

INTERSCALENE NERVE BLOCK IN A PATIENT WITH CONTRALATERAL VOCAL CORD PARALYSIS

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Introduction

Patients with a history of vocal cord paralysis and complex airways present unique challenges in anesthesia management, particularly when balancing airway safety and effective pain control. Vocal cord paralysis can impair normal airway protective mechanisms, increasing the risk of aspiration and airway obstruction (1,3). This condition also complicates certain regional nerve blocks, as they may inadvertently affect the recurrent laryngeal nerve (4). When these patients require surgery, especially in an ambulatory surgical setting, anesthesiologists must carefully assess the risk of airway compromise and nerve damage, taking steps to minimize potential complications.

An individualized approach to anesthesia is crucial in such cases, often involving a multidisciplinary team to ensure that both airway management and pain control are adequately addressed. Effective pain management not only enhances patient comfort but also reduces the risk of postoperative complications such as increased stress or respiratory distress (7). Regional anesthesia techniques are often preferred in these situations because they offer effective pain relief while minimizing the need for systemic opioids, which could exacerbate airway problems (6-7).

In this case, we employed a superficial cervical plexus block which targets sensory branches of the C2-C4 nerve roots, a low-volume interscalene block targeting the brachial plexus which provides anesthesia to the shoulder and upper arm, as well as a suprascapular nerve block to target the posterior shoulder and biceps (4,10,11). This approach ensured adequate analgesia while minimizing the risk of airway complications. The low-volume technique has been shown to reduce the risk of systemic toxicity and nerve injury, which is particularly beneficial in patients with vocal cord paralysis (5,2).

Studies suggest that when performed correctly, regional blocks can provide superior pain control while limiting airway manipulation, thus reducing the risk of airway obstruction or aspiration (7). The low-volume approach further decreases the risk of nerve injury, and inadvertent spread of local anesthetic to unwanted nerves offering an added layer of protection for patients with vocal cord paralysis (2,9). Additionally, regional anesthesia techniques contribute to faster recovery times and greater patient satisfaction, both essential in the ambulatory setting (7).

This case underscores the importance of tailored anesthetic management for patients with complex airways and vocal cord paralysis. By using careful technique and appropriate regional anesthesia, we were able to ensure both airway safety and optimal postoperative pain control which is critical for successfully managing high-risk patients in an ambulatory surgical environment.

Case Report

A 37-year-old male with a past medical history of asthma, traumatic brain injury requiring a prosthetic tracheostomy secondary to a laryngeal fracture complicated by tracheal stenosis and right sided vocal cord paralysis and subsequent tracheostomy reversal presented for left shoulder arthroscopy in the beach chair position. In choosing an anesthetic plan, the decision was made to avoid relying solely on a full volume interscalene block as this patient's risk of recurrent laryngeal nerve palsy from a left sided interscalene block could compromise the patient's already tenuous airway by causing full glottic closure. Intubation was deemed high risk due to the patient's complex airway history. Each time he had a surgery after his tracheostomy reversal, he was intubated only by the ENT service that was familiar with his airway history. On the day he presented for a left shoulder arthroscopy, the ENT service was not available in our ambulatory center. LMA was also deemed suboptimal due to planned beach chair positioning. Following a multidisciplinary discussion, a modified regional anesthetic approach was employed, including a low-volume interscalene block (10 cc of 0.5% ropivacaine) complemented by a suprascapular nerve block (12 cc of 0.5% ropivacaine) and a superficial cervical plexus nerve block (3 cc of 0.5% ropivacaine). Airway equipment was prepared for immediate intervention if needed. The patient underwent the procedure successfully under light sedation with propofol and dexmedetomidine, with no complications, and was discharged home the same day.

Discussion

Managing patients with a complex airway presents unique challenges to the anesthesia team, where maintaining airway safety while ensuring effective pain control is paramount (1,3). Vocal cord paralysis can lead to significant airway obstruction, increased aspiration risk, and difficulty with ventilation, all of which require careful consideration when selecting anesthetic techniques (1,3). This case underscores the importance of a tailored approach, utilizing regional anesthesia methods to both address pain and minimize airway manipulation, ultimately reducing potential complications in these high-risk patients.

In this case, the use of a low-volume block by an expert regional anesthesiologist provided focused and effective anesthesia while limiting the potential for systemic toxicity (2,5,9). Studies have shown that low-volume blocks are particularly effective in reducing complications associated with traditional high-volume blocks, offering sufficient coverage of the surgical site while minimizing the impact on surrounding structures (2,9). The low-volume approach minimizes the risk of inadvertently affecting the recurrent laryngeal nerve during an interscalene block, which is essential for vocal cord movement and airway protection (4,2).

Additionally, the combination of a suprascapular nerve block ensured adequate pain relief for the posterior shoulder and biceps regions, which are commonly affected during upper extremity surgeries (10). This regional anesthetic approach not only provided effective pain control but also preserved airway function which is critical in patients with complex airways

where airway manipulation should be minimized. By targeting specific nerves with precision and a low volume approach, regional anesthesia techniques can reduce the risk of airway obstruction or aspiration that could arise from injury to the recurrent laryngeal nerve or other airway structures.

The efficacy and safety of regional anesthesia in such cases has been well-documented, with numerous studies highlighting its role in minimizing airway manipulation and reducing postoperative respiratory complications (1,3,7-8). Research has demonstrated that regional anesthesia can decrease the need for general anesthesia, thereby reducing the chances of airway obstruction and other complications associated with endotracheal intubation or sedation in patients with vocal cord paralysis (7) .

This case also underscores the importance of a multidisciplinary approach in managing high-risk patients. Collaboration between the anesthesiology team, otolaryngologists and orthopedic surgeons ensures comprehensive airway management and effective pain control. This team-based approach facilitates the optimal balance of safety and patient comfort, with the added benefit of preserving the function of critical structures. The success of this case emphasizes the need for continued exploration and refinement of regional anesthesia techniques, especially in complex clinical scenarios, to enhance patient outcomes and streamline care in the ambulatory surgical setting.

Conclusion

This case illustrates the potential of regional techniques to provide effective anesthesia and analgesia to patients with a complicated airway history, demonstrating that with careful planning and expert technique, such challenges can be met successfully. By utilizing low-volume interscalene and supplemental superficial cervical plexus and suprascapular blocks, we were able to achieve anesthesia to the shoulder while maintaining airway integrity, thereby enhancing both safety and recovery in a high-risk patient population. Future studies and clinical experience will continue to inform and improve best practices in anesthesia for these challenging cases.

References

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