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Changing Trends in Thyroid and Parathyroid Surgery over the Decade: Is Same-day Discharge Feasible in the United Kingdom?

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Abstract
Background A recent British Association of Endocrine and Thyroid Surgeons consensus document suggested that day-case thyroidectomy is feasible in a small proportion of patients but has to be balanced against risks. Currently, there is no large reported series of same-day discharge in thyroid and parathyroid surgery from the UK. The aim of this study was to assess the outcomes of day-case thyroid and parathyroid surgery.
Methods We conducted a retrospective study of patients who underwent thyroid or parathyroid surgery between January 2000 and December 2011 at Oxford University Hospitals. The end points analysed were complications in the form of bleeding, hypocalcaemia, wound infection, and seroma.
Results A total of 2,102 patients (495 males and 1,607 females, age range = 13–90 years) underwent surgery for parathyroid ($n = 776$) or thyroid ($n = 1{,}326$) conditions. The operations included minimally invasive parathyroidectomy (MIP) ($n = 331$), open parathyroidectomy ($n = 445$), lobectomy ($n = 687$), isthmusectomy ($n = 23$), total thyroidectomy ($n = 580$) and thyroglossal cyst excision ($n = 36$). Routine arrangements were in place for consideration of same-day discharge for lobectomies, thyroglossal cyst surgery, and MIPs; lobectomies accounted for 63 % of same-day cases, followed by parathyroidectomy (35 %). Over the decade, day-case surgery increased from 4 to 17 % for thyroid surgery and from 20 to 40 % for parathyroid surgery. None of the 435 patients who had same-day discharge was readmitted for bleeding [confidence interval (CI) 0–0.6 %]. There was no 30-day mortality for the whole cohort. Complications in patients who underwent surgery in the whole cohort versus those who were discharged the same day were temporary hypocalcaemia (4 vs. 0.2 %), permanent hypocalcaemia (1 vs. 0.4 %), bleeding (0.4 vs. 0 %), seroma (0.3 vs. 0 %), and wound infection (0.3 vs. 0 %).
Conclusion Current protocols for thyroid or parathyroid surgery make same-day discharge feasible and safe in carefully selected patients.
MIP Minimally invasive parathyroidectomy

Introduction

Day-case surgery is defined as admission and discharge on the same day for planned surgical procedures and excludes 23-h stay. In 2000 the NHS Plan set a goal of increasing the proportion of elective procedures performed as day cases and backed up the Department of Health's 2002 Day Surgery Operational Guide [1]. With an increase in understanding day surgery, it has been shown that it has a number of benefits, including patient preference for a shorter hospital stay, reduced iatrogenic complications related to being in hospital, and reduced risk of hospital-acquired infections. In addition, there are financial benefits

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to be had. Four factors are involved in deciding the suitability for day-case surgery: preoperative patient assessment, the operation, the discharge, and postoperative support. Day-case thyroid surgery was first described in the 1980s [2], and there has been a gradual reduction in the length of stay after thyroid surgery in the UK. However, currently in the UK only 6 % of thyroidectomies (8 % of lobectomies/isthmusectomies and 1.2 % total thyroidectomies) are performed as true day-case procedures [3].

The slow increase in day-case thyroid surgery in the UK is due to the current controversy about the safety of discharging patients hours after thyroid surgery and the risk of complications [4, 5]. There have been a number of American publications reporting that day-case thyroid surgery is feasible and safe; however, issues have been raised about reporting bias and whether patients are discharged to home or to another facility with low-level nursing care [6–9]. The particular risks of concern with thyroid surgery include haemorrhage causing airway obstruction, which usually manifests within the first 24 h of surgery, bilateral recurrent laryngeal injury, and symptomatic hypocalcaemia causing tetany.

The risk of airway compromise from bilateral nerve injury is reported as 0.2 % [10] and is usually recognised immediately. The risk of hypocalcaemia can be predicted in patients using a parathyroid hormone (PTH) measurement [11], or alternatively all patients at risk can be treated prophylactically [12]. The complication that remains of significant concern is bleeding obstructing the airway, which without prompt treatment may prove fatal. The risk of a haematoma requiring reoperation is around 1 % [13]. The key to safe day-case thyroid surgery is whether those patients at risk can be identified and not put in any increased danger compared to if they remain as an inpatient. The volume of surgery performed by a surgeon may also play a role in determining the feasibility and safety of day-case thyroid and parathyroid surgery.

