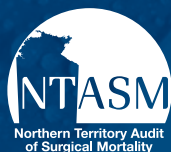




Royal Australasian
College of Surgeons

QASM

Queensland Audit of Surgical Mortality



LESSONS from the AUDIT

JULY 2012
VOLUME 9



Queensland Government
Queensland Health



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Introduction

Who belongs to this patient? - a question I often ask myself.

Patient ownership is an important part of the delivery of excellent surgical care. In *Lessons from the Audit* (Volume 9), case studies from various parts of Queensland are presented. One case, titled ‘*Who is managing this patient?*’, addresses the issue of patient ownership.

The Royal Australasian College of Surgeons is guided by surgical competencies which remain the foundation upon which we stand and upon which our practice of surgery will be judged.

The cases in this volume expand on some of these surgical competencies and perhaps we will be able to learn from the problems experienced (and difficulties encountered) that have been reported here.

Peer review and retrospect combined will certainly add to our knowledge and I trust these case studies will be useful for many surgeons in the days to come.

Once again, sincere thanks must go to the QASM project staff for their enthusiasm, encouragement, and hard work in producing this document for Fellows and Trainees of the College.

Yours sincerely

John North

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.



Shortened forms

BP	blood pressure	GP	general practitioner
CCU	coronary care unit	Hb	haemoglobin
CT	computed tomography	ICC	intercostal catheter
ECG	electrocardiogram	ICU	intensive care unit
ECT	electroconvulsive therapy	INR	international normalised ratio
ED	emergency department	IV	intravenous
E/LFT	electrolytes and liver function tests	PCNL	percutaneous nephrolithotomy
FAST	focused abdominal sonography in trauma	QAS	Queensland Ambulance Service
FBC	full blood count	RFDS	Royal Flying Doctor Service
FFP	fresh frozen plasma	RUQ	right upper quadrant
GA	general anaesthetic	SCC	squamous cell carcinoma
GCS	Glasgow Coma Scale	TURP	transurethral prostatectomy
GFR	glomerular filtration rate	VF	ventricular fibrillation
GIST	gastrointestinal stromal tumour	VT	ventricular tachycardia
GORD	gastro-oesophageal reflux disease		



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1. Bradycardia or block ... that was the question?

An elderly patient with cardiovascular disease was admitted to a regional hospital with abdominal pain and abscess in the groin with marked induration. The patient was afebrile. Attempts were made to incise and drain the abscess under local anaesthesia. Suspicious 'granulation tissue' was noted and several days later debridement was performed under general anaesthetic (GA). Histology confirmed squamous cell carcinoma (SCC) in the margins of the excised tissue.

In the first post-operative 24 hours, the patient was noted to have bradycardia with short periods where the heart rate was less than 30 beats per minute.

Transfer to a tertiary referral hospital was considered but hypotension and intermittent periods of bradycardia were still present. An electrocardiogram (ECG) suggested a complete heart block, albeit intermittent.

Discussions with the cardiologist and the plastic surgeon led to a tertiary referral agreement, but the patient suffered a cardiac arrest prior to transfer and could not be resuscitated.

Comment:

- **Beware the older patient with heart block and ask about syncopal episodes or any other periods of unconsciousness.**
- **Consult closely with your anaesthetist** before offering surgery to such a patient.
- Informed consent may demand more than just the surgeon talking with the patient. **Discuss the prognosis** of your patient with your **cardiology colleague.**
- Consider carefully if a **pacing wire** should be inserted **prior to GA** for surgery.
- **External pacing is relatively simple** and cephalic vein access distant to this patient's site of pathology was possible.





2. Remote area trauma – is it a death sentence?

A middle-aged person was found unconscious following a fall down a flight of stairs. An ambulance was immediately called.

The first-recorded observation by the Queensland Ambulance Service (QAS) was shortly after 11pm. The patient's Glasgow Coma Scale (GCS) was three with a dilated but reactive left pupil and a normal but reactive right pupil. Initial oxygen saturations were 86%. The next QAS observation was three minutes later. Oxygen saturation was then 97%. The left pupil remained dilated but still reactive. The ambulance report documented an abrasion to the forehead and a laceration to the occipital region, indicative of two blows to the head. During the next 15 minutes GCS improved to six, though subsequent recordings showed a GCS of three once more.

