

## Original Article

# Study of Safety of Short-stay Thyroid Surgery

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### *Abstract*

Following surgical procedures, the duration of hospital stay has undergone a significant reduction in recent years. However, there are some risks associated with short-stay thyroid surgery. An analysis has been made of data from patients who underwent short-stay thyroid surgery, analyzing the complications associated with this procedure. Overall 70 consecutive patients undergoing thyroidectomy in 2009 and 2010 were prospectively analyzed. Post-operative care included routine ward overnight observation. The discharge criteria were: stable vital signs; afebrile; no wound or airway problems; tolerating diet; and established autonomy at discharge. Data were collected regarding patients' discharge criteria status, length of hospital stay and readmission, as well as morbidity (post-operative haemorrhage, recurrent laryngeal nerve injury and hypocalcaemia) and mortality. This series comprised 30 total thyroidectomies, 38 hemi-thyroidectomies and 2 isthmusectomies. No cases of death or post-operative haemorrhage occurred in any of these patients. Permanent unilateral recurrent laryngeal nerve injury was observed in 1 patient (1.42%). Transient post-operative hypocalcaemia occurred in 6 patients, whereas permanent post-operative hypocalcaemia was observed in 2 patients (2.85%); 2 patients were re-admitted and required early calcium supplementation. Five patients failed to tolerate the diet during the immediate post-operative period. The average duration of hospital stay was 1.02 days. Considering the 2 patients who required re-admission due to hypocalcaemia, the total length of hospital stay was 1.05 days. In conclusion, the one-day surgery model is safe and effective in patients undergoing surgery for thyroid disorders.

**Keywords:** Thyroidectomy, Length of hospital stay, Post-operative complications, Post-operative haemorrhage, Hypocalcaemia, Post-operative pain

### **Introduction**

The duration of hospital stay, following surgical procedures, has decreased significantly in recent years<sup>1</sup>. Traditionally, patients undergoing thyroid surgery are observed for up to 72 h before discharge<sup>2</sup>. During the last 10 years, short-stay thyroid surgery (< 24 h hospital stay) has been performed and reported in the literature as safe and cost-effective<sup>2-6</sup>.

The benefits of this practice include reduced costs, reduced in-patient waiting lists, increased availability of in-patient beds, reduced post-operative complications and the psychological benefit of avoiding prolonged hospitalisation<sup>1</sup>.

However, there are some risks associated with short-stay thyroid surgery and it must be thoroughly addressed to guarantee patient safety. The complications related to thyroid surgery include hypocalcaemia, bleeding and haematoma

formation, recurrent laryngeal nerve injury, superior laryngeal nerve injury, dysphagia, wound infection, poor wound healing, impossibility to urinate and pain<sup>7</sup>.

Aim of this study was to review the data of patients who underwent short-stay thyroid surgery in our Department, analysing the complications associated with this procedure.

### **Methods**

All patients underwent partial or total thyroidectomy under general anaesthesia. Thyroidectomy consisted of the traditional operation through standard cervicotomy approach. Suction drains were routinely placed. Post-operative care included routine overnight ward observation. Patients were administered antiemetic agents in the operating room. Diets

were advanced, as tolerated, during the immediate post-operative day. Postoperative laboratory values were not collected after operation as routine. All patients were evaluated the same evening and the next morning according to the following discharge criteria: stable vital signs; afebrile; no wound or airway problems; tolerating diet; and established autonomy at discharge, possession of a telephone, suitable home accommodation and adequate home support upon discharge. Patients not meeting these criteria remained in hospital. All patients and relatives received extensive written and verbal pre-operative and post-operative instructions as well as clear information and explanations in the hospital, delivered by the multidisciplinary team of surgeons and nurses, including risks and benefits associated with shortening of hospital stay, wound management, post-operative pain, and signs and symptoms associated with possible complications. Discharged patients were asked to keep the team informed about any discomfort occurring at home.