Due to the current controversy about the safety of same-day discharge with respect to patients undergoing thyroid surgery [4, 5] in the UK, we evaluated the feasibility and safety of same-day discharge following thyroid and parathyroid surgery.

Methods

A prospective analysis of a retrospective database on all patients who underwent thyroid and parathyroid surgery at the institution during the period 2000–2011 was reviewed. Patients who were to undergo a suitable procedure, who met the eligibility criteria for day surgery determined at preassessment, and had adequate support on discharge were managed with the intention to be discharged on the same day. All surgery was carried out with the patient under general anaesthesia and with a superficial cervical block, or with local anaesthesia under intravenous sedation. The surgery was performed by two consultant surgeons, a senior endocrine trainee, or fellow.

Table 1 Procedures that may be suitable for day-case thyroid and parathyroid surgery

Suitable procedures	Less suitable/contraindicated procedures
Lobectomy	Redo thyroid surgery
Isthmusectomy	Retrosternal goitres
Completion thyroidectomy	Toxic goitres
Thyroglossal cyst excision	Thyroid cancers
Total thyroidectomy for small goitres	Total thyroidectomy for large goitres
Minimally invasive parathyroidectomy	Redo parathyroidectomy
Bilateral exploration parathyroidectomy	Total or subtotal parathyroidectomy

Definitions

The following definitions were used for the study: day surgery means that patients were admitted, treated, and discharged the same day; ambulatory means that patients were admitted, treated, and discharged in less than 23 h; and inpatient means the patient was admitted, treated, and discharged after more than a 23-h stay. The unit's protocol in terms of assessment of criteria for day surgery was along the policy of the Department of Health's 2002 Day Surgery Operational Guide [1]. This policy is summarised below.

Preoperative patient assessment

Our unit's protocol for assessment of day surgery included adequate information on the procedure and postoperative course, ASA grade and anaesthetic fitness, and the patient's personal and home circumstances.

Surgical criteria

The unit's policy was to offer day or ambulatory surgery for the types of procedures listed in Table 1. The day cases were scheduled for the morning, which enabled the patient to stay on the day-surgery ward for a minimum of 6–8 h following surgery. The day-surgery ward remained open until 8 pm, which allowed observation up to a maximum of 10 h. Failing this, the patient was admitted to the ambulatory surgical ward for an overnight stay.

Discharge

The patient was reviewed by their surgeon following the procedure, and in cases of parathyroid surgery, total thyroidectomy, or completion thyroidectomy, the patient was started on prophylactic calcium before discharge. The patient was also assessed for any complications, and if there were any, the patient was admitted to the surgical ward. However, if after 6 h on the ward and there were no complications, a nurse-led discharge was done. The patient was given written instructions about the potential side effects to look out for and the medications that needed to be taken. The patient was provided contact numbers for the day-surgery ward and the emergency department and postoperative instructions about what to do in the event of a complication.

Postoperative support

All patients were given 24-h support from the day-surgery unit, with telephone numbers of the ward and the surgical team should the patient have any concerns. They were seen in clinic 6–8 weeks after surgery to assess postoperative outcomes and discuss results.

End points analysed were complications in the form of bleeding, hypocalcaemia which was considered transient if it resolved within 6 months after surgery, wound infection, seroma, and mortality.

Results

Between January 2000 and December 2011 there were 1,326 patients who underwent surgery for thyroid conditions and 776 for parathyroid conditions at our institution. The patient group consisted of 1,607 females and 495 males, with the ages ranging between 13 and 90 years. The demographics of the study population are given in Table 2.

All the thyroid and parathyroid surgery procedures and the discharge patterns are presented in Table 3. True day-case surgery was performed in only 12 % of all the thyroid cases and 36 % of the parathyroid cases. Of those cases selected for day-case surgery, the majority were for benign disease, with cancers and Grave's disease accounting for less than 1 %. The percentage increase in day surgery during the study period is shown in Fig. 1 and the corresponding increase in caseload suitable for day surgery shown in Fig. 2. The mean length of stay for all thyroid surgery decreased from a mean of 2.16 to 1.3 days and for all parathyroid surgery from 1.13 to 0.79 days, as shown in Fig. 3.

