With the Advance in the Techniques of Hemostasis, Is it Necessary to Use Drain Routinely in Thyroid Surgery? A Comparative Study

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Abstract

Prophylactic drainage after thyroid surgery, many surgeons have routinely used it to prevent post thyroidectomy cervical hematoma. With advances in surgical methods of hemostasis, the rate of post thyroidectomy cervical hematoma has decreased significantly to about 0.1%. The aim of this study is to evaluate the outcome of thyroidectomy with drain vs no drain, while we achieved the hemostasis by an Ultrasonic scalpel in all cases. We conducted this study in Al-Shiffa general hospital, Basrah, Iraq, during the period from January 2016 to January 2018. Eighty patients with different thyroid pathologies and candidates for total or near total thyroidectomy have been included; forty patients were undergoing thyroid surgery with drain in the period during 2016. We compared the results with results of a selected similar characteristics group of forty patients that undergo thyroid surgery with no drain in the period during 2017. The results of this study show that, the patients with no drain reported a significant shorter mean duration of surgery in comparison to patients with drain (53.13 ± 14.16 and 60.49 ± 7.78 minutes) respectively, P-value = 0.01. In addition, patients with no drain also reported a significant shorter mean duration of hospital stays in comparison to patients with

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drain (24 ± 4.16 and 48 ± 9.29 hours). Respectively, P-value = 0.001. Most patients with no drain reported mild level of pain score compared to patients with drain, 32(80%) and 11(27.5%) respectively, with significant statistical difference: P-value = 0.001. Three patients (7.5%) developed seroma in patients with drain, while in patients with no drain, the seroma was reported in 4 patients (10%) with no significant statistical difference between 2 groups (P-value = 0.692). No cases of cervical hematoma, postoperative bleeding, wound infection or mortality were reported during this study. In conclusion, using advanced energy devices like ultrasonic scalpel for hemostasis in thyroid surgery, the drain should not be used routinely. The routine drainage may increase postoperative pain, prolong duration of surgery and postoperative hospital stay.

Keywords

Thyroidectomy; Drainage in Thyroid Surgery; Hemostasis in Thyroid Surgery; Advance Hemostatic Energy Devices; Ultrasonic Scalpel

Introduction

Many surgeons have used routinely prophylactic drainage after thyroid surgery to prevent post thyroidectomy cervical hematoma that may compromise the venous and lymphatic drainage of the neck leading to acute laryngeal edema, which can threaten the patient's life [1].

Published studies reported that the routine uses of drain in thyroid surgery did not prevent hematoma formation and may be associated with increased; rate of wound infection, postoperative pain and duration of hospital stay [2,3].

In modern thyroid surgery and with the advance in the methods of hemostasis, it decreased significantly the rate of post thyroidectomy cervical hematoma to about 0.1% [4].

All studies that evaluated the use of the new advanced energy devices like LigaSure and Ultrasonic scalpel in the hemostasis during thyroid surgery, have used a drain to measure the volume of postoperative drainage, they reported significant reduction in the amount of blood loss, postoperative drainage volume and hospital stay [5-8]. Woo SH, et al., compared the results of natural pressure drainage and negative pressure drainage after total thyroidectomy and reported that, the suction effect of the negative pressure drains, unsealing some blood and lymphatic vessels, leading to a significant increase in the postoperative drainage volume [9].

The aim of this study is to evaluate the outcome of thyroidectomy with drain vs no drain, while we achieved the hemostasis by an Ultrasonic scalpel in all cases.

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Patients and Methods

We conducted this study in Al-Shiffa general hospital, Basrah, Iraq, during the period from January 2016 to January 2018. Eighty patients with different thyroid pathologies and candidates for total or near-total thyroidectomy have been included; Forty patients were undergo thyroid surgery with drain in the period during 2016 (group D), we compared the results with results of a selected similar characteristics group of Forty patients that undergo thyroid surgery with no drain in the period during 2017 (group ND). Exclusion criteria includes; history of uncorrected coagulopathy, thyroid carcinoma with multiple levels lymph nodes metastasis, uncontrolled hyperthyroidism and retrosternal goiter larger than grade 1.

