



Hypothyroidism after Hemithyroidectomy

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Abstract

Introduction: Thyroid lobectomy has the advantage of sparing many patients from the need of thyroxine definitive replacement therapy.

Objective: To evaluate the thyroid function after the hemithyroidectomy and the risk factors for the postoperative hypothyroidism.

Methods: It is a retrospective study of 333 consecutive patients undergone thyroid lobectomy and isthmusectomy from 2007 to 2014. Thyroid hormone determinations were performed before and one month after the surgical approach and were correlated to demographic, clinical e histopathological data. The Mann-Whitney U Test and the Exact Test of Fischer were employed.

Results: The mass of the remaining lobe presented some statistical trend ($p=0.0949$) as risk factor for the hypothyroidism. No statistical significance was observed regarding the other analyzed aspects.

Conclusion: Subclinical hypothyroidism was detected in 26.1%, whereas clinical hypothyroidism was detected in 3% of the patients in the postoperative period. The mass of the preserved lobe presented some statistical trend ($p=0.0949$) as risk factor for the hypothyroidism.

Keywords: Thyroidectomy; Hypothyroidism; Thyroid gland disorders; Thyrotropin; Thyroiditis; Thyroid

Introduction

Thyroid disorders are one of the more common endocrine disorders in the American population with prevalence rates ranging from 5 to 20% [1]. While the management of most thyroid cancers is to perform a total thyroidectomy [2,3], the extent of thyroid removal in cases of benign conditions or indeterminate nodules is still a topic of discussion [4,5].

The thyroid lobectomy and isthmusectomy is a common and effective procedure for benign nodular disease. After the hemithyroidectomy, patients must be followed up to prevent a progression to hypothyroidism [6]. The American Thyroid Association (ATA) guidelines strongly suggests the lobectomy for patients with a solitary nodule [7]. Compared to the total thyroidectomy, this surgical approach may avoid definitive hormone replacement therapy with levothyroxine [8]. Although, thyroid hormone supplementation is required in approximately 10% to 50% of patients after thyroid lobectomy [9-11].

The objective of this article is to evaluate the thyroid function after partial thyroidectomies and risk factors for hypothyroidism after this approach.

Methods

A total of 333 medical records of patients who underwent lobectomy with isthmusectomy in the Head and Neck services of Hospital Ana Costa and Irmandade da Santa Casa de Misericórdia de Santos, from 2007 to 2014 were retrospectively revised. All patients had normal thyroid function in the preoperative period, as the TSH and fT4 routine measurements have shown. All patients who underwent thyroidectomy totalization were excluded from the study. Patients were evaluated according to age, race, gland's mass, preoperative TSH and fT4 levels, results of the histopathological study and thyroiditis (according to the histopathological findings) – (Table 1). The postoperative hormonal measurements were performed 30 days after surgery.

Statistical analysis was performed by the chi-square test obtained from U test of Mann-Whitney and the exact Fisher test, being adopted as of statistical significance the $p<0.05$ value.

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Table 1: Histopathological, clinical and epidemiological data.

Variable	Category or measurements	n (%) or measurements
Age (years)	n	69
	Variation	18 – 82
	Median	48
	Average (standard deviation)	46,7 (15,2)
Gender	Men	7 (10,1)
	Women	62 (89,9)
Race	Non Caucasians	4 (7,1)
	Caucasians	52 (92,9)
Mass (grams)	n	62
	Variation	3 – 238
	Median	25,5
	Average (standard deviation)	34,1 (35,3)
Preop fT4	n	47
	Variation	0,9 – 12,8
	Median	1,3
	Average (standard deviation)	2,0 (2,2)
Preop TSH	n	52
	Variation	0,01 – 12,0
	Median	1,2
	Average (standard deviation)	1,6 (1,8)
Histopathological	Goiter	177 (53)
	Adenoma	123 (37)
	Cancer	33 (10)
Thyroiditis	Yes	150 (45)
	No	183 (55)

Results

Two hundred and thirty six patients (70.9%) showed normal thyroid function, 87 (26.1%) subclinical hypothyroidism and 10 (3%) hypothyroidism in the postoperative period. The only statistical trending feature as a risk for hypothyroidism was the volume of the preserved thyroid lobe ($p=0.0949$). Patients with bigger remnant thyroid mass had a tendency for normal thyroid function in the postoperative period – (Table 2).

