similar complaint in another hospital, and was found to have diverticular disease which was diagnosed as the cause of her bleeding. Four months prior to her present admission she had again been admitted elsewhere with an attack of acute diverticulitis which had settled with conservative management. On examination she was pale but alert. She had a tender mass in the LIF although there had been minimal complaints of any pain.

Hb was 97 and her white cell count was normal. A diagnosis of acute diverticulitis was made and she was treated conservatively with appropriate antibiotics, etc. She underwent an abdominal CT the following day, which showed a segmental colitis compatible with acute diverticulitis. She was slow to settle with ongoing lower abdominal tenderness and recurrent fevers. Her abdominal CT was repeated after a few days to exclude a collection or abscess, but there was no significant change in her films and conservative treatment was continued. She settled slowly and sporadically over the next few weeks, although her diarrhoea persisted (*Clostridium difficile* was excluded). After ten days her treating surgeon suggested she would need a colonoscopy after a further interval of four weeks to allow her acute inflammation to settle fully.

During her treatment she had developed a sacral ulcer, treated as a pressure sore, although it became apparent that there was also an ulcer on the anal verge and an associated peri-anal fistula, and a colo-rectal opinion was suggested and obtained. A colo-rectal registrar saw the patient, agreed with the diagnosis of anal verge ulcer and anocutaneous fistula, and recommended an EUA and biopsy of the anal ulcer. This was duly organised for the following week, although in the meantime she was listed for EUA, flexible sigmoidoscopy and biopsy of anal ulcer. Her surgery was scheduled and then cancelled on three consecutive days. Over this period she also developed a recurrence of high fevers and some tenderness in the LIF, and a mild elevation of her WCC.

The following day she had her procedure done: EUA, sigmoidoscopy to 18 cm (unremarkable), biopsy of anal ulcer and fistulotomy of a superficial fistula. This was four weeks after her initial admission. The procedure was done by a different colorectal registrar to the one who saw her initially (the latter was apparently going to do her procedure prior to the repeated cancellations). Her consent form was for a flexible sigmoidoscopy, although later in the ICU notes, "rigid" sigmoidoscopy is mentioned several times. Her operation notes refer only to "sigmoidoscopy" and I assume that this was a flexible scope.

She remained stable post-op and apart from a lowish BP at times her observations were normal and there were no complaints of pain. About 26 hours post-op she developed sudden generalised abdominal pain and distension and straight abdominal films showed pneumoperitoneum, confirming a suspicion of perforated bowel. She was resuscitated and taken to theatre later that evening. A thickened oedematous sigmoid was found, with a 5 mm perforation of a sigmoid abscess, much free pus and a fibrinous exudate (no faecal peritonitis). A Hartmann's procedure was performed with resection of 15 cm of sigmoid colon containing the perforation, rectal stump stapled and end LIF colostomy fashioned. Transferred directly to ICU post op. She remained unwell and three days later deteriorated further, with clinical suspicion of further intra-abdominal problems, ? ischaemic bowel. A further laparotomy did not reveal any unexpected or reversible pathology.

She continued to deteriorate with multiple organ failure and became deceased the following day.

### Comment

The area of concern in this case was the performance of a probably unnecessary sigmoidoscopy in a patient with seemingly ongoing or recurring acute diverticulitis.

This lady might well have perforated anyway as a natural progression of her diverticulitis, but insufflation of gas would not be seen to have helped.

The literature is fairly specific about the need to avoid sigmoidoscopy or colonoscopy during an episode of acute diverticulitis and normally suggests waiting about six weeks or so. This study (below) was prospective and suggests any risk of perforation seems to be confined to those patients with peri-diverticular gas visible on the CT scan. It concludes "Conclusions: Early colonoscopy in patients with acute diverticulitis may alter the working diagnosis and be of therapeutic value. The rate of caecal intubation is lower and the perforation rate appears to be higher. A clear-cut indication therefore has to be evident clinically."

I have seen another review which suggests there is minimal risk if the procedure is performed in a specialist colorectal unit. However even a minimal risk of perforation is too much in very elderly patients who

are unlikely to survive a major complication.

