Published in final edited form as:

J Surg Res. 2014 August ; 190(2): 415–416. doi:10.1016/j.jss.2014.05.062.

To do or not to do: neck ultrasound and the detection of thyroid pathology in patients with primary hyperparathyroidism

Geeta Lal, MD, MSc, FACS*

Minimally invasive parathyroidectomy has rapidly become the procedure of choice for the surgical treatment of primary hyperparathyroidism (PHPT). To facilitate this, a number of imaging modalities can be used to localize the causative parathyroid gland (s) preoperatively; however, 99m-Tc sestamibi scans (MIBI) and cervical ultrasound are the most widely used tests.

Although MIBI scans are, in general, more sensitive and provide functional information, ultrasound is noninvasive, avoids radiation exposure, provides anatomic information, and can be rapidly performed. In fact, some studies show the utility of neck ultrasound as the sole preoperative localization study [1–3]. Another major reported advantage of ultrasound is the identification of concurrent thyroid pathology, which can not only contribute to false positive MIBI scans but may also need management at the time of parathyroid surgery. In addition, ultrasound can also alert the surgeon to the possibility of intrathyroidal parathyroid glands. The absence of thyroid nodules may thus obviate the need for ipsilateral thyroid lobectomy in case of missing parathyroid glands at exploration. Despite the above, there is controversy regarding the most optimal imaging strategy in patients with PHPT.

Coexistent thyroid pathology is found quite commonly in patients presenting with hyperparathyroidism, with various retrospective studies reporting rates ranging from 20%–50%. The rates of thyroid malignancy in these studies are also variable, with reported values from 2%–15% [2–7]. This variability is not surprising given that these are highly selected surgical series. Nevertheless, the data has led many surgeons to recommend routine incorporation of cervical ultrasound, in addition to MIBI scans, in the evaluation of patients with PHPT. In addition to possibly modifying the planned procedure and reducing the need for unplanned thyroid surgery, this strategy allows patients to avoid the risks associated with reoperative neck surgery and its attendant morbidity, should thyroid pathology be identified in the future. Using decision analysis techniques, other investigators have shown that incorporation of neck ultrasound to screen for thyroid gland disease is not cost-prohibitive and may be less costly than routine bilateral neck exploration with intraoperative thyroid evaluation [8].

Multiple studies have shown that although the incidence of thyroid cancer in the United States has been steadily rising, mortality rates have been stable (and low), suggesting that the current thyroid cancer “epidemic” is one of overdiagnosis and overtreatment [9,10]. Related to this, the flip side of the debate regarding preoperative localization studies in

*Corresponding author. University of Iowa, Iowa City, IA 52242. Tel.: 319-356-1727; fax: 319-353-8940. geeta-lal@uiowa.edu.

PHPT is that routine thyroid imaging is not needed as it leads to unnecessary invasive tests and interventions in patients with disease that is not clinically significant.

To this end, Weiss and Chen [11] retrospectively reviewed 222 patients undergoing parathyroidectomy over a 20 y period at their tertiary care institution to determine the long-term effects of omitting preoperative neck ultrasound on the development of thyroid pathology and need for future thyroidectomy. Thyroid procedures were performed in 23 patients intraoperatively with four patients (17%) being found to have cancer, including two patients with medullary thyroid cancer. During follow up, cervical ultrasound was performed in 13 (6%) of patients (for palpable abnormalities), of which 7 (54%) underwent fine needle aspiration biopsy. Only one patient (0.4% of the cohort) underwent a total thyroidectomy for what eventually turned out to be a microcarcinoma. None of the five patients with cancer developed recurrent disease over an average 15-y follow up period. Their overall malignancy rate was 2%, which was similar to that seen in patients who underwent preoperative ultrasound at the same institution in a previously published article [12]. The authors indicate that omitting the preoperative neck ultrasound did not lead to an adverse outcome with respect to the management of clinically relevant thyroid cancer, and avoided fine needle aspirations in a substantial number of patients. As such, they indicate that preoperative cervical ultrasound is optional rather than essential in the work-up of patients with PHPT.

