Ambulatory thyroid surgery: an audit of safety and outcomes

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ABSTRACT

Introduction: Elective hemithyroidectomy is a common operation with a low complication rate. The aim of this study was to conduct an audit on the safety and efficacy of ambulatory hemithyroidectomy in carefully-selected patients.

Methods: This is a cohort study of 114 patients who were scheduled to have either ambulatory (50 patients) or inpatient (64 patients) hemithyroidectomy over a two-year period. Selection for day case surgery was based on pre-established criteria and patient preference. Preoperative patient characteristics, indications for surgery, operative characteristics, histological diagnoses and surgical complications are compared.

Results: Of the 50 patients selected for day case surgery, 45 (90 percent) were discharged on the day of surgery. The complication rates of the two groups were similar. Two patients required admission for wound complications and the other three were admitted for non-medical reasons.

Conclusion: The overall complication rate was low. There were no differences in the rate of complications between ambulatory and inpatient hemithyroidectomies. Ambulatory hemithyroidectomy can be performed safely for a select group of patients in the setting of appropriate facility and management protocol.

Keywords: ambulatory surgery, day surgery, outpatient surgery, postoperative haemorrhage, thyroidectomy

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INTRODUCTION

In Singapore, the current practice for postoperative care of thyroidectomy patients is inpatient care. However, with better healthcare provision in all sectors, including nursing, anaesthesia, surgical care, emergency care, as well as improved technology facilitating telecommunication between patient and hospital, the opportunity for right siting of care can be revisited. Hemithyroidectomy is a common operation with low morbidity. Developments in post-surgical patient care and monitoring have enabled an increasing number of surgical operations to be carried out safely in a day surgery setting. These have resulted in improved patient satisfaction and cost savings. Likewise, there has been a move towards shorter stay for thyroid surgery. A report from 1991 documented experience with same day discharge for a range of thyroid surgeries (n = 76) from simple lobectomy to total thyroidectomy. Patients were discharged after a four- to eight-hour observation period with no complications requiring re-operation.[1]

In 1995, Mowschenson and Hodin reported on a study group of 61 ambulatory care patients with 39 inpatients who had undergone thyroid or parathyroid surgery in an ambulatory setting with a six- to eight-hour postoperative observation period.[2] There were no complications requiring readmission from the ambulatory care group, and there was an estimated 30% savings on hospital costs. In 1997, a protocol using "same-day" 23-hour postoperative observation (n = 71) suggested that this practice was safe and cost-effective.[3] The same year, a report on a large retrospective cohort of outpatient thyroidectomies (n = 869) from the Philippines supported these findings.[4] Similarly, reports from Italian institutions seemed to confirm the safety of one-day protocols for thyroid lobectomy[5,6] and total thyroidectomy.[7]

Nevertheless, it cannot be said that ambulatory thyroidectomy has become standard practice. The traditional practice is for inpatient postoperative monitoring, which allows for earlier detection and management of early postoperative complications. In our initial study of ambulatory thyroid surgery, hemithyroidectomy was chosen, as it is, in general, associated with a very low complication rate. This study was limited to patients undergoing primary hemithyroidectomy, i.e. without prior thyroid or neck surgery. Firstly, this would reduce the heterogeneity associated with different thyroid operations as the extent of surgery has implications on the incidence and type of postoperative complications. Secondly, this would exclude cases of completion of thyroid surgery. Finally,

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if ambulatory hemithyroidectomy was found to be comparable in safety and efficacy to standard inpatient management, this would facilitate the development of a protocol that could be applied to the majority of patients scheduled for this procedure.

METHODS

Patients scheduled for elective primary hemithyroidectomy at the Department of Otolaryngology – Head and Neck Surgery at the National University Hospital, Singapore between January 2004 and December 2005 were included in this study. Preoperative patient data included age, gender, history of previous thyroid surgery, indication for surgery, vocal cord examination via laryngoscopy, and biochemical measurement of thyroid status. Preoperative ultrasound imaging of the thyroid gland was performed in some patients. This provided objective details about the characteristics and size of the lesions.

