

# CORESS

## Feedback

Vascular surgeons, neurosurgeons and other surgical specialists often have to tunnel grafts, lines or drains subcutaneously. Whilst this is a common and routine procedure in most cases, there is significant risk of entering a body cavity, hollow viscus or solid organ if the tunnelling device is inadvertently misdirected or inappropriate force employed. The series of cases reported here remind readers of those risks. "Think before you tunnel".

We are grateful to the clinicians who have provided material for these reports. CORESS is a charity, which encourages surgeons and other theatre staff to submit incident reports where there are lessons to learn. On our website, [www.coress.org.uk](http://www.coress.org.uk), you will find a reporting form, details of how to report, and further information on how CORESS uses confidential reports to educate and to promote safety in surgical practice. Published contributions are acknowledged with a certificate, which can be used in the contributor's record of continuing professional development. All previous Feedback Reports are published on the website.

**Frank C T Smith**  
Programme Director, on behalf of the CORESS Advisory Board

### TUNNEL VISION (1)

(Ref: 143)

A 61 year old man with extensive cardiovascular disease was admitted with sudden onset of bilateral leg ischaemia. Four years earlier, he had undergone axillo-bifemoral bypass for extensive aorto-iliac disease. He was overweight with a rotund abdomen and had previous extensive lower abdominal and right groin surgery in childhood with skin grafting for burns. Emergency MRA confirmed occlusion of the axillo-bifemoral bypass and he was taken to theatre urgently for revision reconstruction.

At surgery, the occluded graft was removed with difficulty, retaining the proximal patent stump of the old graft on the axillary artery. Working from the groins, a tunnelling device was passed proximally via a fresh route from the right groin incision to a small subcutaneous relieving incision just above the costal margin and thence to the right infra-clavicular region where a new graft was attached to the tunneller, and drawn down to the right femoral incision. Proximally the new graft was anastomosed to the stump of the old graft, and distally, onto the right femoral artery. A crossover limb was fashioned from the main body of the graft to the left femoral artery via a small separate lower abdominal incision. Incisions were closed and the patient returned to the ward.

Initially the patient made a good recovery with well-perfused legs. However, at 48 hours he complained of abdominal pain and distension. Bowel sounds were present, but an abdominal X-ray revealed free gas in the abdomen. The patient was taken back to theatre where laparotomy revealed that the axillo-right femoral graft component had been inadvertently tunnelled intra-peritoneally, directly through the proximal transverse colon which was adherent to the anterior abdominal wall. The bowel was neatly sealed around the graft with no evident abdominal faecal contamination. I asked my on-call general surgical colleague to attend briefly to ratify my

decision to remove the graft, and undertook a temporary defunctioning transverse loop colostomy at the level of the bowel injury. Groins were washed out with copious hydrogen peroxide and saline and a new axillo-bifemoral graft constructed using the contralateral axillary artery as the inflow source. The patient made a satisfactory but protracted recovery, but has not had his colostomy reversed yet.

#### **Reporter's Comments:**

Neither the registrar nor I were aware of penetration of the abdomen by the rigid metal tunnelling tool which has a pointed but blunt olive at its tip. Inappropriate force was not employed and by the level of the costal margin the tunneller, having skewered the bowel, had re-emerged into the subcutaneous plane. Factors contributing to the peritoneal breach and bowel injury included scarring in the groin from previous burn surgery which made it difficult to direct the tunneller; the relatively acute angle of the abdominal margin above the groin due to the patient's habitus; and intra-abdominal adhesions resulting in attachment of the transverse colon to the abdominal wall. Vascular surgeons regularly tunnel grafts and this case highlights the need to maintain vigilance at all times to ensure that inadvertent injury to adjacent structures is not caused by careless use of an invasive instrument.

#### **CORESS Comments:**

This is a detailed account of an ever-present danger which may occur when traversing tissues blindly with a rigid instrument. Operator awareness of the risks is the key to avoiding this complication. In the presence of a clean perforation of the bowel with no faecal contamination, bowel repair may have sufficed, with placement of a new arterial graft. Although not always feasible, tunnelling from "north to south" may reduce risk of this type of injury.

