Published in final edited form as:
J Surg Res. 2013 September ; 184(1): 204–208. doi:10.1016/j.jss.2013.04.036.

A Short-Stay Unit for Thyroidectomy Increases Discharge Efficiency

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Abstract

Background—Patients traditionally recover overnight on a general surgery ward after a thyroidectomy; however, these units often lack the efficiency and focus for rapid discharge which is the goal of a short-stay unit. Utilizing a short-stay unit for thyroidectomy patients, who are often discharged in <24 hours, may reduce the duration of hospital stay and subsequently decrease associated costs and increase hospital bed and resource availability.

Methods—A retrospective review of 400 patients undergoing thyroidectomy at a single academic hospital. Post-operative discharge information and hospital cost data were analyzed. Adult patients having stayed a single night in the hospital were included. Comparisons were made between patients staying on a designated short-stay unit (SS) versus a general surgery ward (GS).

Results—223 patients were admitted to SS and 177 to GS. Trends of admission location were blocked based on time period with the majority of patients per time period going to the same location. Discharge times varied significantly between patients admitted to SS ($p<0.001$). 70% of SS patients were discharged before noon versus 40% of GS patients ($p<0.001$). Many variances were identified to account for these differences. Direct costs were significantly lower with SS, due to savings in pharmacy, recovery room, and nursing expenses (all $p<0.01$).

Conclusions—A designated short-stay hospital unit is an effective model for increasing the efficiency of discharge for thyroidectomy patients compared to those admitted to a general surgery ward. It also serves to increase bed availability, which decreases hospital cost and may improve patient flow.

Keywords

Short-stay unit; discharge efficiency; post-operative cost reduction; endocrine surgery; thyroidectomy

Introduction

Short-stay hospital units were created with the primary goal of providing quality and efficient care for patients requiring brief hospital admissions. Many were designed to alleviate Emergency Department overcrowding by freeing hospital beds for those waiting for admission and to improve patient flow through the hospital. Limited hospital bed availability can result in admission constraints, decreased productivity, and lost efficiency for a hospital due to patient overflow and OR backup[1,2,3]. Reducing the length of stay and discharge time for patients requiring < 24 hour stay could benefit multiple hospital units

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through saving the hospital money, reducing infection rates and OR waiting time, and providing the opportunity for more patients to be treated[4,5,6,7].

The short-stay unit model proved to be effective for providing efficient use of hospital beds and resources, without compromising patient outcomes[1,2]. Previous studies have shown the advantages of using short-stay hospital units for patients presenting in the ER and for pediatric care[4,7,8]. A review of a hospitalist-run short-stay unit at a teaching hospital in Montreal showed that the short-stay unit provided efficient use of hospital beds and resources while providing high quality of care for patients presenting in the ER. After an evaluation by an internal medicine physician, patients suffering from acute conditions were sent to the short-stay units for management by a hospitalist for 1–3 days. Discharge planning was discussed the day of arrival and follow-up occurred after 1–2 weeks with the Internal Medicine's daily clinic. Benefits of the short-stay units in this study include shorter lengths of hospital stays, decreased rates of in-hospital complications, and lower rates of 30-day readmission when compared to a traditional clinical teaching unit[8]. Despite the positive outcomes of implementing short-stay units in ERs and for pediatric care, there have been a limited number of studies showing improved efficiency of short-stay units in surgical specialties.

In recent years there has been a shift toward shorter hospital stays (same day or < 24 hour discharge) for the recovery of thyroidectomy patients. This change in length of hospital stay can be attributed to the procedure's overall low risk, low complication rates, and low pain needs, along with advancements in technology and surgical technique[9,10]. A shorter hospital stay has been shown to be safe for patients, more efficient for hospital admissions, and cost effective[9]. Patients traditionally recover overnight on a general care surgical ward after a thyroidectomy. These nursing units are generally diverse in patient population, with many patients requiring prolonged convalesce after a major surgery. With this in mind, they often lack the efficiency and focus for rapid discharge, which is the goal of a short-stay unit. The short-stay hospital unit model, which has shown its capability to be cost-effective and efficient while offering quality patient outcomes, can be a great location for thyroidectomy patients who are often discharged in <24 hours. Benefits of applying this type of system to reduce the duration of a hospital stay include decreased post-operative costs, increased hospital bed and resource availability, and improved patient care[9].

