Is Outpatient Thyroid Surgery for Everyone?

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ABSTRACT: Thyroidectomy is a common surgical procedure. Traditionally, surgeons have performed thyroidectomy on an inpatient basis. However, consistent with current trends in surgery, some practices are transitioning thyroidectomy to an outpatient setting. Although concerns for hypocalcemia and postoperative bleeding exist regardless of surgeon experience, multiple studies demonstrate that outpatient thyroidectomy is safe in the hands of high-volume surgeons. Indeed, experienced thyroid surgeons who perform thyroidectomy in an outpatient setting experience excellent patient outcomes and reduced costs. However, outpatient thyroidectomy may not be suitable for all surgeons, hospitals, or patients. When evaluating whether to implement an outpatient thyroid program, a practice should consider a number of important factors including the team performing the procedure, the hospital, and the patient. With the appropriate staff education and experience, hospital setting, and patient selection, practices in a multitude of settings can successfully develop a safe, cost-effective outpatient thyroid program.

KEYWORDS: Outpatient, thyroidectomy, surgeon volume, tertiary center

Introduction

As surgical practices evolve, practices are transitioning more and more procedures traditionally performed on an inpatient basis to outpatient management. Today, for example, surgeons routinely perform elective laparoscopic cholecystectomy, inguinal hernia repair, and partial mastectomy in an outpatient setting.1-3 At many institutions, surgeons commonly perform parathyroidectomy and thyroid lobectomy as day-surgery procedures requiring only a short period of observation in the recovery room, and some surgeons are even applying this management paradigm to total thyroidectomy.4 Indeed, many high-volume surgeons are performing thyroidectomy in an outpatient setting (same-day surgery) as the rule rather than the exception. The potential benefits of this management strategy include improved patient recuperation, cost savings, and superior utilization of hospital resources.5 With the appropriate staff education and experience, patient selection, and hospital setting, the transition to outpatient thyroidectomy can be made in multiple practice settings. However, as explained further herein, outpatient thyroidectomy may not be suitable for all surgeons, hospitals, or patients. Careful evaluation of a number of issues should factor into a practice’s decision to develop an outpatient thyroidectomy program.

Factors Relating to Staff Education and Experience

Low-volume surgeons, those who perform fewer than 10 thyroidectomies on an annual basis, perform most of the thyroidectomies in the United States.6 However, high-volume surgeons, defined as those who perform anywhere from 25 to more than 100 thyroidectomies on an annual basis, generate the data regarding outpatient thyroidectomy.6 Often, these high-volume surgeons have a background in otolaryngology or general surgery with specific oncologic or endocrine-focused fellowship training.7 In contrast, the low-volume and intermediate-volume surgeons often lack additional dedicated training on thyroid and/or parathyroid disease, with thyroid cases constituting a small fraction of their normal practice. Low-volume surgeons are known to experience higher complication rates than their high-volume counterparts.8 Given the relationship between the volume of thyroidectomies a surgeon performs annually and the outcome of those procedures, low-volume and intermediate-volume surgeons should pause before adopting outpatient thyroidectomy to their practices. Data published on the practice of outpatient thyroidectomy—which are attributable to procedures performed by high-volume surgeons—do not necessarily translate to outcomes likely to be achieved by a low-volume or intermediate-volume surgeon.

Even with significant experience, many high-volume surgeons hesitate to adopt routine outpatient thyroidectomy.8 The likelihood of postoperative hematoma following outpatient thyroidectomy is very low (<2% in most studies).10 However, there is a high risk of morbidity from potential airway compromise with hematoma.10,11 Clinically significant postoperative hematomas can occur during any anterior neck operation. Data vary on time to onset of postoperative hematoma. Although most postoperative hematomas will become clinically apparent in the immediate postoperative period (less than 6 hours), up to 25% of postoperative hematomas may form within 6 to 24 hours after operation.12,13 If a patient undergoes outpatient thyroidectomy,
the chance of a postoperative hematoma occurring while the patient is at home is very high.14 With the proximity of compressible structures in the neck, any postoperative bleeding can quickly evolve into a life-threatening airway compromise.15 As a hematoma forms, it compromises venous flow, causing outflow obstruction and edema in the surrounding laryngeal tissue. The risk of a postoperative hematoma may be mitigated by meticulous attention to hemostasis; however, despite best efforts, postobstruction and edema in the surrounding laryngeal tissue. The hematoma forms, it compromises venous flow, causing outflow

