

Advanced Surgical Management of Hyperparathyroidism: Total Parathyroidectomy with Supraomohyoid Neck Dissection. Case Report

Roman Esteban Hernández Gonzalez^{*1}, Sergio Federico Estrada Tijerina², Sofía Alejandra Pinto López³, Alejandro Ramírez Rodeles⁴, Paola Gonzalez Castelan⁵, Ingrid Jocelyn Romero Pérez⁶, Harumi Rojas Hernández⁷, Juan Carlos Lujano Tello⁸, Jocelyne Saray Wiechman Chávez⁹, Ander Axel Velázquez Pérez¹⁰

¹IMSS HGR2, “El Marqués”.

²Hospital Central del Estado. Universidad Autónoma de Chihuahua.

³Universidad Católica de Honduras.

⁴Hospital General Regional Numero 1 IMSS. Ciudad Obregón.

⁵Universidad Autónoma de Tlaxcala. Facultad de Ciencias de la Salud.

⁶CM Lic. Adolfo López Mateos.

⁷CM Lic. Adolfo López Mateos.

⁸CM Lic. Adolfo López Mateos.

⁹HGR No 1 IMSS Tijuana.

¹⁰Universidad Cristóbal Colón.

ABSTRACT

Hyperparathyroidism is an endocrine disorder characterized by excessive secretion of parathyroid hormone, leading to significant alterations in calcium and phosphorus metabolism. Although most cases correspond to single parathyroid adenomas, advanced and multiglandular forms continue to represent a diagnostic and therapeutic challenge, particularly when associated with a cervical mass and suspicion of regional involvement. We present the case of a 58-year-old male patient with a history of severe hypercalcemia, recurrent nephrolithiasis, bone pain, and progressive enlargement of the left cervical region. Laboratory studies revealed markedly elevated parathyroid hormone levels, while cervical ultrasound, computed tomography, and sestamibi scintigraphy demonstrated a left parathyroid lesion associated with ipsilateral cervical lymphadenopathy. Due to the clinical and radiological findings suggestive of advanced disease, total parathyroidectomy associated with ipsilateral supraomohyoid neck dissection was performed. During the procedure, cervical neurovascular structures, including the recurrent laryngeal nerve, were identified and preserved. Postoperative evolution was favorable, with progressive decrease in serum calcium and parathyroid hormone levels, without major complications. Definitive histopathological analysis reported multiglandular parathyroid hyperplasia without evidence of malignant lymph node infiltration. This case highlights the importance of an individualized surgical approach in patients with advanced hyperparathyroidism associated with cervical mass, as well as the role of total parathyroidectomy and selective neck dissection in achieving adequate metabolic and locoregional control.

KEYWORDS: Hyperparathyroidism, total parathyroidectomy, supraomohyoid neck dissection, hypercalcemia, multiglandular parathyroid hyperplasia, endocrine neck surgery, cervical mass, parathyroid hormone.

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INTRODUCTION

Hyperparathyroidism is an endocrine disorder characterized by excessive production of parathyroid hormone (PTH),

leading to disturbances in calcium and phosphorus metabolism with systemic repercussions mainly affecting the skeletal, renal, gastrointestinal, and cardiovascular systems.

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It is classified into primary, secondary, and tertiary hyperparathyroidism, with the primary form being the most common and usually associated with a single parathyroid adenoma; however, a smaller percentage of cases may correspond to multiglandular hyperplasia or parathyroid carcinoma, entities that represent a greater diagnostic and therapeutic challenge.¹

Clinical manifestations may range from asymptomatic patients diagnosed incidentally through biochemical studies to advanced presentations with severe hypercalcemia, recurrent nephrolithiasis, osteopenia, osteoporosis, bone pain, muscle weakness, neuropsychiatric disorders, and cardiovascular alterations. In cases of prolonged evolution or aggressive disease, significant gland enlargement, local invasion, or associated cervical lymphadenopathy may occur, increasing surgical complexity and the need for extended cervical approaches.²

