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MANAGEMENT OF THYROID NODULES WITH CONCURRENT PARATHYROID DISORDERS: SURGICAL CHALLENGES AND STRATEGIES

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Abstract

Background: *It is easy for clinicians to find thyroid nodules and yet many parathyroid conditions like primary hyperparathyroidism may occur together, making treatment more involved. Because both the thyroid and parathyroid glands are close to one another, surgical problems and confusing diagnoses are more common, so experts from different fields are needed for the most favorable outcomes.*

Objectives: *To evaluate the surgical outcomes and identify perioperative challenges in patients presenting with thyroid nodules concurrently diagnosed with parathyroid disorders, and to determine the impact on complication rates and operative strategies.*

Study Design: *A Retrospective Cross-Sectional Study.*

Place and duration of study: *From 01 October 2024 to 31 March 2025, General Surgery Department, Sandeman Provincial Hospital / Bolan Medical Complex Hospital, Quetta.*

Methods: *We performed a retrospective observational study on patients having thyroid nodule surgery with parathyroid disorders at a tertiary care center from 01 October 2024 to 31 March 2025, Information was gathered on patient demographics, the ways they presented clinically, imaging reports, findings during surgery, histopathology results and complications. People with only a problem in the thyroid or parathyroid were not included in the study. Surgery results and surgical approaches were studied using SPSS version 24.0, with the line separating significance being $p<0.05$.*

Results: *Among the 82 participants, concurrent parathyroid adenoma was seen in 36 (43.9%) and 46 (56.1%) had hyperplasia along with thyroid nodules. Patients in the study were 52.4 ± 11.6 years old on average. Most of the cohort or 72%, consisted of female patients. In most cases (64.6%), we did a total thyroidectomy with a focused parathyroidectomy. Total complication incidence was 17.1% and short periods of abnormally low calcium in the blood were seen*

the most. Operative time was found to be significantly longer with parathyroid hyperplasia (p=0.021). When Sestamibi scans and neck ultrasound were done before surgery, it was easier to pinpoint the tumor and less surgeries were needed again (p=0.008).

Conclusion: *When both thyroid and parathyroid disorders occur, surgeons face both anatomical and overlapping symptomatic problems. With correct preoperative identification, bespoke surgery planning and monitoring throughout the procedure, the risk of issues decreases. Assessing a child from several perspectives improves the results. Surgeons have to keep an eye out for other medical problems in patients who have hyperkalemia and thyroid nodules to manage them all properly at once.*

INTRODUCTION

Thyroid nodules are common in the endocrine system, showing up in 19-67% of general screenings done with ultrasonography [1]. Although nodules are generally not cancerous, when they appear in people with parathyroid disorders—especially hyperparathyroidism—this complicates both diagnosis and surgery [2]. Approximately 90% of people with primary hyperparathyroidism have either a parathyroid adenoma or hyperplasia, making the disease the third most common endocrine disorder [3].Because they are near one another in the body and come from the same embryonic origins, both glands usually affect patients together [4]. Reports advise that up to one-third of people having parathyroidectomy could have thyroid nodules that require surgery at the same time [5,6]. During surgery, intraoperative difficulties can include locating the disease, the chance of damaging the recurrent laryngeal nerve, a risk of calcium loss and the risk that the disease may continue or reappear [7].Managing patients with these simultaneous problems calls for using accurate imaging, targeted biochemical exams and skillful surgical treatment [8]. Although ultrasound is usually the first imaging option, it can underestimate disease in cases of multiglandular problems or nodules in the thyroid [9]. The accuracy of finding an overactive parathyroid is improved by 99mTc-sestamibi scintigraphy, especially in individuals with multinodular goiters [10].Underlying problems determine whether doctors will perform a total thyroidectomy, followed by focused parathyroid removal or only subtotal removal [11]. Yet, the overall amount of surgery done should be guided by a desire to keep complications as low as possible. A larger degree of cervical handling and surgery could raise the risk of hypocalcemia and paralysis of the vocal cords [12]. Monitoring parathyroid hormone during surgery along with nerve monitoring helps the surgeon achieve better results [13].Present findings point out that planning before surgery is important, especially for secondary or tertiary hyperparathyroidism as the parathyroid cells are more spread out and less easy to remove using a focus approach [14]. Furthermore, treating someone with simultaneous thyroid cancer and hyperparathyroidism may occasionally make surgeons decide on more invasive methods of treatment [15,16].Regardless of improvements in surgery and medical imaging, many patients with thyroid nodules and parathyroid gland disease suffer undiagnosed or mismanaged diseases, resulting in less than ideal outcomes and more surgeries [17]. In this study, we sought to understand the profiles, tests used for diagnosis, treatments and outcomes in patients with both thyroid nodules and parathyroid conditions treated at a tertiary center.This study highlights what can lead to complications and assesses various surgical approaches to provide recommendations on the best approach and use of multidisciplinary care for dual aneurysms of the renal and splenic arteries [18].

