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Assessment of Outcome of Surgery in Patients with Primary Hyperparathyroidism

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Abstract

Background: Parathyroid hormone (PTH) mobilizes calcium by increasing calcium resorption from bone and by raising calcium reabsorption in the proximal kidney tubule. Primary hyperparathyroidism (PHP) results from inappropriate overproduction of parathyroid hormone from one or many parathyroid glands and presents with hypercalcemia. In the surgical management of PHP intraoperative PTH (IO-PTH) assays have been shown to improve the success of parathyroid gland surgery. Minimally invasive parathyroidectomy (MIP) has replaced the traditional four-gland bilateral exploration as the procedure preferred by many institutions. Hence; the present study was undertaken for assessing the outcome of surgery in patients with PHP. **Subjects and Methods:** The present study included assessment of outcome of surgery in patients with PHP. Once the suspicious parathyroid was identified, careful dissection with blunt instruments was done to free gland from surrounding fascia. Bipolar was used to ligate the vascular supply and the specimen was removed. Patients with above mentioned inclusion criteria underwent preoperative localization with USG neck and technetium Tc-99m (99mTc) Sestamibi scan (CT/ MRI Neck when required). Based on results of MIBI and USG neck, the findings were defined as concordant and discordant. Patients with concordant findings of USG neck and Sestamibi scan underwent MIP. All the results were summarized in Microsoft excel sheet and were analyzed by SPSS software. **Results:** CT/MRI was done in only 4 patients where 50% of the patients showed involvement of right superior and inferior glands. Minimal invasive parathyroidectomy (MIP) was done in 95.2% patients (20/21) while bilateral neck exploration (BNE) was done in only 1 case of multiple adenoma. The USG neck (n=20) was able to accurately localize abnormal parathyroid glands in 17 patients (85%). **Conclusion:** In patients undergoing surgical treatment for PHP, Minimal Invasive Parathyroidectomy has excellent prognosis.

Keywords: Parathyroid Hormone, Surgery.

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Introduction

Parathyroid hormone (PTH) mobilizes calcium by increasing calcium resorption from bone and by raising calcium reabsorption in the proximal kidney tubule. Primary hyperparathyroidism (PHP) results from inappropriate overproduction of parathyroid hormone from one or many parathyroid glands and presents with hypercalcemia. It is the third most common endocrine disorder affecting 0.3% of the general population, 1%–3% of postmenopausal women and a total population incidence of 21.6 cases per 100,000 person-years. PHP usually occurs as the result of sporadic parathyroid adenomas or carcinomas but can also be seen in association with multiple endocrine neoplasias and in rare genetic syndromes and metabolic diseases.[1-3]

Primary hyperparathyroidism (PHH) is diagnosed when PTH is elevated in the context of hypercalcemia in a patient with no history of renal disease. This is usually a result of inappropriate parathyroid hormone secretion from one or more of the parathyroid glands. Biochemical measurement of "intact" or "total" PTH is performed through immunoradiometric (IRMA) and immunochemiluminescent assays.[4]

In the surgical management of PHP intraoperative PTH (IO-PTH) assays have been shown to improve the success of parathyroid gland surgery. Minimally invasive parathyroidectomy (MIP) has replaced the traditional four-gland bilateral exploration as the procedure preferred by many institutions.[5]

There are many conflicting reports in the literature and some groups have thrown doubt on the clinical usefulness of IOPTH during MIP with major concern regarding the following: low usefulness of the assay in detection of multiglandular disease, a significant rate of false-positive results leading to unnecessary extended neck explorations, low cost-effectiveness of the assay in improving cure rates and lack of substantial value-adding to surgical decision-making (understood as a correct assay-based surgeon's decision to further explore the neck) in patients undergoing MIP.[6]

Hence; the present study was undertaken for assessing the

outcome of surgery in patients with PHP.

Subjects and Methods

The present study was undertaken in the department of general surgery of the medical institute and it included assessment of outcome of surgery in patients with PHP.

