Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2024; Vol-13: Issue 4
Open Access

Outcome of Clinical Profile and Surgical Management of Parathyroid Adenoma: A Retrospective Study of 11 Cases

Md. Morshed Alam[1], Syeda Sharmin Jamal[2], Mohammad Wahiduzzaman[3], Syed Ali Ahasan [4], Mohammad Idrish Ali[5], Arif Mahmud Jewel[6], Umme Salma Sumi[7]

[1]Medical Officer, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka-1000, Dhaka, Bangladesh
[2]Consultant, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka-1000, Dhaka, Bangladesh
[3]Associate Professor, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka-1000, Dhaka, Bangladesh
[4]Assistant Professor, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka-1000, Dhaka, Bangladesh
[5]Consultant, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka-1000, Dhaka, Bangladesh
[6]Medical Officer, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka-1000, Dhaka, Bangladesh
[7]Medical Officer, Sheikh Hasina National Institute of Burn & Plastic Surgery, Dhaka, Dhaka, Bangladesh

Corresponding author: Md. Morshed Alam, Medical Officer, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka-1000, Dhaka, Bangladesh

Cite this paper as: Md. Morshed Alam, Syeda Sharmin Jamal, Mohammad Wahiduzzaman, Syed Ali Ahasan, Mohammad Idrish Ali, Arif Mahmud Jewel, Umme Salma Sumi (2024). Outcome of Clinical Profile and Surgical Management of Parathyroid Adenoma: A Retrospective Study of 11 Cases. Frontiers in Health Informatics, Vol. 13 No.4, 1938-1944

ABSTRACT

Background: Parathyroid adenoma is a benign tumor of the parathyroid gland and the most common cause of primary hyperparathyroidism (pHPT). Although often asymptomatic, it may present with renal calculi, abdominal pain, or skeletal complications. Parathyroidectomy remains the definitive treatment.

Objectives: To evaluate the clinical presentation, diagnostic profile, surgical management, and outcomes of parathyroid adenoma.

Methods: A retrospective review was conducted on patients undergoing surgery for suspected parathyroid adenoma between January 2021 and January 2023 in the Department of ENT, Bangabandhu Sheikh Mujib Medical University (BSMMU). Demographics, clinical features, biochemical and radiological findings, operative details, and histopathological results were analyzed. Intraoperative parathyroid hormone (ioPTH) monitoring was used to assess surgical success.

Results: Eleven patients underwent parathyroidectomy. The mean age was 47.2 years (range: 30–63); six were male and five female. Clinical presentations included recurrent renal stones (3), abdominal pain (1), pathological fractures (2), and incidental detection (5). Ultrasonography localized adenomas in 9 cases, while 99mTc-MIBI scintigraphy was positive in all cases. Single gland involvement was noted in 9 patients, and multiple gland disease in 2. All patients underwent minimally invasive parathyroidectomy; ioPTH dropped >50% post-excision in every case. One patient required revision surgery for intrathyroidal adenoma, with successful outcome. Histopathology confirmed parathyroid adenoma in all cases; none showed carcinoma or

hyperplasia. Postoperatively, serum calcium and PTH normalized in all patients.

Conclusion: Parathyroid adenoma commonly presents with renal manifestations, though many patients remain asymptomatic. Biochemical screening and imaging are vital for diagnosis. Minimally invasive parathyroidectomy, supported by ioPTH monitoring, is highly effective and safe, with excellent surgical outcomes.

Keywords: Primary hyperparathyroidism, Parathyroid adenoma, Hypercalcemia, Parathyroidectomy, Intraoperative parathyroid hormone

