Hydrothorax following right internal jugular vein cannulation: Prompt diagnosis with a simple innovative bedside test

Sir,

Internal jugular venous (IJV) catheterization is a fairly routine part of the anaesthetic management for cardiothoracic and vascular surgical procedures. It is a relatively safe and simple procedure for a trained anesthesiologist.[1] Complications like hydrothorax have been cited on many occasions, usually following subclavian vein or left IJV cannulation but rarely with right IJV cannulation.[2]

A 42-year-old lady classified as ASA Grade I, underwent maximal thymectomy for Myasthenia Gravis, and had a single lumen 18-G Secalon® T (Becton Dickinson Critical Care Systems, Pvt. Ltd., Singapore) inserted into the right IJV using standard precautions under general anesthesia. The single lumen as against the standard triple lumen catheter was preferred due to cost constraints as well as an anticipated short duration of intensive care stay needed for this surgery. Maintenance intravenous fluids were infused via the central venous line and intermittent measurement of central venous pressure (CVP) was done using a transducer during surgery.

The position of the catheter was confirmed in the ICU by confirming CVP trace, checking backflow of blood and a check chest radiograph. She drained 225 ml and 110 ml of serosanguinous fluid over the first six hours from the right and left pleural tubes respectively. Eight hours into the postoperative period, the right chest tube had drained 760 ml of bloodstained fluid, whereas the hourly drainage from the left chest tube was negligible. In the following two hours the urine output fell to 10 ml per hour and serum potassium levels rose to 6.3 mmol/l. The BUN was 55 mg/dl and S. Creatinine was 1.1 mg/dl. The clinical picture created an impression of imminent renal shutdown, which necessitated infusion of more crystalloids based on CVP measurements of around zero. Calcium gluconate and glucose insulin drip were given to correct hyperkalemia, which was followed by an 80 mg bolus of Furosemide. After two hours of failed resuscitative measures it was noticed that the character of the draining fluid looked similar to the infusate and that only the chest tube corresponding to the side of the IJV cannulation was continuing to have increased drain. The possibility of a leak from the central line into the right hemithorax...
was contemplated. The central line was disconnected from the infusion line and central venous pressure wave was monitored; the waveform was lost and there was no backflow from the line. A repeat chest radiograph showed normal position of the cannula tip and was similar to the radiograph taken in the immediate postoperative period [Figure 1].

The confirmation of hydrothorax due to crystalloid infusion collection in the right pleural space from a leaking central line required instillation of nonionic contrast through the catheter and taking a radiograph or injecting a dye like “indocyanine green” and its recovery in pleural fluid.[9] Contrast radiograph requires technical assistance and indocyanine green may not be readily available at odd hours. We thought of a novel and innovative idea that was simple and easily reproducible. An ampoule of multivitamin infusion (which is brilliant yellow due to riboflavin content) was mixed with 100 ml of 5% dextrose in water and infused through the central line. Clear fluid in the right pleural drain instantaneously changed to the brilliant yellow color of the multivitamin injection [Figure 2]. This clinched the diagnosis and the central line was immediately removed. The maintenance line was changed to the left forearm peripheral line. Over a period of two hours the urine output dramatically increased to around 2 ml/kg/h and the chest drainage stopped completely and both drainage tubes were removed within the next six hours. The patient was transferred to the ward and was subsequently discharged on the fifth postoperative day.

Incidence of mechanical complications ranges from 3.4 to 19 percentages of patients undergoing central venous cannulation.[4] Incidence of pneumothorax and hemothorax is however less with IJV cannulation when compared to the subclavian route.[4,5] Proper position of the catheter tip is the key factor in the prevention of all catheter-related mechanical complications. We have found use of “multivitamin injection”, which is a freely available drug without any reported major side-effects, a useful method for early detection of suspected leak into the pleural cavity. This case highlights the possibility of complications occurring late in apparently ‘secure’ lines, the value of bedside clinical observation and a simple test to confirm the suspicion.

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**References**