Another potential complication from outpatient thyroidectomy is recurrent laryngeal nerve (RLN) injury, which is less prevalent in the hands of experienced surgeons.19 Many high-volume surgeons have adopted the use of nerve monitoring as part of the standard of care for their operations. Previous data did not show a decreased rate of nerve injury with the use of nerve monitoring.20–22 However, more recent studies have shown some benefit.20 Although the practice may not prevent an injury from occurring, nerve monitoring will allow the surgeon to pause before continuing on to the other side. In situations where a unilateral nerve injury has occurred, this pause will prevent a bilateral injury and potential airway crisis on extubation. Nerve monitoring is an additional tool in the surgeon’s armamentarium to ensure a smooth operation and same-day discharge. Although most of the tertiary centers have instituted nerve monitoring as standard of care, the practice is less prevalent in smaller practices. The data that nerve monitoring provides are not binary. The surgeon is responsible for interpreting the data to make it useful. Only those surgeons with appropriate training and continuous use will benefit from these devices. It may not make economic sense for low-volume surgeons or hospitals to invest in nerve monitoring devices. The adoption or lack of use of nerve monitoring could have broad implications for which surgeons choose to pursue outpatient thyroidectomy. Noting that nerve monitoring is used by more experienced surgeons, it only follows that they will have improved identification of injuries. This information is invaluable when planning to continue the operation as an outpatient procedure versus admitting the patient. Thorough documentation of the patient’s preoperative vocal function is critical in this case. This information can inform the surgeon as to whether the patient will benefit from laryngoscopy to further investigate any vocal changes. Evidence of preoperative vocal cord dysfunction will place the patient in a higher risk category and exclude them from an outpatient thyroidectomy.

Another reason some surgeons elect not to transition to an outpatient thyroidectomy program is hypocalcemia. Given the proximity of the parathyroid glands and their blood supply to the capsule of the thyroid, even with meticulous, subcapsular dissection, a parathyroid can become compromised. If a parathyroid is found on the thyroid specimen, or if a parathyroid appears devascularized within the surgical field, autotransplantation is appropriate. At the end of an operation, a surgeon’s judgment regarding the viability of a parathyroid is not perfect. As a result, many surgeons advocate use of postoperative parathyroid hormone (PTH) measurement to predict the patients who are at a higher risk for developing hypocalcemia.23 Based on the PTH level, calcium and/or vitamin D is prescribed by protocol.24 Patients are weaned from calcium and vitamin D in the outpatient setting based on the patient’s report of symptoms.25,26 High-volume surgeons have decreased rates of hypocalcemia.6 Episodes of hypocalcemia can have nontrivial downstream effects and cause higher rates of readmission. Patients must be informed of the signs and symptoms of hypocalcemia to help ensure successful management of this issue as an outpatient. Patients need to understand the importance of taking their medications as prescribed. Patients also need to be aware of the early warning signs of hypocalcemia. By identifying the early signs of hypocalcemia, a patient can take additional calcium doses rather than waiting until the symptoms progress to a more dramatic level. An alternative strategy to address hypocalcemia is to have patients present for laboratory evaluation of calcium levels 3 to 4 days postoperatively. Calcium dosing can then be adjusted as needed based on the results.