The sigmoidoscopy did not directly cause the perforation; it was limited to 18 cm and the patient was quite stable for 24 hours post-op with a later sudden development of pain and distension at the putative time of perforation. Allowing for the time to obtain X-rays, organise theatre, etc there was no significant delay in diagnosis or treatment of the perforation itself, and all the treatment thereafter was exemplary.

I think the basic problem was institutional and due to the repeated cancellation of this patient's treatment for her peri-anal fistula, presumably due to lack of theatre time. She was four weeks post her acute attack and sigmoidoscopy would have been relatively safe at this stage anyway - however due to repeated cancellations, the surgeon who eventually performed the procedure was probably not aware that she had developed a possible recrudescence of her acute diverticulitis, and was not the registrar who saw her initially. The sigmoidoscopy was just part of a routine for her fistula surgery, and could easily have been left out without compromise. I suspect the registrar who performed this procedure was unaware of the recent changes in the patient's condition, as she had been waiting for the procedure for four days and she only flared up again the day before. It was at this stage that priorities might have shifted: - it was over two weeks since her last CT scan and it might well have been prudent to repeat this at that time, it might well have shown a collection or peri-diverticular gas, management of which would have taken preference over her fistula problem. The house-surgeon who saw her at the time of her recurrent flare-up arranged a good management plan and cleared it with the registrar (general surgical?) who agreed with the management - this latter registrar was different again and may have been unaware of the background of this case. There is nothing in the notes to show that either of the consultants in charge of the case knew or had been informed that she had flared up again. There was also certainly considerable momentum to get this case done, as it had been cancelled three times, causing considerable angst to the patient and her relatives.

I think that if the change in the patient's condition had been "flagged", then sigmoidoscopy would have been left out of her procedure and any eventual perforation could only be ascribed to the natural history of her condition, and I think the probability of perforation was high without intervention and percutaneous drainage. I think it fair to say that the problem here is the complexity of communication channels, with two specialities involved, different registrars and repeated cancellations with more changes of personnel. These problems will remain endemic in large busy hospitals.

** Endoscopy 2004; 36: 504-507. Early Colonoscopy in Patients with Acute Diverticulitis: Results of a Prospective Pilot Study.*

## PERIOPERATIVE ANTICOAGULATION

### Problems with NFR in a patient whose surgery was delayed because of Clopidogrel


SUMMARY

An 89 year old male nursing home resident was discovered at three in the morning having fallen out of bed and sustained a left intertrochanteric neck of femur fracture. He had a previous left CVA with a right hemiparesis. He had a pacemaker, hypertension, dementia and amongst other drugs took Clopidogrel. The patient's relatives carried power of attorney. He was admitted to hospital and initial decision-making included ceasing of the Clopidogrel and postponing surgical treatment for his fracture by seven days. Relatives carrying power of attorney were initially contacted but were not available for NFR discussion for three days. It had also been established by the end of the first day of admission that the patient stood only to transfer and used a wheelchair for mobility. He was prone to getting out of bed on his own. On day two post-admission, the patient developed a temperature and subsequent investigations indicated pneumonia. Intravenous antibiotics and other routine measures were instigated. The orthopaedic team had the additional medical support service for this patient's treatment. The consultant ward round on day three confirmed initial orders including the seven day wait for the effects of Clopidogrel to clear. The first NFR statement and the patient record appeared at this time indicating the patient was not for CPR or defibrillation in the case of cardiac arrest, but the patient was for full treatment if there was respiratory arrest including intubation and ICU reordered. The patient's hospital course from this point to day seven reflected the treatment of the pneumonia and problems with low urinary output. At day seven, the patient's surgery was postponed due to concerns regarding the pneumonia and from this point to day ten these issues and heart failure predominate within the patient's record. On that afternoon, anaesthetic review indicated the patient was ready for an anaesthetic and the patient's surgery was completed on day eleven.

A left dynamic hip screw was completed in a routine fashion and the immediate postoperative course reflected the problems the patient had in the preoperative period. On day thirteen post- surgery, the NFR status of the patient was modified in the hospital record. The new position was that the patient was not for aggressive intervention in the event of respiratory arrest. The patient remained not for CPR/ defibrillation. On day fourteen post-admission and day three post-surgery, the patient had a myocardial infarction and died peacefully.