The patient was taken to the local rural hospital and admitted shortly after midnight. The last observation recorded by ambulance personnel was shortly before this time, with a GCS of three and with a dilated but reactive left pupil.

The admission notes reported that in the early hours of the morning, the patient was intermittently demonstrating some spontaneous eye opening but clearly had a right hemiplegia. The patient was intermittently bradycardic to 45 beats per minute. A lateral x-ray of the cervical


spine did not demonstrate any fracture or dislocation. There was no skull fracture. An indwelling catheter was inserted.

There were only four more observations on the local hospital neurological observation sheet. These took place between 01:30 hours and 03:00 hours where there was a fluctuating GCS but no record of pupillary or motor responses. Two of the recordings indicate incomprehensible sounds. Another two comments indicate spontaneous eye opening and attempts at speech. No further medical notes were written.

Discussion with the clinical co-ordinator led to the decision to evacuate the patient to a major regional hospital with intensive care facilities and a neurosurgeon.

The Royal Flying Doctor Service (RFDS) first made contact with the patient just before 4am at the local rural hospital and departed for the major regional hospital around 7am. During that time, active measures were taken to resuscitate the patient. There were comments that while in hospital the patient had a conscious state fluctuating GCS 6-10 (However, no documentation to support this was found in the medical record).

Oxygen saturations were deteriorating. Right-sided air entry was deteriorating. A right intercostal catheter (ICC) was inserted and a large volume of air was released with significant improvement in respiratory function. No air entry was heard on the left side ten minutes after ICC insertion and a left ICC was inserted, again with a large volume of air released. There was a significant



improvement in oxygenation. GCS remained three.

Following insertion of ICC and with intubation and ventilation, blood pressure of 210/120 mmHg was recorded with a pulse of 60 beats per minute. There was some improvement in the observations over the following 15 minutes but no improvement in the GCS.

The first record of fixed dilated pupils was just after 8am while in transit with the RFDS. The admission to intensive care unit (ICU) at the major regional hospital was reported at just before 11am.

CT scan at that hospital demonstrated a small acute subdural haematoma with midline shift, some subarachnoid blood and bilateral frontal haemorrhagic contusions. There was evidence of severe diffuse brain swelling. Computed tomography (CT) angiogram demonstrated poor flow in the right middle cerebral artery with possibly no flow in the posterior circulation. The patient's pupils remained fixed and dilated with GCS at three.

After neurosurgical consultation, it was considered that the patient had sustained an irretrievable head injury and after discussion with the relatives, no active treatment was provided. Brain death was confirmed and the patient was pronounced dead later that afternoon.

Comment:

It is clear that hypoxia and hypercarbia played a very significant role in this patient's demise and this was a fatal combination with a brain injury that involved bilateral haemorrhagic contusions and swelling.

There were many features of the management, mostly to do with **communication issues**, which might have been improved. Would best-practice management have altered the outcome? We can only surmise.

QASM assessment of this case was hampered by overall poor record keeping. Observations were sparse and infrequent.

The time delay from injury to the arrival of the retrieval team was lengthy but probably unavoidable. The retrieval team corrected the major complicating factors quickly. This did improve the patient's medical state but made no impact on the final outcome.

There is no suggestion made in the notes that mannitol could have been used in an attempt to provide some relief of raised intracranial pressure throughout the transport period.

Likewise, there was no suggestion that perhaps the patient could have been intubated and ventilated earlier. However, the downside is that it may have impacted adversely on the pneumothoraces.

Ideally, early involvement of a neurosurgeon might have been able to provide other



advice to the local treating doctor during the hours before the arrival of the retrieval team.

Education in the management of head injuries in remote areas needs to be an ongoing project. This is one aspect of patient management which has been well defined with clear-cut guidelines. Telephone support should never be overlooked in the management of head injuries.

Always be willing to 'phone a friend', and do it early in the care pathway.



3. Acute mesenteric arterial embolus – a deadly disease.


An elderly patient initially underwent an elective Billroth II gastrectomy for a gastrointestinal stromal tumour (GIST).

