

Ultrasound-Guided Bilateral Superior Laryngeal Nerve Block for Laryngospasm Prophylaxis in a Child with COVID-19: A Clinical Case Report

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Abstract: Laryngospasm is a constant worry in pediatric anesthesia, especially when dealing with children who have active or recent upper airway infections. The internal branch of the superior laryngeal nerve (SLN) is the primary sensory pathway for the supraglottis and triggers the glottic closure reflex. We report on the case of a 3-year-old girl, ASA I, scheduled for tympanostomy while testing positive for SARS-CoV-2. Because of her high risk for respiratory complications, we performed a prophylactic ultrasound-guided bilateral SLN block at the end of the surgery using 1.5 mL of 1% lidocaine on each side. The patient woke up and was extubated without any coughing, desaturation, or laryngospasm. While SLN blocks are usually meant for awake intubations, this case suggests that using the block for prophylaxis could be a helpful strategy for reflex control in high-risk children. We believe these findings are suggestive observations that need further validation through controlled studies to confirm safety and efficacy in pediatrics.

Keywords: Laringoespasmo; Bloqueio do nervo laringeo superior; Anestesia pediátrica; Ultrassonografia; COVID-19.

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1. Introduction

Laryngospasm, the sudden and sustained closure of the vocal cords, is one of the most stressful complications an anesthesiologist faces in pediatric care. It can quickly lead to hypoxia, bradycardia, or even cardiac arrest if not handled immediately. Young children between 1 and 5 years old, especially those with upper airway infections (UAI), face the highest risks [1]. The COVID-19 pandemic brought new challenges to this group, as SARS-CoV-2 increases airway irritability and complicates management [2].

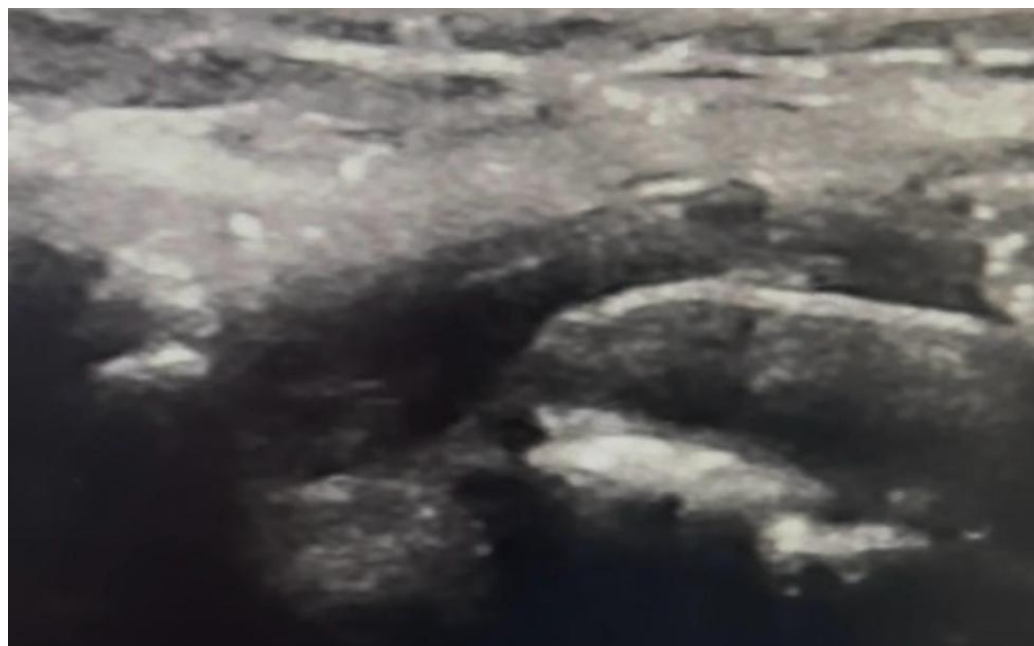
Understanding that the larynx can close at multiple levels, not just the true vocal folds, is vital for prevention [3]. Even though we have several pharmacological tools, stopping laryngospasm in a high-risk child remains difficult [4]. The internal branch of the SLN carries sensory signals that trigger the glottic closure reflex. If we block these signals, we might theoretically lower the airway's sensitivity to irritants [4]. This report details how we used an ultrasound-guided bilateral SLN block as a preventive measure during extubating for a child with a recent COVID-19 infection.

