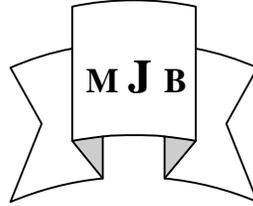


Short Stay Surgery; The Future For Total /Near Total Thyroidectomy

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Abstract

Objective: We propose a regimen for safe and cost-effective short-stay hospitalization following total/near-total thyroidectomy.

Patients and Methods: 127 total/near-total thyroidectomies between 2006 and 2009 were studied to test our short-stay thyroidectomy regimen. Patients were admitted the day of operation and observed overnight. Serum calcium values were obtained at 8, and 20 hours after operation. 23 hour discharge criteria included - stable vital signs, no wound or airway problems, up sloping serum calcium curve, and tolerance of normal diet and activity and availability of the close relative.

Results: Of 127 patients underwent total/near-total thyroidectomy, 116 (%) met 23-hour discharge criteria. No deaths (0 %) occurred. Overall morbidity 9 patients (7.08%) included four patients (3.14%) with transient hypocalcaemia, two patients (1.56%) with transient recurrent laryngeal nerve palsy, one patient (0.78%) with postoperative hemorrhage, one patient (0.78%) developed postoperative angina and another one (0.78%) developed Postoperative bronchospasm in asthmatic patient. Two (1.56%) patients didn't have the Capability of home self-care activities, or didn't have the close relative at home to take care of them.

Conclusion: Significant airway obstruction and wound hematoma rarely developed beyond the first 12 to 18 hours after total /near total thyroidectomy so the practice of 23 hrs short stay thyroid surgery is safe .

Serial serum calcium determinations used to construct a two-point calcium curve within 20 hours after operation can reliably and safely identify patients at risk to have clinically significant hypocalcaemia.

الخلاصة

الهدف من هذه الدراسة هو اقتراح وضع نظام أمين وفعال من حيث التكلفة للبقاء القصير الأمد في المستشفى لعمليات الاستئصال الكامل والشبة الكامل للغدة الدرقية. ضمت هذه الدراسة 127 مريضا للفترة بين عامي 2006 و 2009.

تضمنت معايير التصريف خلال الـ 23 ساعة: الفعاليات الحيوية مستقرة، لا توجد مشاكل في الجرح أو في التنفس، زيادة منحنى مائل مصلى الكالسيوم، يستطيع تناول الغذاء والنشاط العادي وتوافر قريب له. وكانت النتائج 116 مريضا التقى معايير التصريف. لم تحدث وفيات. 9 مرضى عانوا من الاعتلال المرضي (7.08%) أربعة منهم (3.14%) عانوا من نقص كلس الدم المؤقت، اثنان (1.56%) من المرضى أصيبوا بشلل العصب الراجع الحنجري المؤقت، واحد (0.78%) من المرضى أصيب بالنزف بعد

العملية ,واحد من (0.78 %) المرضى أصيب بالذبحة الصدرية غير المستقرة وآخر (0.78 %) عانى من ضيق التنفس نتيجة الربو القصبي.

اثنين (1.56 %) من المرضى لم يكن لديهم قدرة الرعاية الذاتية ، أو ليس لديهم قريب في البيت للاعتناء بهم. الاستنتاجات:- مشاكل مجرى التنفس والتجمع الدموي في الجرح نادرا ما تحدث بعد مرور 12-18 ساعة بعد عملية استئصال الغدة الدرقية الكامل أو شبه الكامل لذلك فان تطبيق البقاء القصير الأمد في المستشفى(أقل من 23 ساعة) يعتبر أمينا.

