

Introduction of day care thyroid surgery in a Dutch non-academic hospital

R.R. Dulfer*, K.S. de Valk, F. Gilissen, T.M. van Ginhoven, P.C. Smitⁱ

Department of Surgery, Reinier de Graaf Gasthuis, Delft, the Netherlands,
*corresponding author: tel.: +31 (0)6-83256948, email: r.dulfer@erasmusmc.nl

The first two authors contributed equally to the manuscript
ⁱCurrently Department of Surgery, Erasmus MC, Rotterdam, the Netherlands

ABSTRACT

Objective: Hemithyroidectomy is the most common endocrine surgical procedure and is performed with low complication rates. Multiple international reports indicate that thyroid surgery in the day care setting is feasible and safe. Despite these results, day care thyroid surgery has not yet been implemented in the Netherlands. The objective of this study is to assess the safety of thyroid surgery in our institution and, when deemed safe, implement day care thyroid surgery.

Methods: All patients who underwent hemithyroidectomy in our institution between January 2010 and December 2014 were included in the retrospective analysis. Hypothetical candidates for day care surgery were identified. All patients undergoing thyroid surgery in 2015 were included in a prospective cohort. Data regarding baseline characteristics, surgical procedures, complications and adherence to the day care schedule are presented.

Results: A total of 210 patients were included in the retrospective cohort; 149 patients complied with the day care criteria. No complications occurred that would prevent day care surgery, or make it unsafe. Day care thyroid surgery was implemented from January 2015. In one year 43 patients underwent hemithyroidectomy. Thirty-one patients were eligible for day care surgery of which 18 patients were treated in day care. Failure of the day care regimen was due to the patient's own choice (n = 5), large retrosternal goitre (n = 2) or failure of logistics (n = 6). Besides transient hoarseness, no complications occurred in this group.

Conclusion: Based on a retrospective safety analysis we successfully introduced day care thyroid surgery in our clinic. Hemithyroidectomy can safely be conducted in day care setting. However, patient selection is of vital importance to minimise the risk of complications.

KEYWORDS

Day care surgery, hemithyroidectomy, patient safety, surgical outcomes

INTRODUCTION

Hemithyroidectomy is the most common endocrine surgical procedure performed in daily practice and indicated mainly due to mechanical and/or cosmetic complaints of a multinodular goitre or a solitary thyroid nodule. Furthermore, it is performed for diagnostic purposes in case of indeterminate cytology. Despite the increased rate of day care surgical procedures, thyroid surgery in the Netherlands is currently solely performed with overnight stays. It is assumed that the potential risk of life-threatening respiratory problems caused by postoperative bleeding, laryngeal nerve injuries or hypocalcaemia warranting (intravenous) supplementation are reasons for which thyroid surgery is not performed in the day care setting. Recently, Segel et al.¹ published their results regarding over 1000 thyroidectomies in the outpatient setting. The most feared complication, acute postoperative haemorrhage with a potentially life-threatening airway obstruction, did not occur. In general, the incidence of postoperative bleeding varies between 0.1-1.1%, and seldom causes acute airway problems or need for reinterventions.² In addition, laryngeal nerve injury after hemithyroidectomy is uncommon and the literature reports incidence rates of up to 3.7% of patients, with 0.4% permanent injuries to the laryngeal nerve.³⁻⁷ Temporary hypocalcaemia occurred in about 3% of the outpatient patients treated in Segel's study.¹ Wound infection occurs in less than 1% of the patients, but

is a late complication and poses no threat in the day care setting.^{4,6}

Worldwide, the number of outpatient thyroidectomies has increased by 39% over the last ten years.⁸ Technological advancements in anaesthesia care and the widespread introduction of minimally invasive surgical techniques have fuelled this trend. The first report regarding thyroid surgery in the day care setting by Steckler dates back to 1986.⁹ Since then, multiple studies have shown that day care thyroid surgery is safe and feasible with regard to hemithyroidectomy and even total or completion thyroidectomy.^{1,2,4-7,10-13} The American Thyroid Association published a statement regarding outpatient thyroid surgery describing important safety criteria for selecting eligible patients.¹⁴