Each patient was scheduled to have surgery either as an inpatient or in an ambulatory setting based on characteristics of the lesion (4 cm and below), the patient's fitness for surgery and postoperative family support. Exclusion criteria for ambulatory thyroidectomy included large retrosternal goitres, goitres causing tracheal obstruction or deviation, patients who were class three and above on the scale of the American Society of Anesthesiologists' Physical Class System (ASA), and patients who could not meet the general criteria for day surgery procedures.

All operations were performed by a team led by the same consultant surgeon. Surgical access was either via a standard central collar-line incision or via a lateral approach.[8] The recurrent laryngeal nerve was identified and preserved in all cases, unless it was obviously involved by tumour. Identification and preservation of the external branch of the superior laryngeal nerve was attempted in all operations. During each procedure, there was an attempt to identify and preserve both parathyroid glands. Autotransplantation of parathyroid tissue into the sternocleidomastoid muscle was performed if there was suspicion or evidence of disruption of parathyroid blood supply. Isthmusectomy was performed with coagulation diathermy; the divided isthmus was not sutured. In most cases, a small tube drain was sited at the thyroid bed and brought out through a separate stab incision. The drain was removed when less than 20 ml was collected in the preceding 24 hours. Skin closure was performed with subcuticular absorbable sutures.

Ambulatory patients were monitored in the Day Surgery Unit for at least six hours after completion of surgery. Patients were discharged after having been reviewed by the surgeon. Specific instructions were given to all patients to return to the hospital in the event of neck swelling or excessive drain bottle accumulation. The patient underwent a telephone follow-up on the first postoperative day to check for any complications. Patients were scheduled to return to the clinic for routine assessment and removal of surgical drain on the third postoperative day. Vocal cord examination via flexible nasendoscopy was performed for patients who reported postoperative voice changes. Statistical comparison between the inpatient and ambulatory groups for operative characteristics and postoperative complications was performed using the chi-square test for independent populations or the Fisher's exact test when the number of cases were less than five.

RESULTS

There were a total of 114 patients (91 female, 23 male) in this study. The mean age was 46 (standard deviation 13) years. Patients in the ambulatory group were significantly younger than those in the inpatient group. This was not unexpected as older patients were more likely to have

Table I. Preoperative characteristics of patients undergoing hemithyroidectomy.

	Inpatient n = 64	Day case n = 50
Mean age (years)*	51	41
Gender (%)		
Male	26.6	12.0
Female	73.4	88.0
Thyroid status (%)		
Euthyroid	96.8	98.0
Hypothyroid	1.6	2.0
Hyperthyroid	1.6	–

* p = 0.001

Table II. Indications for surgery.

	Inpatient (%)^ n = 64	Day case (%)^ n = 50
Suspicious FNA	22.8	20.0
Solitary nodule	26.6	30.0
Enlarging nodule	29.7	24.0
Retrosternal thyroid	4.7	–
Complex nodule	10.9	12.0
Recurrent cyst	1.6	–
Calcification in nodule	6.3	6.0
Change in voice	1.6	–
Compressive symptoms*	28.1	26.0
Dysphagia	10.9	10.0
Dyspnoea	7.8	2.0

* A compressive symptom was defined as discomfort due to the presence of goitre, ranging from globus sensation to dysphagia or dyspnoea; ^ The indications were not mutually exclusive, i.e. patients could have more than one reason for surgery, hence the total percentage exceeds 100%.

comorbidities and thus not meet the selection criteria for ambulatory surgery. 50 patients were scheduled as ambulatory cases, while 64 patients were inpatients. The patient characteristics in the ambulatory and inpatient groups are shown in Table I. The indications for surgery for both patient groups are shown in Table II. In the majority of patients, the indication for surgery was the inability to rule out malignancy based on clinical examination and other investigative modalities.