The complications for all patients who underwent thyroid or parathyroid surgery are presented in Table 4. The morbidity rate for parathyroid surgery patients was 3.35 % and that for thyroid surgery patients was 9.57 %. For the

Table 2 Demographics of the study group

Parameters	Thyroid surgery (n = 1,326)	Parathyroid surgery (n = 776)
Age [median (range)] (years)	59 (13–89)	63 (17–90)
Sex (No. females)	1,034	573
Discharge		
Day case	163 (12 %)	275 (35 %)
Ambulatory	639 (52 %)	438 (57 %)
In patient	474 (36 %)	63 (8 %)

Table 3 The number of patients and indications for surgery of the thyroid gland and parathyroid gland in all patients and discharge pattern (n = 2,102)

	Day case	Ambulatory	In-patient
Thyroid surgery (n = 1,326)			
Nodular goitre	58	497	115
Grave's thyrotoxicosis	6	89	99
Thyroglossal cyst	19	17	0
Follicular adenoma	73	16	5
Cancer	7	45	256
Percentage of total cases	12	52	36
Parathyroid surgery (n = 776)			
Minimally invasive parathyroidectomy	219	110	2
Bilateral cervical exploration	56	328	61
Percentage of total cases	36	56	8

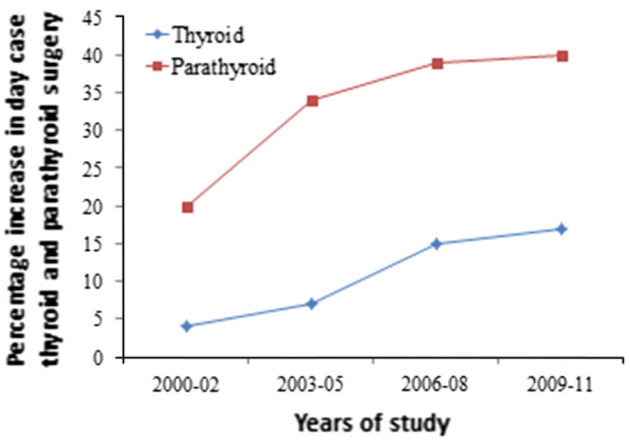

Fig. 1 Graph showing percentage increase in the trend of day-case surgery over the decade

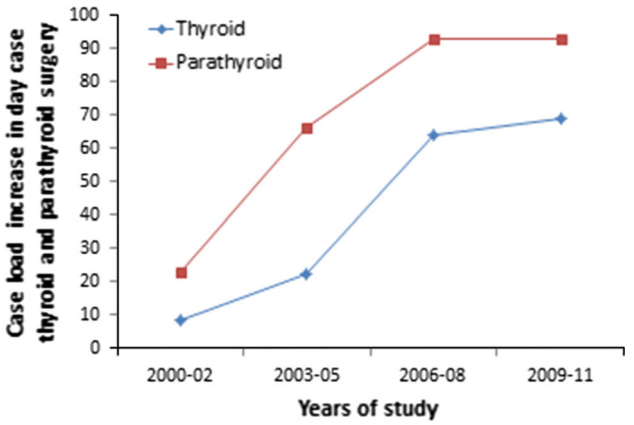

Fig. 2 The graph shows increasing caseload for same-day discharge in thyroid and parathyroid surgery

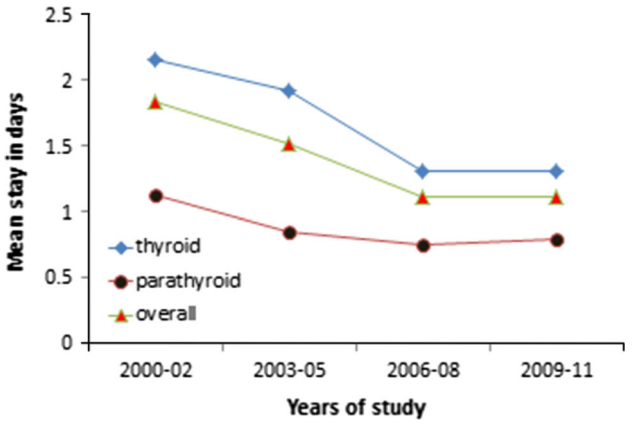

Fig. 3 The mean length of stay has decreased over the decade for both thyroid and parathyroid surgery

entire cohort the complications included temporary hypocalcaemia (4 %), permanent hypocalcaemia (1.5 %), temporary laryngeal nerve palsy (1.4 %), permanent nerve palsy (0.2 %), and bleeding (0.2 %).