Given all the encouraging reports it is peculiar why day care thyroid surgery is not yet implemented in the Netherlands. One can only assume that the risk, albeit utterly small, of losing a patient due to respiratory distress caused by massive bleeding after discharge is the main reason. Therefore our first aim was to assess the safety of thyroid surgery in our institution by means of a retrospective risk analysis of all patients who underwent hemithyroidectomy in a five-year period from 2010 to 2014. Then we present the initial results of implementing day care thyroid surgery in our daily practice, strictly adhering to the international guidelines.¹⁴

METHODS

All patients were operated in the 'Reinier de Graaf Gasthuis' in Delft, a non-academic teaching hospital in the Netherlands, by one of two dedicated endocrine surgeons (P.C.S and F.M.G.). The retrospective cohort (part A) consists of all consecutive patients who underwent primary hemithyroidectomy between January 2010 and December 2014. These patients were identified by means of surgical codes from the hospital software system. All electronic patient charts were reviewed and baseline characteristics, medical history, indication for surgery, postoperative complications and hypothetical eligibility for day care surgery were noted. Complications were retrieved by manually checking the charts in conjunction with checking our prospective database where all operations and complications are prospectively recorded. The data were analysed and an overall judgement was made regarding the safety of day care thyroid surgery in our hospital. All patients in the retrospective cohort who were eligible for day care surgery¹⁴ but received necessary in-hospital interventions from six hours to 24 hours postoperatively are considered 'day care safety failures'. As no 'day care safety failures' occurred, we proceeded to part B of the study: implementation of day care surgery.

All patients scheduled for their first hemithyroidectomy in 2015 were included in the prospective cohort (part B). Baseline characteristics, medical history, indication for surgery and postoperative complications were prospectively collected. All patients were assessed for eligibility for day care surgery according to the criteria published by the American Thyroid Association,¹⁴ as listed in *table 1*. Patients eligible for day care surgery and willing to participate were discharged the same day at least six hours after skin closure with the permission of the surgeon and consent from the patient. All patients received information about the surgical procedure, a letter addressed to the general practitioner and standardised discharge instructions when discharged. These instructions provided information regarding pain and pain medication, wound dressings and signs of infection. Patients were instructed to contact the hospital in case of, but not limited to, voice changes, stridor, swelling of the wound and/or problems swallowing. All patients were contacted by telephone one day after discharge. Two weeks after surgery all patients were seen at the outpatient clinic for their first postoperative check-up. Hereafter, patients were referred back to their treating endocrinologist.

Statistical analysis was done using IBM SPSS software (version 21). Descriptive analysis is performed, where categorical data are expressed as frequency with percentage, and nominal data are expressed as mean with standard deviation. Group differences were analysed with the Chi-square test for categorical data, and the unpaired t-test for nominal data. Significant differences are defined as $p < 0.05$.

RESULTS

Retrospective cohort

A total of 210 patients were included in our retrospective risk analysis cohort, of which 149 patients (71.0%) were eligible for day care surgery. Baseline characteristics and complication rates are summarised in *table 2*. Patients eligible for day care surgery were significantly younger

Table 1a. Eligibility criteria for outpatient thyroidectomy¹⁴

No major comorbidities or ASA class 4
Provision and understanding of preoperative education
Team approach to education and clinical care
Primary caregiver willing and available
Social setting conducive to safe postoperative management
Proximity to skilled facility

Table 1b. Relative contraindications to outpatient thyroidectomy¹⁴

Clinical	Social	Procedure
Uncompensated cardiac or respiratory disease	Excessive distance from skilled facility	Massive goitre
Dialysis for renal failure	Living alone with no person to accompany	Extensive substernal goitre
Anticoagulant or antiplatelet therapy	Lack of transportation	Locally advanced cancer
Seizure disorder	Patient preference	Challenging haemostasis
Anxiety disorder	Communication barriers	Difficult thyroidectomy with Hashimoto's thyroiditis or Graves' disease
Obstructive sleep apnoea		
Hearing loss		
Visual impairment		
Mental impairment		
Pregnancy		

