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Routine Placement of Drains versus Drainless in Uncomplicated Total Thyroidectomy

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ABSTRACT

Background: One of the most frequent surgeries a general surgeon performs is thyroid surgery. Nearly all surgeons utilize a closed vacuum drain at the conclusion of the intervention in an effort to avoid the deadliest complication, a smothering hemorrhage, which several studies suggest may not be essential. Thus, it may be necessary to evaluate the benefit of drainless following thyroidectomy by looking at factors like length of hospital stay, post-operative pain, and wound sepsis. **Objective:** The aim of the current study was to evaluate the advantages of drain-free surgery following thyroidectomy, postoperative pain, wound sepsis, seroma formation and hematoma.

Patients and methods: A randomized controlled clinical trial was conducted at the General Surgery Department, Zagazig University Hospital in Sharkia, Egypt. A total of 30 enlarged thyroid patients were included in the study; 15 patients underwent a thyroidectomy without drain (Group A) and 15 patients underwent thyroidectomy with a drain (Group B)**.**

Results: Regarding post-operative complications including hematoma, infection, dehiscence, and seroma, there was no statistically significant difference between the studied groups. Group B had a higher infection rate. Group A had a longer postoperative hospital stay and a higher postoperative pain score (VAS), with statistical significant differences. **Conclusion:** Without drains, thyroidectomy is possible, less uncomfortable, results in an earlier discharge and hence lower costs, and doesn't raise the risk of postoperative complications.

Keywords: Thyroid surgery, Drains, Complications, Postoperative, Clinical trial, Zagazig University.

INTRODUCTION

One of the most essential components of general surgical practice is thyroid surgery. The majority of surgeons still employ drains, despite the continued controversy around their usage in routine thyroid surgery. Numerous publications have claimed that after a thyroidectomy, the drains are unsuccessful at avoiding the development of a potentially fatal hematoma [(1)]**.**

In addition to causing discomfort, drains have the potential to worsen the cosmetic outcome, increase the risk of surgical site infections, lengthen hospital stays and hence raise costs [(2)].

In situations where there is significant bleeding, the drain's tiny lumen frequently becomes blocked by clots. The necessity of drains during thyroid surgery has been questioned in light of the fact that procedures like cholecystectomy and colon anastomosis, which have significantly bigger potential dead zones, are carried out without drains [(3)].

The idea behind using drains during thyroid surgery is to avoid issues like seroma and hematoma formation after the procedure, although there isn't any real evidence to back up this theory in the literature. According to reports, the incidence rates of hematomas requiring surgical intervention range from 0-1.5% [(4)].

A meta-analysis of 25 randomized trials comprising 2,939 patients indicated no difference in seroma formation between the groups who had the procedures with and without a drain. Several studies have been done to assess the necessity of installing drains in thyroid surgery [(5)].

All types of thyroid surgeries, from lobectomies to subtotal thyroidectomies to complete thyroidectomies, were detailed in the studies that made up this meta-analysis [(6)].

After reviewing the published data, it is still unknown whether drainless complete thyroidectomy is safe for people of different ages, how big the thyroid lesion is, how diseases affect it, and how neck dissection affects it [(7)]. Thus, it is necessary to designate an acceptable target demographic for its performance.

The aim of the current study was to evaluate the advantages of drain-free surgery following thyroidectomy, postoperative pain, wound sepsis, seroma formation and hematoma.

PATIENTS AND METHODS

A randomized controlled clinical trial was conducted at the General Surgery Department, Zagazig University Hospital in Sharkia, Egypt. A total of 30 enlarged thyroid patients were included in the study; 15 patients underwent a thyroidectomy without drain (Group A) and 15 patients underwent thyroidectomy with a drain (Group B)**.**

Inclusion criteria:

- All Patients undergoing Thyroidectomy.
- Patients in euthyroid and benign thyroid lesions
- All age group and small size legion.

Exclusion criteria

- People who have been given a thyroid cancer diagnosis.