An experienced anesthetist can help prevent complications in outpatient thyroidectomy. For a successful outcome, any increased arterial or venous pressure in the neck must be avoided. An anesthetist can prevent swings in the patient’s blood pressure, and, at the conclusion of the case, the anesthetist can provide a smooth extubation for the patient. A rough emergence from anesthesia, with bucking, coughing, or retching, can result in a significant increase in both arterial and venous pressure in the neck. This may dislodge clips, ties, or seals from previously controlled vessels, resulting in immediate hematoma. A smooth emergence from anesthesia, however, is more likely to result in stable control of blood pressure as patients are moved to the postoperative recovery unit.27 Preemptive use of antiemetics and avoidance of noxious gases or narcotics during the case can minimize the severity of postoperative nausea. Vomiting or retching in the recovery room can also result in venous hypertension in the
administration and nursing. Patients undergoing outpatient thyroidectomy programs requires a commitment not only from surgeons performing the procedure but also from hospital and nursing staff who will care for the patient and, as a result, the nursing staff who will care for the patient must be familiar with the procedure. Nurses should, therefore, be educated to recognize the signs and symptoms of a postoperative hematoma. And, nurses should be familiar with discharge instructions for patients. Nurses can reemphasize to patients the importance of taking medications as prescribed and review with patients the early warning signs of a postoperative complication, such as hypocalcemia. Although implementation of an outpatient thyroidectomy program requires a significant initial investment, hospitals stand to benefit greatly. With the adoption of any outpatient procedure, the total number of beds needed in a hospital for a day of operations will decrease. Cost savings associated with the decreased need for hospital beds are passed on to the hospital. In the early stages of outpatient thyroidectomy implementation, cost savings may be limited by the number of revisits and readmissions by patients. The revisit and readmission rates may be higher on initial adoption but should steadily decrease as the hospital and its staff become more accustomed to the procedure. Regardless, with reported revisit rates of 7% and readmission rates of 2%, revisit and readmission of a patient are a relatively rare event. Finally, data suggest that outpatient thyroidectomy can be successfully implemented at tertiary centres. However, the likely return on investment for a low-volume surgeon or center is unknown. In addition, the increased likelihood of complications in low-volume environments should give pause for implementation at any location other than high-volume centers with a high-volume surgeon. Complications can occur in any setting. Therefore, a 24-hour emergency department (ED) within distance to the patient is required. Ideally, the ED would be at the same institution as the operating surgeon. If a surgeon elects to perform outpatient thyroidectomy at a freestanding surgery center, it is imperative that the surgeon be affiliated with at least one of the neighboring hospitals to ensure continuity of care should the patient need unanticipated overnight observation or admission. The surgical team must also be able to advise patients should any questions or concerns arise. Many complications do not occur until several hours following outpatient thyroidectomy. As a result, the operating surgeon, or a knowledgeable representative, must have a means of communication by which they can interact with patients. For example, this can be a telephone or answering service. Patients must understand those symptoms that are emergent and should be reported immediately. Many hospitals now allow patients to communicate with physicians through the electronic medical record systems. Patients should not use the electronic medical record system for emergent contact.

Certainly, many hospital factors cannot be controlled. A large hospital in an urban setting may find the accrual of patients relatively simple. But a smaller rural hospital likely will find patient accrual more difficult. Despite plans to begin an outpatient thyroidectomy program, the population surrounding hospital may not support its implementation. A hospital performing few thyroidectomies on an annual basis is unlikely to benefit from the institution of outpatient thyroidectomy.

Factors Relating to Hospital Setting
Generally, high-volume centers have instituted outpatient thyroidectomy programs. The implementation of an outpatient thyroidectomy program requires a commitment not only from surgeons performing the procedure but also from hospital administration and nursing. Patients undergoing outpatient thyroidectomy will require a longer stay in the recovery unit and, as a result, the nursing staff who will care for the patient must be familiar with the procedure. Nurses should, therefore, be educated to recognize the signs and symptoms of a postoperative hematoma. And, nurses should be familiar with discharge instructions for patients. Nurses can reemphasize to patients the importance of taking medications as prescribed and review with patients the early warning signs of a postoperative complication, such as hypocalcemia.

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Factors Relating to Patient Selection
Aside from physician and hospital factors, practices also must account for a multitude of patient factors before offering outpatient thyroidectomy. If outpatient thyroidectomy may be safely offered to the patient, potential benefits are numerous. First, patients face a decreased risk of nosocomial infection and iatrogenic injuries. Second, patients may benefit financially with reduced insurance co-pays. Third, patients enjoy the benefit of an at-home recovery in a familiar setting. Finally, data show that outpatient thyroidectomy is not inferior to inpatient thyroidectomy. In fact, several studies have demonstrated a decreased rate of hospital acquired morbidity associated with outpatient thyroidectomy. However, confounding biases may explain these findings. Specifically, based on available information, it is not clear whether these findings are due to the particular patient population who is offered outpatient thyroidectomy or the procedure itself. The studies do not clearly differentiate between patients undergoing outpatient thyroidectomy versus patients undergoing traditional thyroidectomy and an associated inpatient stay.

A patient’s baseline health is a critical consideration. Most often, surgeons offer outpatient thyroidectomy to patients with one or fewer comorbidities. The American Thyroid Association’s published guidelines provide absolute and relative contraindications to outpatient thyroidectomy (Table 1). However, chronic obstructive pulmonary disease (COPD) is the only comorbidity predictive of complications. This becomes clear as COPD’s sequelae manifest. Moreover, increased rates of tobacco use inevitably lead to more cough and increased intrathoracic pressure.

