

Identifying Risk Factors of Hypothyroidism: A Study in a Tertiary Care Hospital, Rajshahi, Bangladesh

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Abstract

Original Research Article

This was a study cross sectional prospective study. This study was done in the Department of otolaryngology and Head Neck Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh during the period from 2015 January to 2015 December. Our aim was to identify risk factors of Hypothyroidism in adult patients. All patients were evaluated for age, sex, pre-operative and post-operative TSH levels, histopathology and follow up. Time of diagnosis and therapeutic dose of thyroid hormone were determined for patients with hypothyroidism. Out of 50 patients 11(22%) patients had become hypothyroid after surgery (9 females and 2 males). Female & male ratio is 5.25:1. The remaining 39 patients (33 females & 6 males) were euthyroid. The mean preoperative serum thyroid stimulating hormone (TSH) levels in hypothyroid and euthyroid groups were 3.14 μ IU/L & 2.008 μ IU/L respectively. A tissue diagnosis consistent with multi-nodular goitre (27%), lymphocytic infiltration or hashimoto thyroiditis (18%) compared with euthyroid patients (30% & 2%). Approximately 15-30% of patients who undergo hemithyroidectomy may have this complication, and some may need thyroid hormone replacement therapy. Patients at increased risk for postoperative hypothyroidism should be made aware of their risk factors and undergo more intensive follow-up. Maximum incidence of hypothyroidism following hemithyroidectomy in 3rd and 4th decade. Compared with those who were euthyroid, there was no significance difference in age, family history of goiter.

Key words: Histopathology, Thyroid Stimulating Hormone (TSH), Hemithyroidectomy, Hypothyroid.

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INTRODUCTION

From January 2015 to December 2015 total 50 patients underwent hemithyroidectomy in Rajshahi Medical College Hospital, Rajshahi, Bangladesh. The main indication for surgery was exclusion of malignancy, cosmetic consideration and relief of compressive symptoms. Hypothyroidism is a potential complication after radiation therapy when treatment fields include the thyroid gland. Hypothyroidism results from depleted production and secretion of thyroid hormones. This could flow from to disturbance at intervals the endocrine gland itself (Primary hypothyroidism) or at intervals the hypothalamic-pituitary-thyroid axis (Secondary hypothyroidism) [1]. The operation of hemithyroidectomy (total thyroid excision and isthmusectomy with preservation of the contralateral lobe) is indicated for patients with a unilateral thyroid mass that's inflicting compressive symptoms, cosmetic concern or to exclude thyroid

malignancies [2]. Hypothyroidism will occur when excision if the remaining thyroid lobe doesn't turn out adequate internal secretion to keep up a euthyroid state. Many studies have evaluated thyroid operate when hemithyroidectomy for benign thyroid unwellness. The rumored incidence of adenosis when hemithyroidectomy has been found to vary from five.0% to 49%, with most studies reportage a spread of 15-30% [2-4]. This inequality in results is partly because of variations in their definition of adenosis and to variations long of follow-up. Patients could have subclinical and clinical adenosis. Bodily fluid thyrotrophin levels ought to be habitually checked when hemithyroidectomy to find adenosis. Most patients UN agency square measure found to own associate degree elevated thyrotrophin level when hemithyroidectomy would require internal secretion replacement medical aid. However, some patients could become euthyroid while not intervention [5]. In the past, it absolutely was common observe for physicians to position most post-