Operative Technique

All thyroidectomies had been done with Theodor Kocher procedure. During induction of general anesthesia with endotracheal intubation through the mouth, the patient received intravenous prophylactic antibiotics, either amoxicillin 1 g or clindamycin 900 mg, in case of an allergy to penicillin. In supine position with neck extension, a collar skin incision was done midway between suprasternal notch and thyroid notch and extended from one sternomastoid muscle to another. Creation of sub-platysmal flaps. Vertical incision of pre-tracheal fascia, separation of strap muscles and mobilization of thyroid lobes. In both groups the hemostasis and the excision of thyroid tissues were achieved with Ultrasonic scalpel (Sonicbeat, USG400, Olympus, Japan). Vacuum drainage for thyroidectomy bed has been used for all patients in group D. The pre-tracheal fascia was closed partially, leaving about 3 cm in the distal part unclosed as a prophylactic measure, so that if postoperative bleeding occurs, it will be accumulated beneath the sub-platysmal flap that facilitate it's evacuation and prevention of the tension hematoma formation. The remaining layers of the wound were closed completely.

Postoperative Care

After recovery from general anesthesia, the patients were transmitted to the surgical ward for follow-up. Intravenous antibiotics were continued until the patients were discharged from hospital. Pain assessment have been done by the resident doctor during the night tour. In this study we utilize Visual Analogue Scale (VAS) for postoperative pain assessment (0 to 10 scale); no pain = 0, mild pain = 1-3, moderate pain = 4-6 and severe pain =7-10.

The drain was removed when the amount of postoperative drainage was less than 30 ml per 24 hours. The patients were discharged from hospital once the following conditions were met, the drain was removed and the vital signs were within the normal range. They were re-examined

clinically and also by ultrasound of cervical region to evaluate postoperative hematoma and seroma formation, at the end of the first postoperative week, in two weeks and then in four weeks.

Perioperative data were recorded and include the following; the patient's characteristics in term of; gender, age, clinical diagnosis, preoperative thyroid ultrasound findings, postoperative cervical region ultrasound findings, histopathology results and the surgical procedure details. The outcome of surgery in term of; mean duration of surgery in (minutes), mean postoperative drainage volume in (ml), mean duration of drain removal in (hour) and the mean duration of hospital stay in (hour) and the results of Visual Analogue Scale (VAS) from (0-10). The complications in term of; cervical hematoma, seroma, postoperative bleeding need blood transfusion and/or reoperation, wound infection and any intraoperative or postoperative mortality were also recorded.

The statistical package of IBM SPSS Version 20 (IBM Corp., Armonk, NY, USA) was used for data analysis. The results were directly compared between the two groups using the two-tailed t-test for quantitative variables and related samples Mc Nemar test for qualitative variables. Statistical significance was considered at $P < 0.05$.

Results

Patients' age, gender, and diagnosis are summarized in Table 1. There were no statistically significant differences observed among the groups in terms of age, gender, or diagnosis.

Regarding the outcome of both groups, ND group reported a significant shorter mean duration of surgery in comparison to D group (53.13 ± 14.16 and 60.49 ± 7.78 minutes) respectively, P -value = 0.01. In addition, ND group also reported a significant shorter mean duration of hospital stays in comparison to D group (24 ± 4.16 and 48 ± 9.29 hours) respectively, P -value = 0.001, as shown in Table 2.

The mean postoperative drainage volume (ml) in the group with drain (D group) for the first 24 hours after surgery was 75 ± 10.72 SD and 25 ± 12.36 SD for the second 24 hours. The mean duration of drain removal (hour) was 48 ± 9.29 SD.

Regarding level of pain score, most patient in ND group reported mild level of pain score in comparison to D group 32(80%) and 11(27.5%) respectively, with significant statistical difference, P -value = 0.001, as shown in Table 3.

During this study, regarding postoperative complications, 3 patients (7.5%) developed mild seroma detected by postoperative ultrasound examination of cervical regions in (D group) while, in (ND group), the seroma was reported in 4 patients (10%) with no significant statistical difference between 2 groups (P -value = 692). All cases of seroma were treated conservatively

and resolved in few days without complications. No cases of cervical hematoma, postoperative bleeding, wound infection or mortality were reported.