Almost all the patients were euthyroid prior to surgery. Ultrasonography was performed in 56% of inpatients and 62% of ambulatory patients. The average largest dimension of thyroid nodules based on preoperative ultrasonography was 29.6 mm and 32.6 mm for inpatients and ambulatory patients, respectively, with no statistical difference. There was one patient in each group with subclinical hypothyroidism, and one patient in the inpatient group who was on treatment for hyperthyroidism. The final histological diagnoses for the thyroid masses are shown in Table III. The operative characteristics of our patients are shown in Table IV. Five patients who had been scheduled for ambulatory operations were admitted as inpatients postoperatively. One of these patients was admitted for observation as she had early postoperative bleeding. The patient was brought back to the operating theatre for haemostasis of a small capsular terminal branch of the inferior thyroid artery. One other patient developed mild superficial bruising of the wound but was otherwise asymptomatic and did not require a return to the operating theatre. Three other patients requested admission for non-medical reasons.

Overall, there was no significant difference in the incidence of complications between the ambulatory and inpatient groups (Table V). Two of our patients (one from each group) developed haematoma in the early postoperative period and were taken back to the operating theatre for wound exploration and haemostasis. In both cases, symptoms and signs indicating this complication manifested within four hours of completion of surgery. Bleeding was from a small capsular terminal branch of the inferior thyroid artery in one patient (ambulatory group) and from the strap muscles in the other patient (inpatient group).

DISCUSSION

There have been scattered reports on the feasibility and safety of ambulatory thyroid surgery. This has been driven in part by a general move towards surgery in the

Table III. Histological findings of the excised specimens.

	Inpatient (%) n = 64	Day case (%) n = 50
Nodular goitre	73.4	82.0
Colloid cyst	7.8	–
Follicular adenoma	10.9	10
Follicular carcinoma	1.6	–
Papillary carcinoma	3.1	6.0
Graves' disease	1.6	–
Lymphocytic thyroiditis	1.6	2.0

Table IV. Operative characteristics.

	Inpatient (%) n = 64	Day case (%) n = 50
Lateral approach*	10.9	38.0
Identification of ESLN	42.2	52.0
Identification of parathyroid glands		
None	26.6	12.0
One	22.8	28.0
Two	51.6	60.0
Autotransplantation of parathyroid tissue	6.3	6.0
Thyroidectomy without drainage	10.9	20.0

* p = 0.001. The surgical approach was determined by the surgeon's preference; ESLN: external branch of the superior laryngeal nerve.

Table V. List of surgical complications.

	Inpatient (%) n = 64	Day case (%) n = 50
Wound haemorrhage	1.6[@]	2.0[~]
Recurrent laryngeal nerve palsy	1.6*	–
Superior laryngeal nerve palsy	1.6[#]	–
Voice changes		
Temporary	7.8	4.0
Permanent	1.6[#]	–
Hypocalcaemia	–	–
Wound infection	–	–
Scar hypertrophy or keloid	4.7	2.0
General complications	1.6^	–

[@] Bleeding from strap muscle.
[~] Bleeding from a small terminal branch of the inferior thyroid artery.
* temporary; the patient recovered within three months of surgery.
[#] permanent; the patient complained of persistent weakness of voice.
^ 50-year-old woman with postoperative acute myocardial infarct leading to multiorgan failure and demise.

ambulatory care setting for operations with low rates of complications, and where patients feel well enough to go home once they have recovered from general anaesthesia. An added economic advantage is the reduced cost to the patient and the healthcare provider. However, it is neither apparent if ambulatory thyroid surgery is widely accepted nor to what extent it is practised. Although the complication rate of hemithyroidectomy is low, when it does occur, the consequences can be serious. In particular, postoperative neck haematoma and bilateral vocal cord palsy can lead to devastating respiratory compromise, while hypocalcaemia may result in neurological sequelae. Since most patients with no pre-existing comorbidities can usually be discharged on the first postoperative day, the main reason for performing hemithyroidectomy in the inpatient setting is to monitor patients for the development of rare but potentially life-threatening complications.

The risk of these complications after hemithyroidectomy is low for appropriately selected patients. Our exclusion criteria for the outpatient hemithyroidectomy were targeted at addressing these concerns about safety. Patients in the ambulatory group were significantly younger. This was expected as older patients were more likely to have significant comorbidities, which precluded surgery being performed in the ambulatory setting. Routine preoperative vocal cord examination enabled the identification of patients with pre-existing vocal cord lesions. These patients were not offered surgery in the ambulatory setting because of the increased risk of glottic obstruction. Patients with previous thyroid or parathyroid surgery were also excluded from the ambulatory group in this study, as thyroid surgery in such patients may be associated with a greater risk of significant hypocalcaemia.[9] In relation to the concern regarding postoperative haematoma, postoperative monitoring was continued for at least six hours after completion of surgery to ensure the timely detection of this potentially life-threatening complication.