This gastrectomy was complicated by a duodenal stump collection. The collection was percutaneously drained, and yet despite adequate drainage, the duodenal stump leak continued and required re-laparotomy and conversion to Roux-en-Y gastrectomy six weeks later.

The patient was re-admitted one week after discharge to the coronary care unit (CCU) with a witnessed pulseless ventricular tachycardia (VT) arrest. The patient had a known history of chronic atrial fibrillation, which had been treated by aspirin, digoxin and amiodarone. Symptoms of intermittent abdominal pain, nausea, vomiting, dizziness, fevers, sweats and poor oral intake had been described.

Two more episodes of polymorphic VT were recorded during admission, indicating the severity of the patient's condition.

Surgical review was requested and it was felt that an intra-abdominal cause was unlikely considering the patient had no abdominal pain at the time of examination and the abdomen was soft. A white cell count of $26.4/10^9/L$ with a neutrophilia was either missed or not taken into account. A CT scan of the abdomen was cancelled as a consequence of this omission.



The patient became very unwell in the early afternoon of the following day, with severe abdominal pain, nausea and vomiting. The pain was described as constant and was not relieved by intravenous (IV) opiates. Later that evening, the patient was again seen by the surgical team and the pain was dismissed as 'multi-factorial'.

A CT abdomen was finally performed, and despite multiple calls to the surgical team overnight, the patient was apparently only reviewed by them at about midday the next day. There also appeared to be a significant delay in radiological reporting of the CT scan. At the midday surgical review, the surgical team suspected ischaemic bowel, but instead of immediate surgery, considered a repeat CT angiogram to confirm the diagnosis.

The patient proceeded to the operating theatre in the late afternoon, some 30 hours after onset of pain. At operation, extensive necrotic small bowel was found and resected with a primary anastomosis being performed. A right upper quadrant (RUQ) sub-hepatic collection (possibly a complication of previous surgery) was evacuated and the abdomen closed.

The patient became unwell again some four days later and a repeat CT abdomen showed a large amount of free fluid and gas consistent with leak or perforation. More ischaemic bowel was also suspected as being the cause. After discussion with family, care was withdrawn and the patient died within 24 hours.

Comment:

Acute mesenteric ischaemia caused by arterial embolic disease is a highly lethal disease, with a mortality rate of >70%. Only a high index of suspicion and early operative intervention may improve a patient's chances of survival.

The delay in diagnosis and intervention in this patient was extremely unfortunate. Multiple failures all contributed to this delay. These multiple failures included:

- poor surgical follow-up of a complicated surgical patient
- lack of a high index of suspicion
- failure to consider constant severe abdominal pain (that is not relieved by opiates) as a vital sign
- poor initial assessment of the CT scan
- significant radiological delay in reporting of the CT scan
- poor surgical supervision of trainees
- poor communication between medical and surgical teams (especially poor at a senior level)

There is little doubt that the delay of about 30 hours contributed significantly to the patient's poor outcome.

Damage-control surgery is ideal for severe bowel ischaemia. At the planned re-exploration (about 48 hours later), further ischaemic tissue may be resected and a safer anastomosis can then be fashioned. Delay of fascial closure also allows third-



space losses to be suctioned, thereby avoiding further compromise of blood flow, intra-abdominal hypertension and abdominal compartment syndrome.

The patient with a complicated recent surgical history should be closely followed up. Significant incidents such as life-threatening VT arrests and polymorphic VT should be taken very seriously. One should have a high index of suspicion that complications of the surgical procedures have occurred and these should be actively excluded rather than dismissed.



4. A fatal unrecognised forearm compartment syndrome.

A middle-aged patient experiencing psychotic depression and debilitating Parkinson's disease was admitted to hospital with atypical chest pain which was attributed to a panic attack.

The next documented electroconvulsive therapy (ECT) treatment was planned for six days later, though this was cancelled due to a high temperature. The attending psychiatrist questioned whether the patient's deteriorating mental state was a result of physical causes with associated delirium.

The patient became catatonic, febrile and short of breath, 24 hours following admission. Transfer was arranged to the intensive care unit (ICU) where the patient was unable to verbalise. As the patient suffered dysphagia, the presumptive diagnosis was aspiration pneumonia. A nursing entry also described blistering on some fingers of the right hand.