قراءتي منحنى فحص الكالسيوم في المصل خلال فترة عشرين ساعة بعد العملية يعول عليها و تعتبر أمنة وتميز المرضى المعرضين لاحتمالية نقص الكالسيوم المؤثر في الدم

Introduction

The duration of hospital stay following surgical procedures has undergone significant reduction in recent years. Depending on the type of surgery and the suitability of the patient, 'short-stay surgery' (surgery followed by overnight observation with discharge the following morning; typically stay duration ≤ 23 h) are now undertaken for a growing list of surgical procedures.[1] The benefits of this practice includes reduced costs, reduced inpatient waiting lists, increased availability of inpatient beds, and reduced postoperative complications and the psychological benefit of avoiding prolonged hospitalization.[2]

While initially considered only for simple procedures such as haemorrhoidectomy and herniorrhaphy, ambulatory surgery has now expanded to include more complex procedures like cholecystectomy and appendectomy, with excellent outcomes. The idea of performing short stay thyroid surgery or even day case surgery have become increasingly popular in recent years with several authors publishing large prospective series demonstrating the safety and potential benefits of this approach.

In many centers in the world, patients undergoing thyroid surgery were

traditionally observed for 72 h or longer, to safeguard against potentially catastrophic complications such as postoperative bleeding (with resultant airway compression), hypocalcaemia and recurrent laryngeal nerve injury.[3] In recent years the length of hospital stay has seen significant reduction. Those in favour of a shift towards short-stay thyroid surgery argue that this can reduce hospital costs and propose that with dedicated day units, thorough patient and carer education, improvements in anaesthesia and anti-emesis and significant advances in the early identification of complications, this can be achieved without compromising patient safety.[4]

Patient safety is central to thyroidectomy care. Objectives of total/near-total thyroidectomy care are to prevent or detect the incidence of serious complications and enhance the patient's overall recovery. What are the nature, incidence, and time distribution of complications driving our thyroidectomy care?

Significant morbidity after thyroidectomy occurs in less than 4% of cases.[5] The most serious complication of thyroid surgery is postoperative hemorrhage with the potential for tracheal compression, airway compromise, and death. If a life-threatening postoperative hemorrhage occurs, it is usually within

the first 12 to 18 hours after operation[6,7] Respiratory compromise can also result from vocal cord paralysis or laryngeal edema.[8]

The reported incidence of hypoparathyroidism after total thyroidectomy is highly variable (range, 2% to 33%).[6] because hypocalcaemia may first present as tetany or convulsions, the need to identify patients with hypocalcaemia before clinical sequelae has prompted routine serum calcium evaluations every 8 hours after thyroidectomy[9].

Patients and Methods

From January 1st, 2006 to April, 2009, 127 consecutive patients at Hilla teaching hospitals were included in this prospective study underwent Total/near total Thyroidectomy for treatment of various thyroid diseases by two surgeons. All patients were scheduled for Total/near total thyroidectomy short stay hospitalization regimen underwent outpatients preadmission to allow same day surgery admission. Preadmission clinic enrollment allowed baseline data collection for demography, preoperative laboratory evaluation for serum calcium and albumin and preoperative evaluation of the recurrent laryngeal nerve function.

In the operative technique, we did incomplete closure, or interrupted closure of the strap muscles which would give significant benefits in the early detection of postoperative bleeding. We also tried to visualize all parathyroid gland at operation and preservation of their blood supply by ligating the inferior thyroid artery nearer to the thyroid gland, manipulating the parathyroid glands as less as possible. In our policy, we tried to do near-total thyroidectomy more

frequent than total thyroidectomy which consisted of total lobectomy for the lobe having the dominant nodule, with isthmectomy and near-total lobectomy in the contra lateral side, leaving a small quantity of about 2 g of thyroid tissue adjacent to the parathyroid glands and their blood supply.[10] Drains were placed in all cases.

postoperative data collection included postoperative laboratory values for serum calcium and albumin at 8, and 20 hours and after one week if there is an up sloping serum calcium level, And daily if indicated by a downward trend of serum calcium level

Postoperative care included routine ward overnight observation .No special airway adjuncts or intravenous calcium ampoules were maintained at the bedside .Patients were administered antinausea agents in the ward and are ambulated and allowed oral diet at the same day of the operation.

