

Regional anesthesia for awake surgical excision of a voluminous parathyroid adenoma: a case report

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Abstract

Surgical excision under general anesthesia (GA) remains the standard treatment for parathyroid adenomas (PAs), but regional anesthesia (RA) approaches offer advantages for high-risk patients. This case report describes successful PA resection in a 59-year-old male with multiple comorbidities (hypertensive heart disease, obesity, obstructive sleep apnea) using ultrasound-

guided cervical plexus block and local infiltration anesthesia. The procedure employed an ultrasound-guided single-puncture technique combining superficial and intermediate cervical plexus blocks with levobupivacaine-dexmedetomidine solution, supplemented by ultrasound-guided local infiltration at the surgical incision site. The patient maintained stable vital signs and spontaneous breathing with excellent analgesia during the entire procedure, which lasted 45 minutes, reporting outstanding post-operative analgesia. This case demonstrates RA's efficacy for parathyroid surgery, providing optimal perioperative pain control while avoiding airway manipulation, reducing opioid requirements, and minimizing postoperative nausea and vomiting – representing a viable alternative to GA for patients with cardiorespiratory comorbidities.

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Introduction

Primary hyperparathyroidism (PHPT) is a common endocrine disorder affecting 1-4 per 1000 individuals, predominantly women over 50 (female ratio 3:1). Solitary parathyroid adenoma (PA) accounts for 80-85% of cases of PHPT, and surgical excision of the affected parathyroid gland remains the standard treatment.¹ Although this procedure is traditionally performed under general anesthesia (GA), there is growing interest in regional anesthesia (RA) approaches.² The main advantages of RA techniques, which are tangible especially in high-anesthetic-risk patients, are the possibility of avoiding airway manipulation while ensuring optimal perioperative pain management, reducing the need for opioids and the incidence of postoperative nausea and vomiting, and promoting earlier discharge.³ Cervical plexus block (CPB) has emerged as a viable anesthetic option for parathyroid surgery. The cervical plexus, formed by the ventral rami of C1-C4 spinal nerves, provides sensory innervation to the anterolateral neck region, making it an ideal target for RA during thyroid and parathyroid surgical procedures.⁴ Advances in ultrasound-guided techniques have revolutionized the approach to CPB by enabling direct visualization of anatomical structures, optimizing dosages of local anesthetics, and minimizing the risk of vascular or neural injury.⁴

Case Report

We described a case of a 59-year-old male (ASA III), affected by hypertensive heart disease, obesity (BMI 36.7), and obstructive sleep apnea, who presented for a left voluminous PA resection. After obtaining informed consent, standard monitoring was estab-

lished, and premedication with midazolam 1 mg and sufentanil 5 mcg was administered. Using a high-frequency linear transducer and a lateral-to-medial in-plane approach, both superficial and intermediate CPB were performed by a single puncture technique.⁵ For intermediate CPB (Figure 1A) we injected an anesthetic solution composed of 10 mL of 0.5% levobupivacaine plus 25 mcg of dexmedetomidine. For the superficial approach (Figure 1B), we used 15 mL of the same mixture. Then, a local infiltration anesthesia (LIA) at the surgical incision site (Figure 1C) was performed by an additional injection of 5 mL of 0.5% levobupivacaine. Intraoperative sedation was started by dexmedetomidine (0.8 mcg/kg bolus in 20 minutes, followed by intravenous continuous infusion at 0.4 mcg/kg/h) targeting a RASS score of -3. The surgical procedure, which lasted 45 minutes, involved a median Kocher cervicotomy for the enucleation and removal of a large 3 cm PA (Figure 1D). The patient maintained spontaneous breathing with 3 L/min of oxygen *via* nasal cannula and stable vital parameters during surgery. He reported good quality perioperative analgesia (VAS 0) in the absence of complications.

Discussion

Regional anesthesia techniques are well established in various neck surgical procedures, particularly in carotid endarterectomy (TEA), allowing continuous neurological monitoring during carotid clamping.⁴⁻⁵ However, their application can extend beyond vascular surgery to other neck procedures, as demonstrated in this case of PA excision. The advantages of RA in neck surgery include excellent analgesia, hemodynamic stability, reduced stress response, and the ability to maintain spontaneous ventilation while avoiding airway manipulation. These benefits are particularly valuable in patients with significant cardiorespiratory comorbidities, where GA may pose increased risks. This report suggests that RA may represent a viable option for patients scheduled to undergo parathyroid surgery. In particular, the association of ultrasound-guided superficial and intermediate CPB performed by a single-puncture technique allows for obtaining excellent surgical anesthesia and postoperative analge-

