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ORIGINAL ARTICLE

Does the risk of compressive hematoma after thyroidectomy authorize 1-day surgery?

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Abstract
Background Compressive hematoma after thyroidectomy is a rare complication (1%) but can potentially be severe. The aim of this study was to search for risk factors, in particular the use of anticoagulants or antiplatelet medication, and to see if the delay of hematoma formation would require 1-day surgery performed in a careful manner.
Materials and methods Retrospective review of 6,830 patients undergoing thyroidectomy in a single institution (1991 to 2006) identified 70 patients with hematomas requiring reoperation. Case controls (210 patients) were matched for age, gender, year of operation, type of thyroid disease, and type of operation. The notion of anticoagulant or antiplatelet medication was particularly studied. The delay of hematoma formation and the cause of bleeding were studied in univariate analysis by a chi-squared test and a Fischer's test.
Results In univariate analysis, the formation of hematoma is not related to age, gender, type of thyroid disease, or type of bleeding. The pre or intraoperatory administration of anticoagulant or antiplatelet medication did not influence hematoma formation. Thirty-seven hematomas (53%) presented within 6 h postoperatively, 26 (37%) between 7 and 24 h and seven (10%) beyond 24 h.
Conclusion Patients undergoing anticoagulant or antiplatelet treatment are not a high-risk population for hematoma formation. Forty-seven percent of the patients presented postoperative hematomas beyond 6 h postoperatively, leading to the conclusion that 1-day surgery is not safe.

Keywords Thyroidectomy · Compressive hematoma · 1-day surgery · Anticoagulant

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Introduction

Complications in thyroid surgery are infrequent, especially when the procedure is performed by an experienced surgeon [1]. Nevertheless, the potential for significant morbidity is ever present and serious complications still occur. The reported incidence of compressive hematomas after thyroidectomy is about 1% [2, 3]. Most large series of cervical explorations [3–6] note this complication which is both potentially life threatening and unpredictable. This may have implications on same-day discharge which has been shown to be feasible and cost-effective [7–10]. The aim of this study was to search for risk factors, in particular the use of anticoagulants or antiplatelet medications, and to see if the time interval of hematoma formation authorizes 1-day surgery in a careful manner.

Materials and methods

In a retrospective review of all patients (n=6,830) undergoing thyroidectomy at a single institution from January 1991 to may 2006, 70 patients (1.02%) with postoperative hematomas requiring reoperation were identified.

Hematoma group (n=70) and nonhematoma group (n=6,744) were compared in univariate and multivariate analysis for age, sex, pathology, type of procedure, and compressive signs.

Case controls (n=210) matched for age, sex, type of thyroid disease, pathology, type of surgery, and medical treatment, especially anticoagulant and antiplatelet medications, were selected. These variables were compared by conditional logistic regression analysis.

The study patients were further evaluated for time interval to reoperation required and findings at reoperation and compared in the two groups by chi-squared test and Fischer exact test.

Results

The overall incidence of cervical hematomas requiring reexploration was 1.02% (70 of 6,830).

Characteristics of hematoma group (n=70) and nonhematoma group (n=6,744) were compared by univariate and multivariate analysis as shown in Table 1. In multivariate analysis, only male sex and preoperative dyspnea were statistically significantly different between the two groups.

Characteristics and anticoagulant drug administration of hematoma group (n=70) and matched nonhematoma group (n=210) were compared by univariate and multivariate analysis as shown in Tables 2 and 3. There was no statistically significant difference between the two groups for age, sex, pathology, type of procedure, compressive syndrome, and anticoagulant or antiplatelet medications.

Time interval reoperation in hematoma group (n=70) was studied. As illustrated in Fig. 1, 37 cases (53%) presented within 6 h of the initial procedure, 26 (37%) between 7 and 24 h and 7 (10%) beyond 24 h.

Characteristics and anticoagulant medications were studied in hematoma group (n=70) regarding the time interval of hematoma occurrence (within 6 h, between 7 and 24 h, and beyond 24 h) as shown in Table 4. No statistically significant difference was observed between the three groups, within 6 h (n=37), between 7 and 24 h (n=26), and beyond 24 h (n=7).

Discussion

Our study represents one of the few large case-controlled series evaluating symptomatic hematoma requiring reoperation after thyroidectomy. Four pertinent series were identified in the literature for comparison [2–6].The most important by Burkey et al. [6] from the Mayo Clinic Rochester Minnesota reported 42 patients requiring reoperation after thyroidectomy or parathyroidectomy among 13,817 patients with similar results.

