



coresss Feedback

Surgical Safety Update: Cases from the Confidential Reporting System for Surgery (CORESS)

CORESS is an independent charity, supported by the Federation of Surgical Specialty Associations (FSSA)

Professor Frank CT Smith, Programme Director, on behalf of the CORESS Advisory Board.

This series of reports illustrates a variety of cases in which systems errors were involved. Injection errors remain a perennial problem, and a useful reference article classifying psychological causes of medication errors is cited. A problem arising from pooled lists is illustrated. Attention is drawn again to the value of team briefs and effective use of WHO checks in reducing operative error.

We are grateful to those who have provided the material for these reports. The online reporting form is on the website (www.cores.org.uk), which also includes all previous Feedback reports. Published cases will be acknowledged by a Certificate of Contribution, which may be included in the contributor's record of continuing professional development, or may form part of appraisal or annual review of competence progression portfolio documentation. Trainee contributions are particularly welcome.

Professor Frank CT Smith
On behalf of the CORESS Advisory Board

Thoracic Outlet Surgery Complications

(Case ref: 260)

A 38 year-old woman underwent first rib resection and scalenectomy with pectoralis minor tenotomy for neurogenic Thoracic Outlet Syndrome (NTOS). Preoperatively, the procedure and potential complications were discussed in detail with the patient, whilst obtaining informed consent. Surgery was uneventful and the first rib was excised via a supraclavicular approach. Scalenus anterior was detached from the scalene tubercle on the first rib and a substantial portion excised, relieving compression of the subclavian artery and brachial plexus. The operating surgeon searched for the phrenic nerve which lies on the anterior border of scalenus anterior, beneath the scalene fat pad, but was unable to identify the nerve.

The patient made a satisfactory recovery and was discharged on the first post-operative day. Four weeks later she attended her GP, unwell with a cough and a fever. She was referred to hospital where she was diagnosed with pneumonia. On auscultation of her heart, a mitral valve murmur was noted. Blood cultures were obtained and the patient underwent chest X-ray which showed consolidation in the base of the right lung and an elevated right hemidiaphragm. Echocardiography confirmed mitral valve regurgitation with the suggestion of vegetations on the valve.

She was treated with intravenous antibiotics but remained breathless and unwell. Eventually the cardiac surgery team intervened, in the presence of normal blood cultures, to undertake mitral valve annuloplasty and debridement via median sternotomy. Six months post-surgery, on long-term antibiotics, the patient remains well with improvement of her NTOS symptoms and normal cardiac function.

Reporter's comments:

(Surgery for NTOS represents a small niche in surgical practice. The procedure involves decompression of the scalene triangle by resection of the scalenus anterior and scalenus medius muscles, to decompress the roots of the brachial plexus and subclavian artery, with resection of the first rib. During surgery, the brachial plexus, phrenic nerve and long thoracic nerve to serratus anterior, are at risk (Figure 1). As

operating surgeon, I had discussed the potential risks with the patient in detail, and had documented these on the consent form. Nonetheless, having failed to identify the phrenic nerve, despite looking for it, and documenting this in the operation note, it would appear that the nerve was injured during the procedure giving rise to the elevated hemidiaphragm. Subsequent development of a pneumonia predisposed to septicaemia and the resultant endocarditis. This was not a complication previously encountered. Identification and protection of the phrenic nerve during dissection in this procedure is paramount. The elevated hemidiaphragm subsequently recovered, suggesting nerve paresis.

CORESS comments:

The Advisory Board accepted the reporter's comments. The anatomy relating to this procedure is illustrated in Figure 1.

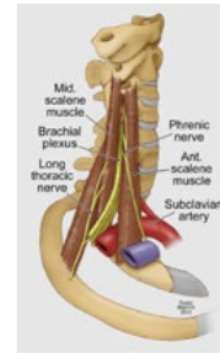


Figure 1. The anatomy of the Thoracic Outlet illustrating nerves at risk during surgical decompression. The clavicle is not illustrated in this diagram. (Reporting Standards of the Society of Vascular Surgery for Thoracic Outlet Syndrome, Illig KA et al, J Vasc Surg 2016)

Missed breast tumour in pooled case.

(Case Ref: 263)

A 50-year old lady presented through the Breast Screening Programme, with a right breast cancer. At the time of assessment, the tumour was easily palpable as a 2cm mass. She was listed for wide local excision and sentinel lymph node biopsy.

During pre-assessment she required cardiac investigations prior to surgery, leading to a delay in the procedure. She was therefore commenced on primary hormonal therapy, as she was oestrogen receptor positive. Her surgery was undertaken approximately 6 weeks later.

On the day of surgery, the patient was examined by a different surgeon, and the tumour was no longer palpable. The consultant who carried out the initial assessment was on leave and the operating list was undertaken by another experienced surgeon. The surgeon spoke to the on-site breast radiologist, who placed a skin mark over the site of the tumour under ultrasound control. Uneventful surgery was undertaken.

