

Introduction

Despite the low incidence of pneumothorax post shoulder surgery and interscalene nerve block, it is one of the most life-threatening condition following shoulder surgeries¹. Lung sonography has emerged as a reliable technique in the evaluation of some thoracic conditions including detection of pneumothorax. Sonographic signs, including A-lines, 'absence of lung sliding', Barcode sign on M mode and ‘the lung point sign’ can help in the diagnosis of a pneumothorax.

Lung Ultrasound

Normal findings

Pneumothorax

• A-line

• Barcode sign

• Lung sliding

• Sea-shore pattern on M-mode

• A-lines, Lung point

Small occult pneumothorax can be missed on traditional upright anteroposterior chest radiography (CXR)². A delay in the diagnosis and treatment of pneumothorax, especially in those who are mechanically ventilated, may lead to the progression of a pneumothorax and resultant hemodynamic instability.

Lung Ultrasound has a higher sensitivity than CXR and a similar specificity³.



Lung Ultrasound for early detection of pneumothorax, uncommon condition following shoulder surgery and interscalene nerve block - Quality improvement project.

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We believe that this approach can be a useful tool to rule out pneumothorax secondary to Interscalene nerve block for shoulder surgeries. Future studies can show evidence of it’s use.



Case/Background

We encountered a case of pneumothorax post total shoulder replacement in which the patient received an interscalene nerve block under ultrasound guidance followed by general anesthesia .

Patient is 70 year-old with history of hypertensive undergoing Reverse total shoulder surgery. He showed signs of pneumothorax required decompression in the recovery room **4 hours** after the nerve block.

The differential diagnosis included :

- spontaneous pneumothorax
- Barotrauma
- iatrogenic pneumothorax secondary to the nerve block or to the surgical procedure itself.

After reviewing the images (US, XR) and the chart, the etiology was still unclear. Patient receive a pigtail that was removed on postoperative day 3. The patient remained asymptomatic throughout his hospital course. He was discharged on postoperative day 4 after near complete resolution of her remaining apical pneumothorax. She was seen 2 weeks later for her first postoperative visit and denied any chest pain or shortness of breath.

As a safety measurement, we suggest to perform lung ultrasound following the performance of interscalene nerve block for reverse total shoulder procedure.

Methodology and Results

A pilot study of 5 patients were included who are undergoing reverse total shoulder replacement with the same surgeon for which they all receive an interscalene nerve block by the same regional anesthesiologist. All patients underwent general anesthesia for the surgery .Chest XR was performed for each patient in the PACU. Demographics, ultrasound and CXR images findings were registered. No pneumothorax were found on either lung ultrasound or postoperative CXR.

Discussion

- Lung Ultrasound has a higher sensitivity than CXR and a similar specificity³.
- Early detection of Pneumothorax on lung ultrasound is possible in asymptomatic patients.
- This approach can be useful for upper extremity blocks esp. in residency program for education and safety purposes.
- Weak evidence

References

1. Sun, W.-C.; Kuo, L.-T.; Yu, P.-A.; Yang, C.-P.; Sheu, H.; Tang, H.-C.; Chan, Y.-S.; Chen, A.C.-Y.; Hsu, K.-Y.; Weng, C.-J.; et al. Pneumothorax, an Uncommon but Devastating Complication Following Shoulder Arthroscopy: Case Reports. *Medicina* **2022**, *58*, 1603. <https://doi.org/10.3390/medicina58111603>

2. Lubna F Husain, Laura Hagopian, Derek Wayman, William E Baker, and Kristin A Carmody, Sonographic diagnosis of pneumothorax, J Emerg Trauma Shock. 2012 Jan-Mar; 5(1): 76–81.

3. Husain LF, Hagopian L, Wayman D, Baker WE, Carmody KA. Sonographic diagnosis of pneumothorax. J Emerg Trauma Shock. 2012 Jan;5(1):76-81. doi: 10.4103/0974-2700.93116. PMID: 22416161; PMCID: PMC3299161.