

Study of Parathyroid Adenoma in a Tertiary Care Hospital: An Otolaryngologist's Perspective

Sampan Singh Bist¹, Lovneesh Kumar²

ABSTRACT

Introduction: Primary hyperparathyroidism syndrome is an endocrine disorder, characterized by excessive secretion of parathyroid hormone from one or more parathyroid glands. Single or double parathyroid adenoma is the primary cause of primary hyperparathyroidism. The aim of the present study was to determine clinical profile, management outcome of patients diagnosed with parathyroid adenoma and role of otolaryngologist in the pre-operative planning of such cases.

Material and Methods: This was a retrospective study conducted in a tertiary care teaching center from January 2012 to December 2015 of the patients diagnosed as parathyroid adenoma and who were referred to Otolaryngology department for surgical intervention. Present study included 7 cases of parathyroid adenoma.

Results: In present study total 7 patients data were analyzed out of which 6 (85.75%) were female and 1 (14.2%) was male patient. Average age at diagnosis was 44.8 years. Clinical presentation varies widely in all the 7 symptomatic patients and patient first reported to different specialties of medical science for their symptoms. Hypercalcaemia and hyperparathyroidism were observed in all the 7 patients. Parathyroid adenoma was diagnosed on 99mTc Sestamibi scanning in all the 7 patients. Ultrasonography localized the adenoma in 5(71.4%) patients while 2(28.5%) patients required MRI for localization of adenoma. Parathyroidectomy was performed in all the 7 patients and 1 patient also required near total thyroidectomy for multinodular goiter. Intraoperative and post-operative period was uneventful. In postoperative period, 5 (71.4%) patients developed hypocalcaemia which was monitored and was managed. The diagnoses of parathyroid adenoma were confirmed on histopathological examination in all the 7 patients. Follow up of all the 7 patients was done up to 6 months.

Conclusion: Preoperative Imaging studies are very helpful for localization of adenoma and good team work with radiologist can definitely make it easy for surgeon and it is the key for the safe delivery of the adenoma. In present study author was able to identify adenoma accordingly as radiologist reporting. The otolaryngologist is well familiar to the anatomy of this part of neck and can plan surgical intervention for these patients in a tertiary care centre.

Keywords: hyperparathyroidism, parathyroid adenoma, parathyroidectomy.

adenoma is a benign tumour of the parathyroid glands and most common disorder of the gland. Surgical removal of tumor done by an experienced surgeon can result in excellent cure rate. After a successful parathyroidectomy, patient improves symptomatically, metabolically and has increased survival rate. Vigilant post operative monitoring is required as complications can occur in postoperative period and long time follow up of the same is also required. Parathyroid adenoma is an uncommon disease and therefore its diagnosis is often missed. The classic presentation is often quoted as 'stones, bones, moans and abdominal groans', majority of patients are asymptomatic. In many instances, patients themselves are unaware of the tumour as they have either no symptoms or only mild symptoms and are picked up on biochemical screening for some other condition. The frequency of the disease increases with age and is more common in females.⁴ Proper diagnosis and preoperative localization of tumor is of utmost importance. The diagnosis of primary hyperparathyroidism can be accurately made in the presence of an elevated serum calcium and PTH level. A positive family history of hypercalcaemia could be indicative of hereditary hyperparathyroidism or multiple endocrine neoplasia (MEN) syndrome. Preoperative localization of parathyroid tumours with high resolution ultrasound and 99mTc-sestamibi scan can locate abnormal glands in 80- 85% of cases.⁵ The treatment of parathyroid adenoma is parathyroidectomy surgery. Although opinions varies regarding the most optimal management for asymptomatic patients, National Institute of Health (NIH) Consensus Development Conference (1990) laid down some guidelines.⁶ The main aim of the present study was to determine clinical profile, management outcome of patients diagnosed with parathyroid adenoma and role of otolaryngologist in it.