The following morning, orthopaedic review diagnosed a right forearm compartment syndrome and the patient was intubated and ventilated. This diagnosis was consistent with the serum creatine kinase that was extremely high. Compartment pressures were greater than 80mm Hg. The diagnosis of Neuroleptic Malignant Syndrome was made and the associated rhabdomyolysis had led to acute kidney injury.



Orthopaedic treatment consisted of forearm fasciotomy, followed by a partial delayed primary closure two days later and a further delayed primary closure to complete the treatment after a further three days. Regular psychiatric review and haemodialysis continued. Recurrent aspiration (long standing dysphagia and intolerance of nasogastric tube placement) and acute kidney injury complications resulted in palliative care referral one month after admission. Three days later the patient was placed on the dying-patient pathway. Two days later, the patient passed away. This was just over a month following admission.

Comment:

- The **in-patient notes** prior to ICU admission were **confusing and unclear**. It was not possible to discern whether ECT had been performed during the first few days of admission, although it was implied in one case note entry.
- If indeed it had been performed, it would appear that within three days the patient had developed an acute kidney injury.
- Haematological investigations quickly lead to diagnosis and orthopaedic review. The diagnosis of compartment syndrome was then confirmed.
- There was no **clinical documentation regarding the forearm status** and no suggestion of signs of a compartment syndrome.
- Where no definitive diagnosis is clear, collaboration with other specialities is always worthwhile.
- In this case, a **comprehensive examination of the patient** would certainly have shown some alarming features in the forearm that should have stimulated further investigation and consultation.
- Although significant co-morbidities were present it would appear that the patient's deterioration was accelerated by the complications of compartment syndrome.
- Orthopaedic treatment was prompt and appropriate, but the patient suffered the fatal consequences of aspiration.
- **Delay in diagnosis was in this case the most significant deficiency.**





5. Consultant communication - simple yet serious!

A morbidly obese middle-age patient underwent a total cystectomy with ileal conduit for bladder malignancy. At three months post-surgery, CT scan was performed to ascertain the cause of the increasing abdominal pain. The scan showed a mass in the left pelvis adjacent to the proximal sigmoid colon. A decision not to offer radiation therapy was made as bowel involvement was considered highly likely.

At five months post-surgery, the patient presented once more with a history of fevers and abdominal pain. The patient was admitted as a urology patient. The diagnosis was thought to be urosepsis. In the previous week, some diarrhoea had been experienced, although no major bowel symptoms were noted.

There was a satisfactory response to treatment with antibiotics and during the admission the patient was seen by a physiotherapist, an occupational therapist, and a social worker. Stoma-therapy nurses were also of great assistance to the patient. The documentation from the allied health staff was extensive and comprehensive.

Daily review by the urology team was undertaken and on day seven, the consultant was present. Whilst surgical consultation was requested to clarify continuing management of the residual/recurrent disease, a further CT scan showed marked increase in size of the mass.

The colorectal registrar reviewed the patient within an hour of being asked. It was determined that colonoscopy/biopsy/stent was the most appropriate course and the gastroenterology team was requested to undertake the procedure.

The registrar did not indicate which consultant they were representing, or on whose behalf they were seeing the patient. Documentation also does not clarify whether their consultant was aware of the plan.

The patient was seen the same day by the gastroenterology registrar and colonoscopy/biopsy/stent was deemed appropriate with the gastroenterology registrar indicating their intention to discuss this case with their consultant. The colonoscopy was undertaken a week later. There was no documentation to explain the delay, or any suggestion that it had been scheduled earlier than this and then cancelled.

The medical record indicates that the colonoscopy preparation was not well tolerated and after plain X-ray, revealed colonic dilatation, and thus the preparation was aborted. However, flexible sigmoidoscopy was a possible alternative and revealed an obstructing tumour in the sigmoid colon. A stent was placed with minimal difficulty and the medical record indicates several bowel actions over the next day suggesting some decompression of the obstruction.

The patient continued with clinical and radiological signs of obstruction and was reviewed by another colorectal registrar. This registrar indicated they were having difficulty in establishing colorectal



consultant ownership of the patient. The rostered consultant was on leave. Another colorectal consultant who was in the hospital was consulted and a plan made for a further attempt at stenting.