A short-stay unit was opened within our university based hospital system at the end of 2008 for the overnight observation and recovery of patients from multiple surgical areas as well as the emergency department. In September 2010, the unit was closed and then was reintroduced in late December 2010. During the time period in which the short-stay unit was closed, surgeons anecdotally noticed a decrease in unit efficiency and discharge times for patients admitted to the general surgery ward compared to the short-stay unit. The goal of this study was to determine if there were differences in discharge time and efficiency between a short-stay unit and a general care surgical ward for patients having undergone a thyroidectomy. We hypothesized that in the post-thyroidectomy patient population, discharge from a designated short-stay unit is more efficient then discharge from a general surgery ward.

Methods

A retrospective query of an IRB approved, prospectively maintained thyroid database at an academic medical center was performed. Patients undergoing a thyroid procedure and requiring overnight observation were identified. All procedures were performed by high volume thyroid surgeons. Patients admitted to pediatric units were excluded, as were patients undergoing additional concomitant procedures, or requiring greater than a 1-day

admission. Patient demographics and information regarding the hospital stay were obtained from the electronic medical record. Direct cost data were obtained from our hospital business office and include all costs associated with the hospitalization. Costs were broken down by department and location to determine where cost savings occurred. Comparisons were made between those patients on the designated short-stay unit (SS) and those on the traditional general care surgical unit (GS). As a majority of patients were admitted under the classification of observation short stay (OSS), the focus was on the performance of each nursing unit and its associated resources in providing expeditious discharge the day after surgery. During the time period in which the SS was open, all patients with an anticipated stay less than one day were recovered on the SS. During the period of SS closure, all patients were recovered on the GS.

IMB SPSS Statistics Version 21.0 statistical software and applications were used for analysis. Chi-squared tests and student's t-tests were used for comparing the equality of means between the two groups. A cut-off level of $p < 0.05$ was used to indicate statistical significance. Data are expressed as mean ± standard error of the mean unless otherwise stated.

Results

Between January 2008 and December 2010, a total of 400 patients were noted to meet inclusion criteria. 223 patients recovered from their surgery on the SS unit, and 177 patients recovered on the GS unit. Patients were comparable in age and gender (Table 1). Incidentally, procedure types differed between the units, with a greater percentage of lobectomy patients in the GS group. Patients observed on the SS unit were discharged significantly earlier in the day (roughly 11:30 am for SS vs. 1:00 pm for GS; P<0.001) (Table 2). This is further supported with 70% of SS patients discharged before noon versus only 40% of GS patients (P<0.001). Patients on the GS unit were more likely to have significant delays in the eventual discharge with 19% discharged after 3 pm compared to less than 5% of SS patients (P<0.001).

Given the significant differences in discharge times between the two unit types, we sought to identify some of the possible factors that could account for these discrepancies in patient care. Many variances were identified to account for these differences. SS patients were more likely to receive oral pain medications on the day of surgery (P<0.001) and the mean time of first oral pain medications was 1.5 hours sooner for the SS unit (P=0.05) (Table 3). Morning lab draws were performed significantly earlier in the SS group (5:53 am vs. 7:18 am; P<0.001).

Difference in discharge processes, including paperwork and administrative procedures, were noted between the unit types. Mean time between signed physician discharge orders and discharge times was almost twice as long with GS (P<0.001) (Table 4). Time between signed pharmacy discharge orders and actual discharge time was over twice as long with GS compared to SS (P<0.001). Time from discharge criteria being met and actual discharge time was over 5 times longer with GS (P<0.001). There was no significant difference in the number of telephone calls regarding post-operative questions between the groups (P=0.667).