Table 2. Baseline characteristics of retrospective cohort

	Total	Meet day care criteria	Do not meet criteria	P
N	210	149 (71.0%)	61 (29.0%)	
Age in years (mean + SD)	51 (13.77)	49 (12.72)	55 (15.06)	0.001
Female sex (percentage)	179 (85%)	128 (86%)	51 (84%)	0.335
ASA score	ASA 1-89 (42%) ASA 2-107 (51%) ASA 3-12 (6%) Unavailable - 2 (1%)	ASA 1-73 (49%) ASA 2-74 (50%) ASA 3-1 (1%) Unavailable - 1 (1%)	ASA 1-16 (26%) ASA 2-33 (54%) ASA 3-11 (18%) Unavailable - 1 (2%)	0.000
Indication for surgery	Mechanical complaints: 151 (71.9%) Suspected malignancy: 36 (17.1%) Other reasons: 23 (11.0%)	Mechanical complaints: 104 (70%) Suspected malignancy: 28 (19%) Other reasons: 17 (11%)	Mechanical complaints: 47 (77%) Suspected malignancy: 8 (13%) Other reasons: 6 (10%)	0.186
Type of operation	LHT-105 (50%) RHT-105 (50%)	LHT-70 (47%) RHT-79 (53%)	LHT-35 (57%) RHT-26 (43%)	0.086
Total complications	9 (4.4%)	3 (2.0%)	6 (9.8%)	0.008
Transient hoarseness or vocal changes	5	1 (0.7%)	4 (6.6%)	
Anaphylaxis	1 (0.5%)	1 (0.7%)	0 (0%)	
Spontaneous tachycardia	1 (0.5%)	1 (0.7%)	0 (0%)	
Rebleeding	1 (0.5%)	0 (0%)	1 (1.6%)	
Wound infection	1 (0.5%)	0 (0%)	1 (1.6%)	

Values displayed as N + percentage unless stated otherwise. LHT = left hemithyroidectomy; RHT = right hemithyroidectomy.

Table 3. Baseline characteristics of day care cohort

	Day care setting	Clinical setting	P
N	18	25	
Age in years (median + range)	50 (14,86)	61 (16,37)	0.036
Female sex (percentage)	14 (78%)	21 (84%)	0.303
ASA score	ASA 1-6 (33%) ASA 2-10 (56%) ASA 3-2 (11%)	ASA 1-10 (40%) ASA 2-13 (52%) ASA 3-2 (18%)	0.440
Indication for surgery	Mechanical complaints: 16 (89%) Suspected malignancy: 2 (11%) Other reasons: 0	Mechanical complaints: 14 (56%) Suspected malignancy: 8 (32%) Other reasons: 3 (12%)	0.029
Type of operation	LHT-7 (38%) RHT-11 (61%)	LHT-10 (40) RHT-15 (60%)	0.471
Total complication	1 (5.6%)	2 (8.0%)	0.378
Transient hoarseness or vocal changes	1 (5.6%)	2 (8.0%)	
Rebleed	0 (0.0%)	0 (0.0%)	
Wound infection	0 (0.0%)	0 (0.0%)	
Meet day care criteria	n.a.	13 (52%)	

Values displayed as N + percentage unless stated otherwise. LHT = left hemithyroidectomy; RHT = right hemithyroidectomy.

(48 vs 55 years, $p = 0.001$) and had lower American Society of Anesthesiologists (ASA) classifications. The overall complication rate is 4.4% and in the hypothetical day care group this was 2.0%.

Five patients experienced transient hoarseness or vocal changes, one developed an anaphylactic reaction of unknown aetiology, and one patient experienced recurrence of a spontaneous tachycardia for which she required medical treatment. In the group not eligible for day care surgery, one patient required a re-operation due to a wound infection (0.5%) and one postoperative haematoma occurred (0.5%), which was managed conservatively. There were no complications in the 'eligible day care group' comprising patients safety in the hypothetical outpatient setting.

Since this retrospective analysis showed low complication rates, we concluded that hemithyroidectomy can be performed safely in a day care setting in our institution, and proceeded to implement this new strategy (part B).