We do not find in our study as well as in the literature any significant factors influencing the hematoma occurrence except, in our study, male sex and preoperative

Table 1 Comparison between hematoma group (n=70) and nonhematoma group (n=6,744) by univariate and multivariate analysis

	Patient with hematoma	Patient without hematoma	Univariate analysis[a] p value	Multivariate analysis[b] p value
N	70	6,744		
Age (years)	50±15	54±16	NS	NS
Sex				
Female	50 (71)	5,652 (84)	0.005	0.007
Male	20 (29)	1,092 (16)		
Pathology				
Benign	42 (60)	4,654 (69)	0.03	NS
Grave's disease	7 (10)	399 (6)		
Toxic pathology	12 (17)	596 (9)		
Thyroiditis	7 (10)	602 (9)		
Neoplasm	2 (3)	493 (7)		
Procedure				
Partial thyroidectomy	12 (17)	1,778 (26)	0.04	NS
Subtotal thyroidectomy	8 (11)	1,215 (18)		
Total thyroidectomy	48 (69)	3,237 (48)		
Totalization	2 (3)	514 (8)		
Compressive syndrome				
Dysphagia	11 (16)	1,082 (16)	0.9	NS
Dysphonia	1 (1)	287 (4)	0.37	NS
Dyspnea	3 (4)	89 (1)	0.06	0.047
Tracheal deviation	7 (10)	428 (6)	0.2	NS

Data are numbers with percentages in parentheses unless otherwise indicated.
[a] Chi-squared test or Fisher exact test as appropriate
[b] Stepwise multivariate analysis

Table 2 Comparison between hematoma group (n=70) and matched patients without hematoma (n=210) by univariate and multivariate analysis

	Patient with hematoma	Matched patient without hematoma	Univariate analysis[a] p value	Multivariate analysis[b] p value
N	70	210		
Age (years)	50±15	54±15	0.88	NS
Sex				
Female	50 (71)	152 (72)	0.8	
Male	20 (29)	58 (28)		NS
Pathology				
Benign	42 (60)	135 (64)	0.6	NS
Grave's disease	7 (10)	20 (10)		
Toxic pathology	12 (17)	30 (14)		
Thyroiditis	7 (10)	12 (6)		
Neoplasm	2 (3)	13 (6)		
Procedure				
Partial thyroidectomy	12 (17)	35 (17)	1	NS
Subtotal thyroidectomy	8 (11)	24 (11)		
Total thyroidectomy	48 (69)	144 (69)		
Totalization	2 (3)	7 (3)		
Compressive syndrome	18 (26)	56 (27)	1	NS
Dysphagia	11 (16)	40 (19)		
Dysphonia	1 (1)	2 (1)		
Dyspnea	3 (4)	9 (4)		
Tracheal deviation	7 (10)	17 (8)		
Goiter	42 (6)	126 (6)	1	NS

Data are numbers with percentages in parentheses unless otherwise indicated
[a] Chi-squared test or Fisher exact test as appropriate
[b] Stepwise multivariate analysis

dyspnea in univariate and multivariate analysis comparing hematoma and nonhematoma group. Factors like age, pathology, type of procedure and extent of thyroidectomy, compressive syndrome, and anticoagulant or antiplatelet medications do not influence hematoma occurrence.

On the basis of the time interval to reoperation, 47% of symptomatic cervical hematomas presented more than 6 h after the initial procedure. Outpatient thyroid surgery is advocated by an increasing number of surgeons as Steckler [9] and Lo Gerfo et al. [8] who conclude that ambulatory thyroid surgery is safe and cost-effective. But these studies reported a few patients less than 100 and were not extensive enough in our opinion.

The results of our study suggest that outpatient thyroidectomy may be dangerous for a significant number of patients. The threat of symptomatic cervical hematoma requiring urgent intervention extends beyond a typical outpatient observation period. Half of the symptomatic hematomas in this study presented beyond 6 h of initial operation and 10% actually presented beyond 24 h. In the study of Burkey et al. [6], more than 50% presented hematomas beyond 6 h and 20% beyond 24 h. In a decision

Table 3 Comparison between hematoma group (n=70) and matched patients without hematoma (n=210) by univariate and multivariate analysis

	Patient with hematoma	Matched patient without hematoma	Univariate analysis[a] p value	Multivariate analysis[b] p value
Preoperative day 10				
Oral anticoagulation	6 (9)	8 (4)	2.7 (0.8–9.2)	NS
Aspirin	1 (1)	8 (4)	0.35 (0.04–2.95)	NS
Preoperative day 1				
Heparin	6 (9)	17 (8)	1.07 (0.38–2.99)	NS
Operative day				
Nonsteroid drug	57 (81)	153 (73)	1.83 (0.86–3.89)	NS
Heparin	5 (7)	9 (4)	0.6 (0.22–1.78)	NS
Postoperative day				
Heparin	24 (34)	55 (26)	1.48 (0.81–2.69)	
Oral anticoagulation	3 (4)	5 (2)	1.8 (0.43–7.53)	