In regards to cost differences between the SS versus GS units, patients recovered on the SS unit had significantly lower associated costs for the admission (Table 5). Direct cost data was further classified to identify where saving occurred. SS patients had significantly lower costs in regards to pharmacy, recovery room, and nursing care. Laboratory, operating room, radiology and miscellaneous costs were all equivalent between both patient groups.

Discussion

Patients managed on the SS unit had overwhelmingly earlier discharge times compared to those admitted to GS units. The impact of these differences when total hospital patient volume is considered can be quite significant, both from a clinical as well as potentially a financial standpoint. Our results are supported by other studies that report a decreased length of stay (LOS) in a short-stay observational unit compared to a general care ward, with greater efficiencies of care and workflow being cited as the cause of this decrease[11].

Once it was shown that significant differences in discharge variables existed between the two units, we explored potential causes for these. The SS unit (called the Care Initiation Unit within our hospital) is a dedicated 18-bed unit which admits a variety of patients including overnight-stay surgical patients from general surgery, ENT, orthopedics, urology, and plastics. It has the ability to be expanded to 27 beds if needed. It also serves patients transferred from the emergency department, hospital clinics, and other hospital units when beds are needed for admission. Patients can be transferred out of the unit to a home floor should they end up requiring an unanticipated extended stay. Similar staff-to-patient ratios (1:4 during day hours, 1:5 for night shifts) exist for both the care initiation unit and general surgery ward.

Early and efficient patient turn over, by way of timely discharge, is not only a core priority of the SS unit, but its main purpose for existence. The nursing staff recognizes this and works with the patient from the moment of arrival to meet the criteria for discharge by morning rounds. Multiple factors were identified that may attribute to the discharge differences. SS patients were quicker to receive oral pain medications on the day of surgery and morning lab draws were performed significantly sooner. We hypothesize that the differences between oral pain med distribution times were due to unit-standardized processes. On the SS unit, as the intent for patients to be discharged with oral medication only the following day, the nursing staff may be more inclined to administer oral pain medication first, with IV medication only as needed for breakthrough pain. On the GS floor, many of the patients stay for greater than 24 hours, with less emphasis on becoming “home ready” with pain control in the immediate post-op period. The nurses on the SS unit recognized that morning labs were often a rate-limiting factor for discharge and would draw the labs themselves if the scheduled lab draw hadn’t come by 7 am. The other units relied on the morning lab draw team, which varied upon its time of arrival at the unit.

Another issue that affects the discharge differences between the two units is the mix of patient types and characteristics. While staff-to-patient ratios are similar between SS and GS, it is common for a GS nurse to have patients with various needs, priorities, and care statuses. Nurses on the SS unit may also have a diverse patient mix, but these patients are anticipated to meet discharge criteria within 24 hours of arriving on the unit, and as such are more likely to be lower acuity.

Patient discharge in the SS unit occurred more quickly after physician and pharmacy orders were signed. From our data, it does not seem that signed pharmacy orders was a limiting factor affecting final discharge time. In the SS unit an average of 30 minutes separated the time of physician signed orders and pharmacy signed orders, compared to the GS ward where an average of 40 minutes separated the two signed orders. Patient education appeared to be similar based on the number of telephone encounters regarding post-surgery questions recorded in the medical record within two months of the operation.

While there was some statistical difference between the two groups when comparing type of procedure, this difference may not have clinical significance since trends of admission location were blocked based on time period with the majority of patients per time period

going to the same location. The greater percentage of total thyroidectomies (a more complex procedure compared to lobectomies or sub-totals) sent to the SS unit actually serves to strengthen our hypothesis since it may be expected for this more complex procedure to have a later discharge time and decreased discharge efficiency, when in fact the opposite was observed.

