BILATERAL NECK EXPLORATION FOR PRIMARY HYPERPARATHYROIDISM : A SURGICAL EXPERIENCE

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ABSTRACT
Objective: *To assess the outcomes of bilateral neck exploration for patients with Primary Hyperparathyroidism (PHPT).*
Study Design: *Quasi Experimental study.*
Setting & Duration: *Surgical ward-2, Jinnah Postgraduate Medical Center (JPMC), Karachi from 1st January 2002 to 31st December 2006.*
Methodology: *37 consecutive patients with PHPT who underwent parathyroidectomy with bilateral neck exploration were included in this study. All 37 patients underwent parathyroidectomy with bilateral neck exploration by a single surgeon. Pre-operative localization was done in all patients by ultrasound scan of neck and sestamibi scan while methylene blue was used for intraoperative localization. Outcomes were assessed by post-operative serum parathormone (PTH) levels, serum calcium levels and symptoms of recurrence.*
Results: *Out of 37 patients 28 had a single adenoma which was localized to right in 18 and left in 10 patients. 8 patients were found to have more than one adenoma per-operatively which was on contralateral side in 6 cases while on the same side in 2. Average operating time was 1 hour and 30 minutes. Post-operative hypocalcemia was observed in 5 cases with serum calcium ranging between 5.5-7 mg/dl and it settled on oral calcium and vitamin-D supplementation. 2 patients developed seroma which was settled by aspiration. There was no incidence of recurrent laryngeal nerve injury.*
Conclusion: *Our limited study showed that bilateral neck exploration for PHPT is the ideal approach, keeping in view the risk of occult adenoma and subsequent re-exploration.*

KEYWORDS: *Primary Hyperparathyroidsm (PHPT), Parathyroidectomy, Adenoma.*

INTRODUCTION

Primary hyperparathyroidism (PHPTH) is a relatively common problem[1] and has been commonly recognized since the advent of routine testing of blood calcium levels. About 80% of patients with PHPTH have a single adenoma, 15% have four gland hyperplasia and 5% have double adenomas.[2] Surgery offers the only definitive treatment for patients with PHPTH.[3] The best surgical approach would give the highest cure rate with low rate of complications. Since the first successful parathyroidectomy by Felix Mandl in 1925, bilateral neck exploration with resection of enlarged parathyroid glands has emerged as the standard operation for PHPTH.[9] It is associated with more than 95% cure rate and minimal morbidity in the hands of an experienced endocrine surgeon.[4,5]

However, since >80% of PHPTH is due to single adenoma, many have questioned the need for bilateral neck exploration and proposed minimally invasive procedures.[10,11] These minimally invasive procedures, for their success, rely on intra-operative PTH testing which should fall >50% from the highest pre-removal level, 10 minutes after removal of gland. Unfortunately, IOPTH testing is not very accurate in patients with multiple abnormal glands and is correct in only 50% of such patients.[6]

In theory, a less invasive operation should offer similar

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cure rates with fewer complications. However, Irvin[11], Udelsman[9] and others in their trials have failed to find any difference in complication rates between unilateral and bilateral operations. Hence bilateral exploration of all four glands remains a Gold Standard against which all other approaches are evaluated.[7] We, therefore conducted a prospective study to evaluate the outcomes of bilateral neck exploration as the ideal surgical approach for parathyroidectomy in patients with PHPTH.

METHODOLOGY

A prospective study was conducted from 1st January 2002 to 31st December 2006 at ward-2, JPMC, Karachi. We evaluated 37 patients who were admitted in our ward with a diagnosis of Primary Hyperparathyroidism and underwent parathyroidectomy with bilateral neck exploration by a single surgeon.

All our patients underwent pre-operative ultrasound scan of neck and sestamibi scan. Intra-operative localization was done in al cases with Methylene Blue in a dose of 5mg/kg of body wt. in 500 mls of dextrose/ saline given in immediate pre-operative period. Post-operatively, patients were evaluated for symptoms of recurrence, PTH levels and serum calcium measurements at specified time intervals (daily -3 days and weekly -2 months).