COMMENT

This patient's case reflects the current problems with NFR. The NFR conditions for this patient appeared to change as his stay in hospital was prolonged. The patient's relatives had a changing view as what was reasonable and what was not with regard to his ongoing

care. The written advice in this patient's record could easily give rise to confusion and difficulty even though it was the intent of those involved to make a more prescriptive statement. This was made more difficult because differing NFR instructions appeared on different pages of this patient's record. These issues are often discussed not in the cold light of day but in the evening and perhaps by not the most experienced medical staff. Additionally the current hand written statements make it hard to cover every eventuality and undoubtedly those confronted with an NFR scenario are left to interpret the written record as best they can.

This patient's surgery was initially delayed on the basis of taking Clopidogrel. It may be worthwhile observing that I could find no specific study or directive regarding the time interval prior to surgery, but in MJA review articles and the TGA website indicate Clopidogrel should be ceased for a period of five days when considering a patient for open-heart surgery. A similar time frame in orthopaedic surgery could be considered. Another difficult decision about this patient was the optimum treatment for this patient's left neck of femur fracture. He was a wheelchair ambulator due to a right hemiparesis who stood to transfer only.

He was demented with a history of cardiovascular disease and a frequent faller. The initial decisions taken were backed by a consultation and were made with all the information available. There is no basis for criticism of this decision. It is one where there would not be a uniformity of opinion across the orthopaedic community. It is most important, that in these particularly difficult decisions, that the patient's record reflects this.

An anaesthetic opinion was obtained at day ten after the patient's admission to hospital. If a decision to delay surgery is on the basis of medical impairment that would have a deleterious effect on an anaesthetic, it may be appropriate that the opinion be obtained as early as possible. Clear parameters are then obtained for medical teams to follow.

An 89 year old demented male with ischaemic heart disease died as a result of a left neck of femur fracture and the death is not as a result of an adverse event. However the patient's care raises a number of important issues regarding NFR, anti platelet therapy and the relationship to surgery and the timing of anaesthetic referral. All of these are issues for general orthopaedic trauma community to discuss.

## Does Community Use of Anticoagulants (Warfarin) Influence Surgical Outcomes

An 83 year old lady with past history of left mastectomy, CVA, deep vein thrombosis and dementia (hostel accommodation) but mobilising with a wheelie-frame fell in the bathroom, without associated head injury and sustained a fracture of the right neck of femur. On assessment at the Emergency Department of a metropolitan hospital, she was found to have a displaced subcapital fracture of the right femur. She was admitted for planned surgery the following day. On assessment, the INR was noted to be elevated (2.2) and surgery was deferred, with cessation of her Warfarin medication.

Pre-operative management was undertaken on the ward. An IV line was inserted. Fluid balance was maintained apart from a period where no IV access was available (15 hours) during the first 24 hours after admission.

By day two of admission, she became increasingly more aggressive and oxygen saturation was noted to be below 90. Chest signs develop and aspiration was suspected. Speech therapy assessment defined difficulty in swallowing. Passage of a naso-gastric tube was unsuccessful.

Six days post admission, the INR was noted to be modestly improved (2.0) and despite a chest x-ray showing signs of patchy consolidation, an anaesthetic assessment cleared her for surgery, with surgery then proceeding on the seventh day post admission.

A routine cemented hemi-arthroplasty was performed. There appeared to be no peri-operative issues apart from a mild hypotensive episode, presumably related to cementation. Surgical time was not excessive.

Post-operatively, a decision is made to treat this lady in the high dependency unit which seemed appropriate. Her condition however deteriorated in the recovery ward and she succumbed within six hours of surgery.

A post-mortem was undertaken and post-mortem changes of pneumonia and cardiac failure were diagnosed by the pathologist.

### Comment

The presentation of an elderly female with a displaced subcapital fracture of the femur is not an unusual occurrence in hospital orthopaedic practice. That this presentation is increasingly accompanied by patients who are medicated with anticoagulant therapy (Warfarin) seems to be an increasing prevalence in the community. Although past history of deep vein thrombosis was provided, any thrombotic episode was distant. Increasingly, patients are anticoagulated for the simple management of atrial fibrillation.

In this lady's case, she presented with an elevated INR and it would appear a decision was made to allow this to spontaneously drop to acceptable levels, before surgery was undertaken.