During the study period 10 patients returned to theatre for bleeding within 6 h of surgery and all of them had toxic goitres. Of the 438 patients discharged the same day during the study period, none were readmitted for bleeding. There was no mortality in the entire cohort.

Discussion

Day-case thyroid surgery has not been widely adopted in the UK because of concerns about the risk of complications that require urgent hospital treatment, including bilateral nerve palsy, hypocalcaemia, and, particularly airway obstruction from bleeding. Despite these risks, there have been numerous reports on successful day-case thyroid surgery, particularly from the US. The risk associated with bilateral nerve injury can be identified in the immediate postoperative period, and the management of hypocalcaemia has evolved with prophylactic treatment and/or the use of a PTH measurement to identify those at risk of hypocalcaemia allowing for a shorter hospital stay, and managing those with hypocalcaemia in an outpatient setting. Our unit adopted the use of routine short-term hypocalcaemia prophylaxis in 2000.

Eighty to 90 % of bleeding that occurs after thyroid surgery does so within the first 24 h, with the majority (40–50 %) occurring within the first 6 h after surgery, with a higher risk of occurrence in those who underwent total thyroidectomy compared to lobectomy [14–16]. The incidence of neck haematomas that require evacuation is reported to be between 0.1 and 0.3 %. In this study, no patient who underwent day surgery developed a neck haematoma that required intervention. Since 2005, our unit has used the Harmonic scalpel which has not resulted in any increase in bleeding complications.

Over the study period, as we gained experience, there was an increase in the total number and proportion of patients undergoing same-day surgery. There was a sharp increase in the day-case load in the first half of the study (2000–2006) than in the second half. This may be because no further recruitment of complex thyroid and parathyroid cases was possible for day surgery without compromising patient care.

With appropriate patient selection, experienced surgical team, and support systems in place for patients, we have demonstrated in a single centre that in addition to parathyroid surgery, thyroid surgery can also be performed safely as a day-case procedure. The results are comparable to those of other well-established units practising day-case thyroid and parathyroid surgery [17–19]. There will always be restrictions on being able to perform day surgery on some patients such as distance to hospital and comorbidities. However, as has been demonstrated in several large series from elsewhere in the world, the results can be reproduced in the UK.

There will be limitations on which institutions in the UK can offer day-case service; this study was carried out in a large tertiary teaching hospital with multiple layers of staff available to deal with patients 24 h a day, from resident surgeons and fellows to experienced day-surgery nurses. In the UK there is still considerable disparity among hospitals in terms of caseload, types of surgeries performed, and the proportion performed as day cases, together with surgical experience; this disparity may limit the growth of same-day thyroid surgery. As with other branches of surgery, thyroid surgery shows a volume-outcome relationship in that a

Table 4 Complications of day-case, ambulatory, and in-patient thyroid and parathyroid surgery in the whole cohort ($n = 2,102$)

Complication	Thyroid surgery ($n = 1,326$)			Parathyroid surgery ($n = 776$)		
	Day case ($n = 163$)	Ambulatory ($n = 639$)	In-patient ($n = 474$)	Day case ($n = 275$)	Ambulatory ($n = 438$)	In-patient ($n = 63$)
Transient hypocalcaemia	1	22	55	0	1	6
Permanent hypocalcaemia	1	3	15	1	9	2
Transient monolateral nerve palsy	0	0	31	0	0	0
Transient bilateral nerve palsy	0	0	0	0	0	0
Permanent laryngeal nerve palsy	0	0	6	0	0	0
Bleeding	0	0	5	0	0	0
Return to theatre	0	0	10	0	0	0
Wound complication	0	2	5	0	0	3
Readmission rate	0	0	1	0	0	0
Seroma needing intervention	0	1	7	0	0	0

surgeon who performs more than 100 thyroidectomies over a 5-year period had lower complication rates and shorter lengths of stay, supporting the position that these surgeries should be performed by experienced surgeons in high-volume centres [20]. However, with increasing centralisation to tertiary centres with greater experience, our data indicate that same-day thyroid surgery is feasible and safe.

Conclusion

Providing day-case parathyroid and thyroid surgery is challenging; however, as we have demonstrated, it is feasible. The feasibility and safety of day-case surgery involves not compromising on patient safety at any cost. It also involves minimising the risk of complications in patients, with systems in place to detect them. This involves careful patient selection with meticulous surgical and anaesthetic technique by those with experience in high-volume centres.

Conflict of interest None.

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