Data are numbers with percentages in parentheses unless otherwise indicated
[a] Chi-squared test or Fisher exact test as appropriate
[b] Stepwise multivariate analysis

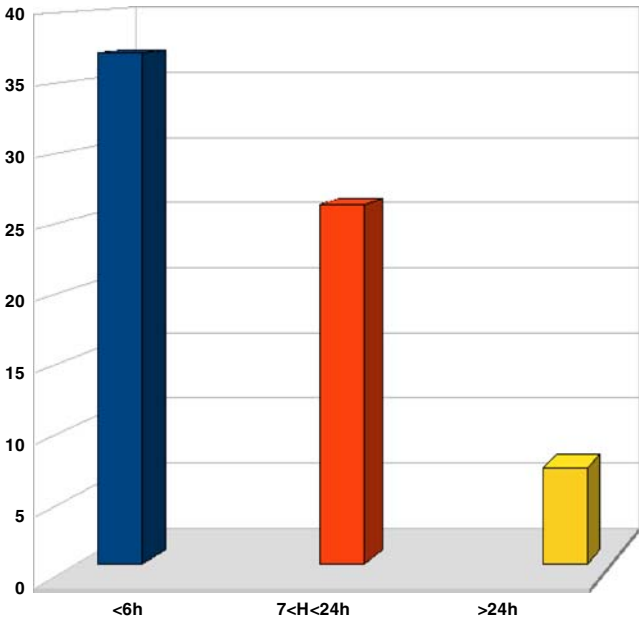

Fig. 1 Time interval reoperation in hematoma group (n=70)

analysis with historical outcome data, Schwartz et al. [11] predicted that, for 100,000 thyroidectomies performed, 94 deaths secondary to postoperative bleeding could be prevented by a 24-h hospitalization compared with a 6-h observation.

Conclusion

Our study identified specific perioperative risk factors that foreshadowed the development of compressive hematomas (Table 1): sex, benign nodules, total thyroidectomy, and dyspnea in univariate analysis and only sex and dyspnea in multivariate analysis. There was no specific perioperative factors influencing development of compressive hematomas comparing hematoma group (n=70) and matched non-hematoma group (n=210; Table 2).

The time interval for compressive hematoma is the same for patients with or without anticoagulant or antiplatelet medications (Table 3).

Table 4 Univariate analysis comparing patients characteristics and anticoagulant medications in hematoma group (n=70) for time interval of hematoma occurrence

	Hematoma	<6 h	Between 6 and 24 h	>24 h	p value
N	70	37 (53)	26 (37)	7 (10)	
Age (years)	50±15	51±18	57±14	56±15	0.36
Sex					
Female	50	27 (54)	19 (38)	4 (8)	0.67
Male	20				
Pathology					
Benign	42	22 (52)	15 (36)	5 (12)	0.87
Grave's disease	7	2 (29)	4 (57)	1 (14)	
Toxic pathology	12	8 (67)	3 (25)	1 (8)	
Thyroiditis	7	4 (57)	3 (43)	0 (0)	
Neoplasm	2	1 (50)	1 (50)	0 (0)	
Procedure					
Partial thyroidectomy	12	7 (58)	4 (33)	1 (8)	0.2
Subtotal thyroidectomy	8	1 (12)	5 (63)	2 (25)	
Total thyroidectomy	48	28 (58)	16 (33)	4 (8)	
Totalization	2	1 (50)	1 (50)	0 (0)	
Anticoagulant medication					
Preoperative day 10					
None	63	34 (54)	24 (38)	5 (8)	0.18
Oral anticoagulation	6	3 (50)	1 (17)	2 (33)	0.16
Aspirin	1	0 (0)	1 (100)	0 (0)	0.47
Preoperative day 1					
None	64	34 (48)	25 (35)	5 (7)	0.08
Heparin	6	4 (66)	1 (17)	1 (17)	0.45
Operative day					
None	11	3 (27)	6 (54)	2 (19)	0.2
Nonsteroid medication	57	32 (56)	20 (35)	5 (9)	0.4
Heparin	5	3 (60)	0 (0)	2 (40)	0.3

Data are numbers with percentages in parentheses unless otherwise indicated

More and more surgeons advocated 1-day surgery for thyroidectomy [7–9]. But these studies were not based on a great number of patients. Our study report 70 hematomas requiring reoperation among 6,830 consecutive patients in a single institution: 47% presented hematoma beyond 6 h and 10% beyond 24 h.

Based on these data, authors do not recommend 1-day surgery for thyroidectomy and think that this risk should be strongly considered before establishing out patient practice guidelines.

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