Discussion

The incidence of hypothyroidism after hemithyroidectomy in several studies ranges between 11 and 43 % [12]. In our study, we found 26.1% of the cases with subclinical hypothyroidism and 3% with clinical hypothyroidism. The only statistical trending feature we found, as a risk for hypothyroidism, was the volume of the preserved thyroid lobe.

Some studies found that preoperative TSH level as the most important predictor for the development of post-hemithyroidectomy hypothyroidism [4,9,12]. In a Brazilian series of 85 patient who underwent hemithyroidectomy, 27 showed hypothyroidism (31%), being the presence of the antithyroperoxidase antibody (50% vs. 20%, $p<0,05$) and a preoperative TSH level above 2.5 mIU /mL (65% vs. 23.5%, $p<0,05$) the main risk factors [8]. In another series of 71 patients who underwent lobectomy with hormonal dosage after five weeks, subclinical hypothyroidism was present in 35% of the patients

and clinical hypothyroidism in 12% [13]. In our study there was no statistical significance between genders, as other articles reported [14], nonetheless, we must consider that male patients are in a smaller number.

There is a association between the presence of thyroiditis, as evidenced by lymphocytic infiltration of the gland on histopathology and postoperative hypothyroidism [4]. Autoimmune thyroiditis compromising the remnant lobe is a frequent cause of functional thyroid failure, mainly in elders, who underwent a lobectomy [15]. We did not perform a systematical dosage of the anti thyroid antibodies, however, the histopathological finding of thyroiditis in our series did not show statistical significance of hypothyroidism. Although it is still a major controversial issue [16,17], some authors understand that hormonal changes may occur later, which would suggest a larger follow up period [16]. In fact, being thyroiditis a progressive pathology, it is possible that a later hormonal dosage may show statistical significance.

On the other hand, we found a tendency for hypothyroidism in patients with smaller remnant lobe mass, which shows conformity with other articles [17,18]. Lang “*et al.*” [19] considered that there is a significant inverse association between the preoperative contralateral lobe's volume and hypothyroidism risk after hemithyroidectomy. In their study, together with a higher preoperative TSH level and fewer ipsilateral nodules, a smaller body surface area measured by preoperative ultrasonography independently predicted

Table 2: Histopathological, clinical and demographic factors and its relation to post-operative thyroid function.

Clinical Situation				
Variable	Category	Normal function	hypothyroidism	p-value
		n (%) / measure	n (%) / measure	
Preop fT4	n	33	14	0,9349
	Variation	0,9 – 12,8	0,9 – 7,0	
	Median	1,3	1,3	
	Average (standard deviation)	2,0 (2,4)	2,0 (1,8)	
Preop TSH	n	38	14	0,1401
	Variation	0,01 – 3,7	0,01 – 12,0	
	Median	1,2	1,7	
	Average (standard deviation)	1,3 (0,9)	2,5 (3,0)	
Mass (grams)	n	44	18	0,1419
	Variation	3,0 – 238,0	8,0 – 65,0	
	Median	26,0	20,0	
	Average (standard deviation)	38,7 (40,0)	22,8 (14,9)	
Tumor	Benign	231 (69,3)	102 (30,6)	0,664 *
	Cancer	102 (30,7)	48 (14,3)	
Thyroiditis	Yes	255 (76,5)	7 (23,3)	0,421 *
	No	216 (64,9)	13 (35,1)	
Volume of removed lobe	n	29	11	0,1979
	Variation	1,0 – 148,7	4,0 – 64,3	
	Median	22,1	9,6	
	Average (standard deviation)	32,0 (32,9)	18,1 (17,7)	
Volume of the preserved lobe	n	28	11	0,0949
	Variation	0,8 – 73,4	2,1 – 9,6	
	Median	6,4	4,8	
	Average (standard deviation)	10,3 (14,2)	5,1 (2,2)	

P-value obtained through Mann-Whitney's U test; *p-value obtained through Fisher's exact test.

hypothyroidism.

Systematical levothyroxine reposition is not recommended and should be used only in case of hypothyroidism development or in case of thyroid remnant growth [20].

Conclusion

Subclinical hypothyroidism was shown in 26.1% and clinical hypothyroidism in 3% of the patients in hemithyroidectomy postoperative. The preserved thyroid lobe mass showed statistical trending as a risk factor for hypothyroidism.