Although qualitative data was not available to support the effects of patient perception on discharge, nurses have expressed that patient preparation makes a difference in discharge efficiency. Nursing protocols on the SS unit result in patients undergoing instruction upon arrival to the unit that they will be staying one night in the hospital and can begin making transportation arrangements for the next day. Patients are well educated in the criteria they must meet before they can be discharged, such as tolerating a general diet and switching to oral pain medications. It is also thought that short-stay units have a positive impact on patient perception of surgery, with the idea that overnight recovery in a designated short-stay unit implies a simpler surgery with fewer risks and the possibility of getting discharged home more quickly.

While geographically separate units for general surgical care and short-stay care are ideal for optimal discharge efficiency, we recognize that cost and volume restrictions do not make this a feasible option for many hospitals. There are modifications that can be introduced and implemented on a surgical ward to increase the efficiency of short-stay discharges without creating a separate unit. Nursing education that includes instructions and indications for early introduction of oral pain medication, early discontinuation of IV pain medication and fluids, introduction of a general diet, and instructions for early lab draws can be coupled with clear goals for anticipating early morning discharge. Clustering patients so that one nurse has admissions of similar needs and discharge requirements may also help to increase discharge efficiency on a non-short stay unit.

Because of the retrospective nature of this study, it is difficult to gauge patient satisfaction and quality of care between the two units. However, there was no significant difference in the number of telephone calls regarding post-operative questions between the groups within 2 months of the surgery. Telephone encounters are recorded in the patient's electronic health record with all personnel (residents, nurses, and clinic staff) following the same instructions for recording these calls. While we recognize the recorded information may not represent 100% accuracy of post-operation calls, any limitations or errors in recording would be the same for all patients, regardless of unit admission.

There were a few limitations that should be addressed when considering these results. In particular, this research was conducted at a single institution and only represents one hospital's short-stay unit resource availability and allocation. Other institutions may not have similar results depending on institution size, patient demographics, and resource accessibility. Data was gathered from a thyroid database and electronic health records that are both prone to entry errors. A few records had missing discharge information; however, the implementation of electronic medical records at the beginning of 2008 resulted in much more reliable data recording. Patient satisfaction data was also difficult to collect and analyze given the retrospective nature of this research.

Previous studies have looked at the financial incentives of implementing an observational short-stay unit in hospitals across the country[7]. A systematic literature review showed an average inflation-adjusted cost saving of $1,572 per observational short-stay unit admission compared to an inpatient admission. With maximal utilization of these units, annual national costs savings were estimated to be $3.1 billion[7]. However, this review focused mainly on

ER admissions to observational units and future research is needed to quantify cost and charge differences for the implementation of a surgical short-stay units.

At our own institution, significant direct cost differences were found when comparing the short-stay unit with the general care surgical ward. Cost savings of over $300 per patient were seen with admissions to the short-stay unit. Breakdown of the costs demonstrated these significant cost savings were due to pharmacy, nursing, and recovery room related costs. Early and often only use of oral pain medications likely accounts for the lower pharmacy costs, and likely contributes to the lower nursing costs given the decreased frequency in which oral medications need to be administered. Earlier patient discharge results in fewer hours of nursing care during the admission, which may also lead to lower nursing costs. The rapid room turn over on the SS ward also allows the room to be ready earlier for the new, incoming patients from the recovery room, resulting in shorter recovery room stays, which equates to the lower recovery room costs. This data suggests that implementing a short-stay unit has substantial cost saving benefits for the hospital, accompanying its increase in quality and efficient patient care.

When the term “short-stay unit” is defined to include observational units, over one-third of all US hospitals have a SS unit[6,12]. Our results showed that overnight admission to a short-stay unit resulted in earlier morning lab draws, sooner distribution of oral pain medications, and less time between discharge criteria being met and actual discharge time, ultimately resulting in significantly earlier discharge times for thyroidectomy patients. Overall, our data supports the implementation and continuation of a short-stay unit in an academic hospital.

