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Original Article

Parathyroid Adenoma-Our Experience

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ABSTRACT

Introduction: Parathyroid adenoma is part of a spectrum of parathyroid proliferative disorder that includes parathyroid hyperplasia, parathyroid adenoma, and parathyroid carcinoma. Patients typically present with evidence of primary hyperparathyroidism with elevated serum calcium levels and elevated serum parathyroid hormone levels. 8 patients with parathyroid adenoma are presented in this study describing their presentations, clinical profiles, and management.

Materials and Methods: It is a case series retrospective review of 8 cases of parathyroid adenoma conducted at MS Ramaiah Medical College Hospital, Bangalore from october 2020 to june 2022.

Results: Eight cases of operated parathyroid adenoma were included in the study, out of which, 2 were male and 6 were female. 4 patients had an incidentally detected parathyroid adenoma while rest of the patients presented with generalised weakness, bony pain and abdominal pain. Serum calcium ranged from 9.6 mg/dl - 13.2 mg/dl (Mean ± SD - 11.26 ± 1.09 mg/dl). Serum PTH ranged from 427 pg/ml - 2161 pg/ml (Mean ± SD - 840.5 ± 559.11 mg/dl). Technetium-99m methoxyisobutylisonitrile (99mTc MIBI) scintigraphy picked up a single parathyroid adenoma wherein 6 of these cases, right-sided parathyroid was involved and left parathyroid adenoma was seen in 2 patients. All the patients underwent parathyroid adenoma excision under GA. Decrease in more than 50% of baseline PTH confirmed the excision of parathyroid adenoma. Intra operative PTH ranged from 57.6 pg/ml - 287.2 pg/ml (197.01 pg/ml). The postoperative period for all these patients was uneventful. There was definitive symptomatic improvement after parathyroidectomy.

Conclusion: The study showed association of diabetes in 4 cases and 4 cases of asymptomatic parathyroid adenoma were incidental findings. In the remaining cases, there was strong clinical suspicion, supported by biochemical evidence, which was then confirmed by 99mTc MIBI scintigraphy. The diagnosis of a parathyroid adenoma was strengthened by 99mTc MIBI scintigraphy and later supported by histological analysis. In each of these cases, there was a clear indication for surgery, and following the procedure, symptoms began to improve.

Key Words: *Parathyroid Adenoma, spectrum of parathyroid*

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INTRODUCTION

The thyroid is surrounded by a small, oval-shaped organ known as the parathyroid glands two located superiorly and two inferiorly [1]. Parathyroid adenoma is part of a spectrum of parathyroid proliferative disorder that includes parathyroid hyperplasia, parathyroid adenoma, and parathyroid carcinoma. Patients typically present with evidence of primary hyperparathyroidism with elevated serum calcium levels and elevated serum parathyroid hormone levels. Sonography and 99mTc-sestamibi scintigraphy are the primary imaging modalities utilized for the visualization of diseased glands [2]. Prolonged and avid uptake of sestamibi is seen on 2 h delayed images within adenomas. Ultrasound imaging demonstrates parathyroid adenomas as typically homogeneously hypoechoic lesions compared with the adjacent thyroid, and they can easily be detected when they are larger than 1 cm [3]. A parathyroid adenoma could cause complications related to hypercalcemia. A rare clinical phenomenon is a parathyroid crisis, which is characterized by extremely high calcium levels, usually more than 15 mg/dL [4]. In this study, 8 patients with parathyroid adenoma are presented describing their presentations, clinical profiles, and management.

MATERIAL & METHODS

This is a retrospective analysis of parathyroid adenomas, operated in the Department of general surgery at MS Ramaiah Medical College Hospital, Bangalore over a 2-year period (October 2020 - June 2022). Clinical data and details of biochemical, radiological and other investigations were obtained from the medical records. Histopathological findings were assessed from the Department of Pathology records using the hospital information system. 8 patients were included

who were biochemically (serum PTH = or > 44 pg/ml), radiologically and histologically proven to be parathyroid adenoma who underwent surgical incision. Patients who were not willing or fit for surgery and pregnant or breastfeeding women were excluded from the study.

