

*This edition of Feedback includes various cases which, respectively, highlight necessity for a competent designated lead clinician in cases of complex trauma, which emphasise, (once again), the importance of full examination of injured patients and lastly, which provide a reminder of principles of vascular control.*

*As ever, we are grateful to the clinicians who have provided the material for these reports. The on-line reporting form is on our website [www.cores.org.uk](http://www.cores.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.*

### CARDIAC STABBING (Too many cooks, no Chef de Cuisine...) (Ref: 69)

I was the on-call registrar for general surgery when I was summoned urgently to the Emergency Department at 23.00 hrs, to see a 38 year old male, who had received a single penetrating knife injury to the left side of his sternum.

I attended the resuscitation bay. On arrival, I found the patient conscious and talking to a nurse. In attendance was the Emergency Department (ED) consultant, two anaesthetic SpRs, an anaesthetic SHO, an operating department assistant, an ED SpR, the locum general surgical SHO and two ED nurses.

Initially, on arrival, the patient had been haemodynamically stable. However, he had since become tachycardic and systolic BP had dropped to 60mmHg. This prompted the trauma call. The ED SpR had undertaken urgent ultrasound of the heart and was concerned that there appeared to be fluid in the pericardial sac.

I assessed the patient's airway, breathing and circulation. Airway was clear, breath sounds equal with no added noises and oxygen saturation was adequate. GCS was 15 and the patient was talking freely. Two large bore intravenous cannulae were sited and crystalloid infusions running. The anaesthetic team was preparing equipment should intubation be required. Examination revealed a 1.5 cm vertical stab wound at the left sternal edge, between 4th and 5th ribs.

I asked the ED consultant for his assessment of the situation, suggesting that we prepare the emergency thoracotomy kit and that the patient should be transferred pre-emptively to the emergency operating theatre as soon as possible, for possible thoracotomy. The ED consultant told me that he was currently trying to contact the cardiothoracic SpR by phone and that thoracotomy equipment was close by in the resuscitation bay.

I returned to the patient, (who had initially responded to a fluid challenge), and observed a second drop in systolic blood pressure to 50mmHg. The ED SpR confirmed that the patient had been cross-matched but that we could not expect blood for 40 minutes. I agreed that it was appropriate to order O-negative blood and asked him to do this immediately. He handed me an arterial blood gas report, demonstrating significant metabolic acidosis. Resuscitation by the other members of the team was ongoing.

The ED consultant told me that the cardiothoracic SpR would not be attending (reason unclear), but that he would contact the cardiothoracic consultant on-call. I told the ED consultant that I would also contact my consultant. I provided my consultant with a succinct history, his immediate concern being that the patient was suffering from cardiac tamponade. He asked that the patient be transferred to the operating theatre immediately. He told me that he would attend the hospital directly.

As I returned to the patient, the ED consultant stated that the cardiothoracic consultant had requested that the patient be transferred to the cardiothoracic surgery department at the other hospital in the city, where that

consultant was based. (There are two hospitals in the city; one has an emergency department and takes the majority of medical and surgical emergencies and all trauma, the second hospital has reduced emergency services but is the site at which the cardiothoracic surgery department is located. Time taken to travel between the two centres is a minimum of 20 minutes).

I explained that I felt that transfer constituted unacceptable risk for the patient. The ED consultant said that the cardiothoracic consultant was not happy to operate away from his department because he was unsure that correct equipment would be available. I asked that the cardiothoracic consultant attend the patient to assess him. At this time I felt it necessary to contact my consultant for a second time as I was concerned that the patient might be transferred against my judgement. My consultant agreed that the patient should not be transferred and should, instead, be moved immediately to the operating room. The ED consultant contacted the cardiothoracic consultant for a second time, explaining that we were not happy to transfer the patient because he remained unstable. They agreed to keep the patient in the ED until the cardiothoracic consultant arrived to assess the patient.

I explained that my consultant and I disagreed with this decision, believing that any assessment could be undertaken in theatre, where we would be optimally located to undertake resuscitative thoracotomy if required. I asked the anaesthetic team to get ready to transfer the patient to theatre, contacted the theatre coordinator and asked theatres to prepare for a patient who may require thoracotomy and cell salvage. At this point a further discussion began between myself, the ED consultant and one of the anaesthetic SpRs, who was of the opinion that the patient did not have cardiac tamponade and should instead be transferred for CT scan. Again, I disagreed, stating that the patient had a significant injury and had remained unstable since admission.

At this point my consultant arrived and ordered the patient's transfer to the operating room. In the anaesthetic room a second ultrasound scan was performed, demonstrating fluid within the pericardial sac. The patient was consented for surgery and my consultant waited for the cardiothoracic consultant, who was on his way. On arrival, the cardiothoracic consultant indicated concern about available resources but eventually agreed to operate and ultimately I assisted him in performing a sternotomy. We found a significant amount of blood clot within the pericardium and, following removal of the clot, identified a 1.5cm stab wound perforating the left ventricle, which was bleeding profusely. My consultant, who had remained in theatre, assisted in controlling the bleeding and suturing the wound. Post-operatively the patient was transferred to the Intensive Care Unit and remained for 24hrs. Ultimately the patient made a full recovery and was discharged from hospital.