Six days after admission, her INR level remained elevated (2.0). In the interim, there clearly had been cardio-pulmonary deterioration of function with documented evidence of difficulty in maintaining oxygen saturation levels. Hypoxia remains a recognised cause of aggressive or disorientated behaviour. This was clearly documented in the medical notes as occurring from the second day of admission. Fat embolism is a recognised complication of major long bone injury and it is likely that this lady was manifesting this. There was no documentation regarding the use of traction and the question needs to be asked that if a delay in treatment was expected, why was traction not utilised. Whilst this may not have prevented fat embolism, it may have assisted in the nursing of this patient.

Warfarin therapy can be reversed by the use of Vitamin K and/or fresh frozen plasma. In the surgical setting, fresh frozen plasma can be utilised. It is unclear as to whether this was considered pre-operatively.

What is known is that early surgery in the presence of neck of femur fracture has been documented in the medical literature as producing better outcomes. Conversely, delayed surgery, as occurred in this case, has a predictably poorer outcome.

This patient clearly followed the latter course. With the well documented aging of the population and an apparently increasing use of not only Warfarin but other anticoagulants in the community, this is an issue that perhaps should be addressed sooner rather than later.

### The Dangers of DVT Prophylaxis

SUMMARY

An 83 year old lady who had been living independently, presented with a leg laceration following a fall. She had multiple medical problems, none of which were major or life threatening. Of note was that she had been taking Prednisolone for 15 years. There was no record of whether she took Aspirin or anti-inflammatories or not for minor aches and pains. There is no description of the wound, particularly the magnitude of the injury. A laceration implies that the skin is all present - was it viable, was there a degloving component? Blood was taken for group and hold, yet I can find no record of a Haemoglobin having been taken. She was taken to theatre; debridement and split skin graft were performed. There is no record of the donor site used. She was ordered Heparin, presumable for DVT prophylaxis.

By the third post operative day she had been noted to have a large bruise distant to the surgical site, blood in the stools, and went on later to have a "right popliteal haemorrhagic cyst", fresh bleeding PR, and a "right thigh blood blister" which yielded 500ml when drained! Despite all of the above, the first record of a Haemoglobin which I found was six days post op and appears to have been after a transfusion. Despite several records noting fresh "spontaneous" bleeding, the decision to stop Heparin was taken only one hour before the decision not to resuscitate was taken. Even then, there is another note the next day to stop the Heparin, which presumably was not stopped. Once the decision to not resuscitate was taken, the out come was inevitable.

POINTS FOR CONSIDERATION.

The point has bee made ad nauseam, that Clinical Notes have to be thorough, legible, and abbreviations avoided. This is a lot of room for improvement on all of these elements, right from the first assessment.

The next point of consideration is the choice of procedure. The skin of most 83 year olds is very thin. Having had 15 years of Prednisolone, the chances of having a skin thick enough to harvest a split skin graft are small. Would the donor site have taken as long to heal as the laceration? This is a matter of clinical judgement, but conservative treatment with VAC dressing may at times be a good option. Avoiding the need for immobilisation and anticoagulation is worth considering in the elderly.

## TECHNICAL MANAGEMENT

### Lack of communication over renal function precluded alternate management.

SUMMARY

A 74 year old male had an abdominal aortic aneurysm >55mm in diameter. His pre-operative co-morbidities included the following: NIDDM, atrial fibrillation, claudicant, ex-smoker and chronic renal failure. His creatinine was 426 pre-operatively but had only been 280 three months previously. The renal physician's letter (one month pre-op) noted that the renal failure was progressive and would most likely soon lead to end-stage renal failure requiring dialysis.

I am unsure of the exact anatomy of the abdominal aortic aneurysm, but based on the notes it had a very short neck thus requiring a fenestrated endoluminal graft. Although on paper the patient seemed to have no other major co-morbidities except for his renal failure, the anaesthetist had classified him as an ASA IV category. I am not sure of the reasoning behind this.

A fenestrated endoluminal aortic aneurysm was performed. Both renal arteries had covered stents placed within them. The SMA had an uncovered stent and there was a scallop placed for the coeliac axis (no stent). The procedure lasted about 7 - 7.5 hours which is not unusual for this sort of case. Two units of packed cells were transfused during the operation, but otherwise no significant events occurred. The patient then was transferred to ICU where he was dialysed that night with CVVHDF via a Hickman's line.