This article certainly adds to our growing knowledge regarding the optimal strategy for preoperative localization studies in the management of patients with PHPT and the evolving field of the appropriate management of concurrent thyroid pathology in this group of patients. Nevertheless, a few issues do merit additional consideration. First, although the authors provide follow up data, they point out that “some patients may have continued their care outside of our hospital system”. This is particularly important in that it could potentially have led to an underestimation of the rate of postoperative thyroid-related pathology and procedures in this group of patients. Second, the majority of intraoperative thyroid procedures in this series consisted of removal of tissue suspected to be parathyroid tissue, with formal thyroidectomy being performed in only four patients with malignancy. It is difficult to assess the full extent of thyroid disease in the remaining patients as information regarding the extent of parathyroid exploration is limited. Finally, although there were no complications from repeat neck surgery in this series of patients, one cannot minimize the anxiety associated with the discovery of thyroid disease and the well-recognized increased risk of recurrent laryngeal nerve injury and permanent hypoparathyroidism in patients needing thyroid intervention after parathyroidectomy.

The low rate of malignancy noted in this article, while reassuring, should be interpreted with the previously mentioned caveats. What the study does clearly highlight is that additional, larger-scale prospective evaluations with careful and complete follow up are needed to better define the true rate of thyroid malignancy and its outcomes in patients with parathyroid disease. This is especially relevant in the current era of cost-effective and accountable care medicine.

References

1. Vitetta GM, Neri P, Chiecchio A, et al. Role of ultrasonography in the management of patients with primary hyperparathyroidism: retrospective comparison with technetium-99m sestamibi scintigraphy. *J Ultrasound*. 2014; 17:1. [PubMed: 24616746]
2. Bentrem DJ, Angelos P, Talamonti MS, Nayar R. Is preoperative investigation of the thyroid justified in patients undergoing parathyroidectomy for hyperparathyroidism? *Thyroid : official J Am Thyroid Assoc*. 2002; 12:1109.
3. Milas M, Mensah A, Alghoul M, et al. The impact of office neck ultrasonography on reducing unnecessary thyroid surgery in patients undergoing parathyroidectomy. *Thyroid : official J Am Thyroid Assoc*. 2005; 15:1055.
4. Kairys JC, Daskalakis C, Weigel RJ. Surgeon-performed ultrasound for preoperative localization of abnormal parathyroid glands in patients with primary hyperparathyroidism. *World J Surg*. 2006; 30:1658. Discussion 64. [PubMed: 16855801]
5. Gul K, Ozdemir D, Korukluoglu B, et al. Preoperative and postoperative evaluation of thyroid disease in patients undergoing surgical treatment of primary hyperparathyroidism. *Endocr Pract*. 2010; 16:7. [PubMed: 20180280]
6. Kwon JH, Kim EK, Lee HS, Moon HJ, Kwak JY. Neck ultrasonography as preoperative localization of primary hyperparathyroidism with an additional role of detecting thyroid malignancy. *Eur J Radiol*. 2013; 82:e17. [PubMed: 22921682]
7. Sloan DA, Davenport DL, Eldridge RJ, Lee CY. Surgeon-driven thyroid interrogation of patients presenting with primary hyperparathyroidism. *J Am Coll Surgeons*. 2014; 218:674.
8. Hollenbeak CS, Lendel I, Beus KS, Ruda JM, Stack BC Jr. The cost of screening for synchronous thyroid disease in patients presenting with primary hyperparathyroidism. *Arch otolaryngologyhead neck Surg*. 2007; 133:1013.
9. Davies L, Welch HG. Current thyroid cancer trends in the United States. *JAMA otolaryngologyhead neck Surg*. 2014; 140:317.
10. Vollmer RT. Revisiting overdiagnosis and fatality in thyroid cancer. *Am J Clin Pathol*. 2014; 141:128. [PubMed: 24343746]
11. Weiss DM, Chen H. Role of cervical ultrasound in detecting thyroid pathology in primary hyperparathyroidism. *J Surg Res*. 2014; 190:575. [PubMed: 24739507]
12. Adler JT, Chen H, Schaefer S, Sippel RS. Does routine use of ultrasound result in additional thyroid procedures in patients with primary hyperparathyroidism? *J Am Coll Surgeons*. 2010; 211:536.