hemithyroidectomy patients on prophylactic thyroid suppression medical aid with low-dose levothyroxine. The explanation for the strategy was supported the idea that the addition of low dose levothyroxine would stop repeat of unwellness within the remaining thyroid tissue by inhibiting endogenous secretion of endocrine (TSH). A consequence of this observe was that the administration of levothyroxine prevented physicians from recognizing those patients UN agency would have otherwise become hypothyroid when hemithyroidectomy. In more recent years, physicians usually stopped administering thyroid suppression medical aid throughout the immediate post-operative period. Instead, the new strategy was to follow these patients clinically for signs of repeat [7]. Hypothyroidism as a sequel of hemithyroidectomy could stay forgotten most of the time [5]. Delicate adenosis when hemithyroidectomy could subside when some months because the remnants of thyroid tissue are stirred by the rising thyrotrophin. Furthermore, post-operative adenosis in patients UN agency had chronic adenosis and don't receive secretion replacement medical aid early when operation is often severe [8]. The incidence and risk factors for development of adenosis when hemithyroidectomy stay unclear. We have a tendency to conducted a study to spot bound risk factors that will place a patient at a better risk for developing adenosis when hemithyroidectomy. These potential risk factors include age, sex, tissue pathology characteristics, the dimensions of thyroid remnant, a history of neck irradiation, and co existing thyroid autoimmune disorder [9]. Post-operative thyroid replacement medical aid is initiated sometimes Levothyroxine at one.8µgm/kg/day. The dose of Levothyroxine is adjusted on the idea of the results of bodily fluid thyroid stimulating secretion (TSH) and T (T4) levels performed four to six weeks when the thyroid replacement medical aid [10]. To identify risk factors of Hypothyroidism in Bangladesh.

OBJECTIVES

General objective

To determine prevalence of identify risk factors of Hypothyroidism in Bangladesh.

Specific Objectives

To find out the incidence of Hypothyroidism after Hemithyroidectomy in Bangladesh

METHODOLOGY AND MATERIALS

In this study all patients were not completed the follow up with their surgeons. All patients were not operated by single surgeon. Weight of excised gland might reflect the volume of the contra lateral or opposite lobe that was reported to be associated with hypothyroidism. Preoperative measurement of thyroid auto-antibodies which were further variable to predict post-operative hypothyroidism were not performed in

this study. We carried out a prospective Cross Sectional Study among 50 euthyroid patients with benign non-toxic thyroid disease who had undergone hemithyroidectomy from January 2015 to December 2015 admitted in the department of otolaryngology and Head Neck Surgery, Rajshahi Medical College Hospital. Subject selected by adopting purposive sampling techniques with maintaining some inclusion criteria.

Inclusion Criteria

- TSH, Age, Sex, Family history of thyroid disease.
- Age, Sex, Relation of patients.
- Preoperative & Postoperative TSH level.

Exclusion Criteria

- Potential risk factors for hypothyroidism.
- Postoperative TSH level µIU/L 6 weeks after surgery.
- Recommended follow-up protocol.

RESULTS

This was a cross sectional prospective study. The study was done in the Department of otolaryngology and Head Neck Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh during the period from January 2015 to December 2015. The main indication for surgery was exclusion of malignancy, cosmetic consideration and relief of compressive symptoms. Of them 42 (84%) were female, 8 (16%) were male and female male ratio was 5.25:1. The age of the patient ranged from 18 years to 60 years (mean age 36years) with a maximum age of patient in 3rd and 4th decade. Only 4 patients (3 females & 1 male) aged below 20 years. Hypothyroidism following hemithyroidectomy developed 22% and remaining 78% were euthyroid. Among hypothyroid patient 9 (81.81%) were female and 2 (18.18%) were male. Maximum incidence of hypothyroidism following hemithyroidectomy in 3rd and 4th decade. Compared with those who were euthyroid, there were no significance difference in age, family history of goitre, side of surgery, but post-operative TSH level between two means were significant (P value is <0.01). The pathological diagnosis after surgery were nodular goitre 5 (45.45%), multinodular goitre 3 (27.27%), hashimotothyroiditis 3(27.27%) and follicular adenoma 1(9.09%). The potential risk factors for hypothyroidism in this study were female (82%) and less than 45 years, preoperative mean TSH level 3.14µIU/l, multinodular goitre (27%), hashimoto thyroiditis (18%). In our study the follow-up schedule was at 6weeks, 3 months and 6 months after surgery, then yearly thereafter. Among hypothyroid patients 5(45.45%) were subclinical and 6 (54.54%) were clinical and 9 patients required postoperative levothyroxine therapy.