The next morning after extubation, the patient was being rolled when he dropped his blood pressure which slowly returned to normal after they put him on his back. A CT was arranged and two units of red cells were transfused. This was only noted in the nursing notes and there was no medical note of this. I cannot find a report of the CT in the notes.

The next morning the SBP dropped to 50 and 30 seconds of CPR was required. A long note was made by the ICU consultant and here is the first mention of a right kidney intraparenchymal bleed noted on CT the day before. A note however was made that ICU had informed the family about the CT results the day before, but felt no intervention was required.

Later that morning, the right renal artery was coiled in an attempt to stop the bleeding. This was performed without any complications.

On day six post op, after an episode of hypertension, another CT was performed which suggested IVE compression secondary to the perinephric haematoma. As a result, the decision was made for a right

nephrectomy to free up the IVC. At this stage, the anaesthetists had changed the ASA category to ASA V. Three days later, the patient developed pneumonia, his condition was worsening and he developed multi-organ failure. He was made NFR and passed away soon after.

COMMENT

I feel there are several issues which could possibly have altered the overall outcome in this case:

1. Choice of operation: There seems to have been three options considered for this man.

   The first was an open AAA repair (which the surgeon in charge states would have required a suprarenal clamp as the aneurysm was close to the renals). The second option was a three vessel fenestration and celiac scallop endoluminal graft. The third option was conservative management.

   I think that in view of this man's rapidly worsening renal failure, the assumption had to be that after any form of intervention, the most likely outcome was end-stage renal failure. A fenestrated endoluminal repair requires large quantities of intra-arterial contrast which surely would have a high likelihood of leading to renal failure. In retrospect, having waited and assessed whether this man would soon require dialysis prior to surgery would have had a different outcome. If this man was to go on dialysis, then the better procedure would have been to cover both his renal arteries which would have made the operation a much simpler ordeal. It also would have avoided any cannulation of the renals which is what ultimately led to this man's death by causing a bleed (known complication of renal artery stenting/angioplasty).

   I am not convinced that the surgical team was fully aware of the speed at which this man's renal failure was worsening and the fact that should this have continued, it would not have been long before dialysis was required.

2. Lack of communication between ICU and surgical team. From the notes (which I must say were very poor in the ICU), there was no indication that the surgical team had ever been made aware of the renal bleed. All blame cannot be put solely on the ICU team as the surgical team should also have looked into the result of the CT scan (I must admit that from the notes there is no way of telling what time the CT was performed and whether it was after hours as the formal report is still not in the notes). I am not sure that better communication would have led to a different outcome as the most likely management would have been conservative (as stated by the ICU consultant the next day).

3. Although I have not seen any scans, it is a bit difficult to understand why a nephrectomy was required six days after the initial operation for possible compression of the IVC. I feel that if the perinephric haematoma was in fact compressing the IVC, it would have done so much earlier. As such, I feel that maybe there was another cause for the hypotension as opposed to IVC compression secondary to perinephric haematoma six days after the operation. One other consideration must be taken into account, maybe the right kidney had a secondary bleed (unlikely as the right renal was coiled) and this led to further compression of the IVC. In this situation, nephrectomy would have been the correct option.

As a final comment, I want to state that even though endoluminal aortic surgery has decreased the trauma of open surgery, it is still a significant operation with moderate mortality and morbidity. Patients still need to be fully worked up pre-operatively if possible and the benefits of fully assessing their medical co-morbidities weighed against waiting the extra time required and the risk of rupture.

## ERCP has a Mortality Risk

SUMMARY

A 75 year old male with a history of MI and angioplasty 16 years previously, attended emergency with epigastric pain. CT was normal as was WCC and LFTs. US reported acute cholecystitis. He was transferred to another hospital and underwent laparoscopic cholecystectomy two days later. CD was 10mm wide and contained stones, although IOC was reported as no stones in the CBD. No contrast reached the duodenum. ERCP was undertaken two days later and a sphincterotomy performed. The following day the patient had abdominal pain and LFTs were abnormal.

Three days following ERCP the abdominal pain worsened and he became hypoxic and tachypnoeic. Abdominal CT revealed some retroperitoneal air and infiltrate but no contrast leak. This was treated conservatively with antibiotics and follow up CT five days following ERCP reported a significant improvement in appearances. The patient recovered and went home ten days following ERCP.