RESULTS

During the study period, there were eight cases of operated parathyroid adenoma. The mean age of the patients was 57.62 ± 9.51 years in this study. Out of 8 patients, 2 patients were male and 6 patients were female. All case of parathyroid adenoma were known cases of hypertension and 80 % i.e. 6 of the 8 patients were associated with diabetes mellitus. 2 patients had history of renal stones and 2 patient had history of gall stones. 4 patients had an incidentally detected parathyroid adenoma while rest of the patients presented with generalised weakness, bony pain and abdominal pain. The biochemical findings revealed hypercalcemia and increased parathyroid hormone level in all the patients. Serum calcium ranged from 9.6 mg/dl - 13.2 mg/dl (Mean ± SD - 11.26 ± 1.09 mg/dl). Serum PTH ranged from 427 pg/ml - 2161 pg/ml (Mean ± SD - 840.5 ± 559.11 mg/dl)

Ultrasonogram of the neck was done for all cases which revealed a multinodular goitre TIRADS 3, left inferior parathyroid adenoma in patient no. 7. CT neck was done in 4 patients which revealed right parathyroid adenoma in 3 patients and left parathyroid adenoma in 1 patient. [Figure 1] Technetium-99m methoxyisobutylisonitrile (99mTc MIBI) scintigraphy was done in all the cases, which picked up a single parathyroid adenoma [Figure 2, 3]. In 6 of these cases, right-sided parathyroid was involved and left parathyroid adenoma was seen in 2 patients.

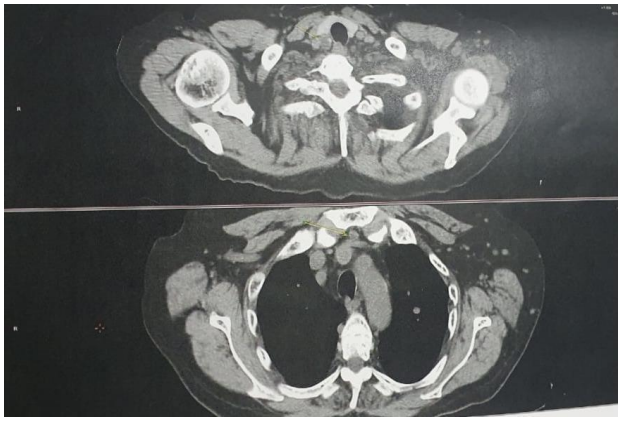

Figure 1: CT neck showing presence of single parathyroid adenoma.

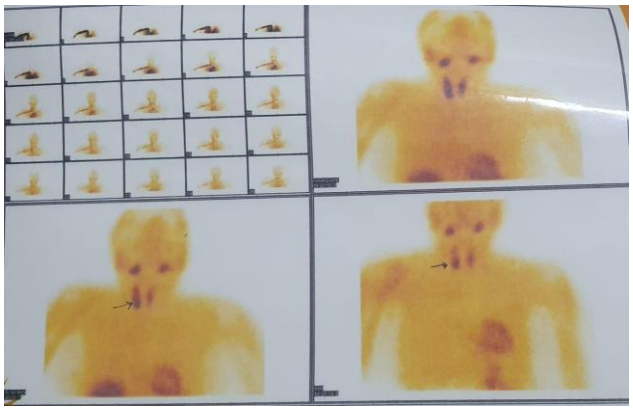

Figure 2: Technetium-99m methoxyisobutylisonitrile (99mTc MIBI) scintigraphy showing right parathyroid adenoma

