

Management of parathyroid adenoma: An institutional review

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Abstract

To assess indications, role of preoperative localization, intra-operative details and post operative recovery of patients who underwent parathyroidectomy. Data of adult patients diagnosed with parathyroid adenoma with primary hyperparathyroidism from January 2006 to September 2016 was retrieved from medical records. Demographics, preoperative investigations, operative details and follow up were studied. Seventeen patients diagnosed with primary hyperparathyroidism (PHPT) due to parathyroid adenoma, were managed by parathyroidectomy by skin collar incision. Median age was 46 (IQR 35 - 57). Median duration of surgery was 80min (IQR of 15-120 min) and median blood loss was 15ml. Thyroid nodules were observed in three patients, which were managed by thyroid lobectomy. Pre-operative Sestamibi scan localized adenoma in 14 patients (frequency 82%). Intraoperative methylene blue and endoscopic ultrasound were not used. Parathormone (PTH) and calcium level were decreased in all post operative patients except one and no recurrence was seen on follow up. Parathyroid adenomas can be successfully localized with a pre-operative Sestamibi scan. Surgery remains the mainstay of treatment.

Keywords: Parathyroid adenoma, MIBI scan.

Introduction

Primary hyperparathyroidism (PHPT) is among the common endocrine disorders caused by excessive production of parathyroid hormone in the presence of elevated serum calcium level.¹ It can be caused by single gland adenoma (85-90%),¹⁻³ multi gland disorder (10-15%) or parathyroid carcinoma (5%). Normal parathyroid glands are not visualized on routine imaging (usually 5 × 3 × 1 mm) with 50mg weight, but parathyroid disease typically results in enlargement of the glands (mean size 1g) allowing for pre operative localization of diseased gland. With the advent of techniques enabling accurate localization of diseased parathyroid gland pre operatively, concept of minimally invasive parathyroidectomy has

developed and found to be equivalent to traditional Bilateral Neck Exploration (BNE).⁴⁻⁷ Pre operative localization is being carried out (in UK) by ultrasonography (USG) (73%), 99 Technetium (TC) Sestamibi parathyroid scan (82%), Computed Tomography (CT) scan or Magnetic Resonance Imaging (MRI) (5%).

Surgery remain the definite treatment of primary hyperthyroidism.²⁻⁵ In past few decades standard of treatment for PHPT has been BNE, but with advances in the field of minimally invasive surgery, trend has been changed. Minimally invasive parathyroidectomy (MIP) has been associated with better outcomes in terms of post operative pain, scaring, recurrent laryngeal nerve injury, early discharge and decreased risk of post-operative hypoparathyroidism.⁴⁻⁶

Studies have been done to evaluate the effect of pre-operative localization and MIP on outcome of parathyroid surgery in high volume center.² Sestamibi scan has been found to be 90% sensitive for localizing glands larger than 500mg while ultrasound can easily detect glands larger than 1cm.

This is a descriptive case series of parathyroid adenoma, we reviewed the data of non randomized consecutive patients who underwent parathyroidectomy for parathyroid adenoma in our hospital. Our aim was to assess the indications, role of pre-operative localization, intra-operative details and post operative recovery of patients who underwent parathyroidectomy.

Case Series

From January 2006 to December 2015, all patients presenting at Shaukat Khanum Memorial Cancer Hospital with a diagnosis of primary hyperthyroidism were included in this study after obtaining formal consent from patients for research and publication as it is the policy of Shaukat Khanum Hospital to ask from its patients at the time of admission that whether they would like to participate in research or not, and only data of patients who would agree to it is used for research purposes.

Patients who had undergone prior thyroidectomy or neck surgery for other reasons were also included. Pre operative localization was done in all patients either with

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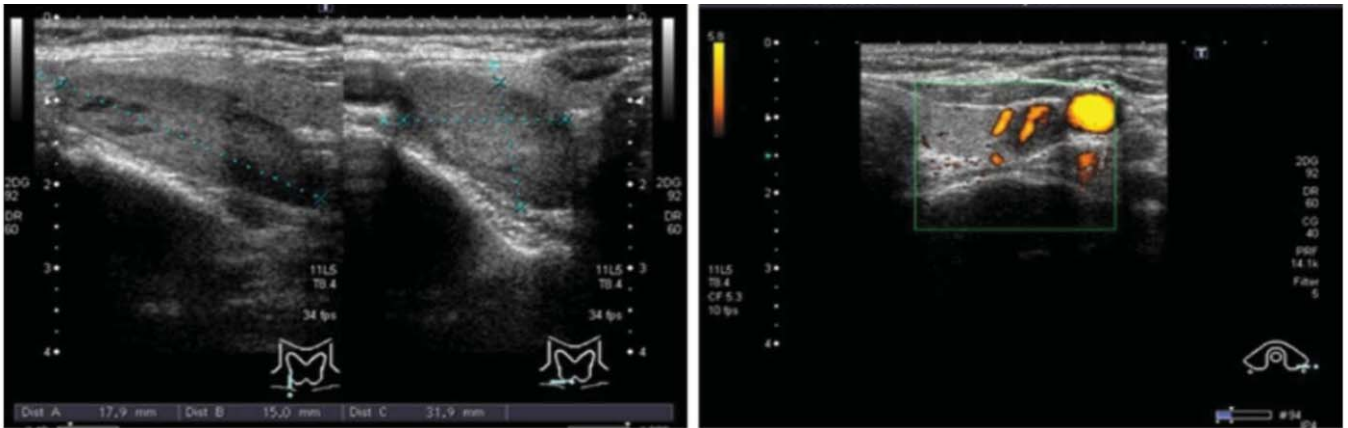


