

## CASE REPORT

## Rare vascular perforation complicating radial approach to percutaneous coronary angioplasty

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fahad.farooqi@nhs.net**SUMMARY**

A transradial arterial approach to coronary angiography and percutaneous coronary intervention has become increasingly embraced by cardiologists as it is associated with decreased vascular complications and allows early mobilisation of patients when compared with transfemoral arterial access. Major vascular complication post-transradial access is uncommon. We describe a very rare case of perforation of the costocervical trunk (a branch of the right subclavian artery at the site of the thoracic inlet) presenting shortly after percutaneous transradial coronary intervention. The resulting rapidly expanding cervical haematoma caused airway compromise necessitating emergent intubation in the catheter laboratory recovery area. Transfemoral catheter coil embolisation of the feeder artery was successful in obliterating blood flow to the perforated vessel with eventual resolution of the neck haematoma.

**BACKGROUND**

The relative safety and rapid associated recovery have made percutaneous coronary intervention (PCI) the favoured technique for the treatment of coronary artery disease. From 1996 to 2006, the number of PCI procedures performed in the UK increased nearly fourfold to over 80 000.<sup>1</sup> Over the same period, the complication rate has fallen<sup>2</sup> and the death rate barely increased from 0.72% to 0.74%.<sup>1 2</sup> There have been two case reports describing significant neck haematoma arising after PCI.<sup>3 4</sup>

The benefits of the transradial approach have clearly been documented in numerous studies in the past 10 years. Access site bleeding complication rates are lower, and early ambulation results in a significant reduction in patient morbidity and a lower total procedure cost.<sup>3 4</sup> Patients undergoing the procedure and staff caring for these patients prefer the transradial approach. As a consequence, there has been an increase in the use of radial artery access for interventional procedures worldwide. This experience has led to an understanding of the problems and complications that can arise from the transradial approach. The commonly reported complications of radial artery occlusion, non-occlusive radial artery injury, radial artery spasm, local access site bleeding, forearm haematoma and access failure occur in less than 1% of cases. Rarer complications such as pseudoaneurysm<sup>5</sup> and arteriovenous fistula of the radial, brachial and subclavian arteries<sup>6</sup> have also been described. We describe a very rare case of perforation of the costocervical trunk presenting

shortly after percutaneous transradial coronary intervention.

**CASE PRESENTATION**

An 81-year-old woman presented with an inferior non-ST elevation acute myocardial infarction. She was a smoker with extensive comorbidities including obesity, hypertension, non-insulin-dependent diabetes, chronic obstructive pulmonary disease, chronic renal impairment and healed duodenal ulceration. Following persistent limiting angina (despite optimal medical therapy), she was scheduled for further investigation with inpatient coronary angiography with the potential to proceed to therapeutic coronary artery stenting.

On arrival in the catheter suite, she was haemodynamically stable and free of resting chest pain. A six French arterial sheath was introduced via the right radial artery. A J-tip guide wire was then advanced through the sheath passing freely along the radial and brachial arteries under fluoroscopic guidance. However, guide wire resistance was encountered at the junction of the right subclavian and brachiocephalic arteries. This was successfully overcome by exchanging the guide wire with a softer hydrophilic wire, which passed smoothly beyond to the ascending aortic root. Coronary angiography revealed a focal tight stenosis in the right coronary artery only. The culprit lesion was successfully treated with a bare metal stent, achieving an excellent final angiographic result. Dual anti-platelet therapy was given preprocedure with aspirin and clopidogrel, and the patient also received weight-adjusted, intra-arterial heparin as per protocol for radial procedures and angioplasty. The patient was monitored continuously and remained comfortable and haemodynamically stable throughout the procedure. Haemostasis at the radial access site was achieved with a standard pressure wristband.

Immediately post-procedure, she was transferred to the catheter suite recovery room. Thirty minutes later, the recovery nurse identified a right-sided swelling at the base of the patients' neck, which rapidly extended anteriorly around the base of the neck. The patient reported difficulty in breathing and swallowing saliva. On assessment by the cardiologist and the rapidly summoned duty anaesthetist, the patient was alert and responsive. In the semirecumbent position, no stridor was evident. The respiratory rate was 25 breaths/min with use of accessory muscles and pulse oximetry indicated 99% saturation on 15l/min facial oxygen. Heart rate and blood pressure were 100 beats/min and

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120/50 mm Hg, respectively. The large anterior neck swelling was palpably firm and non-pulsatile.

### INVESTIGATIONS

- ▶ Coronary angiogram
- ▶ Thoracic aortogram

### TREATMENT

Emergency tracheal intubation was promptly undertaken due to the risk of imminent airway obstruction secondary to extrinsic tracheal compression from the expanding neck swelling. The patient was then transferred for CT angiography, which demonstrated a high density collection around the upper mediastinum and neck, consistent with haematoma secondary to vascular injury. No active bleeding vessel was apparent, so the attending vascular surgeon and the interventional radiologist agreed on initial conservative management. There was no need for reversal of anticoagulation as the effects of bolus intraprocedural heparin had by now mostly subsided.

The patient was transferred to the intensive care unit for overnight mechanical ventilation and observation. Over the ensuing 2 h, her neck swelling continued to enlarge with deteriorating anaemia and hypotension.

She was transferred to the interventional radiology suite for emergent thoracic aortography via percutaneous right femoral artery access. A small bi-lobed pseudoaneurysm originating from the right costocervical artery was identified with extravasation of contrast. Direct manual compression of this intrathoracic vessel is not feasible as it lies deep to the rib cage. This bleed was successfully treated by coil embolisation of the feeder artery performed by the duty interventional radiologist.

### OUTCOME AND FOLLOW-UP

The patient made a gradual recovery and required assistance from physiotherapy for mobilisation before discharge home 10 days later. She was instructed to discontinue clopidogrel after 1 month post coronary intervention and continue aspirin life-long in accordance with our hospital protocol.

### DISCUSSION

We have described an unusual bleeding site complication of radial coronary angiography requiring urgent intervention. The small calibre of the radial artery necessitates fine access sheaths and guide wires. In our case, it is likely that attempts to advance the guide wire against resistance injured the vessel wall. There

have been only two case reports describing significant neck haematoma arising after PCI with both procedures conducted via upper limb artery access.<sup>4–7</sup> However, our case is unique in that no previously reported case of costocervical trunk injury required intubation or therapeutic radiological intervention.

### Learning points

- ▶ Invasive procedures and interventions with a broader range and complexity are increasingly popular.
- ▶ Older patients with comorbidities are at increased risk of complications.
- ▶ Routine invasive procedures can occasionally result in rapidly life-threatening complications.
- ▶ All serious complications following invasive procedures benefit from early assessment, prompt treatment and close monitoring.
- ▶ Rescue may involve multiple emergency specialists.

**Competing interests** None

**Patient consent** Obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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