Definitive treatment of hyperparathyroidism is surgical. Parathyroidectomy remains the procedure of choice in symptomatic patients, those with significant biochemical alterations, or evidence of secondary organ damage. The type of surgical approach depends on the etiology, gland localization, and extent of disease. In patients with suspected malignancy, regional infiltration, or cervical lymphadenopathy, complementary procedures such as selective supraomohyoid neck dissection may be required in order to achieve adequate locoregional control and reduce the risk of disease persistence or recurrence.³

Supraomohyoid neck dissection includes lymph node resection of cervical levels I, II, and III while preserving major neurovascular structures of the neck. This approach has demonstrated usefulness in several head and neck pathologies with regional lymphatic involvement, allowing adequate histopathological staging and improved oncological control in selected cases.⁴

Despite advances in imaging methods and minimally invasive surgical techniques, advanced hyperparathyroidism cases

continue to represent a challenge for endocrine and head and neck surgeons, particularly when extensive disease or aggressive biological behavior is suspected. Adequate preoperative planning, detailed cervical anatomical knowledge, and precise identification of critical structures are essential to decrease complications such as recurrent laryngeal nerve injury, permanent hypocalcemia, or disease recurrence.⁵

We present the case of a 58-year-old male patient diagnosed with advanced hyperparathyroidism treated with total parathyroidectomy associated with supraomohyoid neck dissection, describing the clinical findings, diagnostic studies, surgical technique, and postoperative evolution, along with a literature review related to this type of complex surgical approach.

CASE REPORT

A 58-year-old male patient, without relevant family history, with a past medical history of systemic arterial hypertension under medical treatment, presented with progressive muscle weakness, generalized bone pain, recurrent nephrolithiasis, and an unintended weight loss of approximately 8 kg over the previous year. The patient also reported progressive enlargement of the left cervical region associated with occasional dysphagia to solid foods.

Physical examination revealed a left cervical mass measuring approximately 6 x 5 cm, with firm consistency and limited mobility to deep planes. Laboratory studies showed severe hypercalcemia with serum calcium levels of 13.8 mg/dL and markedly elevated intact parathyroid hormone (PTH) levels of 1,245 pg/mL. Cervical ultrasound and computed tomography demonstrated a lesion dependent on the left parathyroid gland associated with ipsilateral cervical lymphadenopathy at levels II and III. Sestamibi scintigraphy showed increased uptake compatible with hyperfunctioning parathyroid tissue.



Figure 1. Clinical tumor mass

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Due to the clinical and radiological findings suggestive of advanced parathyroid disease, surgical management with total parathyroidectomy associated with ipsilateral supraomohyoid neck dissection was decided.

After obtaining informed consent, the patient was taken to the operating room in the supine position under balanced general anesthesia with orotracheal intubation. An infrascapular roll was placed to achieve cervical hyperextension and slight contralateral rotation. Antisepsis of the cervical region and upper thorax was performed using iodinated solution followed by sterile draping.

A transverse Kocher-type cervical incision was made approximately two centimeters above the sternal notch, following the natural cervical skin creases. Layer-by-layer dissection was carried out until identification of the platysma muscle, which was horizontally divided. Superior subplatysmal flaps were elevated to the mandibular border and inferior flaps to the sternal notch. The cervical midline was identified and separated through blunt dissection of the strap muscles, exposing the visceral compartment of the neck.