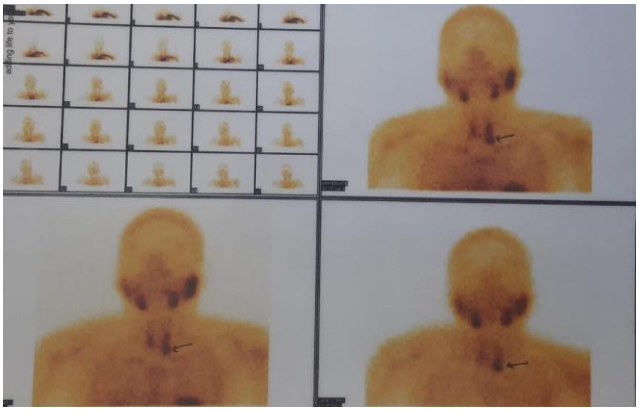

Figure 3: Technetium-99m methoxyisobutylisonitrile (99mTc MIBI) scintigraphy showing left parathyroid adenoma

All the patients underwent parathyroid adenoma excision under GA. [figure 4, 5] During surgery, all the four glands were assessed and care was taken to preserve the recurrent laryngeal nerve. Histopathology of all the parathyroid adenomas revealed the presence of capsulated mass adjacent to normal parathyroid tissue. Intraoperatively, before the incision serum PTH was sent for all the patients. 10 min after the removal of parathyroid gland, IOPTH (intraoperative PTH) was sent. Decrease in more than 50% of baseline PTH confirmed the excision of parathyroid adenoma. Intra operative PTH ranged from 57.6 pg/ml - 287.2 pg/ml (197.01 pg/ml). Intraoperatively the excised sample for frozen section biopsy and specimen was sent for Histopathology. Post operatively, patients were monitored in high dependency unit to monitor serum calcium level. Invariably all patients had post operative hypocalcemia which necessitated use of intravenous calcium gluconate. IV calcium gluconate infusion was given at a rate of 0.5 mg/kg/hr - 2 mg/kg/hr and titrated according to levels of calcium. The postoperative period for all these patients was uneventful. There was definitive symptomatic improvement after parathyroidectomy.

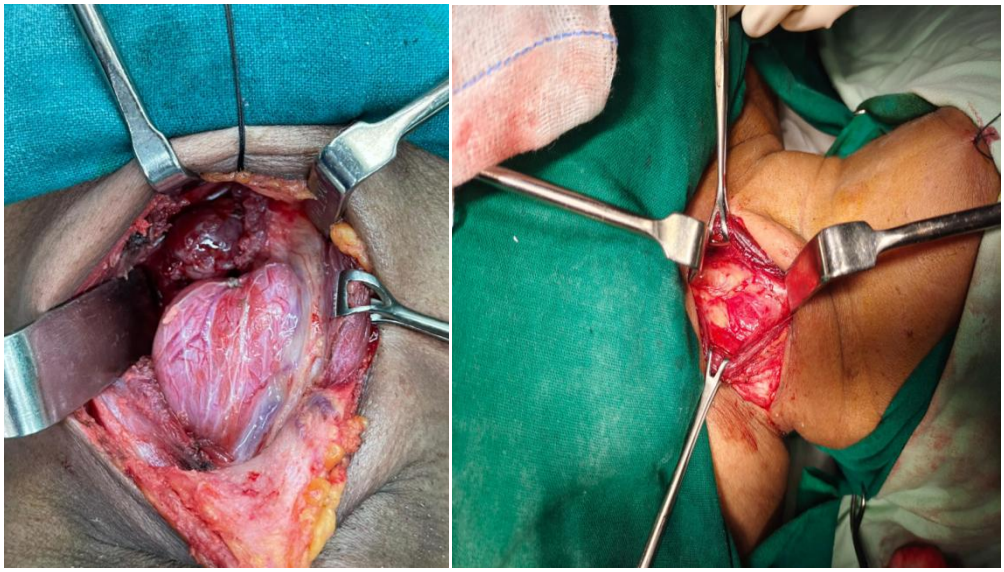

Figure 4, 5: Intraoperative images showing excision of parathyroid adenoma

The individual data for all the cases is summarized in the table below. [Table 1]