Methodology

The study used a retrospective cross-sectional design at the Department of Surgery of **[Institution Name]**. The medical records of patients treated with surgery for both thyroid nodules and parathyroid disorders were looked at. Tests taken before the surgery measured calcium, PTH, thyroid function, imaged with ultrasound and did a 99mTc-sestamibi scan. Both operative reports and laboratory findings were

reviewed to verify the diagnoses and the surgery carried out.

Experienced endocrine surgeons performed all the surgeries using the medical center's own protocols. A discrepancy was found: while some patients only had their affected lobe removed with parathyroid excision, others had all the gland and both parathyroid glands taken out. The results looked at operation time, whether any problems (hypocalcemia or vocal cord palsy) occurred and if the disease came back. All data remained confidential and the institutional review board gave their ethical approval.

Inclusion Criteria

Individuals aged 18 or older, diagnosed with thyroid disease and at the same time with parathyroid adenoma or hyperplasia, who had surgery done between January last year and December this year were part of this research.

Exclusion Criteria

Patients whose pathology was limited to the thyroid or parathyroid, who had incomplete medical records, were not managed surgically or whose secondary hyperparathyroidism was linked to chronic kidney disease were not included in the study.

Data Collection

Data from the patients' hospital records covered demographic information, biochemical lab results, imaging findings, what was seen in surgery, results of histopathology and their outcomes after the operation. All data was entered on a standard form and two researchers checked each entry for accuracy and completeness.

Statically Analysis

The analyses were done with SPSS version 24.0. For categorical variables, we presented the results with both the number of cases and the percentage of the sample. For continuous variables, we showed the results as average ± standard deviation. The chi-square and t-tests were used as required. To find which factors affected complications, a logistic regression analysis was carried out, where winning factors were deemed significant when $p<0.05$.

Results

During the study, 82 patients had both a thyroid and parathyroid operation. The average age of the patients was 52.4 years and 59 (72%) were women. 36 patients (43.9%) had parathyroid adenomas and the rest, 46 (56.1%), had hyperplasia. Of all the patients, 53 (64.6%) had their entire thyroid removed along with some of the parathyroid glands, while the remainder had only the lobe of the thyroid removed together with a selected parathyroid gland.75.6% of the cases had successful localization before surgery, as seen by ultrasonography and 99mTc-sestamibi. Doctors checked the PTH level intraoperatively for about a third of patients with parathyroid hyperplasia. Nineteen percent of cases were considered complicated, of which 12.2% involved low calcium levels immediately after surgery. Our data indicated that parathyroid hyperplasia took longer to operate on ($p=0.021$) and using both preoperative imaging methods lowered the need for a second operation ($p=0.008$).Of all patients, histology showed benign nodules in the thyroid of 63.4% and papillary thyroid cancer in 9.7%. Permanent hypocalcemia or death did not occur in any of the cases. Following surgery, the hospital stay was between two and five days and patients were all observed for six months afterward.

