

Supraclavicular Ultrasound-Guided Nerve Block in the Management of a Difficult Airway in an Elderly Patient with Bilateral Multinodular Goitre with Galeazzi Fracture.

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Abstract:

A 52-year-old woman presented with a large, diffuse, bilateral multinodular goitre, elevated TSH levels, and a right-sided Galeazzi fracture, along with clinical indicators suggesting a difficult airway. Given the anticipated airway management challenges associated with her thyroid enlargement and the multisystem effects of thyroid dysfunction, we opted for a supraclavicular ultrasound-guided nerve block during surgical fixation of her fracture. This case emphasizes the challenges of perioperative management in elderly patients with complex comorbidities, particularly the use of advanced regional anaesthesia techniques in managing both airway risk and providing effective pain control for fracture surgery.

Key words: Goitre, brachial plexus block, Galeazzi fracture, difficult airway

Introduction:

Multinodular goitre is a common thyroid pathology in older adults, often presenting with symptoms such as dysphagia, hoarseness, and airway compromise. Studies indicate that abnormal thyroid stimulating hormone levels are prevalent in up to 21% of women and 3% of men.^[1] Patients who report as emergencies with uncontrolled hyperthyroidism or uncontrolled myxoedema are at significant risk during the perioperative period.^[2] The management of a patient with a large, bilateral multinodular goitre can be complicated by difficulty in securing an airway, particularly when combined with other factors such as advanced age, comorbidities, and trauma, which make the task of an anaesthesiologist extremely difficult. It is necessary to have difficult airway carts on hand for both intubation and extubation. This case discusses the perioperative management of patients with hypothyroidism undergoing non-thyroid surgery. We describe the anaesthetic management of a patient with a right-sided Galeazzi fracture, multinodular goitre, and an anticipated difficult airway, scheduled for open reduction and internal fixation with plating of the right radius.

Case:

A 52 years old female presented to the casualty with a history of slip and fall at home, resulting in injury to the right hand. There was no associated history of loss of consciousness / ENT bleed/ Head trauma/ ICU stay. At the time of presentation, she had a long-standing history of a prominent swelling in the midline of the neck. It was painless and progressive in nature. As the size of the swelling increased, the patient started having discomfort in breathing on lying down.

She was a known case of thyroid disorder since 10 years, on tablet Thyronorm 100 mcg OD since 10 years. Routine investigations like Renal function test, liver function test, serum electrolytes, Complete blood picture were within normal limits. Patient's Thyroid profile test was done, which showed thyroxine (T4) levels of 6.98. Tri-iodothyronine (T3) levels of 1.28 and Thyroid stimulating hormone (TSH) levels of 9.022. Her physical examination showed an enlarged thyroid gland with multiple variable sized solid-cystic nodules, with the largest measuring 3.7*3.1*3.4 CMS in the right upper lobe of the gland. Her MP grade was III and mouth opening was three finger breadth. Electrocardiography (ECG) was normal. Her Chest X-ray and X-ray Neck AP and lateral showed slight tracheal deviation to the left side and a calcified nodule over the right lobe of the thyroid gland. Despite having no prior history of hypertension, the patient had elevated blood pressure during the preoperative evaluation, with several instances of abnormal readings during the assessment. A medical consultation was obtained, and the patient was started on a combination therapy of atenolol (50 mg) and amlodipine (5 mg) for preoperative optimization. Considering all of the above-mentioned details her ASA grade was determined as III, as she was a known case of uncontrolled thyroid disorder.

Clinical Assessment: The patient had a massive, diffuse, bilateral multinodular goitre that extended into the trachea upon physical examination. On Examination a midline neck swelling was noted, which moved with deglutition. Stretching superiorly up to the hyoid bone, the swelling spread laterally from one sternocleidomastoid muscle to the other. The swelling had several nodules and a dominant nodule on the right side, and its substance varied from soft to hard when palpated. No ocular symptoms typical of thyrotoxicosis were seen, nor were there any engorged veins over the enlargement. There were no palpable lymph nodes either.

Airway examination: Examining the airway revealed that the neck was rigid and had little extension, which may indicate that managing the airway will be challenging. The goitre raised worries about possible tracheal compression, although there were no symptoms of acute airway blockage.

Thorough preparation and readiness to employ advanced airway management strategies are essential in managing such cases effectively.