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- Pregnancy, breastfeeding, heart conditions, uncontrolled diabetes.
- Anticoagulant-treated patient with bleeding disorder.

Indication for surgery: The patients selected for surgery after complete evaluation and logic indication for operation as solitary nodule, multinodular goiter or simple toxic goiter, enlarged gland causing pressure symptoms, simple toxic goiter.

Methods of patients' evaluation:

Preoperative measures: Each patient underwent a clinical evaluation that included a medical history interview, physical examination, and laboratory tests. By using indirect laryngoscopy, the vocal cord mobility of all patients was evaluated.

All patients were subjected to complete history taking, general examination for signs of hyperthyroidism or hypothyroidism, determination of surgical suitability, and local examination of the neck for swelling characteristics, the presence or absence of lymph nodes, fixation to the trachea and to nearby structures, tracheal shift, retrosternal extension, and scarring from prior thyroid or central neck operations. Indirect laryngoscopy was performed to all patients for examination of vocal cord mobility by ENT professionals. Preoperative testing for thyroid function, including TSH, Free T4 and Free T3 and total blood count, kidney, liver, and thyroid functions parathyroid function tests were done. Ultrasonography neck and thyroid and cervical lymph node edema were examined using fine needle aspiration cytology.

Operative data: Any patient with toxic goiter had received medication and became in eu-thyroid stat clinically and laboratory, also hypo thyroid patients received thyroid hormones before operation. All patients were admitted the day before operation and operated by the same surgical team. Both the informed consent for the procedure and the consent to take part in the study were obtained. A standard procedure for preoperative care comprised an indirect laryngoscopy. Regular preoperative fitness testing was conducted. All surgeries were performed by senior surgeons with at least six years of experience who were under general anesthesia while the patients were lying on their backs with their necks extended. Strict adherence to the surgical protocol was maintained throughout the procedure, and the recurrent laryngeal nerve was identified and preserved.

All these data were recorded:

(A) Operative time.

(B) Intra-operative complications e.g. Parathyroid gland injury and need for auto transplantation.

(C) Postoperative data: Vital signs and drain output regularly checked; detection of bleeding and hematoma formation every hour in the first 6h. Oral fluids started two hours after complete recovery and light diet at the evening. Postoperatively a common visual analogue score, pain levels were measured after 24 and 72 hours (VAS) was done. At 72 hours following surgery, the drains were removed from every patient in the drain group. Any wound-related issues were noted after 24 hours and the wound dressing was opened after 72 hours. Also, this was done again four and eight days after the surgery. Thyroid function tests were done.

Serum Two calcium tests each day were performed for 48 hours following surgery. If the serum calcium level fell below 8 mg/dL or in the case of symptomatic hypocalcaemia, calcium supplementation was administered (numbness, positive Trousseau). The initial treatment was administration of 20 cc of 10% calcium gluconate in a saline solution of 100 cc passed in 20 minutes then oral calcium at a dose of 1 g every 8h. Evaluation of vocal cord mobility and voice of the patient and indirect laryngoscopy before discharge in people who had hoarseness or voice quality loss were done. All patients were discharged home on the second or third postoperative. Follow up was planned two weeks after discharge.

Ethical Approval:

This study was ethically approved by the Institutional Review Board [IRB] of the Faculty of Medicine, Zagazig University. Written informed consent was obtained from all participants. This study was executed according to the code of ethics of the World Medical Association (Declaration of Helsinki) for studies on humans.

Statistical Analysis

The collected data were introduced and statistically analyzed by utilizing the Statistical Package for Social Sciences (SPSS) version 20 for windows. Qualitative data were defined as numbers and percentages. Chi-Square test and Fisher's exact test were used for comparison between categorical variables as appropriate. Quantitative data were tested for normality by Kolmogorov-Smirnov test. Normal distribution of variables was described as mean and standard deviation (SD), and Mann-Whitney U test and Paired t test were used for comparison between groups. Finally, logistic regression analysis was used to identify risk factors associated with wound complications P value ≤ 0.05 was considered to be statistically significant.