## TUNNEL VISION (2)

(Ref: 144)

A female child was born pre-term and suffered with a Grade 4 intra-ventricular haemorrhage. This was monitored clinically and with serial ultrasound scans of the head, but at six weeks it was noted that head circumference was increasing and the child was becoming symptomatic with poor feeding and irritability. The child was referred for a neurosurgical opinion. CT scans revealed ventriculomegaly and it was decided to place a ventriculo-peritoneal shunt to decompress the cerebral ventricles. This was carried out, as per unit practice, by a Consultant Neurosurgeon at the beginning of the operating list. The procedure was apparently uneventful and the patient returned to the ward after recovering from the anaesthetic. That evening some bogginess was noted around the wound and a simple head bandage was applied to good effect.

Overnight, the patient remained stable but on the ward round the following morning, 'surgical crepitus' was noted on palpation of the neck and scalp. X-rays were immediately undertaken to exclude pneumothorax or free gas in the

peritoneum. A small pneumothorax was detected and a chest drain was placed. Free gas was also noted below the diaphragm on erect abdominal x-ray. The paediatric surgeons were consulted and an exploratory laparotomy was performed which revealed that the distal ventriculo-peritoneal shunt tubing cleanly transfixated the transverse colon. The shunt system was removed, an abdominal drain was placed. The bowel damage was repaired by direct closure of the colonic perforations. The child subsequently developed a ventriculitis which was successfully managed with intrathecal antibiotics. Finally, a replacement ventriculo-peritoneal shunt was placed in-situ. The child is now making a good recovery.

### CORESS Comments:

As in the previous case, care must always be taken when tunnelling through tissue planes blindly. Early recognition of the complication facilitated early correction in this case. A high index of suspicion should be maintained for potential injuries following this type of surgical manoeuvre.

## TUNNEL VISION (3)

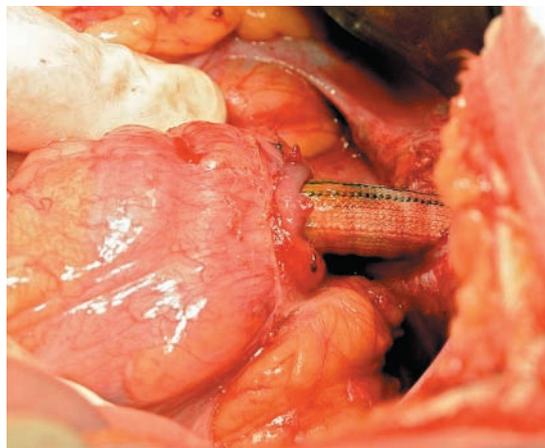
(Ref: 146)

A 73 year old man, who had undergone an aorto-bifemoral bypass for bilateral iliac artery disease and debilitating claudication four weeks previously, presented with blood streaked stools on defaecation. Proctoscopy was normal, but sigmoidoscopy revealed a length of Dacron graft passing through the lumen of the distal sigmoid. Laparotomy was undertaken (**Figure 1**). The left limb of the aorto-bifemoral graft was excised and the sigmoid exteriorised temporarily as a loop colostomy. The remainder of the arterial graft appeared well incorporated into surrounding tissues, so the proximal stump of the left limb of the graft was oversewn, and after careful groin wound irrigation, right to left femoro-femoral cross-over bypass was undertaken. The patient was maintained on long term antibiotics, but made an uneventful recovery.

### Reporter's Comments:

At surgery, the initial vascular graft was tunneled from the aorta to the left groin with the aid of a Roberts' arterial clip. This must have inadvertently pierced the sigmoid colon and the graft was tunneled directly through the wall of the colon with a good seal which prevented faecal leakage

and peritonitis. The risks of using forcible rigid devices blindly, as an aid to tunnelling a passage for a conduit, are self-evident. The patient was lucky to have avoided overt septic complications and peritonitis, although long term graft infection remains a risk.



**Figure 1:** Dacron graft penetrating sigmoid colon as seen at laparotomy.

## TUNNEL VISION (4)

(Ref: 148)

A 75 year old man with debilitating left thigh, buttock and calf claudication underwent right to left femoro-femoral bypass for a long left iliac artery occlusion, not amenable to angioplasty. The graft was tunneled over the pubis using a long arterial clip. Post-operatively he made a satisfactory initial recovery but was noted to have developed frank haematuria which was evident in the urine collection bag on the morning after surgery. The urinary catheter was

removed and early cystoscopy revealed a Dacron graft passing through the vault of the bladder. The graft had been inadvertently tunneled through the bladder whilst trying to avoid scar tissue from a previous midline laparotomy scar.

### CORESS Comments:

The lessons learned from the previous cases apply equally to this case.