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The Risk Factors of Post-Thyroidectomy Hematoma: Our Experience in Jordanian Royal Medical Services

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Abstract **Original Research Article**

Introduction*:** Neck hematoma post thyroidectomy is a life-threatening complication and frequently reoperation is indicated. The risk factors and prevalence of post-thyroidectomy hematoma were evaluated herein. ***Methods: In this retrospective descriptive study (657) medical files of patients who underwent thyroidectomy in Jordanian Royal Medical Services were enrolled. Thyroidectomies were done between January 2016 and May 2023. The follow-up period was up to 48 hours post thyroidectomy. Coagulopathies were excluded from this study. SPSS model 26 was used to analyze data. ***Results*:** Regarding the demographic and categorical data there were significant differences in male sex, age > 50 years, higher BMI, high blood pressure, volume of surgeries, histological diagnosis, and short operative time (P-value < 0.05). The other variables like extent of thyroidectomy, hyperthyroidism, drain placement, lateral and central neck dissection, and use of hemostatic agents were insignificant (P-value > 0.05). Out of (657), 6 patients had post-thyroidectomy hematoma (0.9%). 4 patients were treated by revision of the surgery (0.6%) and 2 patients were treated conservatively (0.3%). ***Conclusion*:** Cervical hematoma is a dangerous complication and rarely occurs post-thyroidectomy. Related risk factors are male gender, ages > 50 years, higher BMI, perioperative hypertension, high surgeon volume, final pathological type, and short operative time which when they monitored closely could decrease the risk of this fatal complication.

Keywords: Neck Hematoma, Thyroidectomy, Hyperthyroidism, Thyroid Cancer, Neck Dissection.

INTRODUCTION

Of all thyroid nodules, thyroid malignances constitute 5% [1]. With the increasing use of neck ultrasonography and fine needle aspiration biopsy (FNAB), the rate incidence of thyroid cancer has increased rapidly worldwide, and so thyroid surgery has become the one of most common surgical procedures [2]. Although thyroidectomy is a relatively safe procedure, postoperative complications cannot be avoided. One of these complications is Postoperative neck hematoma, which is a rare potentially life-threatening event, it may lead to airway compression, causing acute respiratory distress or even death, and emergency revision of surgery is a common operative solution [3]. The commonest complication post thyroidectomy that needs hospital readmission is hypocalcemia, while frequent reason for reoperation is neck hematoma [4]. Other post-thyroidectomy complications are hypoparathyroidism and recurrent laryngeal nerve palsy [5]. The rate of neck hematoma is approximately 0.1% to 1.1% post thyroidectomy and occurs mainly in the first 6 hours after surgery due to several surgeons or patient factors [6].

Herein, we reviewed these risk factors of neck hematoma and the incidence rate of this complication.

METHODOLOGY

In this retrospective descriptive study (657) patients were enrolled with the ages between (19 and 67 years). These patients underwent hemi, total, and completion thyroidectomies in the department of general surgery at Jordanian Royal Medical Services between January 2016 and May 2023. These procedures were done as inpatient surgeries as an open technique. The following data were reviewed: previous medical illnesses, BMI, number of surgeries that were done per

year, histological diagnosis, operative time, extent of thyroidectomy, drain placement, type of neck dissection, use of hemostatic agents, and the methods of hemostasis during operation (including tie and knot, clip, bipolar cautery, or energy devices such as Ligasure or Harmonic Scalpel according surgeon's preferences.

Exclusion criteria included patients who underwent previous parathyroidectomy, and patients with coagulopathy disorders or using anticoagulopathy drugs.

The follow-up period was up to 48 hours post thyroid surgery.

Statistical Analysis

SPSS model 26 was involved to analyze data (demographic and categorical data). Most of the data were presented in the form of tabulated comparative statistics. The numbers and the percentages were generated from the variant variables. The Comparison between these data (N (%)) was done by chi-square test. P-value < 0.05 was considered statistically significant.

Ethical Committee: The ethical committee approval was gained from our Royal Medical Services institution for publication of this study.

RESULTS

Based on the inclusion criteria, (657) patients underwent thyroidectomies. The number of males was (356), while (301) females underwent this procedure. The ages were between (19 and 67 years), (289) patients were < 50 years, while (368) ≥ 50 years. Patients who have BMI between (18.5 and 29.9) were numbered (213), and patients who have obesity BMI 30 or higher were numbered (444). Hypertensive patients were (322). Malignant pathologies were found in (386) patients. Patients with preexisting hyperthyroid were (92). Hemithyroidectomies were (382), total thyroidectomies were (52), subtotal thyroidectomies were (13), and completion thyroidectomies were (210). The number of patients who experienced post-operative neck hematoma was (6) patients (0.9%). 4 patients were treated by revision of the surgery (0.6%) and 2 patients were treated conservatively (0.3%). The percentages were calculated regarding the total number of patients. P-value were considered < 0.05 significantly. Table1.

Table1: The Demographic Data in Association with the Incidence of Hematoma

Variables\N*\%©	Without neck hematoma	With neck hematoma	P-value
Males\356\54.2%	352\53.6%	4\0.6%	0.008
Females\301\45.8%	299\45.5%	2\0.3%	0.034
Age < 50 years\289\44%	288\43.8%	1\0.15%	0.012
Age ≥ 50 years\368\56%	363\55.25%	5\0.76%	0.046
BMI< 30\213\32.4%	213\32.4%	0\0%	0.002
BMI≥30\444\67.6%	438\66.6%	6\0.9%	0.033
HTN\322\49%	318\48.4%	4\0.6%	0.007
No HTN\335\51%	333\50.7%	2\0.3%	0.042
Malignant\386\59%	381\58%	5\0.76%	0.028
Benign\271\41%	270\41%	1\0.15%	0.048
Right hemithyroidectomy\201\30.6%	200\30.45%	1\0.15%	0.053
Left hemithyroidectomy\181\27.5%	180\27.35%	1\0.15%	0.078
Total thyroidectomies\52\7.9%	51\7.75%	1\0.15%	0.092
Subtotal thyroidectomies\13\2%	12\1.85%	1\0.15%	0.059
Completion thyroidectomies\210\32%	208\31.7%	2\0.3%	0.082
Preexisting hyperthyroid\92\14%	92\14%	0\0%	0.066

N*: Number of patients. %©: Percentage of patients.