A postoperative serum calcium curve was constructed for each patient on the basis of their serial corrected serum calcium values:

Corrected serum calcium = serum calcium + {(4.0-serum albumin) ×0.8}9

All patients were evaluated at 23 hours post operatively according to the discharging criteria listed below.

Stable vital signs, no wound or airway problems, capability of home self-care activities and the availability of close relative, up sloping postoperative two-point serum calcium curve and tolerating diet

Patients failing these criteria remained in the hospital.

Patients meeting these 23-hours discharge criteria were released with outpatients follow up at 1 week.

Results

From January 2006 to April 2009, 127 patients underwent thyroidectomy for a variety of pathologies with a view to safe discharge ≤ 23 h after surgery. The mean age of the patients was 41.5 years (range 17 -73). 106 (83.4 %) of the patients were females and 21 (16.6 %) of the patients were males,

This group placed on serial measurement of serum calcium levels preoperative and postoperatively (at 8, and 20 h after surgery) as a predictor of safe early discharge. 23 hours discharge criteria included no wound or airway problems, stable vital signs, tolerance of normal diet and activity, and an up sloping serum calcium curve. Of 127 patients underwent total/near-total thyroidectomy, 116 (91.4 %) met 23-h discharge criteria.

All patients were successfully discharged ≤ 23 h after surgery with no major complications or deaths. No patient developed complications that required re-admission or re-operation.

11 patients (8.6 %) failed the criteria (Table1)

Four cases of transient hypocalcaemia developed in our study ,Those patient had all four parathyroid glands identified and preserved at operation, but they failed the up sloping serum calcium curve test at 20 hours after operation and required early calcium supplementation.

No permanent hypocalcaemia was noted in our study.

For all 127 patients who underwent total/near-total thyroidectomy, preoperative serum calcium values were normal (range, 8.1 to 9.4.mg/dl).

Postoperative serum calcium values for most patients fell, reaching lowest point at the 8-hour collection point and then achieving an upward trend by the 20-hour point. At 1 week most serum calcium values had achieved baseline normal levels. Table (2) presents the serial serum calcium determination data in relation to the time when were taken

Preoperative serum calcium with the two-points serum calcium curves were constructed for each patient and examined for the direction of the curve slope at the 20-hour point. 123 (96.8%) of 127 patients exhibited up sloping postoperative serum calcium curves at 20 hours after operation similar to the aggregate postoperative calcium curve. None of those patients subsequently had hypocalcaemia problems. On further evaluation at 1 week after operation all patients had normal calcium values (range, 8.0 to 9.2 mg/dl).

Four patients (3.2%) developed symptomatic hypocalcaemia. in retrospect; those had failed 23-hour discharge criteria. Their postoperative serum calcium curve was down sloping and they required three additional days in the hospital because of the requirement for the calcium supplementation. All are transient and they developed symptoms within the first two postoperative days and treated accordingly with intravenous calcium and then orally .The figure 1 shows the aggregate of pre and postoperative calcium curve.

Two cases (1.6%) developed transient recurrent laryngeal nerve palsy. One of those patients had thyroid tumour and the other had recurrent goiter, those patients had both recurrent laryngeal nerves identified and preserved at operation and recovered within few

weeks and documented by otorhinolaryngologist .

One case developed haematoma formation (0.78%) in a patient of recurrent big multinodular goiter that required a muscle cutting and need an exploration.

One of the cases (0.78%) developed unstable angina post operatively that require an admission to the CCU and required anticoagulation/antiplatelet therapy and developed wound haematoma and then seroma which was treated conservatively.

Last one which didn't meet the discharging criteria, she was a known case of chronic obstructive airway disease (bronchial asthma) and developed a bronchospasm postoperatively that required another day in the hospital. Table (3) shows the Morbidity and mortality data.