Inclusion Criteria

- Patients with primary hyperparathyroidism who have intact parathyroid hormone with raised or mid to high normal hormone in the setting of raised total or ionised calcium after exclusion of conditions that mimic PHPT.
- Patients with Informed consent

Exclusion Criteria

- Patient with history of previous neck exploration
- Previous any radiation exposure
- Any malignancy
- Concurrent thyroid disease
- Patient with secondary and tertiary hyperparathyroidism.
- After taking an informed consent from all the patients, detailed history of each patient was obtained including the history of presenting symptom, any pre-existing condition and patient's past history including the treatment and the surgical history.

Once the suspicious parathyroid was identified, careful dissection with blunt instruments was done to free gland from surrounding fascia. Bipolar was used to ligate the vascular supply and the specimen was removed.

Patients with above mentioned inclusion criteria underwent preoperative localization with USG neck and technetium Tc-99m (99mTc) Sestamibi scan (CT/ MRI Neck when required). Based on results of MIBI and USG neck, the findings were defined as concordant and discordant. Patients with concordant findings of USG neck and Sestamibi scan underwent MIP.

All the results were summarized in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test and independent t test were used for evaluation of level of significance. P- value of less than 0.05 was taken as significant.

Results

In our study, there were 13 (61.9%) females, which comprised of approximately 2/3rdof the study sample. When observed on the basis of local neck examination, no abnormality was detected in 85.7% (18/21) patients. Whereas one patient each (4.8%) exhibited midline neck swelling, swelling left side neck and swelling right side neck respectively. In our study, CT/MRI was done in only 4 patients where 50% of the patients showed involvement of right superior and inferior glands. Minimal invasive parathyroidectomy (MIP) was done in 95.2% patients (20/21) while bilateral neck exploration (BNE) was done in only 1 case of multiple adenoma. In our study, the USG neck (n=20) was able to accurately localize abnormal parathyroid glands in 17 patients (85%). In remaining 3 cases, the USG neck findings were discordant. In 2 discordant cases, USG neck showed involvement of right lobe (right superior and inferior) and left lobe (Left superior and inferior) as compared right inferior and left superior respectively intraoperatively. In the remaining 1 discordant case, USG neck showed involvement of bilateral lobes of thyroid as compared to bilateral inferior glands intraoperatively.

Table 1: Distribution of subjects according to gender

Gender	No. of Patients	Percentage
Female	13	61.9%
Male	8	38.1%
Total	21	100.0%

Table 2: Distribution of subjects based on local neck examination

Local Examination- Neck	No. of Patients	Percentage
Midline Neck swelling	1	4.8%
Swelling Left side Neck	1	4.8%
Swelling Right side Neck	1	4.8%
NAD (No abnormality detected)	18	85.7%
Total	21	100.0%

Table 3: Distribution of subject according to CT Neck/ MRI Neck

CT Neck/MRI Neck	No. of Patients	Percentage
Left Inferior	1	25%
Right Inferior	1	25%
Right Superior and Inferior	2	50%
Total	4	100.0%

Table 4: Distribution of subjects according to Surgical Procedure

Surgical Procedure	No. of Patients	Percentage
Minimal Invasive Parathyroidectomy	20	95.2%
Bilateral Neck Exploration	1	4.8%
Total	21	100.0%

Table 5: USG neck accuracy

USG Neck accuracy	No. of patients	Percentage
Concordance	17	85%
Discordance	3	15%
Total	20	100%

Discussion

In the present study, no abnormality was detected in 85.7% (18/21) patients on local neck examination and only 3 patients had exhibited midline neck swelling, swelling left side neck and swelling right side neck each respectively. Our results were in concordance with the results obtained by Mohamed Mahmoud HG (2017) who observed the presence of neck swelling in 1 case out of 20 cases of primary hyperparathyroidism.[7]

In 95.2% cases (20/21) with significant fall (>50%) in intraoperative PTH value than the preoperative value, MIP procedure was done whereas in 1 case of primary hyperparathyroidism during the procedure, no significant decline in PTH value was observed at 10min, 30 min so

incision was extended to proceed with BNE and later significant fall in PTH was observed at 24 hours postoperatively. Our results were in concordance with the results obtained by Lee S et al (2014) who reported 96.6 % successful MIP with mean follow-up of 13 months, in their study population.[8]