References

- Dunn JT. Guarding our nation's thyroid health. *J Clin Endocrinol Metab.* 2002;87(2):486-8.
- Sosa JA, Udelsman R. Total thyroidectomy for differentiated thyroid cancer. *J Surg Oncol.* 2006;94(8):701-7.
- Brown RL, de Souza JA, Cohen EE. Thyroid cancer: burden of illness and management of disease. *J Cancer.* 2011;2:193-9.
- Kandil E, Krishnan B, Noureldine SI, Yao L, Tufano RP. Hemithyroidectomy: a meta-analysis of postoperative need for hormone replacement and complications. *ORL J Otorhinolaryngol Relat Spec.* 2013;75(1):6-17.
- Su SY, Grodski S, Serpell JW. Hypothyroidism following hemithyroidectomy: a retrospective review. *Ann Surg.* 2009;250(6):991-4.
- Guberti A, Sianesi M, Del Rio P, Bertocchi A, Dazzi D, Guareschi C, et al. Thyroid function and goiter recurrence after thyroid lobectomy in elderly subjects. *J Endocrinol Invest.* 2002;25(10 Suppl):71-2.
- Cooper DS, Doherty GM, Haugen BR, Kloos RT, Lee SL, Mandel SJ, et al. Management guidelines for patients with thyroid nodules and differentiated thyroid cancer. *Thyroid.* 2006;16:109-42.
- Rosário PW, Pereira LF, Borges MA, Alves MF, Purisch S. Factors predicting the occurrence of hypothyroidism after hemithyroidectomy. *Thyroid.* 2006;16(7):707.
- Lee DY, Seok J, Jeong WJ, Ahn SH. Prediction of thyroid hormone supplementation after thyroid lobectomy. *J Surg Res.* 2015;193(1):273-8.
- Lee DY, Seok J, Jeong WJ, Ahn SH. Prediction of thyroid hormone supplementation after thyroid lobectomy. *J Surg Res.* 2015;193(1):273-8.
- Seiberling KA, Dutra JC, Bajaramovic S. Hypothyroidism following hemithyroidectomy for benign nontoxic thyroid disease. *Ear Nose Throat J.* 2007;86(5):295-9.
- Verloop H, Louwerens M, Schoones JW, Kievit J, Smit JW, Dekkers OM. Risk of hypothyroidism following hemithyroidectomy: systematic review and meta-analysis of prognostic studies. *J Clin Endocrinol Metab.* 2012;97(7):2243-55.

13. Said M, Chiu V, Haigh PI. Hypothyroidism after hemithyroidectomy. *World J Surg.* 2013;37(12):2839-44.
14. McHenry CR, Slusarczyk SJ. Hypothyroidism following hemithyroidectomy: incidence, risk factors, and management. *Surgery.* 2000;128(6):994-8.
15. Araújo Filho VJF, Brandão LG, Carlucci Jr. D, Moyses RA, Brescia MD'EG, Ferraz AR. Elevação de hormônio tireoestimulante (TSH) após as lobectomias: incidência e fatores associados. *Rev Col Bras Cir.* 2007;34(2):84-7.
16. Mariotti S, Franceschi C, Cossarizza A, Pinchera A. The aging thyroid. *Endocr Rev.* 1995;16(6):686-715.
17. Buchanan MA, Lee D. Thyroid auto-antibodies, lymphocytic infiltration and the development of postoperative hypothyroidism following hemithyroidectomy for non-toxic nodular goiter. *J R Coll Surg (Edinb).* 2001;46(2):86-90.
18. Bang U, Blichert-Toft M, Petersen PH, Nielsen BB, Hage E, Diederichsen H. Thyroid function after resection for non-toxic goitre with special reference to thyroid lymphocytic aggregation and circulating thyroid autoantibodies. *Acta Endocrinol (Copenh).* 1985;109(2):214-9.
19. Niepomniszcze H, García A, Faure E, Castellanos A, Del Carmen Zalabar M, Bur G, et al. Long-term follow-up of contralateral lobe in patients hemithyroidectomized for solitary follicular adenoma. *Clin Endocrinol.* 2001;55(4):509-13.
20. Lang B, Wong C, Wong K, Chu K, Shek T. Effect of thyroid remnant volume on the risk of hypothyroidism after hemithyroidectomy: A Prospective Study. *Ann Surg Oncol.* 2017.
21. Tschantz P, Sohrabi N, Dojcinovic S, Chèvre F. [Surgical indications and techniques in Basedow's disease, multinodular goiter and thyroid cancers] Indications et techniques chirurgicales dans la maladie de Basedow, le goitre multinodulaire et les cancers thyroïdiens. *Rev Med Suisse Romande.* 2001;121(5):337-9.