INTRODUCTION

Hyperparathyroidism refers to excessive secretion of parathyroid hormone (PTH), leading to altered calcium and phosphate homeostasis. It is classified into primary, secondary, and tertiary forms, based on etiology and management approach. Primary hyperparathyroidism (pHPT) is the most common form and is most frequently caused by a solitary parathyroid adenoma, followed by parathyroid hyperplasia and, rarely, parathyroid carcinoma. The global incidence of pHPT varies geographically. In Western populations, the incidence ranges between 20–30 per 100,000 individuals annually, with higher prevalence among women and postmenopausal patients [1,3]. In India, the incidence is estimated at 2.5 per 1000 individuals [2], with most cases attributed to solitary adenomas (80–85%) [4]. Although pHPT is relatively common in developed nations due to routine biochemical screening, in resource-limited settings, diagnosis is often delayed until complications such as renal stones, skeletal deformities, or pathological fractures arise. Clinically, pHPT has a broad spectrum of manifestations. Many patients remain asymptomatic and are incidentally detected on routine biochemical evaluation. Symptomatic patients may present with renal calculi, nephrocalcinosis, abdominal pain, bone pain, pathological fractures, or neuropsychiatric symptoms [5]. Renal calculi occur in up to 20% of patients with pHPT, while fractures are less common (2–5%) [6]. Surgical excision of the adenoma is the definitive treatment, and minimally invasive parathyroidectomy (MIP) has emerged as the preferred approach due to reduced morbidity, shorter operative time, and improved cosmetic outcomes. The success of surgery is further enhanced by intraoperative parathyroid hormone (ioPTH) monitoring, which provides real-time confirmation of adequate resection. A decline of more than 50% in ioPTH within 10–15 minutes of gland removal strongly predicts postoperative cure [10–12]. Despite the well-documented prevalence and outcomes of parathyroid adenomas worldwide, data from Bangladesh are scarce. Most available reports are limited to case series with small sample sizes. This study presents the clinical profile, diagnostic evaluation, surgical management, and postoperative outcomes of patients with parathyroid adenoma managed at a tertiary referral hospital in Bangladesh. The findings may help bridge existing knowledge gaps and reinforce the role of biochemical screening, imaging modalities, and minimally invasive surgical techniques in improving outcomes for pHPT patients in low-resource settings.

MATERIALS AND METHODS

This retrospective study was conducted in the Department of ENT, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Data were collected from hospital records of patients who underwent surgery for suspected parathyroid adenoma between January 2021 and January 2023.

Inclusion criteria

- Patients with biochemical evidence of primary hyperparathyroidism (elevated serum calcium and PTH).

- Radiological localization suggestive of parathyroid adenoma (neck ultrasonography or 99mTc-MIBI scintigraphy).
- Histopathological confirmation of parathyroid adenoma.

Exclusion criteria

- Patients with secondary or tertiary hyperparathyroidism.
- Patients lost to follow-up within one month of surgery.

Data collection

Demographic details, clinical presentations, biochemical investigations, radiological findings, operative notes, and histopathology reports were reviewed. Intraoperative PTH levels were recorded at baseline, 10 and 15 minutes after adenoma excision.

Surgical procedure

All patients underwent minimally invasive parathyroidectomy (MIP) under general anesthesia. A focused cervical incision was made, and the suspected adenomatous gland was excised. Adequacy of excision was confirmed by a ≥50% fall in ioPTH compared to baseline. In cases where biochemical cure was not achieved, further exploration was performed.

Ethical approval

The study was approved by the Institutional Ethics Committee of BSMMU. Patient confidentiality was maintained, and data were anonymized for analysis.

RESULTS

Demographics

A total of 11 patients underwent surgery for parathyroid adenoma. Table 1 shows that the majority of patients were below 55 years of age, with a nearly equal male-to-female ratio. The age ranged from 30 to 63 years (mean: 47.2 years). Six patients were male and five were female.

Table 1. Demographic characteristics of patients with parathyroid adenoma (n = 11)

Parameter	Number (%) / Mean ± SD
Age (years)	47.2 ± 9.6 (range: 30–63)
<55 years	10 (91%)
≥55 years	1 (9%)
Sex (Male/Female)	6 / 5

Table 2. Clinical presentation of patients with parathyroid adenoma (n = 11)

Clinical features	n (%)
Recurrent renal stones	3 (27%)
Abdominal pain	1 (9%)
Pathological fractures	2 (18%)
Incidental detection	5 (46%)

Table 2 summarizes presenting complaints. Almost half of the patients were diagnosed incidentally during routine biochemical testing, whereas renal and skeletal manifestations accounted for the rest.

Table 3. Radiological findings and gland involvement

Modality	Positive detection	Sensitivity (%)
Neck ultrasonography	9/11	82%
99mTc-MIBI scintigraphy	11/11	100%

Gland involvement (n = 11):
- Left inferior: 4 cases

- Right inferior: 4 cases
- Left superior: 1 case
- Bilateral inferior: 1 case
- Left superior + inferior: 1 case

Table 3 highlights the diagnostic yield of imaging modalities. 99mTc-MIBI scintigraphy showed 100% sensitivity, while ultrasonography localized 82% of cases. Inferior parathyroid glands were more commonly involved than superior glands.