The rate of postoperative haematoma, voice and laryngeal nerve injury for the combined inpatient and ambulatory group were consistent with accepted norms. As expected, there were no cases of symptomatic hypocalcaemia postoperatively. Furthermore, using our protocol for selecting and managing patients undergoing outpatient hemithyroidectomy, we did not find any significant difference in the rate of complications between the ambulatory and inpatient groups. Two of our patients developed haematoma (one in each group) in the early postoperative period. The majority of postoperative haematoma occurs within the first few hours after surgery.[10] However, the timing of occurrence of postoperative haematoma can range from the immediate postoperative period to as late as five days after surgery.[11-13]

In a retrospective database study of 918 thyroidectomies and 350 parathyroidectomies, there were ten cases where re-operation was required for postoperative bleeding.[12] Of significant concern was the fact that the median and mean time between surgery and the occurrence of bleeding was 16 and 20 hours, respectively. Furthermore, eight of these patients did not have an identifiable preoperative risk factor that would have excluded them from ambulatory surgery. A similar study spanning 25 years and including 13,817 patients undergoing thyroid or parathyroid surgery identified 42 patients who required cervical re-exploration for symptomatic postoperative haematomas. Of these patients, only 18 (43%) presented within the first six hours after surgery, a further 16 (38%) presented after six hours but within 24 hours, and eight (19%) presented after 24 hours.[13]

More pertinent to the issue of safety in ambulatory thyroid surgery is the time to presentation for postoperative haematoma causing acute airway obstruction. The study by Burkey et al addresses this concern in their analysis of the subset of patients, who presented with respiratory distress, ranging from mild dyspnoea to acute airway obstruction.[13] There were nine patients presenting in extremis and the time from surgery to presentation varied from ten minutes to 16 hours. While it is not possible or practical to identify all cases of postoperative haematoma before patients are discharged, it would be prudent to consider a suitable duration for postoperative monitoring to identify serious postoperative complications, especially airway obstruction. The literature indicates that presentation with airway obstruction may occur 16 hours postoperatively, but to our knowledge, there is no data available on whether these patients, who presented with late developed sentinel symptoms and/or signs, could have been identified earlier.

However, for ambulatory hemithyroidectomy to become accepted, two criteria need to be met. Firstly, the rate of postoperative wound haematoma must be low. This should not be greater than one to two percent. Secondly, both patients and practitioners need to be convinced that serious and life-threatening postoperative complications can be identified and managed safely. For the latter condition to be met, postoperative monitoring must be adequately robust. While inpatient monitoring remains the accepted practice, an ambulatory care model that is equally safe is not inconceivable. Such a model would involve primarily two phases of care. The first phase involves a period of ward level monitoring and stringent discharge requirements to be satisfied. The second phase would involve continued monitoring of the patient after he has left hospital until the first follow-up visit.

In the move for the right siting of care, more work needs to be done before ambulatory thyroid surgery becomes an accepted alternative to inpatient care. With careful preoperative selection and a clearly-defined management protocol, a sizeable proportion of the patients may safely undergo hemithyroidectomy in an ambulatory setting. Patients who meet selection criteria should have thorough preoperative counselling, which includes discussion of the options and the implications of both inpatient and ambulatory surgeries.

In our restrospective case-control study, primary hemithyroidectomy was carried out safely in the ambulatory setting for a select group of patients. The incidence of postoperative complications was low and comparable in the ambulatory group and inpatient groups. The management of patients undergoing ambulatory hemithyroidectomy should therefore include a careful preoperative selection, appropriate patient and caregiver education, optimal postoperative monitoring in an adequately set-up ambulatory care facility, and clearly-defined protocols for management of patients who have postoperative difficulties.

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