CASE REPORT

Pseudochylothorax and diaphragmatic weakness secondary to a misplaced central venous catheter

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SUMMARY

A 20-year-old woman admitted with an aspirin overdose was encephalopathic and was intubated for airway protection. Under sonographic guidance, a right internal jugular central venous catheter was inserted for volume resuscitation. She was agitated and required treatment with a propofol infusion. Her salicylate levels improved and she was successfully extubated 12 h after intubation. One day later she developed severe dyspnoea and a right-sided pleural effusion and required immediate reintubation. The effusion was drained and was consistent with a chylothorax. A CT scan of the chest revealed that the central venous catheter traversed the mediastinum with its tip in the right pleural space. The propofol infusion was draining into the pleural space. A video-assisted thoracoscopic surgery was performed to drain the pleural effusion and repair the punctured vessel. She was extubated within a day and discharged home 1 day later without any pleural fluid.

BACKGROUND

Propofol is the most commonly used parenteral anaesthetic in the USA. It is administered intravenously as a lipid emulsion. This case demonstrates that inadvertent infusion of propofol into the pleural space can result in the acute development of a pleural effusion that mimics a chylothorax. This case also demonstrates that patients may develop a phrenic nerve injury due to a misplaced central venous catheter resulting in hemidiaphragmatic paresis. To our knowledge, this is the first case that reports this constellation of findings.

CASE PRESENTATION

A 20-year-old woman recently diagnosed with severe depression presented to the emergency department after ingesting approximately 200 tablets of 325 mg aspirin. She was severely agitated and required sedation with intravenous propofol. She was intubated for airway protection. A triple-lumen haemodialysis catheter was placed into the right-internal jugular vein under sono guidance. Its position was confirmed by the return of blood in all three ports and by an anteroposterior chest radiograph (figure 1). She continued to require propofol to control her agitation; it was infused via the central line. She was extubated several hours later, but continued to require propofol. Twenty-four hours after extubation she developed respiratory distress and right-sided chest discomfort. There were diminished breath sounds on auscultation and dullness to percussion on that side. A chest x-ray confirmed a large pleural effusion. A 12 F pigtail

catheter was inserted that drained 2 litre of pinkish cloudy fluid. Analysis of the fluid revealed a triglyceride level of 222 mg/dl, red blood cell count (RBC) 151 000/UL, white blood cell count 275/UL and pH 7.40 consistent with a bloody chylothorax. A CT scan of the chest (figure 2) revealed that the central line had punctured the superior vena cava at the right atrial junction adjacent to the right phrenic nerve and its tip entered into the right pleural space. Vascular and thoracic surgery recommended the discontinuation of the central line. Despite the application of pressure to the right side of the sternum, the patient went into haemorrhagic shock with profuse bleeding noted from the pigtail catheter. She was immediately resuscitated with 8 units of packed RBC, 8 units of fresh-frozen plasma and 2 units of platelets. Emergency video-assisted thoracoscopic surgery repaired the punctured vena cava. Postoperatively, there was no further bleeding noted from the pigtail catheter. She was extubated 12 h postsurgery, the chest tube was discontinued the next day. A chest x-ray 5 days after admission (figure 3) revealed an elevated right hemidiaphragm. She was discharged home without any sequelae 2 days later. Two weeks postdischarge an x-ray revealed a normal right hemidiaphragm.

DISCUSSION

Central lines are commonly utilised in hospital practice and are associated with numerous complications including, most commonly, haemorrhage, thrombosis, pneumothorax and infection. Superior vena cava injury is a rare complication associated

Figure 1 Chest x-ray of the misplaced central venous catheter. Arrow points to the gentle curve of the catheter from medial to lateral.

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Figure 2 CT scan reveals misplaced central venous catheter and right pleural effusion.

with a central line insertion. Most vascular injuries occur in a proximal vessel, that is, the subclavian or internal jugular veins. Tocino and Watanabe stated that the chest x-ray findings of a

Figure 3 Chest x-ray showing elevation of the right hemidiaphragm.

superior vena cava perforation caused by a central line catheter included a gentle curvature of the central catheter tip.¹ In retrospect this finding was demonstrated in our case as well (figure 1). Injury to the superior vena cava is more common with the insertion of a large bore stiff haemodialysis catheter as was utilised in our patient.

Chylothorax is a rare complication of central line insertion usually resulting from injury to the thoracic duct. Development of a new pleural effusion after the insertion of a central venous catheter should alert the clinician to the possibility that the catheter tip is malpositioned and the fluid is infusing into the pleural space.^{2–6} In our case, the high triglyceride level of this pleural fluid was caused by the infusion of propofol, which is a lipid-based emulsion and mimics chyle in the pleural space.

Phrenic nerve palsy is a rare complication of central venous catheter placement.⁷ Our patient demonstrated transient paresis of the right hemidiaphragm. The right phrenic nerve was injured by the malposition of the central venous catheter. This injury was temporary and did not result in any permanent weakness of the right hemidiaphragm.

Learning points

- ▶ Placing a central venous catheter sonographically followed by an evaluation of the chest x-ray postplacement and good blood return do not guarantee correct placement of the catheter.
- ▶ A gentle curvature of the central catheter tip on the chest x-ray should alert the clinician that the catheter may be misplaced with the tip ending in the pleural space. A CT scan of the chest should be obtained to confirm the catheter tip position.
- ▶ When placing a central catheter, attempt to use a smaller bore, less-rigid catheter when possible.
- ▶ Infusion of a lipid emulsion into the pleural space can resemble a chylothorax both in gross appearance and biochemical analysis.
- ▶ Insertion of a central venous catheter may result in injury to the phrenic nerve that may cause diaphragmatic paresis which is usually transient.

Competing interests None.

Patient consent Obtained.

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