At the post-surgery MDT, it was reported that no tumour was present in the excised breast specimen. The patient was re-assessed radiologically and the persistent tumour was identified adjacent to the surgical bed. A second procedure under wire-guidance was undertaken, and the tumour was successfully removed.



**Reporter's Comments:**

This case highlights the pressure to use operating capacity to its maximum. It was complicated by an unusually fast response of the tumour to hormone therapy, such that it became impalpable. Despite efforts to localise the tumour with a skin mark, this was ineffective. A protocol has now been introduced, dictating that in similar circumstances, a guide wire needs to be placed under imaging control prior to surgery.

CORESS & Reporter Comments:

Where cases are pooled, standards need to be protected through use of common protocols. Options here might have included placement of a coil or clip, under radiological control, prior to chemotherapy, to aid tumour localisation. Placement of a guide wire to aid dissection, under ultrasound control, remains an effective method of localising an impalpable tumour prior to surgical resection.

Abscess Confusion

(Case Ref: 264)

A 45-year old man presented to the Emergency Department on a Friday, with a left buttock abscess of two weeks duration. He was seen and consented for incision and drainage by the surgical SHO who marked the side and site with a large arrow pointing towards the abscess from laterally. In the event the emergency list ran late and the patient was cancelled for surgery that night. He was sent home and told to come back after the weekend. When he reattended, he was listed for incision and drainage of a pilonidal abscess. The skin was re-marked over the site of the still visible inked arrow, and he was consented for drainage of a buttock abscess, but he was not seen by the registrar due to undertake the procedure, who was already operating.

The patient was brought to theatre and placed in the left lateral position, with the marked arrow and abscess obscured. With the patient draped and anaesthetised, the registrar was unable to find a pilonidal abscess. He called in the consultant who thought he felt some localised induration and undertook an exploratory incision in the natal cleft, which he left open and packed. No sample was sent for microbiology. When the patient returned to the recovery area and was awoken, he was disturbed to find that the symptoms from his undetected, and untreated, left buttock abscess persisted. He subsequently required a further procedure and a formal complaint was submitted.

Reporter's Comments:

Confusion arose between the classification of the various abscesses that arise around the buttocks, perineal and natal cleft regions. The patient was inappropriately listed for the wrong operation, and was not seen prior to surgery by the operating surgeon, who positioned the patient according to the procedure described on the list. In this position, neither the abscess or the marked arrow could be seen.

CORESS Comments:

Multiple errors contributed to this adverse event. There was failure to apply the correct nomenclature to the pathology, which was described differently on consent form and operating list. Of paramount importance was the fact that the operating surgeon did not examine the patient and confirm the site of pathology prior to anaesthesia.

The site of the marked abscess was not visible in the position in which the patient was placed. A preoperative brief and a formal WHO check should have prevented this occurrence. This is a systemic problem compounded by individual failures, referred to by the Advisory Board Psychologist as "organisational amnesia".

Injection error 1.

(Case Ref: 265)

On a routine GI operating list, the anaesthetist, keen to ensure rapid patient turnover and completion of the list, drew up three separate prophylactic antibiotic doses of intravenous cefuroxime 1.5 g for the first three patients, as discussed with the surgeon. On administration of the antibiotics the first patient was noted to twitch, but otherwise the procedure was completed uneventfully. When the prophylactic antibiotics were administered to the next case, however, the patient fitted. Review of the administered drugs revealed that the cefuroxime powder had inadvertently been reconstituted with 1% lignocaine solution, which was kept in the same drawer as the water for injection, in a similar ampoule. The patient recovered with no adverse effects but had to be awakened and the operation was not completed.

Injection error 2.

(Case Ref: 266)

In a separate incident, an anaesthetist prepared two syringes of Alfentanil 500 mcg/ml for the first two patients on the operating list. On completion of the first case, he administered what he thought was Ondansetron 2mg/ml, drawn up from a similar sized ampoule, to reduce postoperative nausea. Inadvertently, however, the drug given was the Alfentanil drawn up for the second patient, who sustained temporary laryngospasm and respiratory depression causing prolonged recovery from anaesthesia.

CORESS Comments:

Medication errors can occur in:

- choosing a medicine—irrational, inappropriate, and ineffective prescribing, under-prescribing and over-prescribing;
- writing the prescription—prescription errors, including illegibility;
- manufacturing the formulation to be used—wrong strength, contaminants or adulterants, wrong or misleading packaging;
- dispensing the formulation—wrong drug, wrong formulation, wrong label;
- administering or taking the drug—wrong dose, wrong route, wrong frequency, wrong duration;
- monitoring therapy—failing to alter therapy when required, erroneous alteration.