The patient's urology consultant directly contacted the second colorectal consultant due to their frustration with the inappropriate delays and poor communication surrounding the case.

The procedure was done the same day. The original stent was patent and had not migrated. Further malignant obstruction was noted but could not be stented. The following day, abdominal pain increased and CT showed free gas and fluid indicating perforation.

Careful but open discussion with the patient, their partner, two colorectal consultants, an ICU consultant and the consultant urologist promptly followed. It was decided that palliative surgery to remedy the situation was not feasible.

Palliative care was initiated and the patient died one week later.

Comment:

From the outset, this patient's management appears to have been fraught with **difficulties due to lack of consultant input.**

Lack of early management planning by the consultant was partly due to the registrar's ignorance or lack of desire to clarify the consultant to whom they were responsible. It was also partly due to the failure of the hospital service to clarify and ensure that on-call consultant staff was available and willing to advise. There were deficiencies in all the teams involved in this patient's

care suggesting a **systemic problem in the hospital.**

Lack of clear leadership and consultant ownership caused an inappropriate delay in undertaking the first stent procedure.

Poor communication and/or confusion amongst staff regarding the surgical response to the perforation was obvious. In the chart, an ICU indication that further team discussions were urgently required was clear. The ICU staff believed that surgery was a poor option in this case.

- Difficult cases like this require **early consultant-led decision making** by all the involved specialties and clear documentation of the agreed **management plan** especially when the decision may be to withhold major interventions.
- When this process appears not to be progressing, only **consultant-to-consultant communication** is likely to address the deficiency.
- The decision to **stent** a large bowel obstruction is an **emergent one** and should not be unduly delayed as progression to complete obstruction increases the difficulty and complication rate.
- Within any specialty service, **clear designation of the responsible consultant** is required and clear delegation of **handover** a necessity and all should be documented clearly.





6. Multi-trauma madness!

A middle-age cyclist was admitted to a regional hospital after being hit by a car. Within ten minutes of the accident, the QAS was at the scene. The patient's GCS was 15. A pelvic binder was placed, but the blood pressure was 90/55mmHg with a heart rate of 100 beats per minute. The patient arrived at the hospital shortly thereafter and an initial assessment confirmed the significant pelvic ring injury with a focused abdominal sonography in trauma (FAST) scan proving to be negative.

Some bleeding from an open proximal tibia fracture had been noted, and a tourniquet was placed on the thigh to control the bleeding from that site. The right hip was noted to be dislocated.

Shortly after assessment, two units of blood were given via rapid infusion as well as fresh frozen plasma (FFP) and platelets. The blood pressure remained low.

The general surgery team was called nearly an hour after arrival in ED, just as the patient arrested. The patient was intubated and further resuscitation attempted when it was decided to take the patient to theatre. The patient left ED for theatre 15 minutes after the decision was made and laparotomy to investigate the source of blood loss commenced 20 minutes after arrival in the theatre. The surgery was carried out by the consultant.

Laparotomy showed that the liver and spleen were intact, and a small intestinal tear was repaired. There was no small

bowel perforation. It was decided that most of the bleeding was coming from the pelvis.

Operation notes confirm that the 'pelvis and retroperitoneal' area was packed (though it was not clear which 'procedures', if any, were undertaken).

The patient became coagulopathic and a case conference with anaesthetics, general surgeons and orthopaedic surgeons began. A decision was made that no acute orthopaedic intervention was necessary. Only the abdomen was addressed for damage control.

Referring the patient to a tertiary referral hospital was discussed but seemed impossible due to the poor status of the patient at this time. The only further intervention was the placement of a Steinmann pin in the left distal femur to control the hip dislocation.

Resuscitation and anaesthetic records confirmed eleven bags of blood were given in ED with one bag of platelets and five bags of FFP. In the operating theatre, another thirty-eight units of packed cells, twenty-nine bags of FFP and four units of platelets were counted.

Despite all efforts, there was no response and active resuscitation was ceased and all drugs were ceased shortly after. The patient died shortly thereafter.

It seems from the notes and the anaesthetic protocol that the patient remained in theatre the whole time and could not be adequately controlled or stabilised at any time.