MATERIAL AND METHODS

This was a retrospective study conducted on patients with parathyroid adenoma who presented to Department of Otolaryngology, Himalayan Institute of Medical sciences from January 2012 to December 2015. The study was conducted after the approval from institutional research committee. A total of seven patients were available for the study as per the

INTRODUCTION

Hyperparathyroidism is a common endocrine disease affecting 0.1 to 0.3% of the general population. Primary hyperparathyroidism (PHPT) occurs more commonly in females (0.2%) as compared to males (0.05%).¹ Benign tumors are the major cause in nearly 99% of PHPT.² The majority of cases of PHPT (80%) are due to a single adenoma.³ The disease is attributed to multiple gland hyperplasia and double adenomas in approximately 15% and 2-5% of cases, respectively.³ Parathyroid carcinoma is rare and accounts for less than 1% of patients with PHPT.³ Parathyroid

¹Professor and Head, ²Assistant Professor, Department of E.N.T and Head-Neck Surgery, Himalayan Institute of Medical Sciences, SRH University Jolly Grant Dehradun, India

Corresponding author: Dr. Sampan Singh Bist, Professor and Head, Department of E.N.T and Head-Neck Surgery, Himalayan Institute of Medical Sciences, SRH University Jolly Grant Dehradun, Uttarakhand, India

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inclusion and exclusion criteria. Only those patients who had presented with a diagnosis of parathyroid adenoma by different specialties and subsequently treated surgically by Otolaryngology Unit of Institute were included in present study. The study did not include patients who underwent revision surgery or histopathological examination reported other than parathyroid adenoma. The following data was retrieved for each patient: Age, sex, presenting symptoms and signs, preoperative investigations, histopathological examination, complications, postoperative biochemical studies, state at follow up and role of otolaryngologist in management of parathyroid adenoma. All patients underwent surgical excision and post operatively patients were followed up till 6 months.

STATISTICAL ANALYSIS

Microsoft office 2007 was used for making tables and graphs. The results were expressed using in mean and percentages using descriptive statistics.

RESULTS

Total seven patients diagnosed as parathyroid adenoma on final histopathology after surgery (Table-1). Out of which, 6 (85.75%) were female and 1 (14.2%) was males. There was a female predominance. Age range from 35-62 years and average mean age was 44.8 years. In our study, maximum number of patients was in fourth and fifth decade of life. Majority of patients belongs to lower socioeconomic status. In present study patients were referred from different specialist for surgical intervention to otolaryngology unit. The referring units are 2 patients each from orthopedics, gastroenterology and endocrinology respectively and 1 patient from internal medicine. 2 patients primarily presented to orthopedic for bone fracture, while 2 patients were treated for recurrent pancreatitis due to hypercalcaemia in gastroenterology. The 2 patients presented in endocrinology 1 was mandible fracture with hypercalcemia while other 1 presented with multinodular goiter with hypercalcemia. 1 Patients work-up for unexplained hypercalcemia in internal medicine. In our study it was observed that all 7 (100%) patients were symptomatic. The presentations were muscle cramps, recurrent headache, hypertension, polydipsia, nausea, vomiting, abdominal pain, kidney stone, bone fracture and psychiatric symptoms. All the patient were having more than one symptoms and/or signs. All 7(100%) patients had hypercalcaemia varying from mild to severe. In all patients serum parathyroid hormone level was above the normal limits. Preoperative 99mTc Sestamibi parathyroid scan was done and parathyroid adenoma diagnosed in all the 7 (100%) cases. Ultrasound of the neck were done in all the seven cases and ultrasonologist able to detect adenoma in 5 (71.4%) cases, while in 3 (42.8%) cases MRI of the neck were required as routine pre-operative localization of adenoma. More than one imaging studies were done in 2 cases. All 7 cases in our study were symptomatic and underwent surgery. 6 (85.7%) cases underwent unilateral parathyroidectomy (Figure-1) and 1 case underwent near-total thyroidectomy with unilateral parathyroidectomy. Intra-operatively adenoma was recognized without any difficulty and in majority of cases it correlated with imaging report. Intra-