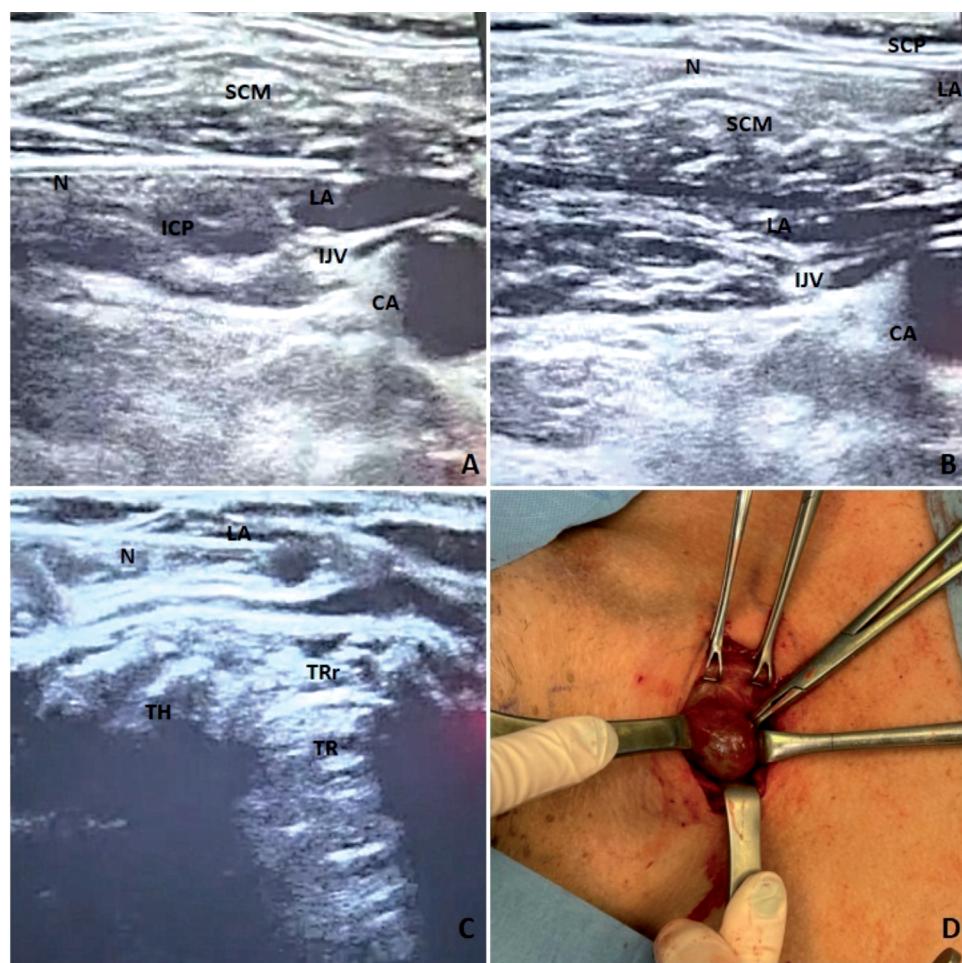


Figure 1. Sequential procedures for parathyroid adenoma removal: cervical plexus blocks and surgical intervention. A) Ultrasound-guided intermediate cervical plexus block. Local anesthetic is injected deep to the investing fascia and superficial to the prevertebral fascia at the midpoint of the posterior border of sternocleidomastoid muscle. B) Ultrasound-guided superficial cervical plexus block. The needle is withdrawn, and local anesthetic is injected in the subcutaneous tissue superficial to the investing fascia at the midpoint of the posterior border of sternocleidomastoid muscle. C) Ultrasound-guided local infiltration anesthesia. Local anesthetic is injected into the subcutaneous tissue at the surgical incision site. D) Enucleation and removal of a large 3 cm parathyroid adenoma. ICP, intermediate cervical plexus; N, needle; LA, local anesthetic; SCM, sternocleidomastoid muscle; CA, carotid artery; IJV, internal jugular vein; SCP, superficial cervical plexus; LIA, local infiltration anesthesia; TR, trachea; TRr, tracheal ring; TH, thyroid lobe.

sia, minimizing patient discomfort and avoiding potential adverse effects of deep CPB such as phrenic nerve paralysis, brachial plexus block, or intravascular injection.⁵

Conclusions

Our experience suggests that the combination of ultrasound-guided superficial and intermediate cervical plexus blocks with local infiltration anesthesia represents a promising approach for parathyroid surgery. This technique provides adequate sensory blockade of the surgical field while minimizing the risks associated with deep cervical plexus block. When integrated with appropriate intraoperative sedation, it offers an effective and safe alternative to general anesthesia, especially for patients with significant cardiorespiratory comorbidities. Further studies are warranted to establish standardized protocols and to compare outcomes with traditional general anesthesia approaches in larger patient populations.

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