Comment:

This multi-trauma patient suffered a significant pelvic injury involving one acetabulum with hip dislocation. Such significant injuries carry a high probability of death. Nevertheless, the following issues must be considered.

- **This patient was already haemodynamically unstable at the accident scene.**
- **Information transfer to ED is essential.** Can we assume QAS had already forwarded this information to the ED?
- The QASM assessor could not find in the medical records that pre-notification (trauma alert/trauma response or trauma attend) was passed to the surgical teams so that an immediate surgical intervention could be initiated.
- **While the patient arrived in daylight, it took almost an hour to summon the surgical team.** During this period, several units of blood and FFP had been given.
- The loss of one hour in the decision-making process made a critical difference in the outcome. It then took almost an hour to start the surgical procedure. **The consultant was present for the laparotomy but does not seem to have been present for the decision making. Another critical absence.**
- Without doubt, this case would have also challenged a tertiary referral

hospital with all equipment including a radiological intervention suite available immediately to control the bleeding of this injury.

In summary, immediate involvement of surgical teams in the decision-making process by activating a trauma alert is recommended.





7. Not in that institution... please!

An elderly patient died two days following a right hemi-colectomy.

A general practitioner (GP) had referred this patient to a surgeon. The tumour was 'beside the ileocaecal valve' and the procedure was described as 'semi-elective'.

The patient, an ex-smoker, was a substantial pre-operative risk and had had a stroke some years before but recovered well. Medication was noted for atrial fibrillation, hypertension, and hyper-cholesterolaemia. Pre-operative blood results were disconcerting showing that bilirubin and liver enzymes were raised. The pre-operative glomerular filtration rate (GFR) was 30 mL/min/1.73m², urea 18.0 mmol/L, and creatinine 0.19 mmol/L, indicating significant renal impairment.

The patient ceased regular warfarin six days before operation but the international normalised ratio (INR) was still 2.0 on the day the procedure was done.

On admission prior to surgery, the patient's BP was recorded as 80/55mmHg. Anaesthetic assessment immediately prior to surgery describes the patient as 'a bit dry'. The patient underwent open right hemi-colectomy. The surgery apparently went well but there was some 'oozing' where the tumour was 'stuck posteriorly'.

From the admission stage onward, the patient continued to be hypotensive, often with a critically low BP and poor urine output. This was managed by the anaesthetist with IV fluid boluses, albumin, ephedrine, two units of blood, lasix, and Vitamin K. FFP was given later on the day of operation because of 'coagulopathy'.

In view of acute (or chronic) renal failure, the patient was referred to the local public hospital the day after the surgery. **The public hospital notes confirm that although the patient was accepted, the 'hospital' appears to have regarded this 'process' as unsatisfactory.** The receiving hospital's records noted that the patient 'had an inotrope requirement which we were not aware of ' and that the patient was 'sicker than we were led to believe at handover'. The referring letter from the surgeon did not express the gravity of the situation.

After careful but comprehensive family discussions, a 'do not resuscitate' decision was made and noted in the medical record. Further documentation commented on the fact that the patient was considered to be 'unsalvageable with refractory metabolic acidosis and renal failure'. Consultant comment further stated that the patient almost certainly had 'pre-operative hepato-renal failure due to widespread liver metastases'. A further comment stated: 'dehydration pre-operatively'.

The patient died late the same day.



Comment:

This patient died as a consequence of surgical intervention superimposed on a multitude of pre-operative problems. The P-Possum score was estimated to be approximately 93% chance of morbidity and 30% for chance of mortality.

The crucial CT scan, colonoscopy reports and surgeon's letter were not passed on to the receiving hospital. Given that the patient had extensive liver metastases, with large volume ascites, and was in renal failure with poor pre-operative liver function: should this patient have been offered or undergone surgery? For this patient, even if acutely obstructed, this was an end-of-life event. The patient should have been managed by palliative care.

In this case, the following issues need to be considered:

- **What are the benefits of surgery?**
- The **raised INR** needs further discussion. In the presence of liver disease it would take a long time for the INR to reverse.
- The **issue of the hypotension pre-operatively** calls into question the patient's actual fitness to proceed on the day of surgery.
- There are respected guidelines in the literature that all patients over 80 years require **combined physician and surgeon management**.

