RCS
ADVANCING SURGICAL STANDARDS

CORESS is a confidential reporting system for surgery. The purpose of CORESS is to promote safety in surgical practice, both within the NHS and in the independent sector.

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coress feedback

The cases described in this issue of CORESS Feedback emphasise recurrent themes in confidential reporting. Attention is drawn again to the risks of inadvertent diathermy activation. Lack of communication underpins the adverse events recounted in three disparate cases. A case contributed by the ophthalmologists underlines the theme of prevention of retained foreign objects, common to all surgical specialties.

We are grateful to the clinicians who have provided the material for these reports. The online reporting form is on our website (www.coress.org.uk), which also includes all previous Feedback reports. Published contributions will be acknowledged by a 'Certificate of Contribution', which may be included in the contributor's record of continuing professional development.

Inadvertent diathermy activation... again! (Ref 176)

During an emergency laparotomy, the finger-switch diathermy (which had previously been working normally) stopped working. We checked the lead, connection and machine, and I was told the equipment was functioning correctly. The Mayo operating table partially obscured my view of the diathermy machine. While the circulating nurse fetched another lead, I picked up and used the foot pedal operated diathermy forceps.

It was immediately apparent on tissue contact that the forceps was active, even without the foot pedal being depressed. The yellow cutting diathermy pedal had been placed on the base of the operating table. Ten minutes earlier I had asked for the table to be lowered and the yellow pedal had been compressed between two table components. The volume on the diathermy machine had been turned down to the lowest setting so no warning signal was audible. Fortunately, the forceps had been in the sheath and not on the drapes or on the patient's skin, and the patient did not come to any harm.

Reporter's comments

The yellow cutting diathermy pedal is rarely used in my experience and is often placed out of the way to avoid accidental deployment. In this case, it was inadvertently depressed and activated when the table was lowered. The diathermy warning volume had been turned down to zero. It was not noticed on the display that the cutting diathermy had been activated.

CORESS comments

This is a perennial problem. (See cases 149 and 161 reported in the March 2014 issue of the *Annals*.)[1] Almost all surgeons on the CORESS Advisory Committee, across the range of surgical specialties, have been involved in similar incidents. Education about the risks of diathermy is a fundamental component of surgical training, and this is taught in the intercollegiate *Basic Surgical Skills* course and included in the Intercollegiae Surgical Curriculum Programme.

When not in use, the diathermy pedals should be kept well out of the way of the operating surgeon and not placed above or below the foot of the operating table. The diathermy alarm is there for a purpose and any activation warning alarm should not be turned off or set to an inaudible level. CORESS has queried the need for an 'alarm off' mode. Never leave diathermy forceps lying on a patient and always place in a protective sheath when not in use to avoid inadvertent harm to the patient.

The Medicines and Healthcare products Regulatory Agency has developed an educational module on electrosurgery, jointly with The Royal College of Surgeons of England. This useful tool can be found at:

http://www.mhra.gov.uk/ConferencesLearningCentre/LearningCentre/Deviceslearningmodules/Electrosurgery/

Reference

1. CORESS feedback. *Ann R Coll Surg Engl* 2014; **96**: 161–162.

Retained foreign objects in ophthalmic surgery (Ref 177)

A 68-year-old patient underwent a trabeculectomy under local anaesthesia performed by an experienced glaucoma surgeon. Sponges soaked in antimetabolite were placed under the conjunctival flap (into the space between Tenon's capsule and the sclera) for three minutes, as per standard practice. At the end of this time, two of the five pieces of sponge could not be retrieved; it was assumed that they had migrated backwards between Tenon's capsule and the sclera. Repeated attempts at removal resulted in significant orbital haemorrhage. The sponges were eventually removed by an orbital surgeon under general anaesthesia: one piece was found behind the macula and the other had migrated to the tendon sheath of one of the rectus muscles. Thankfully, no harm came to the patient's vision.