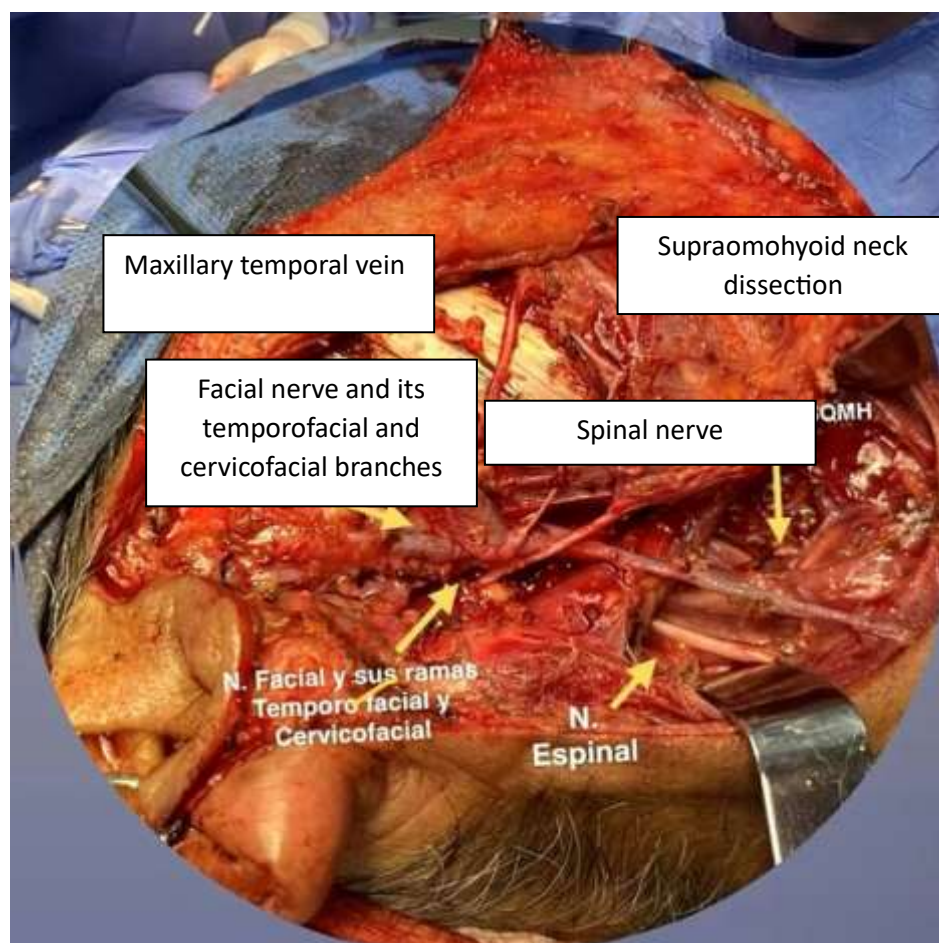


Figure 2. Intraoperative image

During cervical exploration, an enlarged left parathyroid gland measuring approximately 5 cm and partially adherent to surrounding perithyroid tissues was identified. Careful dissection was initiated using blunt technique and bipolar electrocautery while preserving adjacent vascular structures. The left recurrent laryngeal nerve was identified within the tracheoesophageal groove and preserved throughout the entire procedure. Subsequently, all four parathyroid glands were identified and resected, and surgical specimens were sent for intraoperative histopathological evaluation. Ipsilateral supraomohyoid neck dissection was then performed, beginning at cervical level I through identification of the anterior belly of the digastric muscle and the

mylohyoid muscle. Dissection of fibro-fatty and lymphatic tissue from cervical levels II and III was continued, bounded by the posterior border of the sternocleidomastoid muscle, internal jugular vein, and omohyoid muscle. Major neurovascular structures were preserved during the procedure, including the spinal accessory nerve, internal jugular vein, common carotid artery, and hypoglossal nerve. Hemostasis was subsequently verified, abundant saline irrigation was performed, and a closed-suction Jackson-Pratt drain was placed within the cervical surgical bed. Layered closure was completed with approximation of the strap muscles, subcutaneous closure, and intradermal skin closure.