Patient pathology is important in deciding whether to offer outpatient thyroidectomy. Benign conditions tend to make up
surgeons have been less likely to offer outpatient thyroidectomy to patients with malignant conditions when a lymph node dissection remains a possibility. The glands in malignant disease may be larger or have substernal extension. Larger thyroid glands have been shown to have an increased risk of bleeding.10 Graves’ disease is the least likely diagnosis to be treated with outpatient thyroidectomy. Graves’ glands have increased vascularity and perithyroidal inflammation. During surgery, these large glands require manipulation to increase exposure. This manipulation can increase hormone release causing greater risk of cardiovascular side effects.38 In addition, patients with Graves’ disease are at higher risk for issues with postoperative hypocalcemia which may require additional monitoring and intervention.39,40

All patients will have a baseline risk for complications from thyroidectomy. There are several factors that can increase a patient’s risk for incurring a complication. Hematoma formation can be exacerbated by several underlying conditions which must be taken into account. Respiratory diseases (e.g., COPD, tobacco use) may cause coughing. The subsequent increase in intrathoracic pressure is relayed to the neck and may cause previously sealed vessels to bleed. Patients may require anticoagulation due to other medical conditions as well. Use of anticoagulants is associated with higher rates of hematoma formation.10

Hypocalcemia is more prevalent in patients with certain comorbid conditions. Many patients with malignancy will require central neck dissections, putting them at greater risk of inadvertent parathyroid injury.41 Graves’ disease can lead to higher rates of hypocalcemia due to increased bone metabolism.40 Any deficiencies found preoperatively must be corrected. Patients who are noncompliant with supplementation and have vitamin D deficiency will be at risk for hypocalcemia. In addition, patients with previous gastric bypass or malabsorptive weight loss surgery may have an unrecognized hypocalcemia and vitamin D deficiency, which can be difficult to manage in the postoperative period.42

Recurrent laryngeal nerve injury is a dreaded complication of thyroidectomy. Patients with large goiters (with or without substernal extension) or malignant lesions are at greater risk of RLN injury.22 Preoperative laryngoscopy is necessary for any patient with signs or symptoms of RLN malfunction (voice change, hoarseness, or stridor). Being aware of whether a patient has a benign goiter or malignant lesion will allow the surgeon to develop the best approach and determine whether the patient remains a candidate for outpatient thyroidectomy.

Aside from patient medical factors, there are several socioeconomic factors that should also be considered. A patient will require conveyance to and from the hospital with a responsible party waiting to transport him or her home. A patient needs access to a reliable means of transportation back to the hospital should a complication arise at home. Those patients without reliable transportation, or who are without a stable living situation, may not be safe for outpatient thyroidectomy. These situations may more commonly occur among the lower socioeconomic classes. In addition, for those patients who travel great distances for medical care, a planned stay at a local hotel may be a safe alternative to an overnight hospital stay.

Patient education is a major factor in successful outpatient management. The patient should be educated about “what to expect” and “what to watch for.” This information must be explained in a manner the patient can understand and comprehend. The decision to offer or perform outpatient thyroidectomy may be affected by the patient’s underlying level of education. Language barriers can also pose a problem to patient education. Important nuances may be lost in translation, which may result in a patient’s misinterpretation of discharge instructions. Interpreters—whether physically present

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**Table 1.** Patient factors which may preclude the option of outpatient thyroidectomy.

| COMORBID CONDITIONS | SOCIOECONOMIC | PATHOLOGY |
|---------------------|---------------|-----------|
| Uncompensated cardiac or respiratory disease | Great distance from facility | Large goiter |
| Dialysis for renal failure | Lack of family/home support | Substernal goiter |
| Anticoagulant use | Lack of reliable transportation | Locally advanced cancer |
| Seizures | Barriers in communication/education | Difficult hemostasis |
| Severe anxiety | Patient preference | Difficult surgery with underlying Hashimoto’s or Graves’ disease |
| Obstructive sleep apnea | | |
| Hearing loss | | |
| Visual impairment | | |
| Mental impairment | | |
| Pregnancy | | |

Adapted from ATA (American Thyroid Association) Guidelines.35
or remote—must be available to enable communication between the staff and the patient. The patient must know what to expect and what to watch for following surgery to identify signs of impending complications.