Reporter's and CORESS comments

The capsule of Tenon (bulbar sheath) is a thin membrane that envelops the eyeball from the optic nerve to the limbus, separating it from the orbital fat. Local anaesthetic may be instilled into the space between Tenon's capsule and the sclera to provide anaesthesia for eye surgery. A

sponge or other item inserted into this space can potentially migrate within the space, to any location beneath the membrane. Standard practice was to insert sponges into the sub-Tenon's space, with no failsafe method of retrieving them. Attempted retrieval (eg with forceps) may inadvertently push the sponges deeper.

This problem can be prevented by threading sponges on to a suture (6/0 or 5/0 nylon) beforehand, tying it in a loop, analogous to a necklace. This makes surgery quicker as well as safer. Sponges can still potentially come off the necklace so they must be counted in and out of the eye. Reconciliation of a swab count is essential in all surgical fields to reduce the risk of patient harm.

Water under the bridge: missed deteriorating renal function (Ref 186)

An elderly woman with acute arm ischaemia was referred by the on-call surgical registrar in a peripheral hospital to the vascular consultant in the hospital covering the region's vascular take. He informed the consultant that the patient was in atrial fibrillation, had chronic obstructive pulmonary disease and ischaemic heart disease. The fact that she also had chronic renal disease was overlooked in the verbal referral. Contrast computed tomography (CT) angiography was performed, confirming brachial artery occlusion, and the patient was then transferred to the vascular centre, arriving late at night. On arrival, the arm was noted to be viable, blood tests were carried out and a heparin infusion was commenced.

A ward round was undertaken the next morning, before the blood test results were available. In view of the fact that the patient had significant co-morbidities but the arm was asymptomatic and viable (although with no radial pulse), it was decided to manage her conservatively. The consultant then handed her over to the new vascular consultant on call for that day by telephone, without information about renal function. It was not recognised until late morning that she had poor urine output overnight, becoming anuric after the morning ward round. When nursing staff pointed this out to the surgical senior house officer, it was recognised that the patient had high serum creatinine and urea, with increasing serum potassium. Attempts were made to manage her acute renal failure but she deteriorated rapidly and died within 24 hours from a cardiorespiratory arrest.

Reporter's comments

A series of errors predisposed to an adverse outcome in this case. The salient fact that the patient had severe kidney disease was inadvertently neglected by the referring registrar. The consultant requested contrast CT, which probably induced acute-on-chronic renal failure. The patient arrived in hospital late at night and the clinical focus was on the presenting complaint of arm ischaemia such that the patient's renal function was overlooked. On review of the patient the following morning, blood tests were not yet available and the surgical team was falsely reassured by the relatively good condition of the arm, missing the poor urine output. In the subsequent handover, again, the deteriorating renal function was missed.

CORESS comments

When investigations are requested, these should always be followed up at the first opportunity. In a vascular patient for whom a contrast investigation is ordered, confirmation of normal renal function should always be checked prior to administration of contrast. With increasing specialisation in surgery, there is risk of the clinician becoming blinkered, concentrating solely on the specialist aspect of the clinical problem. This is poor medicine. A good doctor will always review the patient in context, remaining alert for likely co-morbidities. There is evidence that missed deteriorating renal function in elderly patients is a significant problem in the National Health Service, particularly at night and during weekends. Surgical teams should remain alert to this possibility.

Lack of 'vac' (Ref 185)

A long-stay, complex patient, with a chronic perineal wound being treated with negative pressure dressings, was placed on the emergency list for a dressing change since the patient was unable to tolerate dressing changes on the ward. Higher priority emergencies and reluctance by staff (surgical as well as anaesthetic) to undertake 'non-life or limb saving surgery' in the middle of the night resulted in the patient being deferred for more than two days. It had not been appreciated by the teams involved that a sponge dressing was in situ without negative pressure being applied, nor had the significance of this been realised.

By the time the patient was brought to theatre, there had been deterioration with formation of a large amount of pus. The wound cavity was much more friable and haemorrhagic than previously (whereas it had been slowly improving). As such, it was not safe to replace the dressing with negative pressure. This significantly set back the patient's progress.