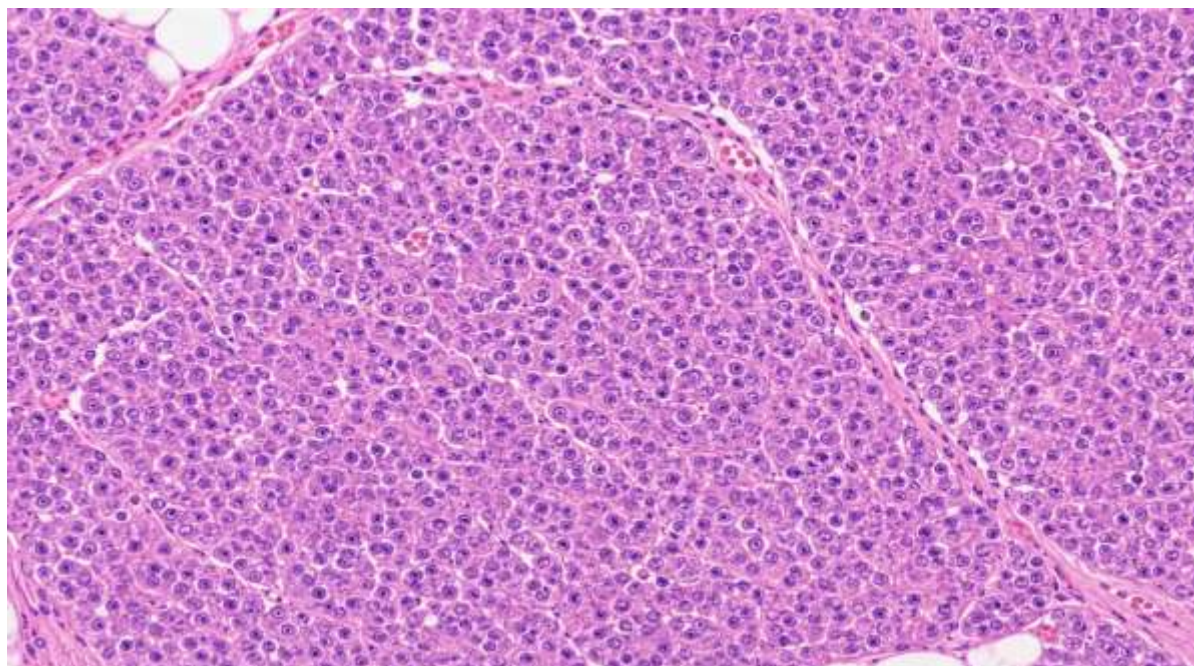


Figure 3. Histopathological study

The patient showed favorable immediate postoperative evolution without evidence of neurological injury or respiratory compromise. Progressive decrease in serum calcium and parathyroid hormone levels was observed, requiring temporary supplementation with calcium and vitamin D. Definitive histopathological examination reported advanced multiglandular parathyroid hyperplasia without evidence of malignant lymph node involvement. The patient currently remains under follow-up by the head and neck surgery and endocrinology departments, with satisfactory clinical evolution.

DISCUSSION

Hyperparathyroidism represents one of the leading causes of hypercalcemia in adults and has become increasingly important due to the growing number of incidental diagnoses through routine biochemical testing. Although most cases correspond to single parathyroid adenomas, advanced and multiglandular forms continue to represent a diagnostic and therapeutic challenge, particularly when associated with

significant cervical enlargement, locoregional involvement, or suspicion of malignancy, as observed in the present case.⁶ In this patient, the presence of severe hypercalcemia, markedly elevated parathyroid hormone levels, palpable cervical mass, and regional lymphadenopathy raised suspicion of advanced disease, leading to the decision to perform an extended surgical approach consisting of total parathyroidectomy associated with ipsilateral supraomohyoid neck dissection. This type of management not only allows metabolic control of the disease but also provides adequate lymph node assessment and locoregional control in patients with findings suggestive of infiltration or aggressive behavior.^{6,7}

Several studies have demonstrated that surgery remains the definitive treatment for symptomatic hyperparathyroidism, achieving cure rates greater than 90% when appropriate preoperative localization and complete resection of hyperfunctioning tissue are performed. However, surgical complexity significantly increases in the presence of multiglandular hyperplasia, ectopic disease, or suspicion of parathyroid carcinoma.⁷

Table 1. Clinical manifestations of advanced hyperparathyroidism

Clinical manifestation	Reported frequency
Hypercalcemia	85–100%
Nephrolithiasis	40–70%
Bone pain	30–60%
Muscle weakness	40–55%
Palpable cervical mass	<15%
Gastrointestinal manifestations	20–40%

In the present case, the patient exhibited classical manifestations of advanced disease, including recurrent nephrolithiasis, bone pain, and palpable cervical mass. The

presence of a cervical mass in patients with hyperparathyroidism requires exclusion of parathyroid

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carcinoma, a rare entity associated with extremely elevated calcium and PTH levels.⁷

Imaging studies play a fundamental role in preoperative localization and surgical planning. Cervical ultrasound and

sestamibi scintigraphy remain the most widely used diagnostic tools; however, computed tomography is especially useful in patients with extensive disease, ectopic localization, or associated lymphadenopathy.⁸