- Were the **patient and family informed accurately?**
- Should this patient have been **operated upon at all?**





8. Who is managing this patient?

This elderly patient was admitted for an elective percutaneous nephrolithotomy for a large left staghorn calculus.

The patient was known to have had a large renal calculus since 2005 on that side but had been lost to follow-up. They re-presented to the Urology outpatients with a history of recent 'flank pain' and lower urinary tract symptoms. Further investigation also demonstrated a bladder stone.

The patient subsequently underwent an uncomplicated transurethral prostatectomy (TURP) and removal of a bladder stone. The patient was then scheduled for a left percutaneous nephrolithotomy (PCNL).

There was no identifiable medical contraindication for this planned operation. The patient had a well-controlled hypertension, gastro-oesophageal reflux disease (GORD) and moderate but asymptomatic mitral valve regurgitation. The patient's medications included fish oil (which was presumed ceased).

Intra-operatively, despite an earlier successful placement of a guide wire, significant difficulty was encountered gaining percutaneous access to the collecting system. Tract dilatation was performed, but access failed despite three attempts.

The procedure was appropriately abandoned and there seemed to be no obvious problem. The anaesthetic was completed mid-morning and the patient arrived in recovery within fifteen minutes. The patient was kept in the recovery for over an hour. Observations in recovery were normal and the patient appeared stable.

The patient was then transferred to the surgical ward. A drop in blood pressure (95/60 mmHg) was noted on arrival and an hour later 70/40 mmHg was recorded and the urology resident was notified. IV normal saline (300 mLs) was given and the plan was to review the patient in 30 minutes. BP rose to 90/50 mmHg but the patient was not reviewed for over two hours when the resident was again called. BP then was 80/60 mmHg. Haematuria was noted and the patient complained of left flank pain.

The patient was given 500mL of normal saline over the next hour. Investigations included full blood count (FBC), electrolytes and liver function tests (E/LFT) and coagulation studies and a 'group and save' was initiated. A large IV cannula was inserted.

Hb was recorded as 120gm/mL. The platelet count was normal. No radiological investigations were arranged. BP was 130/70 mmHg one hour after the bloods were taken but shortly thereafter dropped to 60/40 mmHg. The patient became increasingly drowsy and an 'arrest code' was called.



Transfer to ICU was prompt and the urology registrar was called. Persistent retroperitoneal bleeding was thought to be the diagnosis and surgical intervention was planned. Repeat Hb was then noted to be 70 gm/mL and despite transfusion and resuscitation, the patient remained unstable.

Two hours later, the patient suffered a refractory VF and died.

Comment:

Was the decision to operate a reasonable one?

The decision to operate on this patient was not an issue as the patient was symptomatic with left loin pain.

The choice of surgery, a PCNL, was also not an issue as there was good cortical preservation of that kidney despite the presence of a large staghorn calculus.

One may argue the role of differential renal function in determining the choice of treatment (nephrectomy versus PCNL). It is well documented, however, that the kidney function is likely to improve if stone clearance can be achieved.

Was the post-operative complication recognised in a reasonable time?

The delay in diagnosis of a significant retroperitoneal bleed is a significant issue.

Considering the difficulty in this percutaneous approach and the failure to access the collecting system despite puncture tract dilatation, the issue of

renal parenchymal trauma with significant retroperitoneal bleeding should have been considered. Immediate radiological investigation should have been arranged to confirm the possible diagnosis. This would then expedite urgent appropriate management.

Who was managing this patient?

The patient was seen by the Urology resident on the ward for their hypotensive episode. **Inexperience, mixed with ignorance** about the possible causes of this significant hypotensive episode, led to a failure to notify a more senior colleague.

The urology **registrar and consultant** were **not notified** until late in the event.

The **systemic failure** may perhaps have been avoided if there was appropriate education of the junior medical and nursing staff about the possible complications of a 'failed' PCNL.

Clear communication in post-operative instructions/orders should have been written by the consultant drawing attention to the high risk of post-operative bleeding and encouraging early discussion of any concerns at the **consultant surgeon level**.

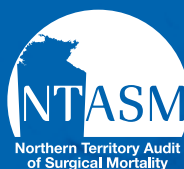




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