S. No	Age/Sex	Clinical presentation	Preoperative Calcium (mg/dL), PTH level (ng/L)	Postoperative Calcium (mg/dL), PTH level (ng/L)	Neck imaging studies	Surgical procedure
1	40 years/F	Symptomatic (Recurrent pancreatitis)	11 mg/dL 2230pg/ml	7.9 182	-99mTc Sestamibi scan -USG	Right Inferior parathyroidectomy
2	35 years/F	Symptomatic (recurrent Fracture Femur)	11.6 665	6.8 55	-99mTc Sestamibi scan -USG	Left Inferior parathyroidectomy
3	46 years/F	Symptomatic (Mandible Fracture)	12.7 1800	6.4 228	-99mTc Sestamibi scan -USG -MRI	Left Inferior parathyroidectomy
4	62 years/F	Symptomatic (Multinodular goiter with symptoms of hypercalcemia)	10.4 286	7.3 32	-99mTc Sestamibi scan -USG -MRI	Right Superior Parathyroidectomy with near total thyroidectomy
5	48 years/M	Symptomatic (Fracture Femur with kidney stone)	14.1 344	6.3 56	-99mTc Sestamibi scan -USG	Right Inferior parathyroidectomy
6	38 years/F	Symptomatic (Acute pancreatitis)	13.6 710	7.2 54	-99mTc Sestamibi scan -USG	Right superior parathyroidectomy
7	45 years/F	Symptomatic (Symptoms of hypercalcemia)	10.6 210	7.8 64	-99mTc Sestamibi scan -USG -MRI	Right Inferior parathyroidectomy

Table-1:- Profile of patients with parathyroid adenoma

operative period were uneventful in all the 7 cases. The average size of excised adenoma was 3.4mm X 1.6 mm. The diagnoses of parathyroid adenoma were confirmed on histopathological examination in all the 7 cases (Figure-2). In postoperative period, 5 (71.4%) cases developed hypocalcaemia. There was marked decrease of PTH level high as 2230 pg/ml (preoperative value) to as low as 32 pg/ml (postoperative value). In all cases there was decrease of PTH level at least 80% postoperatively. 5 (71.4%) cases developed hypocalcemic symptoms on 3rd-4th postoperative day and serum calcium level was dropped as low to 5.2 mg/dL. Hypocalcaemia was strongly monitored and all the cases were managed with injectable calcium gluconate and Alpha D3. Average postoperative stay of patients in the hospital was 7 days. Follow up was done 1 week, 1 month, 3 months and 6 months. All patients were advised regular follow-up in future.

DISCUSSION

Primary hyperparathyroidism (PHPT) syndrome is an endocrine disorder, characterized by excessive secretion of PTH from one or more parathyroid glands.⁷ Increase in the PTH usually results in hypercalcemia and hypophosphatemia which in turn may lead to classic skeletal disease or recurrent nephrolithiasis. Sometimes patients can be asymptomatic and can be detected on routine biochemical screening. The clinical profile of PHPT in the western countries had shifted from a symptomatic disorder, toward a more asymptomatic state.⁸ PHPT has a variable clinical presentation and patients in developing countries predominantly present with symptomatic PHPT with skeletal manifestation as the most common symptom.⁹ Earlier studies from India have attributed the greater severity of PHPT to delayed diagnosis and widely prevalent vitamin D deficiency.¹⁰ Majority of patients in present study were female. A study showed, the incidence of parathyroid adenoma is three times more common in females than male.¹¹ Same study reported the peak incidence in 5th and 6th decade of life and rarely below 15 years of age.¹¹ Our study shows the peak incidence in 4th and 5th decade. In our study, all patients were detected in symptomatic stage of disease. Presentation of parathyroid adenoma varies widely ranging from asymptomatic disease to broad range of symptoms. Occasionally, hyperparathyroidism may be completely asymptomatic and detected after the further work-up of patients presenting with hypercalcaemia. In our study clinical presentation also varies widely. All patients in present study presented to different specialist for different group of symptoms. Preoperative investigations including biochemical and imaging studies are crucial for early diagnosis and treatment. Biochemical investigations include serum calcium, serum PTH, serum electrolytes and serum creatinine. In a study, it was shown that all parathyroid adenoma patients had hypercalcaemia and increase PTH level.¹² High PTH levels were noted in the all the cases of present study. All of our 7 cases had hypercalcaemia preoperatively varying from mild to severe. Parathyroid scan is indispensable for focused approach. Recent advances in the field of imaging technique especially parathyroid scans has considerably reduced the need of repeat parathyroidectomy.⁵ In our series, preoperative ^{99m}Tc Sestamibi scan was done in all patients and adenoma detected in all the 7 cases. Although ultrasound is cost effective and non-invasive but it can only be used to locate adenomas in the neck,

