Superior vena cava injury during central venous catheter insertion in a young child: recognition and minimally invasive management

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DESCRIPTION

A 32-month-old girl required tunnelled central venous catheter (CVC) insertion prior to stem cell transplantation. After routine internal jugular vein puncture and guidewire insertion under fluoroscopy, resistance was felt as the peel-apart percutaneous introducer was passed over the wire. The guidewire was seen to be abnormally looped (figure 1A). Intravenous contrast injection demonstrated extravasation and confirmed superior vena cava (SVC) injury (figure 1B). The patient remained haodynamically stable and a decision was made to proceed with right thoracoscopy. Additional central venous and arterial access was obtained and the patient placed in left lateral decubitus position. A 5 mm endoscope was inserted along with two 5 mm instruments. The guidewire was seen passing out of the SVC through the pleura (figures 2A and 3A–C), this was grasped and retrieved via the thoracic cavity. A thrombin/gelatin haemostatic matrix (Floseal, Baxter) was applied along with direct pressure (figure 2B). There was no significant further bleeding. The patient made an uneventful recovery.

CVC insertion is frequently performed by paediatric anaesthetists, radiologists, intensivists and surgeons: major vascular injury is very rare but is life-threatening.1 2 Early recognition is key to successful outcome; this is assisted by operator experience and meticulous use of fluoroscopy and intravenous contrast. The anatomical site of injury dictates management and this may be unclear. Empirical thoracotomy has high morbidity and different injury sites mandate different approaches. In the stable patient, thoracoscopy allows injury characterisation and surgical planning (eg, thoracotomy approach): it may also offer technical advantages when accessing bleeding sites.3 4 In this

Figure 1 (A) Fluoroscopy of thorax demonstrating abnormally looped guidewire. (B) Fluoroscopy of thorax following injection of intravenous contrast with extravasation of contrast from SVC. SVC, superior vena cava.

Figure 2 (A) Endoscopic visualisation of guidewire passing out of SVC through pleura. (B) Endoscopic application of thrombin/gelatin haemostatic matrix to injury site. SVC, superior vena cava.

Figure 3 (A) Diagram of relevant central venous anatomy (illustrator Helen Figgins). (B) Diagram demonstrating passage of the peel-apart introducer causing a SVC injury (illustrator Helen Figgins). (C) Diagram demonstrating loop of guidewire still passing through defect once peel-apart introducer is removed (illustrator Helen Figgins). SVC, superior vena cava.
To say that the complication that happened during our child’s Hickman line placement was unexpected, would be an understatement. The complication pushed our transplant schedule further for 2 weeks which was of course not pleasant for us, but not a very big setback after all. This wouldn’t have been the case if they had opened our child up on the O.R. table for sure. All in all the doctors performing this procedure handled it very professionally and took time to explain very vividly afterwards what had happened. It was important for us to understand it well and we have no hard feelings over this complication as we could never foresee all the possible risks that may occur when we enter the human body. The hardest part was to come in for a relatively easy procedure before all the chemo and transplant process and end up staying for a week while not knowing how this might affect our planned transplant and our child’s well being through all of that. Luckily, it doesn’t seem to have affected it at all.

Case it avoided thoracotomy and its associated morbidity (eg, pain and scarring) entirely.

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REFERENCES