Figure-1: Pre-operative USG was used to localize the adenoma.

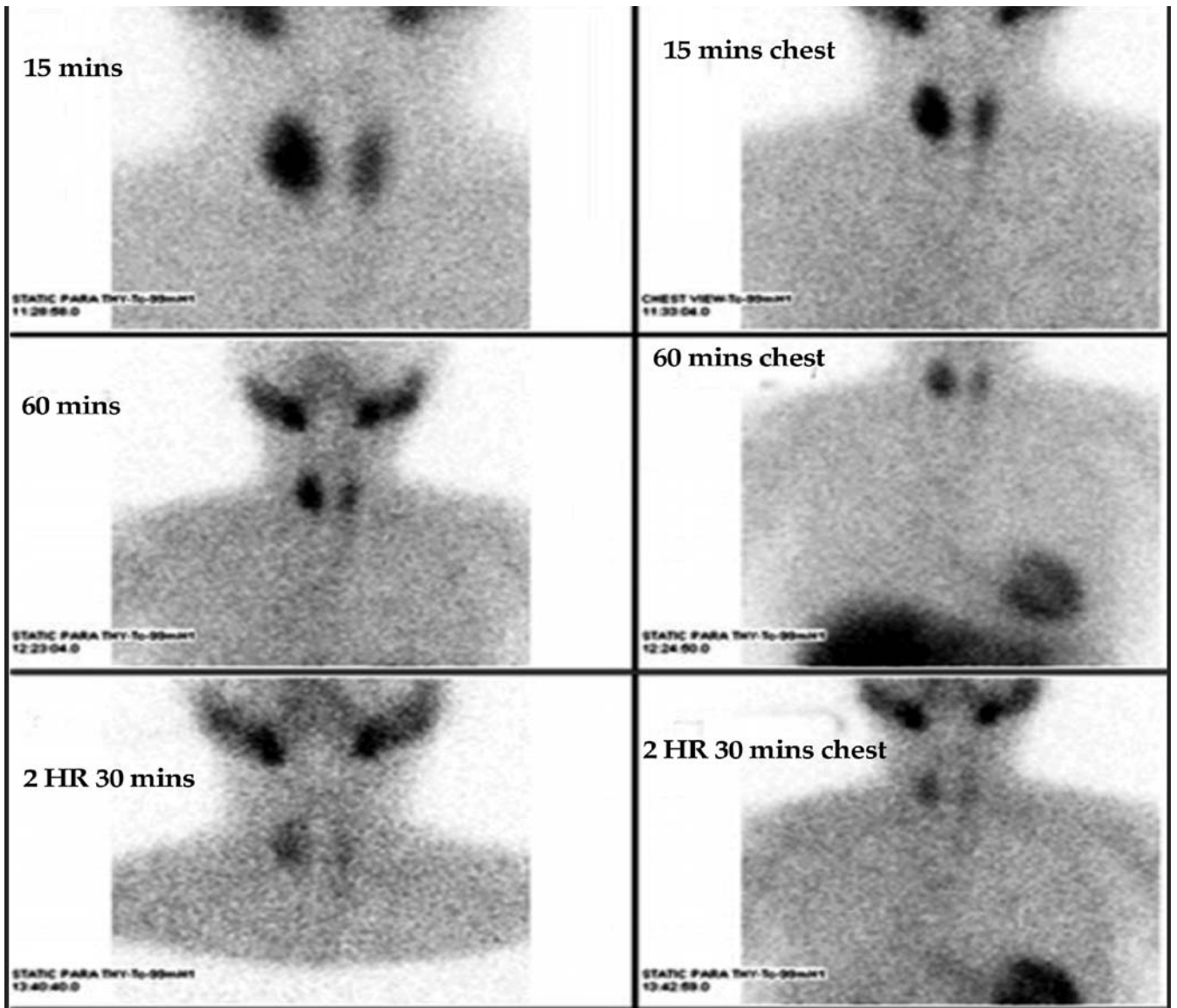


Figure-2: Pre-operative MIBI scan.

