Usefulness of Ultrasound for Diagnostic Pneumothorax after Central Venous Catheter Insertion

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Introduction:
Use of the ultrasound (US) is now a strong tool to achieve safer central venous catheter (CVC) insertion. Although pneumothorax is a rare complication related to CVC placement, it cannot be avoided even with the US guided technique. Not only performing US before and during CVC insertion, but also the procedure to rule out pneumothorax is also important. We evaluated the normal lung signs after routine CVC insertion.

Methods:
After institutional approval and written informed consent, thirty-eight patients requiring CVC insertion for cardiovascular and thoracic anesthesia were enrolled. Before CVC insertion, anatomical structure of the vessels where CVC will be attempted were scanned. In addition, anterior chest wall where accessible was quickly scanned with portable echograph (MicroMax, Sonosite, Bothell, WA, with a linear 5-10 MHz probe). Normal lung is diagnosed with one or more of the following four signs:

- **lung sliding**: A to-and-fro motion of the pleural line synchronized with respiration; "comet tail" is a rough vertical artifact arising from pleural line; "lung pulse" is a perception of heart activity at the pleural line, and "power sliding" is the lung sliding enhanced with the power color doppler. When the sign above was not recognized, or when the reverberation artifact was seen, it was diagnosed as pneumothorax. Incidences of normal and abnormal signs were recorded. In all cases, chest XP was taken postoperatively to confirm catheter position and to detect pneumothorax.

Results:
Inserted sites were: 62 patients via right internal jugular vein, 2 patients via left, and 10 patients via the right subclavian vein. There was one case of pneumothorax, diagnosed preoperatively, who required thoracoscopic intervention.

Conclusion:
Our result indicates that each normal lung signs were not always recognized with the US. Therefore, depending on sole normal sign may lead misdiagnosis there fore they should be used in combination. With this technique, it is possible to exclude at least anterior pneumothorax when the multiple signs were used.

Abstract

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