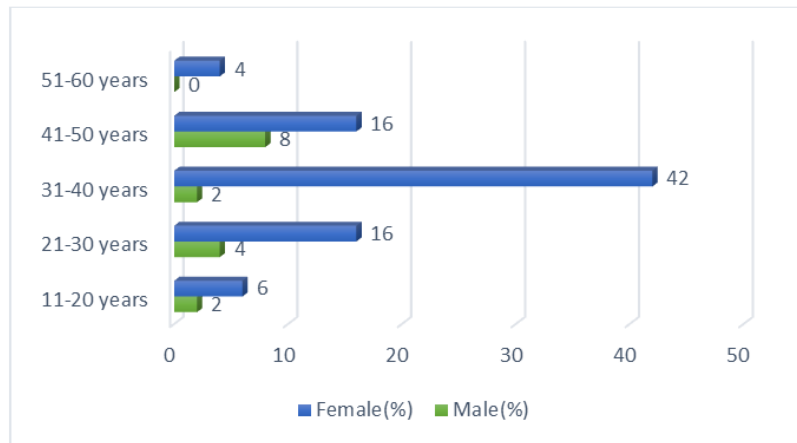


Fig-I: Age & Sex distribution of the study participants (n=50)

Table-1: Incidence of hypothyroidism after hemithyroidectomy (n=50)

Diseases	N (%)
Hypothyroid	11(22%)
Euthyroid	39(78%)

Table-II: Incidence of hypothyroidism after hemithyroidectomy according to sex (n=50)

Sex	Total number of patients	Number of patients with hypothyroidism	%
Male	08	02	18.18
Female	42	09	81.81

Table-III: Incidence of Hypothyroidism after hemithyroidectomy (age sex relation) (n=50)

Age group	Male	Female	Total number of patients
11-20	0	1	1
21-30	1	1	2
31-40	0	4	4
41-50	1	1	2
51-60	0	2	2

Table-IV: Post-operative TSH, Age, Sex, Family history of thyroid disease, Side of operation (n=50)

		Post-operative Euthyroid N = 39	Post-operative Hypothyroid N = 11	P Value
Post-operative TSH (Mean)		3.06 μ IU/L	13.06 μ IU/L	< 0.01
Age (mean)		35.69	36.27	0.08
Sex	Female	33 (84.61%)	9 (81.81%)	
	Male	6 (15.38%)	2 (18.18%)	
Family history of thyroid disease	Yes	5 (12.82%)	2 (18.18%)	0.14
	No	29 (74.36%)	7 (63.64%)	
	unknown	5 (12.82%)	2 (18.18%)	
Side of operation				0.08
	Right	22 (56.41%)	7 (63.63%)	
	Left	17 (43.58%)	4 (36.36%)	

Table-V: Pathology of resected tissue (n=50)

Histopathology	Post-operative Euthyroid N = 39	Post-operative Hypothyroid N = 11
Nodular goitre (adenomatous, goitre, hyperplastic)	23 (58.97%)	5 (45.45%)
Follicular adenoma	3 (7.69%)	1 (9.09%)
Multinodular goitre	12 (30.76%)	3 (27.27%)
Hashimoto thyroiditis	1 (2.56%)	2 (18.18%)

Table-VI: Potential risk factors for hypothyroidism:

Risk Factors		Hypothyroid (N = 11)	Euthyroid (N = 39)
1. Sex	Female	9 (81.81%)	33 (84.61%)
2. Age	≤ 45 years	8 (72.72%)	36 (92.30%)
	>45 years	3 (27.27%)	3 (7.69%)
3. Pre-operative TSH(Mean)		3.06 μ IU/L	2.008 μ IU/L
4. Lymphocytic infiltration		1 (9.09%)	1 (2.56%)
5. Histologic type	Nodular goitre	5	23
	Follicular adenoma	1	3
	Multinodular goitre	3	12
	Hashimoto thyroiditis	2	1

Table-VII: Preoperative & Postoperative TSH level in hypothyroid patient (n=11)