Table 1: Patient Demographics

Characteristic	Value
Total Patients	82
Mean Age (years)	52.4 ± 11.6
Female (%)	59 (72%)
Male (%)	23 (28%)

Table 2: Parathyroid Pathology and Surgery

Pathology Type	Patients (n=82)	Surgical Approach
Parathyroid Adenoma	36 (43.9%)	Focused Parathyroidectomy
Parathyroid Hyperplasia	46 (56.1%)	Total Parathyroidectomy

Table 3: Postoperative Complications

Complication	Frequency (n, %)
Transient Hypocalcemia	10 (12.2%)
Recurrent Laryngeal Nerve Injury	2 (2.4%)
Hematoma	1 (1.2%)
Persistent Hypercalcemia	1 (1.2%)

Discussion

Having thyroid nodules along with problems in the parathyroid glands, especially with primary hyperparathyroidism, creates a special clinical and surgical concern. Because these two abnormalities are infrequently spotted, patients may receive incomplete surgery and encounter more postoperative problems. In our research, the majority (56.1%) of patients experienced parathyroid hyperplasia and had less frequent parathyroid adenomas (43.9%) which continues the trend recently suggested by research, showing multiglandular disease to be more usual in concurrent conditions. Among our key results, we discovered that imaging both the neck with ultrasonography and the thyroid with 99mTc-sestamibi scans allowed us to find lesions with much more accuracy. According to Solorzano et al., duo-technology improves the ability to spot parathyroid adenomas, especially if thyroid nodules block the view of the parathyroid glands [20]. The combination of these techniques helps avoid further operations which can result in nerve injury and extra scarring.We found that 17.1% of the complications in our study were transient hypocalcemia, a typical outcome of extensive bilateral surgery or taking out most of the parathyroid gland. Parathyroid hyperplasia adds to the surgery's difficulty and raises the possibility of subsequent hypocalcemia, covered in the work of Schneider et al. and Wilhelm et al. [21,22]. Monitoring intraoperative PTH is important, our study shows, since it confirmed total gland removal and this practice is now advised for those with increased risk. It's notable that 9.7% of the patients had papillary thyroid carcinoma at the same time. Because of this, there is a new push for hyperparathyroid patients to be checked for additional thyroid cancer. According to Vigneri and his group, patients who undergo parathyroidectomy more often have incidental thyroid cancer than people in the general population which underlines the need for a thorough thyroid check during surgery [23].We confirmed that using appropriate surgical approaches is valuable. When nodules or malignancies affected both lobes of the thyroid, a complete surgery was appropriate, while select patients with just one nodule responded well to conservative treatment. This supports the recommendation for tying treatment to the characteristics of the gland, the nodule and the results from imaging testing.Collectively, the findings suggest that using a variety of medical specialties is essential in caring for people with co-problems of the thyroid and parathyroid glands. Prior to operations, surgeons ought to pay close attention to any other medical issues and arrange for joint consultation from endocrinology, radiology and pathology to decrease risks during surgery and improve patient results.

Conclusion

Thyroid and parathyroid problems happening together should be carefully evaluated and treated through well-planned surgery. When ultrasonography is paired with sestamibi scans, localizing the problem becomes much easier. When treating multiglandular disease, surgeons need to pay close attention to possible complication risks to provide the best possible results and minimize extra operations.

Limitations

Since the study used only one center and was retrospective, the results are not easy to generalize. We

could not accurately measure recurrence rates because some patients were not followed long enough and documents were often incomplete. Furthermore, different patients had intraoperative PTH measurements which might have changed how well decisions and results were looked at during surgery.

Future Directions

Long-term outcomes after combined thyroid and parathyroid surgery should be studied in future multicenter studies. By combining information from molecular tests with 3D images, planning for an operation can be improved. Further study is needed to find the most effective surgery for patients with thyroid cancer and parathyroid hyperplasia or multiglandular disease.

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