Reporter's comments

There was failure to recognise that a negative pressure dressing should not be left without suction for any significant time (let alone two days). Use of the emergency list for patients requiring regular dressing changes may not be appropriate but is commonplace. There is a need for an alternative to the emergency list for complex patients requiring predictable, regular returns to theatre.

CORESS comments

Vacuum dressings are useful in the management of open wounds producing large quantities of fluid but may require specialised management and equipment. Some complex cases may need dressing changes in the theatre environment, particularly if debridement or sedation is necessary. When undertaken in theatre, these cases should be included

in an elective schedule rather than on an ad hoc emergency list. Team working practices in which space is left on a list for urgent ward-based cases may facilitate this. Good communication at handover between shifts should ensure that a patient's clinical priorities are recognised by the incoming team.

Communication failure compounding inappropriate device use (Ref 145)

A 77-year-old man underwent open repair of a 6.5cm infrarenal abdominal aortic aneurysm. The surgery was uneventful; the inferior mesenteric artery was oversewn at the aneurysm sac and a dacron bifurcated graft was inlaid to the iliac artery bifurcation on each side. On completion of the procedure, the bowel appeared pink and the patient was transferred to the intensive care unit (ICU). However, 72 hours later he was unwell with elevated C-reactive protein and white cell count. No other source of sepsis could be identified and a flexible sigmoidoscopy suggested distal colonic ischaemia. The patient returned to theatre for a 'relook' laparotomy, where it was found that the distal descending and sigmoid colon had infarcted. A Hartmann's procedure was undertaken, resecting ischaemic bowel, stapling the rectal stump and bringing out proximal descending colon as an end colostomy in the left iliac fossa. The patient returned to the ICU.

Despite resuscitation, the patient continued to deteriorate and abdominal ultrasonography suggested the presence of a pelvic abscess. Seventy-two hours after the second laparotomy, the patient returned to theatre for a third time, where it was noted that ICU staff had inappropriately employed a faecal management system consisting of a large bore catheter with a 45ml sealing balloon, inserted into the rectal stump. No formal protocol for use of this device had been consulted. Product literature indicated that the device should only be used for bedridden or immobilised, incontinent patients with liquid or semiliquid stool, to divert faecal matter, protecting wounds from faecal contamination, and to reduce risk of skin breakdown and spread of infection.

At the second relook laparotomy, it was found that the rectal stump had been disrupted and was communicating with the abscess, which was drained. Since small bowel was adherent to the abscess cavity, requiring extensive mobilisation, and there was now apparent ischaemia of the end colostomy, the remaining colon was resected, an end ileostomy fashioned, and the rectal stump debrided and reclosed with sutures. The patient returned to the ICU, where he made a prolonged and stormy recovery.

Reporter's comments

Left colonic ischaemia is a recognised complication of aortic aneurysm repair, in which the inferior mesenteric artery is usually oversewn. This may occur where the marginal communicating branch of the left colic artery ('the wandering artery of Drummond'), which forms an anastomosis between the superior and inferior mesenteric arteries, is inadequate or diseased. If ischaemia of the left colon is recognised at the time of surgery, the inferior mesenteric artery origin may be inlaid into the aortic graft. Frequently, however, the colon appears normal on completion of surgery. Failure of a patient to thrive postoperatively should always give rise to concern over the possibility of colonic ischaemia.

Inappropriate use of the faecal management system and balloon promoted further ischaemia and disruption of the rectal stump. ICU staff did not liaise with the surgical team and appeared unaware of the nature of the second surgical procedure. No protocol or guidelines were in existence concerning use of the catheter-based system. Product guidelines specifically advise against use in cases of rectal injury. Excessive faeculent discharge would not be expected from a rectal stump. Similar systems should only be used in accordance with product instructions and with recognition of potential complications arising from use.

CORESS comments

The Advisory Committee agreed with the reporter's comments. The use of the balloon system was clearly inappropriate in this case. The responsibility for who looks after the patient admitted to the ICU must be clearly established. No matter which clinician holds overriding responsibility, it is vital that adequate communication takes place between all teams involved so that the implications of any management strategy are fully understood. Good communication might have prevented the secondary iatrogenic consequences of this known complication of aneurysm repair.