Table 4. Surgical outcomes and postoperative findings

Outcome	n (%)
Minimally invasive parathyroidectomy performed	11 (100%)
>50% ioPTH drop achieved intraoperatively	11 (100%)
Revision surgery required	1 (9%) (intrathyroidal adenoma)
Histopathology: adenoma	11 (100%)
Transient hypocalcemia	2 (18%)
Persistent/recurrent disease	0 (0%)

Table 4 demonstrates excellent surgical outcomes. All patients achieved >50% intraoperative PTH reduction. One patient required revision surgery for an intrathyroidal adenoma. No persistent or recurrent disease was observed.

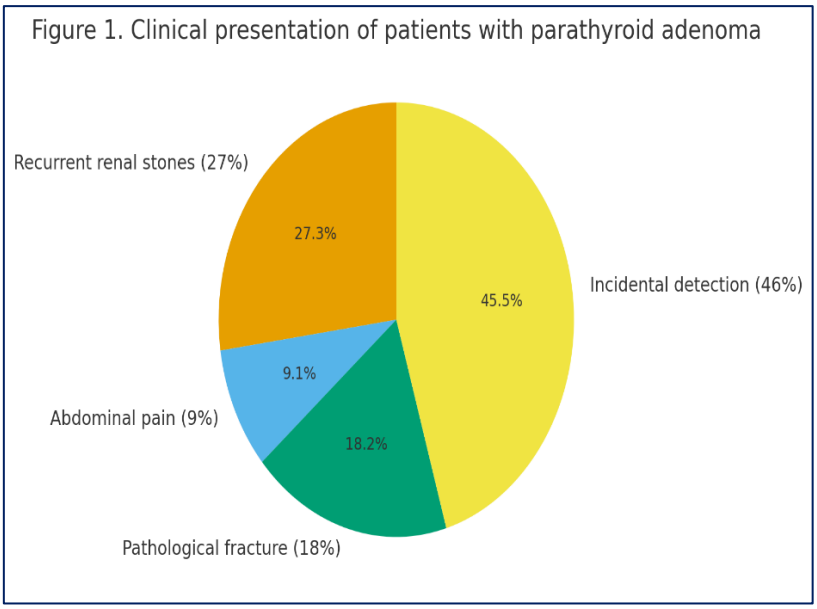

Figure 1. Clinical presentation of patients with parathyroid adenoma.

Pie chart showing distribution of presenting features. The most common presentation was incidental detection during routine biochemical evaluation (46%), followed by recurrent renal stones (27%), pathological fractures (18%), and abdominal pain (9%).

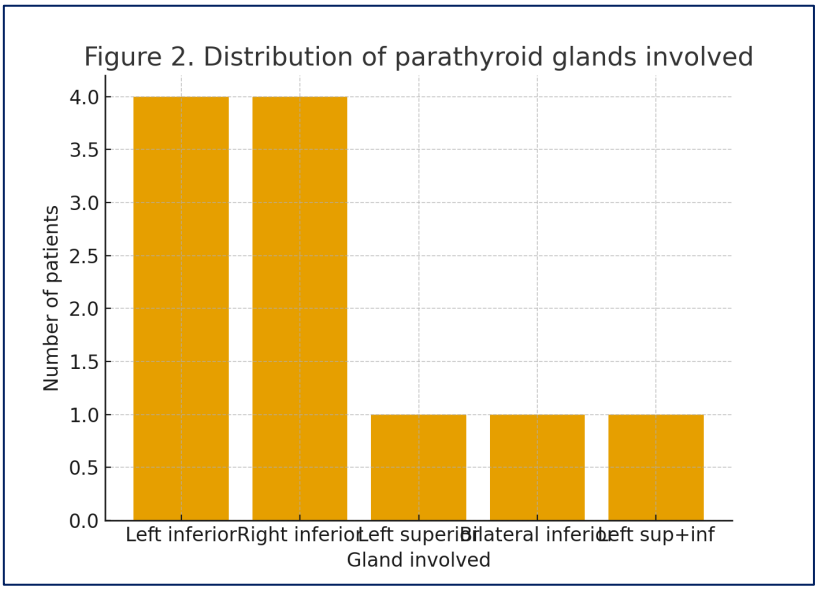

Figure 2. Distribution of parathyroid glands involved.