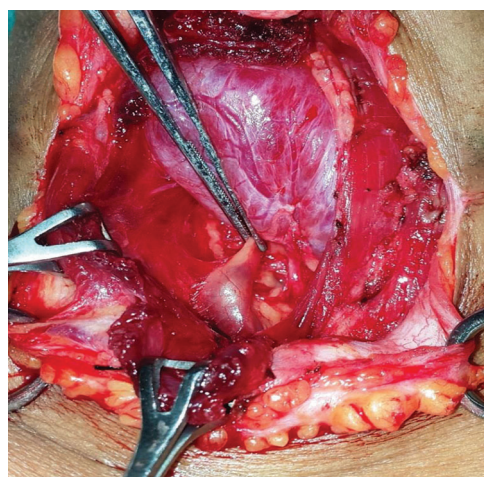


Figure-1: Per-operative view showing right inferior parathyroid adenoma

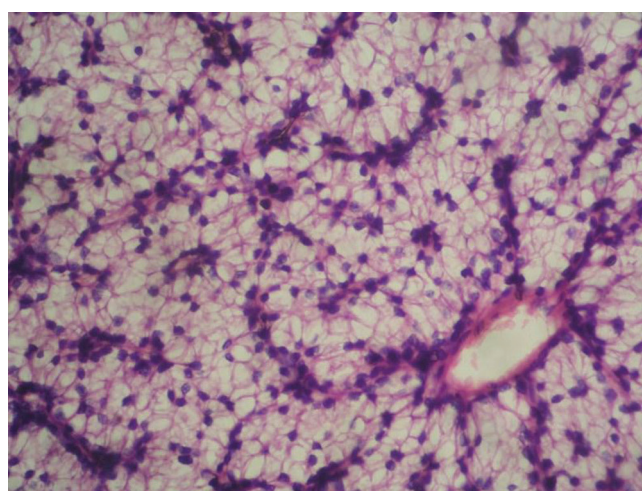


Figure-2: Microphotography (H&E X 40) showing parathyroid adenoma

with a sensitivity of 85% in the unexplored neck, which reduces further to 40% in patients having previous exploration.¹³ In comparison, SPECT (single photon emission computerized tomography) scan can detect 75% of persistent or recurrent lesions in the previously explored neck apart from the sensitivity of 87% for solitary adenomas and 55% for abnormal glands in patients with multiglandular disease.¹⁴ PET (positron emission tomography) scan is clinically useful in highly preselected patients with recurrent primary hyperparathyroidism with a sensitivity of 83% and specificity of 100%. Computerized tomography (CT scan) and Magnetic resonance imaging (MRI) may be useful for parathyroid localization in selected cases.¹⁵ In our study MRI were done in 3 patients for preoperative localization. Sestamibi probe is valuable tool for localizing parathyroid adenomas intraoperatively. It detects a radioactive molecule accumulated in the parathyroid adenoma which is administered preoperatively.¹⁶ Probe-guided surgery may be more useful in reoperative cases of missed adenomas, recurrent disease or ectopic glands.¹⁶ In our study we are able to identify the adenoma intra-operatively in all the 7 cases. Preoperative Imaging studies are very helpful for localization of adenoma and good team work with radiologist can definitely make it easy for surgeon. Immediate postoperative hypocalcaemia is desirable.¹⁷ Development of hypocalcaemia could be secondary

to surgical manipulation of the opposite parathyroid gland or suppressed PTH from normal gland due to hyper secretion of the diseased gland.¹⁷ Development of hypocalcaemia after parathyroidectomy though expected should be closely monitored for early intervention. In our study, 5 cases had experienced symptoms of hypocalcaemia on 3rd and 4th post operative day. Similar result has been observed in other studies.¹¹ Postoperative fall of PTH level is an operative success.¹⁷ In our cases also, there was marked fall in the PTH level in all the 7 cases. Hypercalcaemia in postoperative period is an operative failure.¹⁷ None of our patient developed hypercalcaemia at 6 months of follow up.

CONCLUSION

Preoperative Imaging studies are very helpful for localization of adenoma and good team work with radiologist can definitely make it easy for surgeon and it is the key for the safe delivery of the adenoma. In present study author will able to identified adenoma accordingly as discussion with radiologist. The otolaryngologist is well familiar to the anatomy of this part of neck and should plan surgery for these patients in a specialist centre.

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