Sr no.	**Age/Sex**	**chief complaints**	**S. calcium**	**S. PTH**	**USG neck**	**Tc 99 sestamibi scan**	**Intra op PTH levels**	**Parathyroid adenoma size**	**histopathology report**
Patient 1	40y/M	decreased appetite bloating sensation of abdomen	10.6 mg/dl	793 pg/ml		right inferior parathyroid adenoma, ? ectopic adenoma/lymph node in	80.6 pg/ml	3*2 cm parathyroid adenoma, ectopic - 2*2.5cm	adenoma

		bony pain generalized weakness				retrosternal region			
Patient 2	59y/F	headache vomiting pain abdomen (b/l renal calculi)	13.2 mg/dl	599 pg/ml		right inferior parathyroid adenoma	160.7 pg/ml	3*3cm	adenoma
Patient 3	73y/F	pain abdomen	12 mg/dl	579 pg/ml		right inferior parathyroid adenoma	278.2 pg/ml	8*8mm	adenoma
Patient 4	56y/M	incidental finding	9.6 mg/dl	978.7 pg/ml		left parathyroid adenoma	158.7 pg/ml	1.5*2cm	adenoma
Patient 5	52y/F	low back ache generalized weakness	10.8 mg/dl	2161.3pg/ml		right inferior parathyroid adenoma	287.2pg/ml	2*2cm	adenoma
Patient 6	63y/F	incidental finding	10.9 mg/dl	560 pg/ml		right inferior parathyroid adenoma	126 pg/ml	3.5*1cm	adenoma
Patient 7	56y/F	incidental finding	11 mg/dl	626 pg/ml	multinodular goitre TIRADS 3, left inferior parathyroid adenoma	left parathyroid adenoma	112.6 pg/ml	1*1.5cm	thyroid - multinodular goiter, parathyroid - adenoma
Patient 8	62y/F	incidental finding	12 mg/dl	427 pg/ml		right parathyroid adenoma	56.7 pg/ml	3cm*3.5cm	adenoma

DISCUSSION

Parathyroid adenoma is a relatively uncommon condition however it has been the primary contributor to hyperparathyroidism, which develops when the usual feedback control by serum calcium is compromised or PTH production is elevated. As parathyroid adenomas frequently present without symptoms, the only way to diagnose hyperparathyroidism is to measure the serum PTH and calcium concentrations [5].

A previous history of renal calculus illness, such as nephrocalcinosis, renal or ureteral lithiasis, or bone diseases with clear bone involvement, such as osteoporosis, subperiosteal resorption, or osteitis fibrosa, is frequently provided by the patient [6]. 4 patients in our study had history of chronic renal disease and 2 patients had history of renal stones. 4 of our patients presented with history of diabetes mellitus. After parathyroidectomy, patient showed improvement in glycaemic control which was also found in study by Gerl H et al [7].

Normal parathyroid glands (normally 541 mm) are too small to be seen on imaging, however parathyroid illness frequently causes the glands to grow and become visible. The two main imaging modalities used to visualise diseased glands are sonography and 99mTc preoperative sestamibi (MIBI) scan. The sensitivity of the MIBI scan for locating a parathyroid adenoma is about 90% [8].

In our study, parathyroidectomy was a successful and safe procedure with excellent serum calcium and parathyroid hormone normalisation and a high rate of patient satisfaction. Similar results were seen in study by Jena A. et al [9]. Agarwal G et al states in their study that parathyroidectomy is a successful and risk-free procedure that results in excellent normalisation of serum calcium and parathyroid hormone as well as high patient satisfaction [10]. Another study by Pradeep PV et al also shows improvement in clinical symptoms after parathyroidectomy [11]. There were no

post op complications except operative hypocalcemia which was resolved by giving iv calcium gluconate. Similar findings were seen in study by Foster Jr AH et al [12].

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