

PERSISTENT PHRENIC NERVE PALSY FOLLOWING INTERSCALENE NERVE BLOCK

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Introduction

- Interscalene nerve blocks (ISBs) are a commonly used adjuvant for shoulder and upper arm surgeries.
- Transient phrenic nerve block with ipsilateral hemi-diaphragmatic paralysis is a common side effect of ISB, with up to 100% incidence [1].
- Persistent phrenic nerve dysfunction is a rare complication of ISB.

Results / Case Report

- A 79-year-old male with a past medical history of obstructive sleep apnea, hypertension, and paroxysmal atrial fibrillation presented for right reverse total shoulder arthroplasty with ultrasound-guided right continuous interscalene catheter for post-operative pain control.
- The ISB catheter required replacement pre-operatively. The catheter was replaced post-operatively due to ineffective pain control and the patient was discharged with an ambulatory infusion pump on post-operative day 1.
- One week post-operatively, the patient endorsed residual numbness and paresthesia over the right lateral forearm and 1st and 2nd digits, as well as subjective right upper extremity weakness. He additionally endorsed dyspnea on exertion.
- The patient underwent extensive work-up including treadmill stress test, left heart catheterization (LHC), CT chest, and fluoroscopic sniff test. The CT revealed incidental left upper lobe adenocarcinoma and the sniff test was significant for right hemi-diaphragmatic paralysis.
- Right robotic diaphragm plication was performed 6 months after the ISB for persistent exertional dyspnea with significant improvement. The patient required resection of the lung adenocarcinoma which was curative but complicated by lung entrapment and pleural effusion requiring subsequent surgery.
- Electromyography performed 9 months post-operatively was significant for superior trunk plexopathy. The patient's motor weakness resolved.

Imaging



Pre-ISB (10 years prior)



Post-ISB

Discussion

- Persistent phrenic nerve palsy (PPNP) is an atypical complication of ISB described in several case reports [2]. One study reports an incidence of PPNP of 0.048% [3].
- In this patient, multiple catheter replacements may have increased the risk of PPNP.
- Chest radiographs revealed possible pre-existing partial right hemi-diaphragmatic elevation prior to ISB. Our patient may have had prior subclinical phrenic nerve palsy which was exacerbated during ISB, resulting in complete phrenic nerve palsy.

Conclusion

- The two-hit hypothesis may apply to our patient- the first “hit” was subclinical partial diaphragmatic paralysis of unknown origin and the second “hit” followed the interscalene nerve block.
- We can consider a possible multifactorial cause of our patient’s palsy including local anesthetic neurotoxicity and increased risk for direct needle trauma with multiple catheter replacements.
- It is worthwhile to review prior imaging regardless of history of pre-existing disease or pulmonary dysfunction before performing ISB.

References

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