The inferior parathyroid glands were most frequently affected (4 left inferior, 4 right inferior), while the superior gland was less commonly involved (1 left superior). Two patients had multigland disease (1 bilateral inferior, 1 combined left superior and inferior involvement).

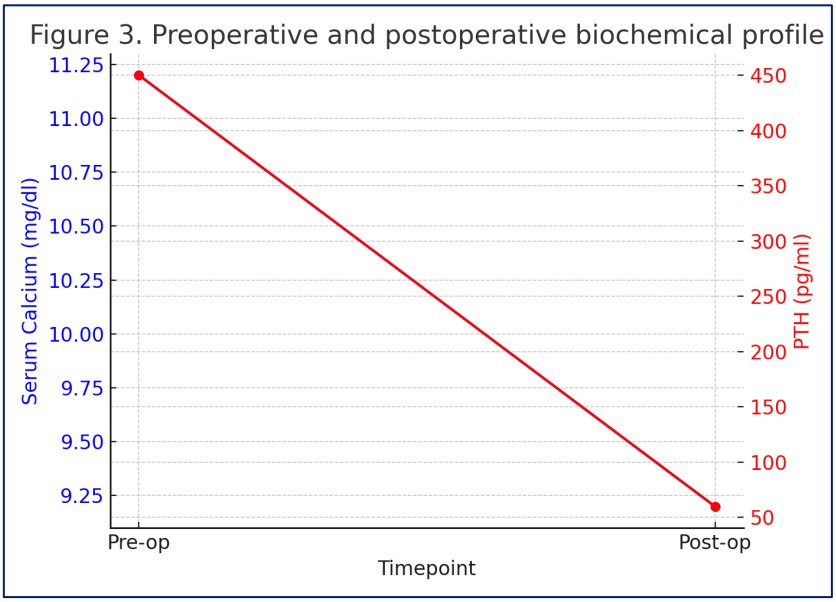

Figure 3. Preoperative and postoperative biochemical profile.

Mean serum calcium decreased from 11.2 mg/dl to 9.2 mg/dl following surgery, while mean parathyroid hormone (PTH) decreased from 450 pg/ml to 60 pg/ml, confirming biochemical cure.

DISCUSSION

Primary hyperparathyroidism remains a significant endocrine disorder with variable clinical manifestations. This study highlights the clinical spectrum and surgical outcomes of parathyroid adenoma in a tertiary center in Bangladesh. In our series, the mean age was 47.2 years, with a slight male predominance (6:5). This differs from global literature where pHPT occurs more frequently in women, particularly postmenopausal women [4,6,10]. A possible explanation is the small sample size in our study, limiting the significance of gender distribution. Symptomatically, renal manifestations were common (36%), consistent with international studies reporting nephrolithiasis

in 20–30% of patients [6,7]. Interestingly, nearly half (46%) of our patients were diagnosed incidentally during routine screening, reflecting a growing awareness and wider use of biochemical evaluation in Bangladesh. This trend parallels findings from Western countries where most cases are detected incidentally due to routine serum calcium testing [1,3]. Radiological localization was crucial for surgical planning. Ultrasonography detected adenomas in 82% of cases, consistent with reported sensitivities of 70–85% [11]. However, 99mTc-MIBI scintigraphy demonstrated 100% sensitivity in our study, in line with previous reports of 80–90% [12]. Combined use of both modalities enhanced preoperative localization accuracy. Minimally invasive parathyroidectomy (MIP) has largely replaced traditional bilateral neck exploration due to its advantages of smaller incision, reduced operative time, and shorter hospital stay [13]. In our study, all patients underwent MIP, with successful outcomes in 10/11 patients at first surgery. The revision case underscores the diagnostic challenge of intrathyroidal adenomas, which account for 1–6% of cases [16]. Surgical excision via hemithyroidectomy successfully resolved hypercalcemia in this patient. The role of intraoperative PTH monitoring cannot be overemphasized. All patients demonstrated >50% ioPTH decline, meeting the widely accepted Miami criterion [14]. Nevertheless, our revision case highlights the limitation that a 50% fall without normalization may still predict surgical failure, as suggested by Wharry et al. [15]. Thus, both percentage decline and normalization should be considered for optimal assessment. Postoperative transient hypocalcemia occurred in two patients, managed conservatively, consistent with literature reporting incidences of 10–20% [13]. No permanent hypoparathyroidism or recurrent laryngeal nerve injury occurred, reflecting the safety of MIP.