USG local swelling neck: Suggestive of multinodular goitre with right upper lobe nodule suggesting of TRAIDS 4.

Awake fiberoptic oral intubation was scheduled for the patient. The patient was thoroughly prepared and counselled, and after discussing the associated risks, including cardiorespiratory instability, delayed recovery, and the potential need for postoperative mechanical ventilation, written informed consent was obtained. On the day of surgery, the supraclavicular approach to the brachial plexus was selected after a pre-block ultrasound scan because the gland growth was aligned along the anterior-posterior axis, enabling access without requiring the displacement of neck anatomical features. After a very careful sonographic survey, it was realized the anatomy of the supraclavicular plexus was well preserved and therefore it was decided to proceed with a supraclavicular approach for the block [Figure 1,2]. The patient received an intramuscular injection of glycopyrrolate 0.2 mg, administered 30 minutes before being transferred to the operating room. Upon arrival in the operating room and positioning on the operating table, multiparameter monitors were attached, including ECG, non-invasive blood pressure (NIBP), and a pulse oximeter, to ensure continuous monitoring throughout the procedure. Standard monitoring, oxygen supply, suction equipment, resuscitation tools, and

essential medications, including lipid emulsion, are readily available in the operating room where the block is performed. Additionally, a well-defined contingency plan is essential to ensure the prompt and safe management of any complications or emergencies that may arise during the procedure. Brachial plexus blockade may be facilitated by ultrasound-guided regional anaesthesia in a number of ways, such as improved visualization of the neural target and surrounding structures, evaluation of the appropriate needle-tip position and local anaesthetic spread, and detection of abnormal anatomy or pathology. Using a high-frequency linear probe, the brachial plexus was identified at the level of the subclavian artery, injection of 20 cc 0.75% ropivacaine + 10 cc of 2% lignocaine adrenaline + 15 mcg of Dexmedetomidine and a volume of 20cc was administered around the plexus [Figure 3]. A right-sided tourniquet block was performed using a total volume of 5 mL of local anaesthetic solution. This comprised 3 mL of 0.5% bupivacaine (15 mg) and 2 mL of 2% lignocaine with adrenaline (40 mg) .The block was successful, Complete motor and sensitive blocks were obtained after 15 mins, The patient remained comfortable throughout the procedure. Without complete general anaesthesia, the patient was given fentanyl and midazolam for mild sedation. She was kept awake but calm, and airway patency was maintained without the need for endotracheal intubation. Continuous monitoring of the patient’s blood sugar, temperature, cardiovascular and respiratory status was maintained, with no significant intraoperative complications. The patient was moved to the recovery room after surgery, where she was closely monitored for signs of respiratory distress. After the surgery, the patient reported no pain in the right upper limb, demonstrating the great analgesia delivered by the supraclavicular nerve block.



