The Risks of Thyroidectomy

Words of Caution for Referring Physicians

The risk of serious complication from thyroid surgery has long tempered physicians' enthusiasm for recommending thyroidectomy. Over 100 years ago, an author wrote in a surgical textbook that, "if a surgeon should be so foolhardy as to undertake [thyroidectomy], . . . lucky it will be . . . if his victim lives long enough to enable him to finish his horrid butchery."¹ With the advent of improved surgical technique and effective preoperative medical therapy for hyperthyroidism, concern for the development of potentially fatal thyrotoxicosis or "storm" has abated. Nevertheless, the internist should continue to refer patients for thyroidectomy with some unease and caution because of the risk of permanent hypoparathyroidism and paralysis of recurrent or superior laryngeal nerves.

At a superficial glance, preservation of parathyroid and laryngeal nerve function seems an easy task. Iatrogenic hypoparathyroidism is usually the result of interruption of the blood supply to most or all of the glands and therefore could be avoided by careful dissection and preservation of the glands' vascular pedicles. Similarly, intraoperative identification of the laryngeal nerves should permit the surgeon to avoid injuring them. Of course, these tasks are difficult, and permanent hypoparathyroidism occurs following 1% to 30% of bilateral thyroidectomies. It even occurs in the occasional patient undergoing a unilateral procedure. The consequences can be life-threatening. Even when therapy is successful, patients may require lifelong, intensive monitoring and therapy with large doses of calcium and vitamin D, which have substantial toxicity. In addition, recent perturbations in the supply of vitamin D have placed hypoparathyroid patients at even greater peril. Unilateral laryngeal nerve palsy generally results in a considerable voice change, and damage to both laryngeal nerves usually necessitates tracheotomy, a disfiguring and life-altering event.

In this issue of *JGIM*, Burge and coworkers attempt to identify risk factors that might predispose a patient to experience permanent hypoparathyroidism following total or subtotal thyroidectomy.² They retrospectively examine a cohort of 142 patients who underwent the operation during an 8-year period at four tertiary-care hospitals in Albuquerque, New Mexico. Permanent hypoparathyroidism, defined as a persistent need for either vitamin D or calcium 6 months after surgery, occurred in 10.6% of the cases. Several factors are reported not to influence the risk of postoperative hypoparathyroidism, including patient age, gender, ethnicity, preoperative evaluation with a fine needle aspiration, extent of surgery (subtotal vs total thyroidectomy), or presence in the operating room of a resident surgeon. However, increasing clinicopathologic stage of thyroid carcinoma, and the speciality of the operating surgeon (general surgery vs otolaryngology) were significant predictors of hypoparathyroidism.

It seems intuitive that a worse disease stage should be associated with a higher risk of complications because patients with worse disease receive more aggressive treatment. On closer inspection, however, the significance of disease stage is less obvious. In the Ohio State staging classification that was used in this study, patients are classified as stage I if they have small tumors confined entirely to the thyroid, stage II with intermediate-sized tumors or bilateral disease or locoregional nodal involvement, stage III with large tumors or local invasion outside the thyroid, and stage IV with distant metastases.³ Certainly, patients with extrathyroidal invasion have surgical procedures that often resect skeletal muscle and perithyroidal fat and sometimes resect a laryngeal nerve or a portion of the tracheal wall. Therefore, patients with stage III disease because of extrathyroidal invasion are likely to have more extensive surgical resection and thus greater risk to the vascular supply of the thyroid glands. Patients with stage II disease, however, should be no more likely to have parathyroid ischemia during a total thyroidectomy than those in stage I. Also, patients with stage IV disease should not have a riskier resection in the absence of extrathyroidal invasion. Therefore, there is little reason to expect a priori that advanced disease stage would increase the risk of hypoparathyroidism from a total thyroidectomy, especially not the doubling of risk with each stepwise increase in disease stage reported in this study.

These considerations raise two issues. First the authors should have determined whether disease stage remained a predictor of hypoparathyroidism when the presence or absence of extrathyroidal invasion was included as an independent predictor. Second, the staging system used in this study does not apply to the subgroup of patients with medullary carcinoma and has relatively poor predictive value. The authors could have used a staging system that includes all histologic subtypes and has a superior predictive value, such as TNM or NTCTCS.^{4,5}

More controversial is the conclusion that otolaryngologists are more likely than general surgeons to perform a total thyroidectomy that results in hypoparathyroidism. Burge and coworkers report that patients who undergo a thyroidectomy performed by an otolaryngologist are 6 times more likely to become hypoparathyroid. Before deciding, however, that otolaryngologists should never be permitted to perform thyroidectomies (at least in Albuquerque), many potential confounding variables need to be considered. Perhaps most important is the experience of the individual surgeon. If we count only the thyroidectomies that qualified for this study, the otolaryngologists performed an average of 3.1 thyroidectomies over 8 years. The general surgeons averaged 4.1 thyroidectomies each year, and this average is skewed by one surgeon who did 35 procedures. Even including the 438 patients with less-

extensive thyroidectomies who were excluded from the analysis and assuming the minimal number of surgeons, it is likely that the average surgeon performed no more than 2 thyroidectomies per year! It seems reasonable that a surgeon who performs this technically difficult operative procedure so infrequently is likely to have a higher rate of complication than one who performs it regularly, regardless of surgical subspecialty. Further, patients with more advanced disease were more likely to be referred to an otolaryngologist, perhaps reflecting the presence of extrathyroidal extension of tumor into surrounding soft tissue and aerodigestive tract structures. The authors may have reached different conclusions about the effect of specialty if they had incorporated variables such as the frequency of performing thyroidectomy, the years of operating experience, and the presence of extrathyroidal extension in their analyses.

The internist who has a patient requiring thyroid surgery must consider multiple factors in deciding who should operate and what operative procedure should be done. The first and foremost consideration must be the potential benefit from surgery. Given the lack of evidence that total thyroidectomy is beneficial for patients with a nominal papillary carcinoma—for example, a young patient with stage I disease by the Ohio State classification—it is probably reasonable to refer such a patient for a unilateral lobectomy and isthmusectomy. For the remainder of patients in whom total thyroidectomy probably does improve disease-free survival, however, the internist must

consider the experience level and the complication rates of individual surgeons, regardless of their subspecialty. If a proficient surgeon is not readily available, perhaps the most prudent course of action would be to send the patient to a referral center.⁶ With the introduction of newer modalities of monitoring and repairing laryngeal nerves and the use of recombinant human parathyroid hormone, perhaps the long-term morbidity of complications will be reduced.—**STEVEN I. SHERMAN, MD**, *University of Texas M.D. Anderson Cancer Center, Houston.*

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