Patients Characteristics	D Group (n=40)	ND Group (n =40)	P-value
Mean age (y) $\pm$ SD	40.27 $\pm$ 10.05 SD	40.46 $\pm$ 9.74 SD	0.46
Gender (%)			
Male	10 (25%)	9 (22.5%)	0.500
Female	30 (75%)	31 (77.5%)	0.125
Total	40 (100%)	40 (100%)	
Diagnosis (%)			
Toxic goiter	17 (42.5%)	18 (45%)	0.250
Non-toxic goiter	23 (57.5%)	22 (55%)	0.125
Total	40 (100%)	40 (100%)	
Multinodular goiter	22 (55%)	22 (55%)	0.125
Diffuse goiter	15 (37.5%)	16 (40%)	1.000
Solitary nodule	3 (7.5%)	2 (5%)	1.000
Total	40 (100%)	40 (100%)	
Benign	37 (92.5%)	38 (95%)	0.630
Papillary ca.	2 (5%)	1 (1.25%)	1.000
Follicular ca.	1 (2.5%)	1 (1.25%)	1.000
Total	40 (11%)	40 (100%)	
Large goiter	9 (22.5%)	8 (20%)	0.500
Moderate goiter	26 (65%)	26 (65%)	0.630
Small goiter	5 (12.5%)	6 (15%)	1.000
Total	40 (100%)	40 (100%)	

Table 1: Patients' age, gender and diagnosis.

Outcome Factors	D group (n=40)	ND group (n=40)	P - Value
Mean duration of surgery (min) $\pm$ SD	60.49 $\pm$ 7.78	53.13 $\pm$ 14.16	0.01
Mean duration of hospital stays (hr) $\pm$ SD	48 $\pm$ 9.29	24 $\pm$ 4.16	0.001

Table 2: The outcome of both groups.

Score Pain	D Group (n=40)	ND Group (n=40)	P-value
No Pain	-	-	< 0.001
Mild Pain	11(27.5%)	32(80%)	
Moderate Pain	29(72.5%)	8(20%)	
Severe Pain	-	-	
Total	40 (100%)	40 (100%)	

Table 3: Pain score in both groups.

Discussion

Thyroid gland is a highly vascular structure, which necessitates secure hemostasis during thyroidectomy to avoid hemorrhagic complications [11].

In conventional hemostasis during thyroidectomy, the blood vessels are secure either with frequent clamp and tie with sutures or a metal clips, these methods of hemostasis are difficult to be use for securing all small or micro blood vessels in the surgical bed after thyroid surgery that may bleed leading to hematoma formation, which in the past considered as the main frequent complication of thyroid surgery. In contrast, the new advanced energy devices like ultrasonic scalpel can secure even micro blood vessels, that make the incidence of post thyroidectomy hematoma very rare [4,12,13].

Regarding the postoperative hematoma and bleeding complications, our study reported no cases of cervical hematoma or postoperative bleeding. These results are similar to the results of published studies about the benefits of advanced energy devices in reducing postoperative hemorrhagic complications [14,15].

Regarding the other outcome factors, our results shows that the mean duration of surgery in drain group (D group) is longer by about 7 minutes in comparison with no drain group (ND group), the time needed for placement of drain. Moreover, the use of drain in D group resulted in a longer mean duration of hospital stay (48 ± 9.29 hours) in comparison with (24 ± 4.16 hours) for ND group.

Although, the patients in both groups complaining of mild to moderate postoperative pain, the D group reported more percent of patients with moderate level of pain, 80% in comparison with 27.5% for ND group. These results are similar to the results of published studies [16-20].

Regarding the amount and type of drainage in group D, in all cases the amount of drainage decreased to less than 30 ml after 48 hours and the type of drainage was bloody serous in all cases. On other hand, our results reported few cases of mild seroma in both groups of patients that treated conservatively and resolved in few days without complications. These results are similar to the results of published studies [9,21-23].

No cases of wound infection reported in our study, this result is similar to the results of published studies that reported no relationship between wound infection and the use of drain [24-26].

In general, our results go with the result of published literatures, that suggested using a drain in cases in which there is extensive dead space or retrosternal goiters and in patients with Graves' disease or patients on anticoagulants, also noted that routine drainage of the thyroidectomy bed is not effective in decreasing the rate of complications after thyroid surgery, on the contrary it may increase post-operative pain, rate of surgical site infection and duration of hospital stay [27-30].

Conclusion

With the use of advanced energy devices like ultrasonic scalpel for hemostasis in thyroid surgery, the drain should not be used routinely. The routine drainage may increase postoperative pain, prolong duration of surgery and postoperative hospital stay.

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