Five days following discharge the patient was re-admitted with right sided abdominal and groin pain. A retroperitoneal abscess was drained under CT guidance. The following day the patient suffered a MI and had a coronary stent. He developed diarrhoea and became oedematous. Six days following admission a NJ feeding tube was inserted. He developed hypokalaemia, hypocalcaemia and hypoalbuminaemia. Heparin was ceased when he developed haemetemesis and malaena. TPN was started. Two week following readmission a laparotomy, washout, debridement of retroperitoneal necrotic tissue and insertion feeding jejunostomy was performed. He continued to have malaena and eighteen days after the first episode of malaena had an upper GI endoscopy and injection of a bleeding site. He continued to be managed intensively by the surgeons, intensivists, microbiologists, gastroenterologists, cardiologists and physicians. He had a further CT and drainage of another retroperitoneal collection three weeks following laparotomy. One week following this, his condition deteriorated and he passed away.

### Comment

I do not see any defects in the management of this patient, nor did I identify an adverse event or area of concern. With the benefit of hindsight there are possibly four areas of consideration.

Like all surgical procedures complications from ERCP can result in death. With MRCP and laparoscopic exploration of CBD the indications for ERCP may be changing. It could be argued that intraoperative buscopan may have allowed contrast to pass and a postoperative ERCP avoided. It could also be argued that in the absence of a definite stone on IOC and normal LFTs then a wait and see policy could have been instigated. Alternatively an MRCP performed two days postoperatively when any oedema related to passage of a stone may have resolved may have avoided ERCP.

I believe that the conservative management of the injury following ERCP was the correct choice given that the initial CT did not demonstrate a contrast leak and follow up CT reported a significant improvement in the appearance of the retroperitoneum.

CT guided drainage of the abscess on readmission is without criticism. The following day the patient suffered a MI and I have no doubt that this will have influenced the surgeon in choosing to organise further CT guided drainage rather than laparotomy for further retroperitoneal collections. Recent MI and abnormal clotting would also have resulted in the delay in performing endoscopy when the patient developed malaena. Conservative management of a controlled duodenal fistula is again without criticism.

A third area of consideration was the delay in instituting TPN. A malnourished patient with copious diarrhoea perhaps should have had TPN earlier and for longer rather than being fed through a jejunostomy. I do not believe this would have affected the outcome.

The last area of consideration would be the use of CT guided drainage after the laparotomy. At the time of the first laparotomy it was decided that CT guided drainage was not controlling sepsis and debridement of necrotic tissue was required. It could be argued that further CT guided drainage would be futile in the presence of infected necrotic tissue in the retroperitoneum and that further laparotomy and debridement could have been attempted. However the decision to re-operate on a very sick patient with a recent MI is a difficult one.

### Editorial note

*Although the second line reviewer states 'I do not see any defects in the management of this patient, nor did I identify an adverse event or area of concern' this patient died after an elective ERCP. The WAASM office has a policy of not changing the opinions made by first or second line assessors even when there may be prima facia evidence that the opinion does not conform to WAASM definitions. This death was the direct result of a medical care and WAASM would consider this to be an adverse event that caused the death in a patient otherwise expected to survive.*

## Retained Pack Associated with Sepsis after Anterior Resection

### Summary

This 88 year old man was admitted electively for anterior resection of a distal sigmoid carcinoma. The procedure was apparently uneventful. He was discharged 11th post-operative day. He was readmitted for "nursing care" under bed card of his GP on the following day. Abdominal sepsis became apparent about two weeks later, and CT showed a collection deep to the wound. At laparotomy four weeks after the first operation the abscess was drained and found to contain a laparotomy pack. He was transferred to HDU- slow progress. Day six after the second procedure he collapsed as a result of what was rapidly diagnosed as a ruptured abdominal aortic aneurysm. He was seen by a vascular surgeon, who felt that operative intervention would be unavailing. He died within an hour of this decision being made.

### Comments

The only concern here is the obvious one, noted by the surgeon and first line assessor- a deficient instrument and swab count led to a retained pack. The reason why this may have been so need to be addressed by the hospital concerned. The fact that this type of problem, which is a well known source of litigation, is still occurring could usefully be flagged to other hospitals.