Prospective cohort

In 2015 a total of 43 patients underwent primary hemithyroidectomy and were included in the prospective cohort. A total of 31 (72%) patients met the international guidelines for day care thyroid surgery published by the American Thyroid Association, of which 58% ($n = 18$) were eventually treated by means of day care surgery. Twenty-five (58%) patients stayed overnight after surgery. A flowchart of patients undergoing

hemithyroidectomy is illustrated in *figure 1*. Baseline characteristics and complication rates for the prospective cohort are summarised in *table 3*. The day care group was younger than the clinical group (median 50 and 61 years, respectively). Indication for surgery in the day care group was mechanical complaints in 89% and suspected malignancy in 11%; in the clinical group the indication was mechanical complaints in 56% and suspected malignancy in 32%.

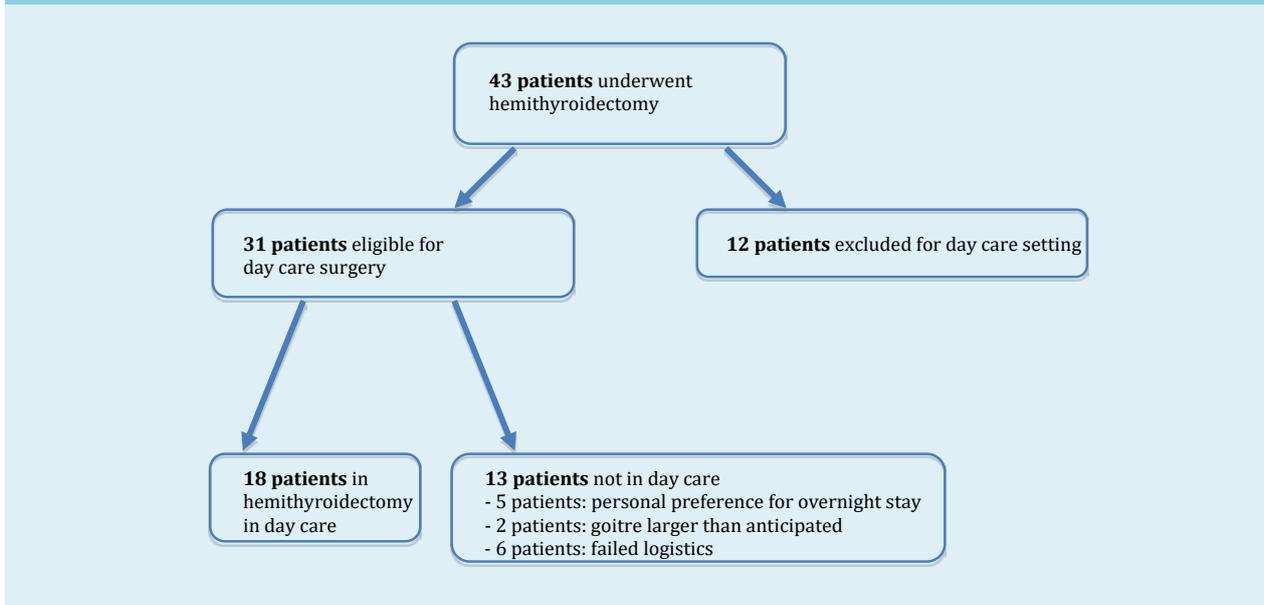
Two minor complications (transient vocal changes, $n = 2$) occurred in the clinical group and there was one minor complication (transient vocal change) in the day care group. There were no emergency department visits or readmissions following surgery. No wound infections, haematomas or laryngeal nerve damage occurred.

Thirteen patients (30%) were eligible for day care surgery, but were not treated as such. Five patients (12%) chose to stay overnight, two patients had a retrosternal goitre which was larger than anticipated, and in the remaining six (14%) patients our logistics failed for example as these patients were scheduled for surgery late in the afternoon.