Disparity exists in many fields of medicine. Low-volume surgeons are more likely to perform thyroid operations on patients from high health risk communities. Women and African Americans are affected disproportionately, and, unfortunately, this results in higher complication rates. Data from the National Surgical Quality Improvement Program (NSQIP) that most of the patients offered outpatient thyroidectomy have private insurance. The decision to offer outpatient thyroidectomy to a patient may be due to the patient’s higher socioeconomic stratum and closer proximity to tertiary centers in urban areas. However, the decision also may reflect a surgeon’s judgment due to the previously mentioned variables that may affect the patient’s ability to promptly obtain medical help in the event of a postoperative complication occurring at home. The surgeon may determine that if an individual faces difficulties in accessing the medical system, that patient would be better served with an overnight observation in the hospital. Likewise, a patient who lacks support at home may not be a good candidate for outpatient thyroidectomy.

### Discussion

Thyroid surgeons have noninferior patient outcomes and reduced costs from outpatient thyroidectomy. This success, however, may not translate to all surgeons, hospitals, or patients. When evaluating whether to implement an outpatient thyroidectomy program, a practice should consider a number of important factors including the team performing the procedure, the patient, and the hospital.

To develop a successful outpatient thyroidectomy program, a practice must assemble a qualified team capable of performing the procedure. Most importantly, the primary surgeon must have the necessary skills and training. She or he must be comfortable operating in the neck, perform a high volume of thyroidectomies on an annual basis, and employ the use of nerve monitoring and other techniques to reduce the likelihood of intraoperative complications.

The remainder of the team is essential to preventing and handling any postoperative complications. The anesthesia team should be familiar with the procedure to reduce the time a patient is under anesthesia and to prevent anesthetic-related complications that can result in airway edema or hemorrhage. Nursing staff should be educated to identify postoperative hematoma and hypocalcemia. The facility should have operating rooms and staff capable of speedy turnover to maximize throughput and limit delays. The facility also should be equipped with a 24-hour ED to handle any postoperative complications.

A practice also must evaluate its setting. Smaller hospitals serving less densely populated areas should carefully evaluate the cost of implementing an outpatient thyroidectomy program. These hospitals are unlikely to see a large throughput of patients who qualify for outpatient thyroidectomy and, as a result, they are unlikely to recover the cost of implementing an outpatient thyroidectomy program.

A practice also should give careful consideration to its patient population. Qualifying patients should be American Society of Anesthesiologists (ASA) 1 or 2, with isolated thyroid pathology. Surgeons should not attempt outpatient thyroidectomy on those patients with multiple medical conditions or poor functional status. The pathology should be limited to benign conditions without extremely large goiter and/or hyperthyroidism or small isolated malignant nodules. Those patients who have a more extensive medical history or who may require a more significant dissection will benefit from an inpatient stay postoperatively. In addition, those glands found to be hypervascular, which is often the case in hyperthyroidism, may be patients who would benefit from overnight observation as their risk for a postoperative hematoma is slightly higher.

Some controversy does exist within the literature regarding the qualifications of surgeons attempting outpatient thyroidectomy. Small studies have shown that outpatient thyroidectomy may be safe in lower volume hospitals with intermediate volume surgeons operating. However, even in those studies, it is acknowledged that the operating surgeon must maintain a sufficient case volume to feel comfortable performing this thyroidectomy on an outpatient basis. Moreover, outpatient thyroidectomy has not been recommended in all countries. Some international studies do not recommend outpatient thyroidectomy due to the risk of postoperative hematoma. Those studies point out that most postoperative hematomas do not develop until more than 6 hours after the operation and, as a result, overnight observation is mandatory. However, other studies have shown that a postoperative hematoma may occur several days post-operatively. This demonstrates that an inpatient observation period is not a panacea for postoperative hematoma identification prior to discharge. Moreover, the risk of a postoperative hematoma decreases significantly 24 hours after the procedure.

Ultimately, the decision to perform outpatient thyroidectomy must be made by the surgeon, hospital, and patient. With adequate operative experience and careful patient selection, hospitals and patients stand to benefit from total thyroidectomy as an outpatient procedure.

### Author Contributions

Conceived and designed the review: SO. Analyzed the literature: DB. Wrote the first draft of the manuscript: DB. Contributed to the writing of the manuscript: SO. Jointly developed the structure and arguments for the paper: SO and DB. Made critical revisions and approved the final version: SO. All authors reviewed an approved the final manuscript.
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