Regional advanced malignancies, with presence of metastases in the lateral compartment, were considered exclusion criteria. A total of 70 consecutive patients 52 (74.28%) female, 18 (25.7%) male; mean age 43 years; range: 18-67 years; undergoing thyroidectomy, in 2009 and 2010, at Dhaka National Medical College & Hospital were included in this prospective analysis.

Pre-admission clinic enrollment allowed assessment of pre-operative laboratory values for serum ionic calcium and recorded videolaryngoscopic evaluation of recurrent laryngeal nerve function. Laryngeal nerve injury was defined permanent if it persisted > 9 months after surgery. Collection of post-operative data included post-operative laboratory values for serum ionic calcium at 48 hours, if the patient presented any symptom and 1 month as routine. Patients were not considered at such risk if at least 3 parathyroid glands were identified and visually preserved in cases undergoing total thyroidectomy. Also the patients who underwent hemi-thyroidectomy were not considered at risk of hypo-parathyroidism, Serum calcium levels were measured in all patients at risk of hypoparathyroidism, on the second post-operative day after discharge. Besides providing patients with detailed information from specialized staff, oral calcium prophylaxis (calcium carbonate therapy) was administered in patients at risk of hypo-parathyroidism. Treatment was prolonged for as long as necessary and progressively reduced until complete

withdrawal, depending on the calcium levels observed at scheduled blood tests.

Data were recorded regarding criteria status of patients upon discharge, length of hospital stay and readmission, and morbidity (post-operative haemorrhage, recurrent laryngeal nerve injury and hypocalcaemia) and mortality.

### Results

Overall, 70 patients underwent thyroidectomy, in this study, with no deaths (0%). Of these, 30 were total thyroidectomies, 38 hemi-thyroidectomies and 2 isthmectomies. The pathological evaluation revealed: multinodular goitre in 20 patients; uni-nodular goitre in 25; Graves' disease in 3; papillary carcinoma in 15; follicular carcinomas in 5; medullar carcinomas in 1; and Hashimoto's thyroiditis in one. The suction drain was maintained for an extra day in 13 patients. As it was not considered a criterion for remaining in hospital, the drain was removed in the office, after discharge.

Post-operative haemorrhage with compromised airway did not occur in any patient (0%). Thus, surgical evacuation of the haematoma was not required. Permanent unilateral recurrent laryngeal nerve injury was observed in 1 patient (1.42%). This 1 patient had both recurrent laryngeal nerves, identified and preserved during the operation, but intense surgical manipulation of the nerves was necessary. At 9 months, the traction injuries of the nerves had not been resolved.

For all 40 patients who underwent partial thyroidectomy, pre-operative serum ionic calcium values were normal and the patients were asymptomatic when discharged. Transient post-operative hypocalcaemia occurred in 6 patients, whereas permanent post-operative hypocalcaemia was observed in 2 patients (2.85%). All 8 patients with post-operative hypocalcaemia underwent total thyroidectomy; as 5 patients in this group were considered at risk for hypoparathyroidism, they were discharged with immediate oral calcium supplementation and remained asymptomatic. The other 3 patients presented symptomatic hypocalcaemia: 2 patients received both intravenous and oral calcium supplementation and could be managed as outpatients, whereas 1 patient was re-admitted and required early calcium supplementation. They came into hospital for 1 to 3 additional days and were asymptomatic upon discharge, receiving oral calcium supplementation and with ionic calcium close to the normal rates. None of these patients subsequently presented signs of hypocalcaemia. Overall morbidity and mortality data are outlined in Table-I.

**Table I**

Mortality and morbidity data (n = 70).

| Mortality and morbidity data(n=70)         | N | %    |
|--|---|------|
| Mortality                                  | 0 | 0    |
| Post-operative haemorrhage                 | 0 | 0    |
| Permanent recurrent laryngeal nerve injury | 1 | 1.42 |
| Transient post-operative hypocalcaemia     | 6 | 8.57 |
| Permanent hypo-parathyroidism              | 2 | 2.85 |

**Discharge criteria**

Of the 70 patients studied, 68 (97.1%) met the established discharge criteria while 2 patients failed the discharge criteria as they could not tolerate the diet during the immediate post-operative period. They required an additional day in hospital. All symptomatic patients with post-operative hypo-calcaemia presented the symptoms from the 2<sup>nd</sup> to the 7<sup>th</sup> post-operative day. Details regarding outcomes for each of the specific discharge criteria, for this study group, are outlined in TableII.