RESULTS

There were no statistically differences between studied groups regarding gender and age distributions. The highest age frequency was found to be in the fourth decade of life (**Table 1**).

Table (1): Demographic distribution of the studied groups.

Gender	Group-A (N=15)		Group-B (N=15)		Total	X^2	P Value
	N	%	N	%	N		
Male	5	33.3%	3	23.3%	8	0.04	0.83
Female	10	66.7%	12	76.7%	22		
Total	15	100%	15	100%	30		
Age (Years)							
Range	23-65		19-70			1.54	0.12
Mean	43.75		38.1				
Sd. Deviation	12.5		12.6				

Table 2 summarizes symptoms and signs of the studied groups.

Table (2): Distribution of symptoms and signs of studied cases.

Symptoms / Groups	Enlarged Thyroid	Pressure symptoms	Toxic symptoms	Total
Group A	15 (100%)	3 (20%)	12 (80%)	15
Group B	15 (100%)	8 (53.3%)	7 (46.6%)	15
Total	30 (100%)	11 (36.6%)	19 (63.3%)	100

There was no significant difference between both groups regarding preoperative U/S diagnosis and measurements (**Table 3**).

Table (3): Preoperative U/S Diagnosis and measurements.

U/S Diagnosis	Group A		Group B		X^2	P Value
	N	%	N	%		
LT thyroid nodule	6	42.8	8	57.14	0.21	0.64
RT thyroid nodule	5	71.4	2	28.5		
LT and RT thyroid nodule	3	21.4	2	28.5		
U/S Measurement						
Range	2-5 CM		2-6 CM		0.07	0.93
Mean	3.5		3.48			
Sd. Deviation	0.82		0.9			

The commonest type of thyroid pathology of the studies patients was nodular thyroid (66.7%) and the least was thyroiditis (6.7%) (**Table 4**).

Table (4): The incidence of the histo-pathological types:

Histopathological type	No	%
Nodular	20	66.7
Thyroiditis	2	6.7
Toxic	8	26.6
Total	30	100

There was no statistically difference between studied groups regarding Haemoglobin (gm/dl) before and after operation (**Table 5**).

Table (5): Comparison between studied groups as regard to Haemoglobin (gm/dl) before and after operation

Variable	Groups			
	Group A	Group B	t- test	
	Mean (SD)	Mean (SD)	T	P value
Pre-operative haemglobin g/l	11.5 (0.5)	11.7 (0.47)	0.11	0.9 NS
Post-operative haemglobin g/l	10.9 (0.46)	11.1 (0.39)	1.16	0.2 NS
Paired t-test **P value**	14 0.0	11.3 0.0	---	

There was no statistically significant difference between the studied groups regarding post- operative complications; hematoma, dehiscence and seroma. Infection was higher in Group B.
Group A had a longer postoperative hospital stay and a higher postoperative pain score (VAS), with statistical significant differences (**Table 6**).

Table (6): Comparison between groups as regard to post- operative complication, hospital stay and post-operative pain score.

Complications	Group A (N=15)		Group B (N=15)		Test of significant	
	N	%	N	%	Fisher exact	P value
Hematoma	3	20	1	6.6	-	1 NS
Infections	2	13.3	5	26.6	*0.5	0.4 NS
Dehiscence	0	0	1	6.6	-	1 NS
Seroma	2	13.3	1	6.6	-	0.6 NS
Variable	**Group A (N=15)**		**Group B (N=15)**		**t-test**	
	Mean (SD)		Mean (SD)		T	P value
Hospital stay(days)	**3.63 (0.71)**		**1.19 (0.47)**		**0.11**	**<0.05 S**
Postoperative pain score (VAS)	**60.87 (7.46)**		**41.19 (4.39)**		**1.16**	**<0.05 S**

Table 7 shows that Haemoglobin (gm/dl) after operation, pathology of thyroid disease and technique of wound closure are the predictor variables for occurrence of wound infection.