Sl. no	Sex	Age	Preoperative TSH level μ IU/L	Postoperative TSH level μ IU/L 6 weeks after surgery
1	Female	60	4.29	13.54
2	Female	31	3.31	18.69
3	Female	35	2.91	5.22
4	Female	23	3.90	11.14
5	Female	32	3.41	7.21
6	Female	55	2.87	14.17
7	Female	19	1.47	5.52
8	Female	42	1.97	21.5
9	Female	34	2.66	7.89
10	Male	23	3.50	7.06
11	Male	45	4.30	18.99

Table-VIII: Classification of Hypothyroidism (n=50)

Sub-clinical hypothyroid (TSH level > 4.5 μ IU/L)		Clinical hypothyroid Abnormal serum TSH & free T4 concentrations or development of hypothyroidism symptoms	
Number of patient	Percentage (%)	Number of patient	%
5	45.45	6	54.54

DISCUSSION

In this study all patients were not completed the follow up with their surgeons. All patients were not operated by single surgeon. Weight of excised gland might reflect the volume of the contra lateral or opposite lobe that was reported to be associated with hypothyroidism. Preoperative measurement of thyroid auto-antibodies which were further variable to predict post-operative hypothyroidism were not performed in this study. In our study all bio-chemical values were not performed in single laboratory which reflected different reference values. The objective of this study is to see the incidence, risk factors and management of malady| gland disease| glandular disorder| adenosis} occurring once hemithyroidectomy for benign non-toxic thyroid disease. The operation of hemithyroidectomy may be a comparatively normally performed procedure. It's indicated for patients with a unilateral mass to exclude cancer, to alleviate compressive symptoms or for cosmetic concerns. Hypothyroidism, each clinical and subclinical, may be a potential consequence of hemithyroidectomy and is related to variety of adverse clinical outcomes. The routine uses of tetraiodothyronine for all patients once surgery is not

any longer adopted due to queries over its effectuality and doable facet effects. Therefore, it's necessary to spot those patients United Nations agency square measure in danger of developing glandular disorder within the early surgical amount in order that they will be additional watchfully monitored victimisation thyroid perform tests. There's no universally accepted definition of traditional thyroid perform, primarily based upon thyroid perform assays. For this study, we've got adopted a thyrotropic hormone level of four.5 μ IU/L because the higher limit of traditional [11-12]. Our results demonstrate associate incidence of glandular disorder following hemithyroidectomy of twenty-two (clinical glandular disorder was seen in fifty fifth and subclinical glandular disorder in 45%). All patients are} follow up once half-dozen weeks of surgery and habitually measure liquid body substance thyrotropic hormone level. Risk factors for hypothyroidism following hemithyroidectomy embrace the female (82%), less than forty-five years, surgical mean thyrotropic hormone level three.14 μ IU/L, multinodular goitre (27%), hashimoto thyroiditis (18%). Thyroid perform once hemi-thyroidectomy is clearly dependent upon the purposeful capability of the