Fig 1: Pre-block ultrasound scan

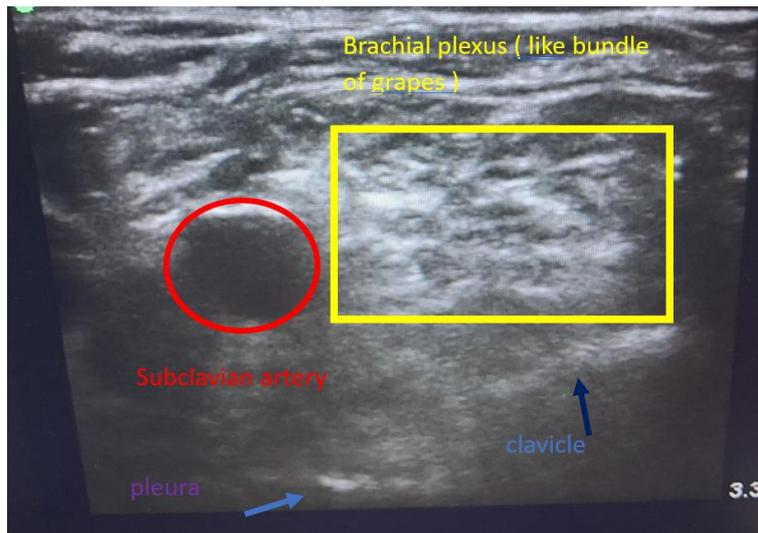


Fig 2: The anatomy of the supraclavicular plexus was well preserved

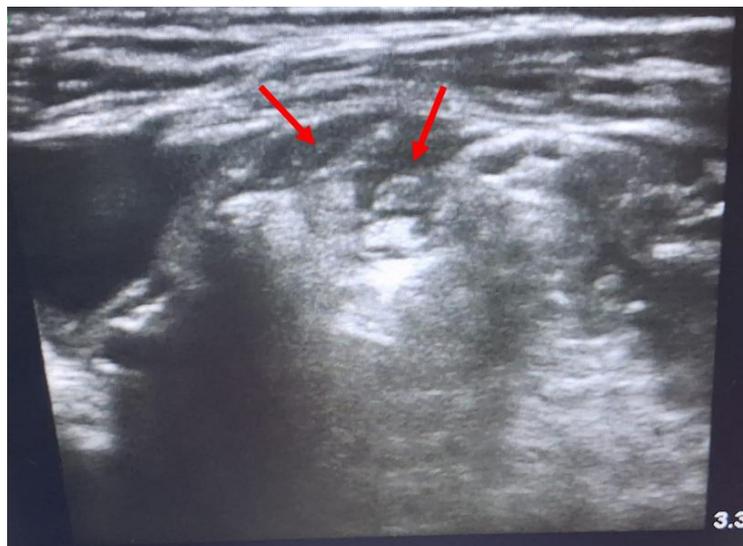


Fig 3: An arrow is shown on an ultrasound image indicate the spread of the local anaesthetic

Discussion:

This case emphasizes the value of a multidisciplinary approach in the treatment of older people with complex conditions, such as trauma and medical comorbidities (such as thyroid dysfunction). The amount of iodine in the diet determines the incidence of hypothyroidism.^[3] Myocardial depression, decreased spontaneous breathing, aberrant baroreceptor function, decreased plasma volume, anemia, and other conditions can all be caused by hypothyroidism. decreased drug metabolism, hypoglycemia, hyponatraemia, and hypothermia.^[4] Taking precautions to prevent hypothermia is essential, especially during periods of increased surgical stress. Hypothyroid patients should receive hydrocortisone coverage in these situations due to their reduced adrenocorticotropic hormone (ACTH) response to stress and an elevated risk of adrenocortical insufficiency.^[5] Patients with hypothyroidism face a high risk of coronary events, likely due to elevated cholesterol levels, prolonged circulation of several clotting

factors, and the development of anemia.^[6-9] Electrocardiograms often show nonspecific ST-segment abnormalities and low voltage, and in rare cases, a type of ventricular tachycardia known as "torsade de pointes" may be observed.^[10]

Patients with large goitres may have trouble managing their airways because of the possibility of tracheal compression, limited neck mobility, and intubation difficulties. Even though fiber optic intubation is a preferred approach, it is not always practical for elderly, fragile patients. Instead, methods like supraclavicular ultrasound-guided nerve blocks can offer safe, efficient anaesthesia. A dependable and efficient regional anaesthetic method for upper limb procedures is supraclavicular brachial plexus block, especially for patients with challenging airways. The safety and accuracy of the block are further improved by the use of ultrasound guidance, which guarantees a successful procedure with minimal complications. Particularly for procedures that need a tourniquet, the supraclavicular block is the recommended option for complete upper limb anaesthetic due to its superior pain management during tourniquet inflation. Compared with the axillary block, it offers more thorough and accurate anaesthetic. The necessity of thorough preoperative planning and thyroid function optimization is further highlighted by this particular case, since thyroid disorders might exacerbate anaesthesia difficulties and postoperative consequences including poor wound healing, cardiovascular instability and respiratory instability.

Conclusion:

This case demonstrates the safe and effective use of ultrasound-guided supraclavicular nerve block in an elderly patient with a Galeazzi fracture, thyroid dysfunction, and a large multinodular goitre. In situations where airway management is challenging, regional anaesthesia offers a reliable alternative to general anaesthesia, especially in high-risk patients. Ultrasound guidance provides precise needle placement near the cervical pleura, minimizing complications like pneumothorax and ensuring adequate surgical anaesthesia.

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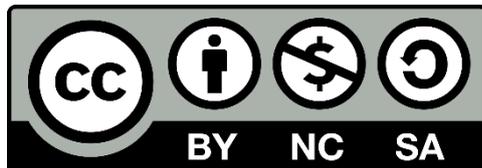
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