Sestamibiscan or pre operative USG. Sestamibi scan was done using a double isotope technique with technetium sestamibi (approximately 22.0 mCi [81 MBq]) with computer subtraction of iodine I 123 thyroid scan (1.0 mCi [37 MBq]) including all three views and single-photon emission computed tomography images. 10-13MHZ real-time USG with colour Doppler was done.

Patient demographics were recorded. Duration of surgery and per operative complications along with post-operative hospital stay were noted. Post operative PTH and calcium level were monitored 2 weeks after surgery and patients were followed for a period of two years to assess recurrence. All variables were recorded on SPSS IBM 20 and frequencies calculated.

A total of 17 patients were identified, with a median age of 46 (IQR 35 - 57). All patients had parathyroid adenoma and no parathyroid carcinoma was found. There were nine males and eight females. All patients had raised PTH level with a mean of 357 (175-1572) and preoperative calcium level of 1.66 (1.4 to 2.0) and pre operative Vitamin D level was 6.7 (0-39). Three patients presented with neck swelling, two with joint pain and one with constipation while it was an accidental finding in rest of the patients.

Pre-operative USG was used to localize the adenoma in six patients (Figure-1). Pre operative MIBI scan was done in all patients (Figure-2) which could localize adenoma in all patients except one. Among these 16 patients, 13 parathyroid adenomas were found in relation to lower poles of thyroid, one was intra-thyroidal (Figure-2) and two were in superior mediastinum. Associated thyroid disease was seen in three patients.

All patients underwent open neck exploration. Of these 14 patients underwent excision of parathyroid alone as where in three patients thyroid lobectomy was also performed. Median duration of surgery was 80min (IQR of 15-120 min). Mean blood loss was 16 milliliters. Intra-operatively there was associated thyroid disease in two patients and two ectopic parathyroid glands found in superior mediastinum with one intra-thyroid adenoma.

Post operatively optimized parathyroid level with a median of 67(IQR 10-117) was observed. Persistent hyperparathyroidism was seen in one patient with post operative parathyroid hormone level of 144. There was a decrease in post operative calcium level with median of 1.3 (IQR1.1-1.6) except in one patient with calcium level of 9.54. mg/dl.

Post operative hospital stay was two days (IQR1 - 4 days). All patients were followed for a period of 24 months and all were alive without disease. One patient had persistent

hyperparathyroidism and is alive two years after surgery with symptoms of hypercalcaemia. He is being managed conservatively.

Discussion

Primary hyperparathyroidism is mostly caused by excessive secretion of parathyroid hormone from a parathyroid adenoma or parathyroid hyperplasia.¹⁻³ Parathyroid adenomas are commonly reported in women,¹ however we did not see any gender dominance in our patients. The mean age of patients with parathyroid adenoma is more than 40 years,⁹ similar age group was observed in our patients.

Parathyroid adenomas are associated with raised PTH and Calcium levels.¹ All our patients had raised PTH and Calcium levels. Most parathyroid adenomas are located in the neck region and mediastinum, most common location being the lower pole which is similar to what we saw in our patients. Approximately 75% (13/17) patients had an adenoma along the lower pole of the thyroid.

Minimally invasive surgery is becoming the standard of care in such conditions. However, directed surgery depends on preoperative localization of the adenoma which is achieved by preoperative USG or a Sestamibi scan. If both modalities fail a bilateral neck exploration is sometimes required. Although we were able to localize adenomas in all our patients with a pre-op Sestamibi scan we did not follow a minimal invasive approach. The reason was surgeon preference. However we would recommend a minimal approach for removal of parathyroid adenoma as it is safe, cheaper (in terms of operation duration and hospital stay), and has better cosmetic outcomes. USG was done in 6 patients but adenoma could be localized in only five of these patients. This is similar to what has been reported in literature.¹⁰ USG has a sensitivity of 85% in the unexplored neck. However a preoperative Sestamibi scan was able to localize the adenoma in all 17 patients. Although the reported sensitivity of Sestamibi scan is reported as high as 90%^{2,8} we had a sensitivity of 100% probably because of a small sample size.

Treatment of hyperparathyroidism is parathyroidectomy.² Surgery was performed in all patients. Parathyroid adenoma was successfully localized in all patients. Postoperative fall of PTH level marks a successful operation. All patients except 1 had a drop in their post op PTH levels. Similarly post-operative hypercalcaemia in post operative period means operative failure. One patient had a persistent hypercalcaemia despite surgery. A repeat Sestamibi scan on the patient failed to localize any adenoma and he was managed with medical therapy.

There were no immediate post operative complications and a good long term follow up was achieved without recurrence in all but one patient.

Conclusion

Parathyroid adenomas can be successfully localized with a pre-operative Sestamibi scan. Open neck exploration is a safe treatment option if minimal access surgery is not available.

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Conflict of Interest: None.

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