RESULTS

Out of 37 patients, 22 were females and 15 were males. All the patients were between 30-50 years of age with a mean age of 40 years. Commonest presentation was musculoskeletal problems including muscle weakness, arthralgia, myalgia and pathological fractures. Average hospital stay was 5 days.

Pre-operative ultrasound showed adenoma in 28 out of 37 patients, which was localized to right in 18 and left in 10 patients. Pre-operative PTH levels were in the range of 45-65ng/ml with an average level of 55ng/ml. Rest of the 09 patients had hyperplasia which was not localized.

Injection Methylene Blue was given in immediate pre-operative period. Per-operatively, out of 28 patients who were diagnosed single adenoma, 8 were found to have more than one adenomas, with 6 patients having bilateral and 2 having unilateral involvement. Bilateral neck exploration was done in all cases with an average operating time of 90 minutes (60-120 minutes). In patients with adenoma total excision of single gland was done while in cases with hyperplasia, subtotal or total parathyroidectomy with forearm auto-transplantation was done. Post-operatively, hypocalcemia was observed in 5 cases with serum calcium between 5.5-7mg/dl. It settled on oral calcium and vitamin D supplementation. 2 patients had seroma which settled on aspiration. There was not a single incidence of recurrent laryngeal nerve injury.

DISCUSSION

The primary goals of parathyroidectomy for patients with PHPTH are to cure the disease and to achieve normocalcemia. The best surgical strategy should achieve this goal with minimal complications, like persistent recurrent hyperparathyroidism, postoperative hypoparathyroidism and recurrent laryngeal nerve injury with efficient use of operating time and resources.[7] The rate of persistent hyperparathyroidism may be as high as 30% usually caused by missing one of multiple abnormal glands.[8] Hence, it is more cost-effective to have a higher success rate in the initial operation than to rely on re-operation in which costs and risks of recurrent nerve injury are higher.

In our limited series of 37 patients, we were able to accurately localize the adenoma pre-operatively in 20 patients which is comparable to study by Sippel in which an additional adenoma was detected in 10-15% of patients with a negative sestamibi scan.[12] 8 out of 37 patients were found to have more than one adenoma on exploration. Besides, exploring the opposite side did not take much more time than waiting for the IOPTH levels.

Allendorf have reported a 95% success rate for parathyroidectomy using a bilateral approach.[13] In our study only 5 out of 37 patients (13%) developed transient hypocalcemia that settled on oral calcium and vitamin D supplementation. However there was no single incidence of recurrent hypercalcemia which explains our success rate Iin excess of 95%. But since we don't have a long term follow up in most of our cases this rate cannot be stated confidently. Our average operating time was 90 minutes which is higher than that in specialized endocrine centres where 45 minutes is the average operating time.[13]

The success rate of minimally invasive parathyroidectomies is highly dependent upon accurate pre-operative localization comprising a combination of Tc-99m sestamibi-SPECT and or thallium-pertechnetate subtraction scanning with intraoperative gamma probe as well as the intraoperative parathyroid hormone assay to rule out multigland disease intraoperatively.[11,12] Unfortunately, IOPTH testing is not as accurate in patients with multiple abnormal parathyroid glands and is correct in

only about 50% of such patients.[14] Thus, the IOPTH level may fall more than 50% in some patients with multiple abnormal parathyroid glands when abnormal parathyroid glands remain in the neck. The reason for this decrease is not known but may be due to a different calcium or PTH receptor set point in these tumors. Furthermore, waiting for the IOPTH assay delays the operation by about 15 min[6] which is comparable to time taken for exploring the opposite side. Numerous previous reports document that superb result can be obtained using a bilateral approach by an experienced surgeon[7,8,13] which is also proved by our limited study.

Hence, bilateral neck exploration is not only cost effective but also takes same time as in focused approach with IOPTH levels assessment.

CONCLUSION

Our study showed that bilateral neck exploration remains a safe approach for patients with PHPT with an excellent success rate. It is associated with minimal complications and efficient use of operating time and resources.

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