Table 2. Imaging studies used in hyperparathyroidism

Study	Main utility	Sensitivity
Cervical ultrasound	Anatomical localization	70–85%
Sestamibi scintigraphy	Functional identification	80–90%
Computed tomography	Deep cervical evaluation	75–85%
Magnetic resonance imaging	Ectopic disease	70–80%

The surgical procedure performed in this patient included total parathyroidectomy and ipsilateral supraomohyoid neck dissection due to the presence of suspicious lymphadenopathy. Dissection of cervical levels I, II, and III allows adequate lymph node evaluation and locoregional control in selected patients. During the procedure, identification and preservation of the recurrent laryngeal

nerve, as well as meticulous hemostatic control, were essential to reduce postoperative complications.⁹

Complications associated with parathyroidectomy include transient hypocalcemia, recurrent laryngeal nerve injury, and persistent disease. In the present case, the patient showed satisfactory postoperative evolution, with progressive reduction of serum calcium and parathyroid hormone levels, without neurological alterations or respiratory compromise.¹⁰

Table 3. Postoperative complications of parathyroidectomy

Complication	Frequency
Transient hypocalcemia	15–35%
Permanent hypocalcemia	1–5%
Recurrent laryngeal nerve injury	1–3%
Cervical hematoma	1–2%
Persistent or recurrent disease	2–10%

Definitive histopathological analysis reported multiglandular parathyroid hyperplasia without evidence of metastatic lymph node infiltration. Multiglandular hyperplasia

represents a smaller proportion of hyperparathyroidism cases, although it is commonly associated with more extensive disease and the need for broader surgical resections.¹¹

Table 4. Differential histopathological findings in parathyroid disease

Diagnosis	Characteristics
Parathyroid adenoma	Single gland involvement
Parathyroid hyperplasia	Multiple gland involvement
Parathyroid carcinoma	Capsular and vascular invasion
Ectopic parathyroid tissue	Aberrant localization

In conclusion, advanced hyperparathyroidism continues to represent a diagnostic and surgical challenge. Adequate clinical, biochemical, and imaging correlation allows timely and safe management. Total parathyroidectomy associated with supraomohyoid neck dissection may represent an effective alternative in selected patients with extensive disease or suspected regional lymph node involvement, achieving adequate metabolic control and favorable clinical evolution.^{12,13}

CONCLUSION

In conclusion, Hyperparathyroidism is a complex endocrine disorder that, in its advanced forms, may present significant

systemic repercussions and represent an important diagnostic and surgical challenge. The presence of severe hypercalcemia, markedly elevated parathyroid hormone levels, osteorenal symptoms, and palpable cervical mass requires comprehensive evaluation aimed not only at confirming the diagnosis but also at excluding multiglandular disease, regional extension, or even parathyroid malignancy. In the present case, adequate correlation between clinical, biochemical, and radiological findings allowed the establishment of a timely and safe therapeutic approach. Total parathyroidectomy associated with ipsilateral supraomohyoid neck dissection achieved complete resection of hyperfunctioning tissue and adequate regional lymph node

evaluation, resulting in satisfactory metabolic control and favorable postoperative evolution. Preservation of cervical neurovascular structures, particularly the recurrent laryngeal nerve, was fundamental in reducing procedure-related morbidity.

Likewise, definitive histopathological findings confirmed multiglandular parathyroid hyperplasia without evidence of metastatic lymph node infiltration, a relevant finding considering that this presentation is commonly associated with greater surgical complexity and the need for long-term follow-up. Clinical and biochemical improvement after surgery reaffirms that surgical treatment remains the cornerstone in patients with symptomatic or advanced hyperparathyroidism.

This case highlights the importance of suspecting advanced parathyroid disease in patients presenting with severe hypercalcemia and associated cervical mass, as well as the need to individualize surgical management according to disease extent and clinical behavior. Furthermore, it emphasizes the role of imaging studies in preoperative planning and the relevance of a multidisciplinary approach to optimize functional and metabolic outcomes.

Finally, total parathyroidectomy associated with supraomohyoid neck dissection represents an effective and safe surgical alternative in selected patients with extensive disease or suspected regional involvement, allowing adequate locoregional control, reduction in the risk of persistence or recurrence, and improved postoperative quality of life.

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