Aronson¹, has classified medication errors according to four broad categories:

Knowledge-based errors (through lack of knowledge)

Rule-based errors (using a bad rule or misapplying a good rule)

Action-based errors (called slips)

Memory-based errors (called lapses)

The Advisory Board were grateful to the anaesthetist who contributed these reports. Two separate mechanisms were involved in these injection errors. In the first, the antibiotics were reconstituted with the wrong fluid for injection. In the second, the wrong syringe was picked up. These were both action-based errors. The anaesthetist commented that drawing up multiple drugs for different operations contravened good practice. Coloured sticky labels applied to syringes may help, but are not always standardised. Keeping drugs with similar packaging and appearance next to each other in a store cupboard constitutes a systems error. Checking each drug, ampoule and date, prior to administration is a mandatory action prior to injection.

1. Medication errors: what they are, how they happen, and how to avoid them

J.K. Aronson QJM: An International Journal of Medicine, 2009;102 (8) 513-521,

<https://doi.org/10.1093/qjmed/hcp052>





Fall from grace

(Case Ref: 267)

An anaesthetised patient, due to undergo a gynaecological procedure, was placed on the operating table with her legs up in stirrups, and her bottom over the edge of the table. The anaesthetist, keen to reduce the risk of pulmonary aspiration, tilted the table head-up with the consent of the operating surgeons. Unfortunately, despite prior removal of the transfer slide sheet, the patient slid off the table and fell to the floor. The procedure was abandoned. The patient had to be awakened from anaesthesia and transferred to the emergency department to undergo a full trauma survey and imaging to exclude spinal and cranial injury. Litigation was successful.

CORESS Comments:

Falls from operating tables constitute serious risk to the patient and may be under-reported. Removal of the slide sheet forms part of the WHO check. Certain procedures may be more prone to risk of patient slippage particularly where an operating table needs to be angled (neurosurgery; laparoscopic surgery; gynaecological and colorectal procedures). Where there is increased risk, securing straps can be employed, and a high degree of awareness of the potential risk is the responsibility of the operating surgeon.

Atypical thromboses

(Cases 268, 269, 270)

Case 1

A 42-year old lady presented to her GP with rapid onset pain and pallor of her right leg. The GP was unable to feel pulses and referred her to the Emergency Department of the local hospital. She was transferred to the care of the vascular team who obtained a duplex scan and CT angiogram confirming occlusion of the superficial femoral artery with the appearance of embolism causing acute leg ischaemia. A femoral embolectomy was undertaken that night, at which the vascular registrar removed a quantity of recent clot. The patient was placed on intravenous heparin.

The leg survived overnight but remained dusky and further thrombectomy was necessary the following morning. Due to the odd appearance of the clot, some was sent for histological examination. The histology report commented on the appearances of myxomatous material. The patient underwent transthoracic echocardiography and chest CT scans confirming the presence of a left atrial myxoma. She was subsequently referred to the cardiac surgeons, who undertook surgical resection of the tumour, and the patient made a full recovery.

Case 2

Following hysterectomy for bleeding, a 46-year old woman presented with a warm swollen left leg. Duplex scan suggested iliofemoral thrombosis and the patient was treated for a postoperative DVT. She was anticoagulated, but at 3-month follow-up duplex scanning, imaging suggested propagation of the clot with abnormal appearances, and she underwent abdominal and pelvic CT scans. CT imaging revealed fleshy tissue, or clot invasion of the left pelvic and iliac veins, propagating into the inferior vena cava. The vascular surgery team became involved and eventually undertook open venous exploration, removing a large quantity of abnormal thrombus from the IVC and iliac vein. Postoperatively the patient remained anticoagulated.

Histological examination of the clot revealed cellular features of intravenous leiomyomatosis, a rare benign smooth muscle tumor, of uterine origin, that may grow into pelvic veins. On continued anticoagulation the patient remained well at 6-month follow-up with no significant recurrence.

Case 3

A 54-year old non-smoking man with minimal risk factors for vascular disease presented with a dusky painful swollen left calf of 48 hours onset. Duplex scanning suggested the probability of a calf vein DVT with an associated haematoma in the calf muscles adjoining the veins. The haematoma was explored and drained of dusky clot, and the patient was anticoagulated. However, the swelling persisted over the next two weeks and there was further bloody discharge from the calf incision. An MRI scan showed an irregular oedematous appearance of the calf muscles and the wound was re-explored with biopsy of the indurated muscle. Histological examination of the excised muscle demonstrated the presence of an invasive rhabdomyosarcoma. The patient required amputation of the affected leg shortly after.

CORESS Comments:

These atypical presentations of arterial and venous thromboses don't represent surgical mishap or adverse incidents. However, the Advisory Board noted that if there is no obvious source of embolus, then it is reasonable to ask for histological examination of thrombus, to rule out an atypical pathology. Arterial or venous thrombosis with no obvious cause may be the first manifestation of occult neoplasia.