**Table II**

Patients' outcome (n = 70).

| Patients outcome(n-70)                         | N  | %     |
|--|----|-------|
| Criteria                                       |    |       |
| Stable vital sign                              | 70 | 100   |
| Apyretic                                       | 70 | 100   |
| No wound problems                              | 70 | 100   |
| No airway problems                             | 70 | 100   |
| Tolerating diet                                | 68 | 97.14 |
| Ambulating and capable of self-care activities | 70 | 100   |
| Re-admission                                   | 1  | 1.41  |

The mean duration of hospital stay for patients undergoing thyroidectomy was 1.02 days. The 68 patients (97.1%) were discharged in the morning of post-operative day 1. As far as concerns the 1 patient who required readmission due to hypocalcaemia, the overall duration of hospitalisation was 1.05 days.

**Other Sections ▼**

**Discussion**

The duration of hospital stay, following surgical procedures, has decreased significantly, in recent years. The benefits of this practice include reduced costs, reduced in-patient waiting lists, increased availability of in-patient beds, reduced post-operative complications and the psychological benefit of avoiding prolonged hospitalization <sup>1</sup>.

Usually, patients undergoing thyroid surgery are observed for up to 72 hours before discharge <sup>2</sup>. Steckler was the first to report on the feasibility of out-patient thyroid surgery, concluding that it was both safe and cost effective <sup>8</sup>. Length of stay has progressively decreased from several nights to a post-operative course of less than 6 hours, in some cases <sup>7</sup>.

Short-stay thyroid surgery (< 24 hours hospital stay) has been performed and reported in the literature as safe and cost-effective <sup>5 6 9 10</sup>, and it is becoming increasingly popular. However, some potentially lethal complications are considered strong arguments against reducing hospitalization time after thyroidectomy <sup>9</sup>. In fact, patient safety is central to thyroidectomy <sup>3</sup>. Knowledge of possible complications and when they can occur is important to determine how long the patient will need to remain before discharge.

The complications associated with thyroid surgery occur both with inpatient and outpatient surgery, but the time frame for monitoring is reduced in the outpatient setting. This time frame focuses special attention on hypocalcaemia and formation of haematoma <sup>7</sup>.

Significant morbidity, following thyroidectomy is uncommon, and occurs in less than 6% of cases <sup>10</sup>. The most serious complication related to thyroid surgery is post-operative haemorrhage with the potential for tracheal compression, airway involvement, and death. Immediate or early haemorrhage occurs in less than 1% to 2% of cases <sup>7</sup>.

The main factor limiting endorsement of outpatient surgery is the unknown and unpredictable rate of post-operative haematoma and possibility of subsequent respiratory distress <sup>1</sup>. The rate of post-operative bleeding, with formation of a haematoma has been reported to be 0.1-4.3% with the rate for symptomatic haematomas being 0.1- 1% <sup>11</sup>. The use of drains and the time frame for observation are changing <sup>7</sup>.

Schwartz et al. reviewed post-operative bleeding in patients who had undergone thyroidectomy, and they described a critical period of time in which bleeding occurs most commonly (in all cases the potential for airway compromise was identified within 4 hours of surgery) <sup>2</sup>.

It has been shown that late haematomas (> 24 hours) occurred only in patients submitted to resection of substernal goitres and who had cardiac co-morbidity that required anti-coagulation/anti-platelet therapy <sup>10</sup>. In another study, it was observed that most of the “late haematomas” were superficial (above the strap muscles) and these were treated conservatively <sup>9</sup>. Thus, the major life-threatening

complications of haemorrhage and airway compromise are uncommon with modern, meticulous surgical techniques and when they do occur, they do so during the early postoperative period (12 to 20 hours)<sup>3</sup>.