In other respects, I can find no cause for consideration or concern in the notes reviewed. Specifically, the decision not to intervene terminally seems appropriate. Record keeping was very clear, and use of DVT prophylaxis was appropriate and did not in any way contribute to the course of events.

In this patient, as it happens, fate intervened to lessen the impact of the adverse event. He was known to have a AAA, and had been turned down for elective repair. It was measured at 8.6cm in maximum diameter on the CT scan which diagnosed the post-operative collection. This gives it a high risk of rupture – by my calculation of the order of 1-1.5/1000/day ( underlying data from Samson LN, Cronenwett JT: Abdominal aortic aneurysms. In Zelenock GB: Problems in General Surgery, vol II. Philadelphia, JB Lippincott, 1995, pp 385-417). We therefore need invoke no other cause for the rupture, and I do not think that this was precipitated by the other events here. Thus this gent happened to be fated to die of his AAA on the day that he did, and this may have prevented his demise as a result of the adverse event, which probably did contribute to his sepsis, and thereby to his second operation.

## Elderly patient with rectal cancer may have been better managed without surgery.

### Summary

A relatively fit 90 year old was diagnosed with a rectal cancer at l2cms. Notably ten months earlier he had had a normal barium enema. He underwent a low anterior resection performed by two experienced surgeons in a peripheral hospital.

At laparotomy severe adhesions were found relating to a previous anterior resection for diverticular disease. Planes were difficult to establish in the pelvis. Tumour was found adherent to the bladder and was unable to be completely resected. Adhesions were difficult and a small bowel enterotomy was repaired. Blood loss of two litres was noted. A Hartmann's procedure with no anastomosis was performed.

Post operatively the patient was persistently hypotensive, cold and clammy and had significant drain losses in the recovery room. His systolic blood pressure was rarely above 100. The ward nurse initially refused to take the patient to the ward but after a colloid infusion and discussion with the anaesthetist the patient was transferred back to the ward.

The surgeon reviewed the patient that evening and after discussion with the relatives made the patient not for resuscitation in view of the unresected pelvic tumour. Despite blood and FFP transfusion there were ongoing signs of bleeding and the patient died on the ward just before 2200 hr.

### Comment

One could argue that this was not a bad outcome for the patient, i.e. a relatively rapid death with unresectable pelvic cancer. However, there are a number of significant issues worth reviewing. Firstly, rectal cancer surgery in a 90 year old patient is always going to be a major undertaking with considerable morbidity and mortality even in ideal circumstances. In this case a pre-operative CT scan may well have shown that the rectal cancer was invading the bladder and hence change the surgical plan to a palliative stoma and/or radiotherapy only.

In this age group major surgery needs to be regarded as palliative, i.e. the key issue is symptom control and quality of life rather than cure of the tumour itself Whilst there is no doubt that resecting primary colorectal cancer offers the best palliation, the very elderly often have locally advanced disease at diagnosis, hence resection of the primary tumour is often a difficult and morbid affair. I can not determine what symptoms the patient was getting from his rectal cancer pre-operatively. I note that the colonoscope was able to pass through the tumour implying that impending obstruction was unlikely.

In retrospect this patient could have been managed by a palliative stoma or endoscopic stent. The decision to proceed with resection in an elderly patient with tumour adherent to bladder, previous anterior resection and difficult adhesions is questionable.

This patient had signs of shock and ongoing haemorrhage in the recovery room. Normally this would have necessitated immediate re-laparotomy and packing of the pelvis. There is evidence that the anaesthetist was contacted about this but probably not the surgeon. The surgeon later made decision after consulting with the family not to offer further operative management, which was quite correct.

Very elderly patients only occasionally have a straightforward recovery following rectal cancer surgery. This patient may well have been better having surgery in a teaching hospital where there is access to HDU and ICU facilities.

Finally, it is very likely this patient's recto sigmoid cancer was missed on a barium enema ten months prior to surgery. At his stage it may have been more readily resectable. Despite colonoscopy clearly being more accurate for diagnosing colorectal cancer, barium enemas are sometimes performed in this age group as they are thought to be less morbid. Whilst this is not unreasonable, a colonoscopy may be a better option in a symptomatic elderly patient fit enough to undergo colorectal resection.