Discussion

In 1986, Steckler was the first to report on the feasibility of outpatient and short stay thyroid surgery, concluding that it was both safe and cost effective.[11] Those who argue against routine outpatient thyroid surgery, while aware of the potential hospital cost savings, maintain that this should not be at the expense of patient safety.[6]

Postoperative haemorrhage is the main concern for any thyroid surgeon, having the tendency to lead to rapid airway compromise, hypoxia and death. Those who disagree with short-stay thyroid surgery argue that with the potentially devastating consequences of a postoperative bleeding, patients should be observed for longer in the hospital to minimize this risks [3], but there are critical period of time in

which bleeding occurs most commonly from 12 to 18 hours after operation, So we chose 23 hours for discharge because we didn't want to miss that because Safety was our first concern.

The extent and method of strap muscle closure appeared to impact on the capacity of the haematoma to cause respiratory compromise. Incomplete closure of the lower strap muscles would allow any bleeding to be detected early in the postoperative period as blood could easily decompress into the subcutaneous space. This would mean that significantly more bleeding would be required to cause tracheal compression.[12] As operative techniques were modified in short-stay surgery (strap muscle closure), it is perhaps unsurprising that no significant difference has been noted in the occurrence of this complication in short-stay vs. conventional longer stay surgery.[4] Postoperative drains allow passive or active withdrawal of postoperative haemorrhage, which could compress the trachea and thus produce respiratory compromise.7 Those who reject the routine use of drains following thyroid surgery suggest that they are no substitute for meticulous operative dissection and haemostasis, and may predispose to postoperative infection.[2]

Drains were routinely used in all procedures in addition to the meticulous operative dissection and good haemostasis. In addition to the careful observation of patients in the recovery room and early management of any apparent neck swellings would avoid serious airway compromise-ation.[13]

In our study one patient developed haematoma, which was apparent within 6 h of the surgery .This patient had undergone extensive procedures

(resection of recurrent big multinodular goiters which needed muscle cutting and exploration was required, and we found that the bleeder was subcutaneously at the site of the drain and no bleeding found in the remaining thyroid tissues. Therefore Surgeons should be very cautious when achieving haemostasis in patients who are being operated on a short stay basis.[14]

Postoperative hypocalcaemia unlike haemorrhage or recurrent laryngeal nerve damage which can often be identified at surgery or early in the postoperative period, symptomatic hypocalcaemia can take much longer time to manifest itself. This is likely to preclude early discharge, and is thought to develop as a result of several factors including parathyroid devascularisation, injury, and unintentional removal during dissection.[9] Significant hypocalcaemia was defined clinically. We didn't want to discharge a patient to be later on readmitted with tetany or convulsions. The literature has shown that a patient's first presenting sign of hypocalcaemia may be either tetany or convulsions.[15,16] We tried to develop a reliable method for identifying those patients at risk for hypocalcaemia on the basis of systematic laboratory studies. So we did the two data points to construct the two-point calcium curve, which was a reliable predictor of safety. In our study we would like to do the same study using ionized calcium instead of having to do a correction based on serum calcium and albumin levels but ionized calcium determinations were not available at our hospitals.

At the same time, what we found most helpful is visualizing parathyroid tissue at operation and leaving the operating room knowing that viable parathyroid glands are present in the neck. What

we had found was that those patients in whom hypoparathyroidism developed all had required surgical manipulation of the parathyroid glands.

We advocate verbal communication and patient education regarding symptoms of hypocalcaemia, and prescribes postoperative calcium supplements to patients should they become symptomatic.

Recurrent laryngeal nerve injury is an infrequent but potentially serious complication of thyroid surgery.

Exclusion criteria from short stay thyroid surgery included significant comorbidity, and those whose social circumstances were not favorable to short stay thyroid surgery. [1,17]

In our study two patients had comorbid diseases, one of them had unstable angina and the other had a bronchospasm in a known asthmatic patient and two cases their social circumstances were not favorable for short stay thyroid surgery.