2. Case Report

A 3-year-old girl weighing 12 kg (ASA I) came to us on October 7, 2025, with acute right mastoiditis. Although she was asymptomatic and had clear lungs with a saturation of 98% on room air, her routine SARS-CoV-2 test was positive. She started antibiotics, and her surgery was set for October 10. In the operating room, we used standard monitors and chose an intravenous induction since she already had an IV line. We gave her 250 µg of atropine for her heart rate, followed by 25 µg of fentanyl, 30 mg of propofol, and 24 mg of succinylcholine. Intubation went smoothly, and we maintained her on sevoflurane.

Knowing her age and recent COVID-19 infection put her at high risk for laryngospasm during emergence, we decided to perform an SLN block before waking her up. Using a 10–12 MHz linear probe, we identified the hyoid bone, thyrohyoid membrane, and thyroid cartilage in a sagittal view (Figure 1). We used color Doppler to find the superior laryngeal artery, as the nerve itself is quite hard to see directly. We targeted the fascial plane right next to the artery. With a 25G needle, we injected 1.5 mL of 1% lidocaine on each side. The emergence was calm. She breathed spontaneously, and we extubated her without any airway issues. Her saturation stayed at 99%. After an hour in the recovery room, she went back to the ward and was eventually discharged without complications.

Figure 1. Ultrasound image demonstrating the relevant laryngeal anatomy.



The procedure was uneventful, and extubation was performed with the patient breathing spontaneously. No laryngospasm, coughing, or desaturation occurred (SpO₂ 99%). The patient remained stable in the PACU for one hour and was later transferred to the ward, completing antibiotic therapy and being discharged without complications.

3. Discussion

This case shows a logical, though less common, use of the SLN block in pediatrics: preventing laryngospasm at the end of a case. Small children with active viral infections like COVID-19 are much more likely to have reactive airways [1, 2]. Our goal was to apply the block while she was still in a deep anesthetic plane. By desensitizing the sensory pathway early, the patient could move through the excitement phase (Guedel Stage 2) without her larynx reacting spastically to the tube or secretions.

Figure 2. Ultrasound identification of the key anatomical landmarks: hyoid bone (red), thyroid cartilage (blue), thyrohyoid muscle (yellow), and thyrohyoid membrane (green).