Conclusion

A designated short-stay hospital unit is an effective model for improving the timeliness of discharge for thyroidectomy patients compared to those admitted to a general care surgical ward. Utilizing a short-stay unit for thyroidectomy patients, who are often discharged in <24 hours, may reduce the duration of hospital stay and subsequently increase hospital bed and resource availability. This results in decreased cost for the admission, and may also serve to improve patient flow within the institution.

Acknowledgments

Funding for this research was provided by the University of Wisconsin – Madison, Department of Surgery NIH T35 Training Grant.

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Table 1

Patient demographics and procedure type.

	Short-stay Unit N=223	General Care Surgical Ward N=177	P-value
Gender (% female)	181 (81%)	132 (75%)	**0.145**
Mean Age	50.14±1.03	50.54±1.20	**0.802**
Procedure			
Lobectomy	40 (18%)	62 (35%)	<**0.001**
Total Thyroidectomy	171 (76.5%)	97 (56%)	<**0.001**
Sub-total Thyroidectomy	1 (0.5%)	0 (0%)	<**0.001**
Completion	10 (5%)	16 (9%)	<**0.001**

*Data presented as number (percentage) or as mean ± standard error of the mean.

Table 2

Differences in discharge efficiency.

	Short-stay Unit N=223	**General Care Surgical Ward N=169**	**P-value**
Discharge time	11:36 am ± 6 minutes	12:51 pm ± 10 minutes	**<0.001**
Discharged before noon	70% (N=156)	41% (N=69)	**<0.001**
Discharged after 3pm	5% (N=11)	19% (N=32)	**<0.001**

* Data is presented as mean values ± standard error of the mean.

Table 3

Differences in hospital management.

	Short-stay Unit	General Care Surgical Ward	P-value
Oral pain medication given on day of surgery	90% (181/201)	75% (97/129)	**<0.001**
Time between arrival on unit floor and first oral pain medications given	263 ± 18 minutes	355 ± 29 minutes	**0.05**
Time between 5 am and morning lab draws	53 ± 4 minutes	138 ± 7 minutes	**<0.001**

* Data is presented as mean values ± standard error of the mean.

Table 4

Differences in discharge processes.

	Short-stay Unit	General Care Surgical Ward	P-value
Time between discharge criteria met and actual discharge time	21 ± 3 minutes (n=125)	113 ± 10 minutes (n=78)	<**0.001**
Time between signed physician discharge order and actual discharge time	108 ± 5 minutes (n=222)	209 ± 11 minutes (n=162)	<**0.001**
Time between signed pharmacy discharge order and actual discharge time	78 ± 6 minutes (n=218)	169 ± 12 minutes (n=160)	<**0.001**
Number of telephone encounters regarding post-operations (< 2 months post-surgery) per 100 patients	10 ± 2 encounters/100 pts	11 ± 2 encounters/100 pts	NS

* Data is presented as mean values ± standard error of the mean.

Table 5

Direct Cost Data for Short Stay Unit Compared to General Surgery Ward.

	Short-stay Unit	General Care Surgical Ward	P-value
Total Direct Costs (US $)	3357.90 ± 47.55	3670.60 ± 76.47	**<0.01**
Pharmacy	205.52 ± 5.39	241.98 ± 11.76	**<0.01**
Laboratory	98.31 ± 3.97	91.34 ± 4.54	0.25
Operating Room	2029.08 ± 34.15	2052.14 ± 54.76	0.72
Recovery Room	337.29 ± 9.10	473.34 ± 17.5	**<0.01**
Nursing	641.10 ± 13.58	794.45 ± 29.82	**<0.01**
Radiology	97.87 ± 6.61	91.64 ± 13.27	0.68
Miscellaneous	16.90 ± 3.48	25.35 ± 3.60	0.10

* Data presented as mean values ± standard error of the mean. All units are in US dollars.