Limitations

The major limitations include the small sample size, retrospective design, and short follow-up period. Larger prospective studies with long-term outcomes are needed to better understand recurrence patterns and compare outcomes with global data.

Implications

This study demonstrates that with appropriate imaging and ioPTH monitoring, MIP is a safe and effective treatment for parathyroid adenoma in resource-limited settings. Routine biochemical screening could enable earlier detection, reducing morbidity associated with renal and skeletal complications.

CONCLUSION

Parathyroid adenoma is the most common cause of primary hyperparathyroidism, often presenting with renal stones or incidentally through biochemical testing. Minimally invasive parathyroidectomy supported by intraoperative PTH monitoring provides excellent outcomes with minimal morbidity. Intrathyroidal adenomas remain a diagnostic challenge, requiring high suspicion and appropriate surgical management. Larger studies are warranted to further validate these findings in the regional context.

REFERENCES

1. Madkhali T, Alhefdhi A, Chen H, Elfenbein D. Primary hyperparathyroidism. Turk J Surg. 2016;32(1):58–66.
2. DeLellis RA, Lloyd RV, Heitz PU, Eng C, editors. Pathology and Genetics of Tumours of Endocrine Organs. WHO Classification of Tumours. Lyon: IARC; 2004.

3. Udelsman R. Six hundred fifty-six consecutive explorations for primary hyperparathyroidism. Ann Surg. 2002;235(5):665–70.
4. Pradeep PV, Jayashree B, Mishra A, Mishra SK. Systematic review of primary hyperparathyroidism in India: past, present, and future trends. Int J Endocrinol. 2011; 2011:921814.
5. Cope O. The story of hyperparathyroidism at the Massachusetts General Hospital. N Engl J Med. 1966;274(21):1174–82.
6. Lindner G, Felber R, Schwarz C, et al. Hypercalcemia in the ED: prevalence, etiology, and outcome. Am J Emerg Med. 2013;31(4):657–60.
7. Bandeira FA, Oliveira RI, Griz LH, Caldas G, Bandeira C. Accuracy differences of 99mTc-sestamibi scanning between severe and mild pHPT. J Nucl Med Technol. 2008;36(1):30–5.
8. Patel CN, Salahudeen HM, Lansdown M, Scarsbrook AF. Clinical utility of US and 99mTc sestamibi SPECT/CT for parathyroid adenoma. Clin Radiol. 2010;65(4):278–87.
9. Khorasani N, Mohammadi A. Effective factors on sensitivity of sestamibi scanning for pHPT. Int J Clin Exp Med. 2014;7(9):2639–44.
10. Chen H, Mack E, Starling JR. Evaluation of perioperative adjuncts during MIP: which is most reliable? Ann Surg. 2005;242(3):375–80.
11. Chen H, Pruhs Z, Starling JR, Mack E. Intraoperative PTH testing improves cure rates in MIP. Surgery. 2005;138(4):583–90.
12. Kim HG, Kim WY, Woo SU, Lee JB, Lee YM. MIP with or without ioPTH for pHPT. Ann Surg Treat Res. 2015;89(3):111–6.
13. Sokoll LJ, Remaley AT, Sena SF, et al. Intraoperative PTH: NACB guidelines. Washington DC: NACB; 2006.
14. Wharry LI, Yip L, Armstrong MJ, et al. The final intraoperative PTH: how low should it go? World J Surg. 2014;38(3):558–63.
15. Paruk IM, Esterhuizen TM, Maharaj S, Pirie FJ, Motala AA. Management of pHPT in South Africa: a single-centre experience. Postgrad Med J. 2013;89(1057):626–31.
16. Goodman A, Politz D, Lopez J, Norman J. Intrathyroid parathyroid adenoma: incidence and case against thyroid lobectomy. Otolaryngol Head Neck Surg. 2011;144(6):867–71.