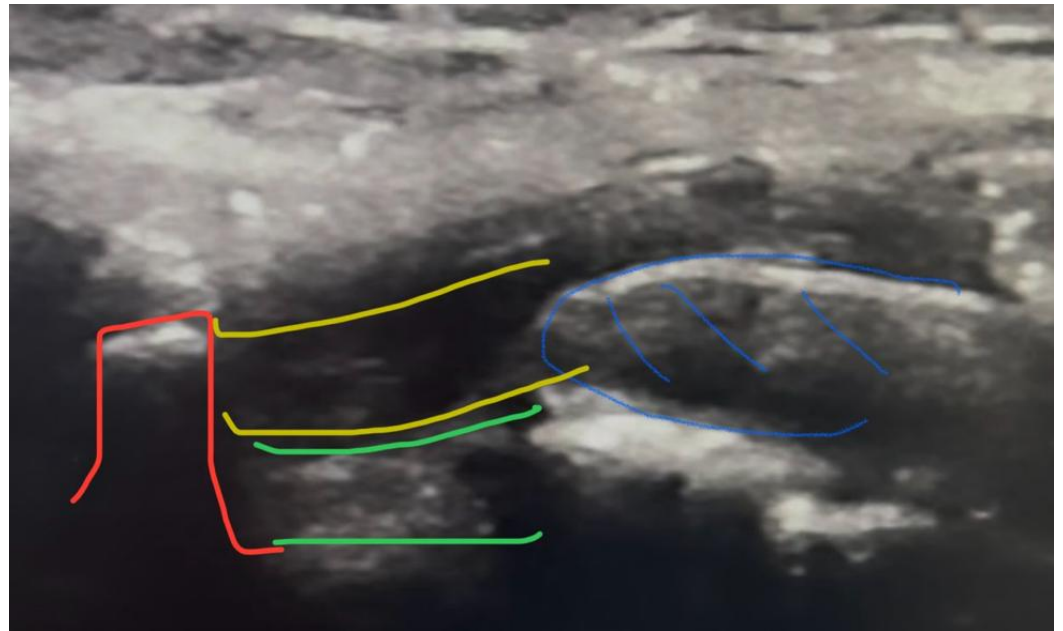
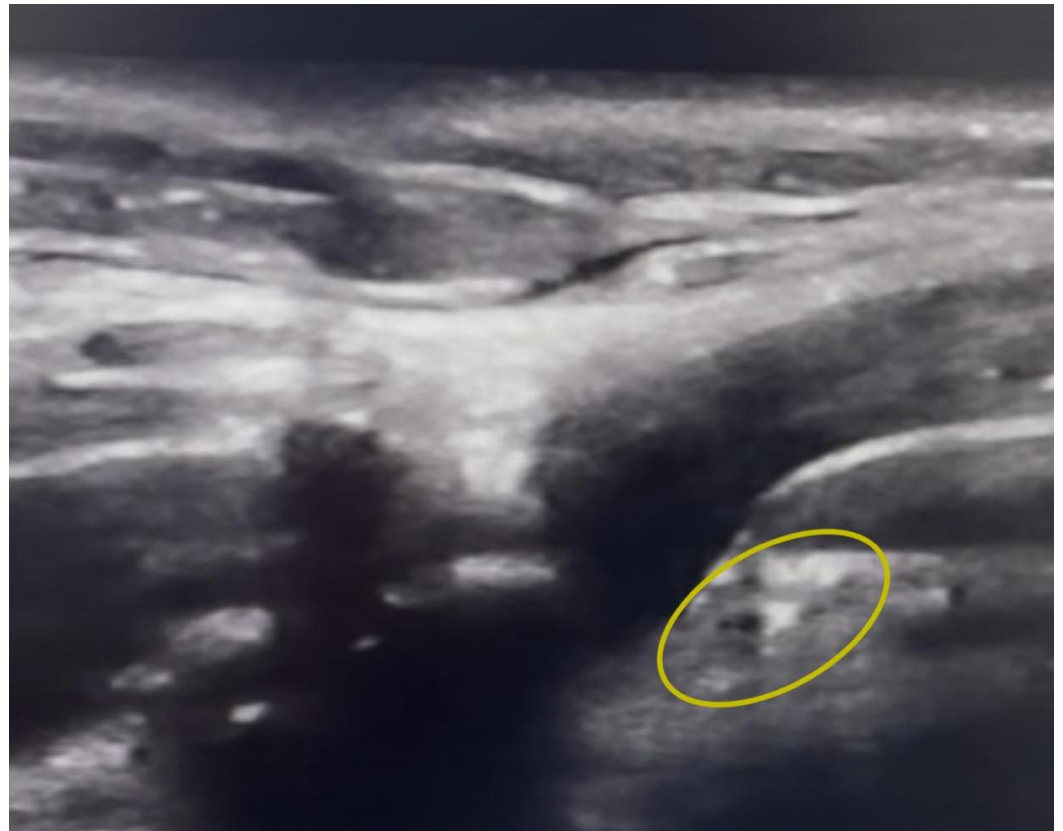


Figure 3. Color Doppler view shows the superior laryngeal artery. The internal branch of the superior laryngeal nerve runs adjacent to the artery.



We must clarify the novelty here. While SLN blocks are well-known for awake intubation in adults [4], using them prophylactically to bridge the gap between deep anesthesia and awakening in a child is a different approach. The timing is the key. By blocking the afferent limb of the reflex arc before the patient starts to wake up, we provide a more

targeted effect than systemic medications. However, we cannot ignore other factors. The use of fentanyl and propofol during induction, along with a smooth intravenous technique, certainly helped stabilize her airway. These are high-quality practices that also reduce risk. It is impossible to say the SLN block was the only reason for her smooth recovery, but it likely played a significant role.

Safety is another major point. For a 12 kg child, the maximum safe dose of lidocaine is roughly 5 mg/kg (60 mg). Our total dose was 30 mg (2.5 mg/kg), which is well within the safety margins. Using ultrasound helped us keep the volume small and stay away from blood vessels [5]. It is important to note that while we used the artery as a landmark, we did not visualize the nerve fibers themselves; this is common practice given how small they are in a 3-year-old. Comparing this to IV lidocaine, the evidence for systemic lidocaine is often mixed and prone to bias [1]. A local block acts directly where the reflex starts, which we felt was a better choice for an inflamed larynx.

4. Conclusion

Using an ultrasound-guided bilateral SLN block for a 3-year-old with COVID-19 was feasible and resulted in a safe recovery. This case highlights how targeted nerve blocks might help manage airway hyperreactivity in children. However, this is just one case. We need controlled, randomized studies to truly understand how well this works and to define the best doses and safety profiles for pediatric anesthesia.

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Research Ethics Committee Approval: The patient provided written informed consent for participation, and the study was conducted in accordance with the ethical guidelines outlined in the Declaration of Helsinki.

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Conflicts of Interest: All other authors declare no conflicts of interest.

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