Lew et al (2010) reviewed a total of 723 patients with 2.9% operative failures. The main cause of their operative failures was an inability to find the abnormal parathyroid glands.9 Our study also confirms their finding that surgeon's clinical skills and judgment play an important role in the surgical outcome of MIP. On USG neck done in 20 patients, the findings were in concordance with intraoperative findings in 85% (17/20) and accuracy of USG neck was 85%. Our results were in concordance with the result obtained by Shaheen F et al (2008) who reported accuracy of USG neck in 90.9% cases of solitary adenomas of parathyroid glands in patients undergoing parathyroidectomy.[10]

Thielmann A et al (2017) validated the approach of treating primary hyperparathyroidism using sestamibiscan directed parathyroidectomy without routine use of intraoperative parathyroid hormone measurements (ioPTH). They prospectively established a protocol limiting the use of ioPTH to patients with negative or equivocal sestamibi scans and those who had risk factors for multi-gland disease. They then performed a retrospective review to determine the disease control rate. In the study 128 patients underwent sestamibi-guided parathyroidectomy without (111/128 = 87%) or with (17/128 = 13%) ioPTH. The overall disease control (eucalcemia) rate was 95%. 3/111 (3%) of patients who had surgery without ioPTH measurements required re-exploration. Selective use of ioPTH was an effective strategy and ioPTH was best reserved for patients who have non-localizing preoperative imaging, were at risk for multi-gland disease or required revision surgery.[11]

Conclusion

From the above results the authors conclude that in patients undergoing surgical treatment for PHP, Minimal Invasive Parathyroidectomy has excellent prognosis.

References

1. Nelson CM, Victor NS. Rapid Intraoperative Parathyroid Hormone Assay in the Surgical Management of Hyperparathyroidism. The Permanente Journal. 2007;11(1):3-6.
2. Richards ML, Thompson GB, Farley DR, Grant CS. An Optimal Algorithm for Intraoperative Parathyroid Hormone Monitoring. Arch Surg. 2011;146(3):280-5.
3. Proctor MD, Sofferman RA. Intraoperative parathyroid hormone testing: what have we learned? Laryngoscope. 2003;113(4):706-14.
4. Lew J, Rivera M, Irvin GL, Solorzano CC. Operative failure in the era of focused parathyroidectomy: a contemporary series of 845 patients. Arch Surg. 2010;145(7):628-33.
5. Grant CS, Thompson G, Farley D, van Heerden J. Primary hyperparathyroidism surgical management since the introduction of minimally invasive parathyroidectomy: Mayo Clinic experience. Arch Surg. 2005;140(5):472-8.
6. Barczynski M, Konturek A, Cichon S, Hubalewska-Dydejczyk A, Golkowski F, Huszno B. Intraoperative parathyroid hormone assay improves outcomes of minimally invasive parathyroidectomy mainly in patients with a presumed solitary parathyroid adenoma and missing concordance of preoperative imaging. Clin Endocrinol (Oxf). 2007;66(6):878-85.
7. Mohamed Mahmoud HG. Clinical presentation and outcome of surgical management of primary hyperparathyroidism: A single center-based case series in Egypt. J Head Neck Physicians Surg. 2017;5:17-22.
8. Lee S, Ryu H, Morris LF, Grubbs EG, Lee JE, Harun N, Feng L, Perrier ND. Operative failure in minimally invasive parathyroidectomy utilizing an intraoperative parathyroid hormone assay. Ann Surg Oncol. 2014;21(6):1878-83.
9. Lew J, Rivera M, Irvin GL, Solorzano CC. Operative failure in the era of focused parathyroidectomy: a contemporary series of 845 patients. Arch Surg. 2010;145(7):628-33.
10. Shaheen F, Chowdry N, Gojwari T, Wani AI, Khan S. Role of cervical ultrasonography in primary hyperparathyroidism. The Indian Journal of Radiology & Imaging. 2008;18(4):302-5.
11. Thielmann A, Kerr P. Validation of selective use of intraoperative PTH monitoring in parathyroidectomy. Journal of Otolaryngology - Head & Neck Surgery.2017;46:10.

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