

# No Need to Abandon Focused Unilateral Exploration for Primary Hyperparathyroidism with Intraoperative Monitoring of Intact Parathyroid Hormone

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- BACKGROUND:** We investigated the rate of persistent and recurrent hyperparathyroidism after focused unilateral exploration (UE) with intraoperative monitoring of intact parathyroid hormone (IOPTH).
- STUDY DESIGN:** A prospective cohort of 915 patients with primary hyperparathyroidism (PHP) underwent parathyroid surgery by a single surgeon from January 2003 to September 2013. A total of 556 patients with at least a single positive preoperative localization by ultrasound (US) and/or sestamibi scan (STS) underwent UE with IOPTH. The criterion for completion of surgery was an IOPTH fall of 50% from the highest intraoperative level and into the normal range 5 to 10 minutes after resection of the localized gland.
- RESULTS:** Fifteen patients had either persistent or recurrent PHP, yielding a 2.7% (95% CI 1.6% to 4.4%) overall recurrence rate based on the refined Wilson method with continuity correction. Four patients had persistent PHP. Three of these patients were cured with reoperation, and the fourth patient was followed nonoperatively. Eleven patients had recurrent PHP, with 5 corrected by surgery and 6 patients followed nonoperatively. The mean postoperative serum calcium (Ca) level was 9.4 mg/dL over a mean follow-up interval of 44.0 months. Preoperative localization rates by each localization study were: US 74.3% (n = 413), STS 86.9% (n = 483), and US and STS 71.4% (n = 397). There was no difference in the preoperative study that localized the hyperfunctional parathyroid gland in recurrent vs nonrecurrent patients by the Fisher's exact test (US, p = 1.00; STS, p = 0.65; US and STS, p = 1.00).
- CONCLUSIONS:** The low rate of recurrent PHP after focused unilateral exploration with IOPTH suggests that this procedure should not be abandoned. (*J Am Coll Surg* 2015;221:518–523. © 2015 by the American College of Surgeons)

Focused unilateral exploration (UE) is a frequently used approach for the treatment of primary hyperparathyroidism (PHP).<sup>1-5</sup> This approach is dependent on adequate localization by sestamibi scan (STS) and or ultrasound (US) and an appropriate decline in intraoperative

parathyroid hormone (IOPTH) after removal of the localized gland. Advances in localization techniques and intraoperative monitoring of IOPTH levels have enabled UE to achieve 95% to 97% long-term cure rates for PHP.<sup>6-10</sup> Recent studies have, however, shown a trend toward bilateral exploration (BE).<sup>11-19</sup>

Several short-term follow-up studies, including multiple randomized control trials, have confirmed the efficacy of UE and do not show that BE results in a significantly lower recurrence rate.<sup>1-6,8,9,20-30</sup> A single long-term study by Lew and Irvin<sup>8</sup> described a recurrence rate of 3% for UE using IOPTH. The advantages of UE are often debated, but UE eliminates the risk of bilateral recurrent laryngeal nerve paralysis, eliminates the risk of permanent hypoparathyroidism, and makes reoperation easier on the contralateral side.<sup>1,2,4,5,20-33</sup>

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**Abbreviations and Acronyms**

- BE = bilateral exploration
- Ca = calcium
- IOPTH = intraoperative parathyroid hormone
- PHP = primary hyperparathyroidism
- PTH = parathyroid hormone
- STS = sestamibi scan
- UE = unilateral exploration
- US = ultrasound

Recent controversy, however, has challenged the efficacy of UE at achieving comparable rates of recurrence compared with BE.<sup>11-18,34,35</sup> Unilateral exploration critics cite the presence of multi-gland disease at the time of surgery as the reason for persistent or recurrent hyperparathyroidism.<sup>11,15,19</sup> Despite appropriate localization and an adequate drop in IOPTH after removal of the localized gland, exploration of the contralateral side has resulted in finding an additional enlarged parathyroid gland in as many as 17% of patients.<sup>19</sup> The significance of these enlarged glands is currently not known. We investigated our rate of persistent and recurrent PHP after UE to determine the impact of the choice of UE for PHP in a long-term, prospective cohort study.

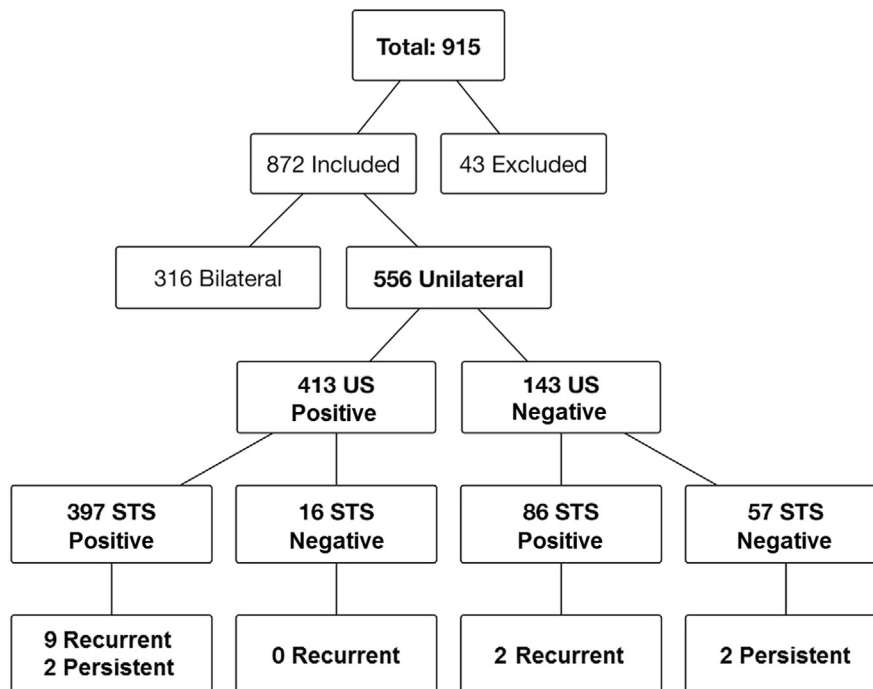
**METHODS**

**Patient selection**

This study received institutional review board approval and is Health Insurance Portability and Accountability Act (HIPAA) compliant. We prospectively compiled a database of 915 patients who underwent parathyroid surgery for PHP by a single surgeon at an academic tertiary care center, from January 2003 to September 2013. Forty-three patients were excluded due to the presence of multiple endocrine neoplasia, previous parathyroid surgery, or a mediastinal tumor requiring thoracotomy, and 316 patients who had BE were not included in this analysis (Fig. 1). The study included a total of 556 PHP patients, 147 men and 409 women, who underwent UE, had localization by at least 1 preoperative imaging modality, and exhibited an adequate drop in IOPTH (Table 1).

**Surgical outcomes**

Surgical outcomes were obtained through operative notes, clinical notes, laboratory results, radiology reports, and were documented prospectively on a standardized research record at the time of work-up and treatment. The laterality of the focused UE was guided by preoperative localization studies, and the contralateral side was not explored when IOPTH criteria were met



**Figure 1.** Patient selection and treatment distribution, including subgroups of their preoperative localization and the corresponding number of recurrent cases observed. There was no difference in the rate of recurrence depending on the result of ultrasound (US) and sestamibi scan (STS) before unilateral exploration parathyroidectomy.

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