thyroid remnant. it'd be intuitive to assume that patients with current thyroid malady would be at raised risk of developing consequent glandular disorder.¹⁵ Our study demonstrates that a comparatively raised (greater than the mean thyrotropic hormone however still at intervals traditional limits) surgical thyrotropic hormone is additionally related to associate raised risk of developing glandular disorder. A raised thyrotropic hormone will be taken as a mirrored image of deteriorating thyroid reserve associated afterward a raised risk of developing post-operative glandular disorder [15]. Our results additionally support the hypothesis that WBC Infiltration/ Hashimoto redness may be an important risk issue for the event of glandular disorder [17-18]. The presence of lymphocytes in thyroid tissue would indicate active or current malady and thus the likelihood of a progressive decline in thyroid perform [19]. Multi-nodular struma has been related to associate raised incidence of post-operative glandular disorder [19]. This may additionally ascertain in our study. Multi-nodular struma is connotative a full of life malady method, it'd got to be assumed that it should alter the perform of remaining thyroid tissue [15]. In our country most incidence of thyroid malady occurs in feminine. In our study majority of patients are feminine and below forty-five years getting on. Many studies have evaluated thyroid perform once hemithyroidectomy for benign thyroid malady. The reported incidence of glandular disorder once hemithyroidectomy has been found to vary from five.0% to 49%, with most studies reportage a spread of 15-30% [2-4]. Our figures square measure around midway and agree favourably with alternative studies. This inequality in results is partly because of variations in their definition of glandular disorder and to variations long of follow-up. Glandular disorder, each clinical and subclinical, may be a potential consequence of hemithyroidectomy and has been related to variety of adverse clinical outcomes. However, glandular disorder once hemithyroidectomy is associate underneath recognized complication, with patients most frequently monitored just for a brief timepostoperatively [15]. There is not any wide accepted guideline for the observance of thyroid perform once hemithyroidectomy, going glandular disorder because the most typical ensuing complication. Follow-up tips vary wide and customarily carries with it one surgical measuring of thyrotropic hormone. Some patients might not be examined the least bit till the event of bald glandular disorder. If thyroid disfunction is detected, the choice to start out hormone replacement medical aid is typically supported the preference of the treating medico, patient symptoms, and therefore the degree and length of thyrotropic hormone elevation, instead of on proof obtained from clinical trials. Therefore, it's necessary to spot those patients United Nations agency square measure in danger of developing glandular disorder presently once surgery in order that they will be additional paying attention monitored victimisation thyroid perform tests [15]. many recommendation

protocol for follow-up once hemithyroidectomy is given below- surgical thyrotropic hormone measuring eight to twelve weeks once surgery, followed by the measuring of thyrotropic hormone levels at half-dozen months and twelve months once surgery. If the thyrotropic hormone level is traditional at twelve months, time period to annual determination of thyrotropic hormone levels was inspired unless symptoms of glandular disorder manifest¹⁹Postoperative thyrotropic hormone level ought to be checked four weeks once surgery and once more three months. At three months once operation, the choice relating to prescription of levothyroxine to patients with subclinical glandular disorder (more than 10 μ IU/ml). once three months once operation, the measuring of thyrotropic hormone levels was suggested at half-dozen and twelve months once surgery. If the thyrotropic hormone level is traditional at twelve months, time period to annual determination of thyrotropic hormone levels might be checked unless symptoms of glandular disorder manifest [20]. To acquire a surgical thyrotropic hormone measuring for all patients at half-dozen weeks once surgery, followed by the measuring of thyrotropic hormone levels at half-dozen and twelve months once surgery was suggested. thyrotropic hormone level at three months was now not suggested as a result of most patients displayed marked increase in their thyrotropic hormone level right away once surgery, that afterward normalized over time[21]. Our guide line was measuring of liquid body substance thyrotropic hormone level half-dozen weeks once surgery and once more once three months. At three months once operation, the choice relating to prescription of levothyroxine to patients with subclinical glandular disorder (more than 10 μ IU/ml). Then measuring of thyrotropic hormone levels was suggested at half-dozen and twelve months once surgery. If the thyrotropic hormone level is traditional at twelve months, time period to annual determination of thyrotropic hormone levels might be checked unless symptoms of glandular disorder manifest. This study needs longer follow up periods to confirm this, but follow up periods of our study were only 6 months.

LIMITATIONS OF THE STUDY

It was a cross-sectional study with small sample size, which doesn't reflect the scenario of the whole country.

CONCLUSION AND RECOMMENDATIONS

The incidence of hypothyroidism after hemithyroidectomy is not negligible and should not be overlooked. Approximately 15-30% of patients who undergo hemithyroidectomy may have this complication, and some may need thyroid hormone replacement therapy. Risk factors such as elevated preoperative TSH levels, elevated concentrations of thyroid autoimmune antibodies, degree of thyroiditis,

age, and residual thyroid volume are associated with an increased risk of hypothyroidism after hemithyroidectomy. Patients at increased risk for postoperative hypothyroidism should be made aware of their risk factors and undergo more intensive follow-up.

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