

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Location of abnormal parathyroid glands: lessons from 810 parathyroidectomies



Melissa LoPinto, MD, MPH,* Gustavo A. Rubio, MD, Zahra F. Khan, MD, Tanaz M. Vaghaiwalla, MD, Josefina C. Farra, MD, and John I. Lew, MD, FACS

Division of Surgical Endocrinology, DeWitt Daughtry Family Department of Surgery, University of Miami Leonard M. Miller School of Medicine, Miami, Florida

ARTICLE INFO

Article history:

Received 9 May 2016

Received in revised form

8 July 2016

Accepted 5 August 2016

Available online 13 August 2016

Keywords:

Primary hyperparathyroidism

Parathyroidectomy

Parathyroid anatomy

Parathyroid gland localization

Negative parathyroid imaging

ABSTRACT

Background: Primary hyperparathyroidism (pHPT) is commonly treated with targeted parathyroidectomy (PTX) guided by preoperative imaging and intraoperative parathormone monitoring. Despite advanced imaging techniques, failure of parathyroid localization still occurs. This study determines the anatomical distribution of single abnormal parathyroid glands, which may help direct the surgeon in PTX when preoperative localization is unsuccessful.

Methods: A retrospective review of prospectively collected data of 810 patients with pHPT who underwent initial PTX at a tertiary medical center was performed. All patients had biochemically confirmed pHPT and single-gland disease. Abnormal parathyroid gland localization was determined at time of operation, correlated with operative and pathology reports, and confirmed by operative success defined as eucalcemia for ≥ 6 mo after PTX. Patients with multiple endocrine neoplasia, secondary, tertiary, or familial hyperparathyroidism, multiglandular disease, parathyroid cancer, and ectopic glands were excluded. Data were analyzed by chi-square and Z-test analyses.

Results: Among 810 patients who underwent PTX for pHPT, single abnormal parathyroid glands were unequally distributed among the four eutopic locations (left superior, 15.7%; left inferior, 31.3%; right superior, 15.8%; right inferior, 37.2%; $P < 0.01$). Abnormal inferior parathyroid glands (68.5%) were significantly more common than abnormal superior glands (31.5%), respectively ($P < 0.01$). In men, the most common location for single abnormal parathyroid glands was the right inferior position (43.4%, $P < 0.01$). Overall, there was no significant difference in laterality.

Conclusions: This large series of patients suggests that single eutopic abnormal parathyroid glands are more likely to be inferior. In men, moreover, if an abnormal parathyroid gland is not localized preoperatively, the right inferior location should be explored first. Nevertheless, successful PTX remains predicated on knowledge of parathyroid anatomy, experience, and judgment of the surgeon.

© 2016 Elsevier Inc. All rights reserved.

Presented at the 11th Annual Meeting of the Academic Surgical Congress in Jacksonville, FL, February 2016.

* Corresponding author. Division of Endocrine Surgery, DeWitt Daughtry Family Department of Surgery, University of Miami Leonard M. Miller School of Medicine, 1120 NW 14th St, 4th floor, Clinical Research Building 410, Miami, FL 33136. Tel.: +1 305 243 4444; fax: +305 243 4221.

E-mail address: melissa.lopinto@gmail.com (M. LoPinto).
0022-4804/\$ – see front matter © 2016 Elsevier Inc. All rights reserved.
<http://dx.doi.org/10.1016/j.jss.2016.08.045>

Introduction

Primary hyperparathyroidism (pHPT) is the most common cause of hypercalcemia in the outpatient population with at least 80%-90% of cases being caused by single-gland disease (SGD).^{1,2} Over the last half century, the surgical approach to parathyroidectomy (PTX) has evolved from a four gland, bilateral neck exploration (BNE) to targeted PTX that is directed by preoperative imaging studies and guided by intraoperative parathormone (PTH) monitoring.³⁻¹¹ Targeted PTX, which is predicated on positive preoperative localization of abnormal parathyroid glands to direct initial targeted exploration, has become the preferred approach for the surgical treatment of pHPT at many specialized medical centers worldwide with rates of operative success equal to or higher than BNE.⁶⁻¹⁰ However, this targeted approach is susceptible to limitations related to imaging studies for parathyroid localization and known variability in parathyroid anatomy.