DISCUSSION

The retrospective analysis shows that day care surgery could be safely implemented in our institution. Thereafter, day care thyroid surgery was implemented and 58% of the eligible patients were treated as such. This is the

Figure 1. Flowchart



first cohort in the Netherlands where thyroid surgery is performed in the day care setting. Patient safety is of paramount importance when installing a new regimen. Only one patient in the day care group experienced a complication, namely temporary hoarseness. No postoperative haematomas necessitating urgent interventions occurred. However, even though day care thyroid surgery was already reported in 1986,⁹ it remains a delicate topic as airway compromise due to haematoma formation is a feared complication. This complication did not occur in either our retrospective or our prospective cohort. We do have to acknowledge the fact that our low number of patients is prone to be biased with respect to complication rates. In the literature, Snyder et al.⁷ published the largest series of outpatient thyroidectomies, with over 1000 procedures in their cohort. Postoperative haematoma requiring reoperation was present in only one patient undergoing hemithyroidectomy.

A total of 31 patients met the international guidelines for day care thyroid surgery; however, only 18 were treated in day care surgery. In six patients our own logistics failed, so this is a major item to improve with this new strategy. Furthermore, it is important to interview patients to determine factors for which they chose to stay overnight, after which preoperative information can be adapted to address these factors.

Patients expressed their satisfaction when contacted by telephone the next day; however, no objective measurement of patient satisfaction was performed. Measurement and documentation of patient satisfaction is important to improve patient selection and improve preoperative information.

Despite the logistical hurdles and the low number of patients in this study, we advocate the introduction of day care thyroid surgery in the Netherlands.

However, although complications rates are supposedly very low, it is important to stay vigilant and carefully select patients suitable for day care surgery adhering to international guidelines.

CONCLUSION

Hemithyroidectomy performed in day care is feasible and safe with low complication rates provided that adequate patient selection is performed.

DISCLOSURES

The authors declare no conflict of interest. No funding or financial support was received.

REFERENCES

1. Segel JM, Duke WS, White JR, Waller JL, Terris DJ. Outpatient thyroid surgery: Safety of an optimized protocol in more than 1000 patients. *Surgery*. 2016;159:518-23.
2. Hopkins B, Steward D. Outpatient thyroid surgery and the advances making it possible. *Curr Opin Otolaryngol Head Neck Surg*. 2009;17:95-9.
3. Vaiman M, Nagibin A, Olevson J. Complications in primary and completed thyroidectomy. *Surg Today*. 2010;40:114-8.
4. Hessman C, Fields J, Schuman E. Outpatient thyroidectomy: is it a safe and reasonable option? *Am J Surg*. 2011;201:565-8.
5. Teoh AY, Tang YC, Leong HT. Feasibility study of day case hemithyroidectomy. *ANZ J Surg*. 2008;78:864-6.

6. Champault A, Vons C, Zilberman S, Labaille T, Brosseau S, Franco D. How to perform a thyroidectomy in an outpatient setting. *Langenbecks Arch Surg.* 2009;394:897-902.
7. Snyder SK, Hamid KS, Roberson CR, et al. Outpatient thyroidectomy is safe and reasonable: experience with more than 1000 planned outpatient procedures. *J Am Coll Surg.* 2010;210:575-84.
8. Sun GH, DeMonner S, Davis MM. Epidemiological and economic trends in inpatient and outpatient thyroidectomy in the United States, 1996-2006. *Thyroid.* 2013;23:727-33.
9. Steckler R. Outpatient thyroidectomy: a feasibility study. *Am J Surg.* 1986;152:417-9.
10. Lacroix C, Potard G, Clodic C, Mornet E, Valette G, Marianowski R. Outpatient hemithyroidectomy. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2014;131:21-6.
11. Ayala MA, Yench MW. Outpatient thyroid surgery in a low-surgical volume hospital. *World J Surg.* 2015;39:2253-8.
12. Trottier DC, Barron P, Moonje V, Tadros S. Outpatient thyroid surgery: should patients be discharged on the day of their procedures? *Can J Surg.* 2009;52:182-6.
13. Mowchenson PM, Hodin RA. Outpatient thyroid and parathyroid surgery: a prospective study of feasibility, safety and costs. *Surgery.* 1995;118:1051-3.
14. Terris DJ, Snyder S, Carneiro-Pla D, et al. American Thyroid Association statement on outpatient thyroidectomy. *Thyroid.* 2013;23:1193-202.