Post-operative drains allow passive or active withdrawal of post-operative haemorrhage. However, they cannot be considered a substitute for meticulous surgical dissection and haemostasis, and may predispose to post-operative infection<sup>1</sup>. Hypocalcaemia is the most common risk factor following total thyroidectomy and has traditionally represented a barrier to outpatient surgery<sup>2</sup>. In our service, the use of calcium without symptoms is not a routine.

Most cases of post-operative hypocalcaemia occur within 72 hours of surgery, and most develop signs more rapidly<sup>1</sup>. It has been shown that the readmission rate (0.1%) and conversion rate (0.6%) for hypocalcaemia is quite low<sup>2</sup> and is comparable to findings in our patients.

The infrequent need for calcium supplementation (about 2%) suggests that routine oral calcium supplementation not only is not indicated but is also not cost-effective<sup>3</sup>. The incidence of specific complications following thyroidectomy is reported, in the literature, as very low, especially in specialized centres and, in particular, when surgery is performed for benign disease or malignancies that are not locally advanced<sup>1 7 9 10</sup>. These complications occur within a relatively short time after the operation, usually within 24 hours<sup>2</sup> and they can be rapidly identified (vacuum drainage, serum calcium sampling, indirect laryngoscopy). Therefore, a short (< 24 hours) but adequate observation time after surgery can reduce, to near zero, the risk of erroneously discharging patients undergoing thyroidectomy<sup>2</sup>.

Many patients may experience nausea and vomiting, voiding difficulties, and post-operative pain following thyroid surgery<sup>1</sup>. In our routine practice, the patient must have had some ingestion to be discharged. Some criteria can be used for discharging patients following thyroidectomy, such as stable vital signs, no wound or airway problems, tolerating diet, ambulating and capable of home and selfcare activities and rising post-operative three-point serum calcium curve<sup>3</sup>. All these items, except the calcium curve, are used in our Service. Materazzi et al.<sup>2</sup> have developed a scrupulous selection protocol to select patients for short-stay thyroidectomy. Anaesthesia criteria include age 10-85 years, American Society of Anesthesiologists class I or II, a low intubation score, and body mass index (BMI) less than 32 kg/ m<sup>2</sup>.

Surgical criteria include primary neck surgery, being euthyroid, gland size less than 80 ml, and no locally advanced malignancies or intra-thoracic goitres. Social criteria considered are autonomy post-discharge, possession of a telephone, suitable living situation, and adequate home support<sup>2</sup>. Use of criteria guidelines such as these may help select patients at low risk of complications<sup>7</sup>.

Suitable patient education pre- and post-operatively as well as scrupulous patient selection are of paramount importance<sup>1</sup>. Managing complications can be made easier by patient education. Explaining signs of complications, providing handouts, and providing patients with the ability to reach a physician or representatives, 24 hours a day, may help to detect potentially life-threatening complications in time to intervene<sup>2 7</sup>.

Some new techniques and technology can be usefully employed to perform surgery. Minimally invasive surgery, harmonic scalpel and nerve monitoring can decrease not only the dissection but also the surgical time required. These new techniques may lead to even lower complication rates, but this cannot be confirmed until a large trial examining the impact of these variables is conducted<sup>7</sup>. Furthermore, these techniques can help but are not essential for the outcome. One-day surgery for thyroid disease is safe, effective, and well received by patients and relatives; it might easily substitute standard hospitalization (48 hours) in a considerable percentage of patients undergoing thyroid surgery<sup>2</sup>.

## Conclusions

The results of this study confirm that the one-day surgery model is safe and effective in patients undergoing surgery for thyroid disease. Complication rates following shortstay thyroid surgery appear safely manageable. With increasing surgeon experience and improved patient education and selection, we are of the opinion that this approach can be considered truly safe. Hypocalcaemia is the most well known barrier to short-stay thyroidectomy.

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