Surgeons use imaging studies preoperatively to localize abnormal parathyroid gland(s) to help direct initial surgical approach after biochemical confirmation for diagnosis of pHPT. Preoperative localization studies, typically comprised of sestamibi (MIBI) and ultrasound in conjunction with intraoperative parathormone monitoring (IPM), are used to minimize neck exploration and confirm removal of all abnormal hypersecreting parathyroid glands.⁶⁻¹⁰ Nevertheless, preoperative imaging studies may have high false positive rates and fail to localize abnormal single parathyroid glands. Reports estimate up to 17% percent of patients with biochemically confirmed pHPT have negative preoperative localization studies.^{3,12,13} Furthermore, patients with negative preoperative localization have similar rates of eutopic SGD compared to those with positive localization studies.^{3,12,13}

Understanding the anatomic and embryologic relationships of the parathyroid glands to the thyroid gland and surrounding structures is essential for successful PTX.¹⁴⁻¹⁷ Although most have four parathyroid glands, some patients may have three glands (3%) and others five or more (13%) with up to 11 parathyroid glands being reported.¹⁷ Most commonly, the inferior parathyroid glands are found adjacent to the posterior-lateral aspect of the inferior thyroid pole and inferior to the junction of the inferior thyroid artery and recurrent laryngeal nerve. The superior parathyroid glands are located near, or just superior to, the junction of the inferior thyroid artery and recurrent laryngeal nerve.¹⁴⁻¹⁷ Embryologically, the parathyroid glands arise from the branchial pouches. The inferior glands arise from the third pouch, and the superior glands from the fourth pouch. During development, parathyroid glands migrate to their anticipated location in the adult. These glands may reside anywhere along the path of migration and at ectopic locations, which may create a challenge at time of operation.¹⁴⁻¹⁷

In cases of nonlocalized abnormal parathyroid glands, surgeons most often perform BNE with the goal of identifying usually four parathyroid glands and excising abnormal glands based on size, color, and/or appearance. Successful PTX in these sometimes challenging surgical explorations is dependent on knowledge of surgical embryology, anatomy, surgeon experience, and judgment. In addition, most patients who

undergo initial unsuccessful operations for pHPT have abnormal parathyroid glands located in eutopic locations.¹⁸⁻²¹ Although previous studies have observed unequal anatomic distribution of abnormal single parathyroid glands, other reports have made further observations regarding the most likely anatomic location of an abnormal gland.²²⁻²⁵

This study evaluates the distribution of eutopic locations for single abnormal parathyroid glands in pHPT patients with the purpose of providing anatomic information to direct parathyroid exploration in those patients with negative preoperative localization studies.

Methods

A retrospective review of prospectively collected data from 824 patients who underwent PTX at the single tertiary institution was performed. Of this group, 810 patients with pHPT who had a single abnormal parathyroid gland at a eutopic location at initial PTX were included. All patients had biochemically confirmed pHPT with calcium and PTH levels above the normal reference range that varied over the study period. Prospectively collected data for all patients, which included preoperative and postoperative laboratory values including serum calcium and PTH levels at 2, 6 and 12 mo and yearly thereafter successful PTX were reviewed retrospectively. All patients were followed for at least 6 mo, and detailed intraoperative data from operative reports regarding location of single abnormal parathyroid glands were recorded. Anatomic location of single abnormal parathyroid glands was confirmed at time of operation and from operative reports. Operative success was defined as continuous eucalcemia for 6 mo or longer after PTX. Patients with operative failure defined as hypercalcemia and elevated PTH levels <6 mo after surgery, and those patients with recurrent hyperparathyroidism defined as elevated serum calcium and PTH levels above normal reference range ≥ 6 mo after successful PTX were excluded. In addition, patients with multiple endocrine neoplasia, secondary, tertiary, or familial hyperparathyroidism, multiglandular disease, parathyroid carcinoma, ectopic glands, thiazide usage, underlying nonendocrine malignancy, and those undergoing reoperative PTX were also excluded.

Indications for surgery included symptomatic disease and, in the case of asymptomatic disease, the decision to operate was based on the International Workshop Guidelines or a previous report from the authors' institution.²⁶⁻²⁹ Targeted PTX with IPM was the initial approach performed in all patients from 1993 to 2013. IPM criterion used for predicting successful PTX was a decrease of intraoperative PTH levels of >50% from the highest preincision or preexcision hormone level obtained 10 min after removal of all abnormal parathyroid gland, as previously described.^{3,4} Prior to 1993, PTX principally involved BNE for usually four parathyroid glands and the excision of abnormal glands based on size, color, and/or appearance.

Abnormal parathyroid gland location was confirmed by the surgeon at time of operation and correlated with operative and pathology reports. Each of the four eutopic sites for the single abnormal parathyroid glands among the patients were

Download English Version:

<https://daneshyari.com/en/article/5733904>

Download Persian Version:

<https://daneshyari.com/article/5733904>

[Daneshyari.com](https://daneshyari.com)