All patients must be obedient, well motivated and have the nature of the surgery and its potential complications carefully explained. The person responsible for taking care for the patient postoperatively must also be fully aware of these issues

Patient satisfaction to short-stay thyroid surgery is of fundamental importance in the provision of satisfactory healthcare.[18,19]

In our study, none expressed any displeasure with regards to early discharge with their experiences of short stay thyroid surgery.

There is increasing evidence that patient outcomes correlate with surgeon experience, and improved outcomes are obtained when surgeons

subspecialties in their field and achieve high-volume surgery. [20]

Conclusion

Significant airway and wound hematoma rarely developed beyond the first 12 to 18 hours after total /near total thyroidectomy so the practice of 23 hrs short stay thyroid surgery is safe .

Serial serum calcium determinations used to construct a two-point calcium curve within 20 hours after operation can reliably and safely identify patients at risk to have clinically significant hypocalcaemia.

No patient with a perioperative complication escaped detection by the total/near-total thyroidectomy regimen tested.

Table 1 Shows 23 hours discharge criteria for total/near total thyroidectomy:

Criteria	Criteria met		Criteria failed	
	Count	Percentage	Count	Percentage
Stable vital signs	125	(98.4)	2	(1.6)
No wound or airway				
Up sloping postoperative two-point serum	123	(96.8)	4	(3.2)
Capability of home self-care	125	98.4)(2	(1.6)
	127	(100)	0	0.0)(
23-hr discharge criteria	116	(91.4)	11	(8.6)

Table 2 Presents the serial serum calcium determination data in relation to the time when were taken.

Time of calcium collection	Median value	Range
Preoperative	8.7	8.1-9.4
8 hr after operation	7.8	7.5-8.2
20 hr after operation	8.1	7.7-8.5
1 wk after operation	8.5	8.0-9.2

Note: These values are corrected serum calcium which were calculated with the formula listed previously.

Table 3 Morbidity and mortality data (N=127)

Morbidity and mortality data	n	(%)
Deaths	0	(0)
Morbidity	9	(7.08)
Postoperative hypocalcaemia	4	(3.14)
Postoperative hemorrhage	1	(0.78)
Recurrent laryngeal nerve injury (transient)	2	(1.56)
postoperative angina	1	(0.78)
Postoperative bronchospasm in asthmatic patient	1	(0.78)

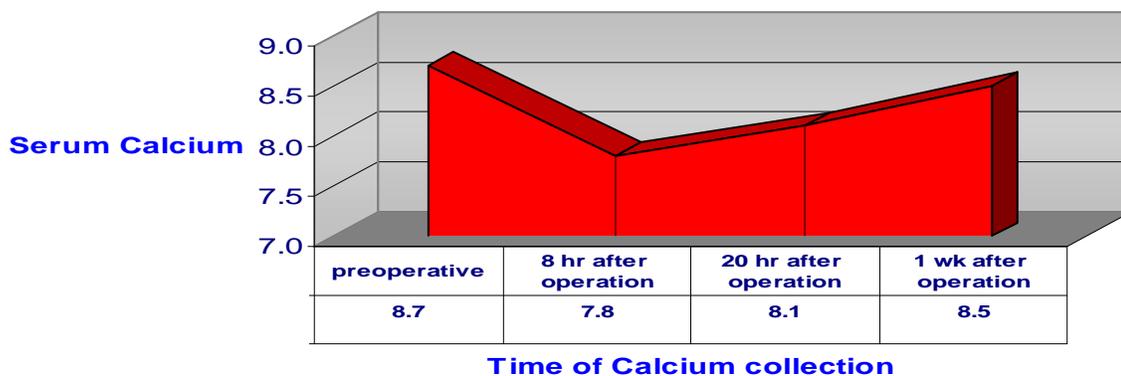


Figure 1 The aggregate of pre and postoperative calcium curve

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