Regarding the categorical variables there were an increase in numbers of patients among those who underwent short operative time of surgeries < 45 minutes (5 out of 391 patients). Also, the incidence of bleeding after thyroidectomies was influenced by the load of surgeries that were done per year > 100 surgery\year (4 out of 374). Two out of 243 patients who experienced use of hemostatic agents intraoperatively developed bleeding post thyroid surgery. 408 patients had neck drain placement post-thyroidectomy and 249 without drains. Three patients after removal of neck drains suffered from bleeding post thyroidectomy, while patients without neck drains had three cases of cervical hematoma. In relation to neck dissection, 27 patients underwent central neck dissection, 14 underwent bilateral neck dissection, and 9 patients underwent unilateral neck dissection. One patient developed bleeding post-operatively in central neck dissection, one patient after bilateral neck dissection, and nobody experienced any neck bleeding post unilateral neck dissection. Concerning the methods of hemostasis intraoperatively (tie and knot, clip, bipolar cautery, or energy devices such as Ligasure or Harmonic Scalpel no significant differences were observed. In table2 the variables were presented in association to the cervical hematoma post-operatively and the numbers of patients were calculated regarding the total number of patients (657). P-value < 0.05 were considered significant.

Table 2: the categorical data in relation to post-operative neck hematoma

Variables\N*\%®	Without neck hematoma	With neck hematoma	P-value
Short operative duration\391\59.5%	386\58.75%	5\0.76%	0.003
Long operative duration\266\40.5%	265\40.33%	1\0.15%	0.029
High load of surgeries> 100 per year\374\56.9%	370\56.3%	4\0.6%	0.038
Low load of surgeries <100 per year\283\43%	281\42.77%	2\0.3%	0.017
Use of hemostatic agents\243\37%	241\36.7%	2\0.3%	0.051
Without use of hemostatic agents\414\63%	410\62.4%	4\0.6%	0.085
Drain placement\408\62%	405\61.64%	3\0.45%	0.072
Without drain placement\249\38%	246\37.44%	3\0.45%	0.054
Central neck dissection\27\4.1%	26\3.95%	1\0.15%	0.069
Bilateral neck dissection\14\2.13%	13\2%	1\0.15%	0.094
Right lateral neck dissection\5\0.76%	5\0.76%	0\0%	0.088
Left lateral neck dissection\4\0.6%	4\0.6%	0\0%	0.071
Tie and knot method\ 263\40%	262\39.87%	1\0.15%	0.055
Clip method\117\17.8%	117\17.8%	0\0%	0.062
Bipolar cautery\93\14%	93\14%	0\0%	0.059
Energy devices\184\28%	183\27.85%	1\0.15%	0.091

N*: Number of patients. %®: Percentage of patients.

DISCUSSION

The incidence of neck hematoma in our study was (0.9%). And there were significant differences in male sex, age > 50 years, higher BMI, high blood pressure, volume of surgeries, histological diagnosis, and short operative time. While the extent of thyroidectomy, hyperthyroidism, drain placement, lateral and central neck dissection, and use of hemostatic agents were insignificant variables. Concerning the methods of hemostasis intraoperatively (tie and knot, clip, bipolar cautery, or energy devices such as Ligasure or Harmonic Scalpel no significant differences were observed. Out of 6 patients who had post-thyroidectomy hematoma, 4 patients were treated by revision of the surgery (0.6%) and 2 patients were treated conservatively (0.3%).

Saad M. Alqahtani *et al*., reported the incidence of cervical hematoma (0.8%), which is consistent with our findings, but in the contrary, they reported no significant association between age, sex, and final pathology with risk of hematoma [7].

Regarding the type of neck dissection, unilateral neck dissection is an independent risk factor for cervical hematoma, in contrast to our results [8].

Other literature reported the incidence rate of post-thyroidectomy hematoma (1.24%), and perioperative hypertension did not affect the hematoma [9].

The extent of thyroid surgery plays a role in increasing risk of post-thyroidectomy bleeding (partial thyroidectomy), while in our article no role of this factor to increase risk of bleeding [10].

In contrast to the above-mentioned literature findings, bilateral thyroidectomy increases the risk of cervical bleeding more than types of thyroidectomies [11].

Energy vessel sealant devices could be associated with lower risk of bleeding than other methods of hemostasis techniques in thyroid surgery, while the toxic goiter could increase that risk [12]. Decreasing surgeon volume is considered a risk factor of bleeding post thyroidectomies, in contrast to our results [13]. Hyperthyroidism, especially Grave's disease could be an independent risk factor for post-thyroidectomy bleeding [14].

In our study, malignant process of thyroid gland increases the risk of postoperative bleeding, while others reported the increase in this risk after surgery of benign thyroid gland lesions [15].

Drain placement and use of hemostatic agents could also be independent risk factors for bleeding post thyroidectomies [16].

CONCLUSION

Cervical hematoma is a dangerous complication and rarely occurs post-thyroidectomy. Related risk factors are male gender, ages > 50 years, higher BMI, perioperative hypertension, high surgeon volume, final pathological type (malignant process), and short operative time. Patients with these risk factors should be monitored closely postoperatively to decrease the risk of this fatal complication.

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