**Reporter's Comments:**

A trauma call should have been put out as soon as the patient arrived in the ED (or before, if forewarned of the patient's arrival). ATLS principles for the management of trauma should be adhered to. The ED consultant should have assumed leadership responsibility rather than relying on the cardiothoracic consultant, who had not seen the patient. Transfer of unstable trauma patients between hospitals should not be undertaken - it is better that the surgeon travel to the patient rather than risk transfer of a haemodynamically unstable patient. Patients with penetrating trauma have cardiac injury until proven otherwise. Unstable trauma patients should not be transferred for a CT scan.

**CORESS Comments:**

This case stimulated considerable discussion by the Advisory Committee. Issues illustrated by the case concern leadership, timing and responses to trauma calls and provision of designated trauma teams.

In complex trauma it is essential that a nominated, experienced and competent clinician assumes responsibility for directing patient management. In this case, the Advisory Committee felt that, whilst in the emergency department, the patient should have been managed by the ED consultant and general surgical registrar until the consultant general surgeon arrived. Once the patient had been assessed by a cardiothoracic surgeon then, if he/she decided to transfer the patient, this was his/her responsibility.

The outcome in this scenario was favourable, but there are issues that should be addressed:

- Early assessment by the consultant general surgeon is important in the management of such patients. The

cardiothoracic surgeon may not be instantly available and it is important that another senior surgeon is present.

- Local agreements and transfer protocols should be clearly established concerning responsibility for such patients. Surgeons should not be arguing amongst themselves about whether a patient should, or should not, be transferred.
- If the cardiothoracic surgeon has seen the patient and wishes the patient to be transferred, then he should take responsibility for the outcome of that decision. An experienced cardiothoracic surgeon should be allowed to make such a decision.

The Society for Cardiothoracic Surgery in Great Britain and Ireland made the following additional comments:

- The doctors involved in this case were put in an invidious position by the fact that cardiothoracic surgical unit and emergency departments were in different hospitals.
- A cardiothoracic unit will be covering other hospitals for similar trauma within the region.
- Such cases are managed optimally in a cardiothoracic theatre where appropriate equipment and in particular, cardiac bypass facilities are available. If there is penetrating injury to a coronary artery, bypass may be required.
- There will be patients with chest trauma who are stable for transfer to a cardiothoracic unit and others who are not. Many stab wounds seen in an emergency department do not penetrate deeply and injured patients remain haemodynamically stable.

## DISTRACTING FRACTURES

(Ref: 74)

A lady aged 48 fell and sustained a fracture of proximal humerus and distal radius. Both were treated conservatively and progress was satisfactory. However, after two months, it was noted that her elbow was stiff with a reduced range of movement in both flexion and extension. Follow-up radiographs revealed a Mason 2 fracture of the radial head with a displaced fragment which was causing reduced range of movement of the elbow.

**Reporter's Comments:**

It is often said that the second fracture is the one most easily missed. Beware the third fracture! The radial head fracture was missed because attention was distracted by the two

most painful injuries. Careful initial assessment of the patient and clinical examination at follow-up is essential. This is especially the case in busy fracture clinics, where there is a high chance that a patient may see several surgeons.

**CORESS Comments:**

The lesson here is to undertake comprehensive examination. X-rays of all joints proximal and distal to fractures will be useful and, here, should have included the elbow. However, these will not be undertaken in all cases. This case further illustrates a problem previously emphasised in CORESS Feedback Report 61; December 2008.

## LIFE-THREATENING HAEMORRHAGE DURING ELECTIVE NEPHRECTOMY

(Ref: 80)

A right nephrectomy was undertaken through a subcostal extraperitoneal approach. The right renal artery was clamped close to the aorta and the kidney removed. Access was difficult as the renal artery was approached behind the vena cava. After oversewing the origin of the right renal vein on the IVC, control of the renal artery stump was lost, either because the clamp slipped or the artery was avulsed from the aorta. Immediate attempts to stop the bleeding included the blind application of vascular clamps across the aorta transversely. While this stopped the aortic bleeding, torrential haemorrhage ensued, which was extremely difficult to control. It is likely that the bleeding arose from a lumbar vein. Finally, control was achieved by packing, after several hours and transfusion of many units of blood. However, packs were removed after an hour and further haemorrhage ensued. The patient survived but suffered a life-threatening haemorrhage that was potentially avoidable or could have been better controlled, resulting in permanent damage to the remaining kidney.

**Reporter's Comments:**

Blind application of clamps to control haemorrhage is dangerous. Application of direct pressure with a finger should be the first response, while calling for assistance, obtaining extra suction and cross matching blood.

Adequate exposure and lighting are essential. If control cannot be obtained, the area should be packed and packs left *in-situ* for 48 hours before removal. Clamps passing transversely across the aorta run the risk of damaging lumbar veins passing in an antero-posterior direction alongside the left edge of the aorta on the left side of the patient, and into the inferior vena cava on the right side.

**CORESS Comments:**

Principles of arterial and venous vascular control need to be borne in mind when undertaking dissection around blood vessels. A useful mnemonic summarising necessary conditions for adequate control of bleeding is **LAMPPS** (Light; Access; Manpower; Position; Pressure; Suction). Whilst arterial inflow may be reduced by clamping the aorta, bleeding from the vena cava and iliac veins can sometimes be controlled by gentle pressure with rolled swabs mounted on sponge holders, applied to either side of the region of venous damage. Surgeons should be aware of the anatomy of the lumbar veins and of the risk of damage to these delicate structures during retroperitoneal mobilisation of the kidneys. Damaged lumbar veins can be difficult to control. Application of liga clips – if the vein can be visualised – may be helpful in this situation, but should not be attempted blindly.