Table (7): Logistic regression analysis for risk factors associated with wound complications.

Variables	Odds ratio	95% confidence interval		Significance	
		Lower limit	Upper limit		
Age group	7.4	0.2	205	0.14	NS
Sex	0.7	0.14	3.78	0.7	NS
Pathology of thyroid disease	1.2	0.12	13	0.8	S
Hemoglobin (gm/dl) before operation	1.6	0.07	38	0.6	NS
Hemoglobin (gm/dl) after operation.	217	9.6	4904	0.001	**S**
Technique of wound closure	0.17	0.01	2.6	0.2	S

DISCUSSION

The results of this study demonstrated that there was no statistically significant difference between the analysed groups in terms of the distribution of gender or ages. The average age of Group A's participants ranges from 23 to 65 years was 43.57 (SD 12.5) years and in Group B from 19 to 70 years with mean of age was 38.1 (SD 12.6) years. The highest age incidence was found to be in the fourth decade of life.

There was no statistically significant difference between the tested groups, according to the current study as regard postoperative complication hematoma, infection, dehiscence and seroma but infection was high in Group B.

A cross the studied groups, there were statistical differences in reference to postoperative hospital stay/days and Postoperative pain score (VAS) Group A was higher postoperative hospital stay and Postoperative pain score (VAS).

Hurtado-Lopez *et al.* [8] reported an examination of 150 patients revealed that the presence or absence of drains had no impact on the frequency of seromas or haemorrhages.

Suslu *et al.* [9] reported 135 patients who underwent thyroid surgery were evaluated; one of these patients experienced respiratory problems as a result of a clot blocking their drain.

Hence, mass size was not thought to be a factor affecting the insertion of the drain. **Dunlap *et al.*** [10] reported that the kind of surgery and the size of the tumour could not be used as markers for drain placement or predictors of postoperative haemorrhage. They compared the use of drains in 100 patients undergoing lobectomies and total thyroidectomies.

Hurtado-Lopez *et al.* [11] further provided evidence that the use of an external drain was not justified by factors such as gland size, diagnosis, kind of surgery, or intraoperative haemorrhage.

Patients with drains in the current study had considerably longer hospital stays than individuals without drains. Patients with drains also had a greater prevalence of wound infection; however this was not statistically significant. An increase in nosocomial infections, especially surgical site infections, is linked to prolonged hospital stays, costlier hospital stays, and prolonged medication [12].

In our study, we discovered that postoperative pain and discomfort were more common in the drain group, which may be related to how annoying it is to have a drain installed.

According to a recent meta-analysis, inserting drains following standard thyroid surgery did not benefit patients; instead, it increased their risk of wound infection, pain on the first postoperative day, and length of hospital stays [13].

Furthermore, **Hurtado-Lopez *et al.*** [8] showed that patients without drains spent much less time in the hospital than patients with drains, which reduced expenses and reduced the risk of intrahospital infections.

Patients with drains were shown to have longer hospital stays, and subsequent research have confirmed similar findings [1].

Hellums *et al.* [14] conducted a meta-analytic analysis in order to address the clinical confusion around the use of prophylactic drain, which found that the use of drain would theoretically seem advantageous. Subcutaneous drain should eliminate any remaining blood and fluid from the site that could act as a breeding ground for germs, as well as minimize any potential subcutaneous dead space. The literature does not convincingly support the theoretical advantages of drain [15].

Higson and Kettlewell [16] reported 250 abdominal surgery wounds were randomly assigned to draining with a Penrose drain versus no drain. Three groups of incisions were created: clean (100), potentially contaminated (100), and obviously polluted (100). Each group was further divided into two equal groups (drain or no drain). Patients in the third group received intraparietal ampicillin powder. They came to the conclusion that open parietal drains are dangerous when applied to clean wounds and have dubious benefit when applied to wounds that may be contaminated, but that they are a suitable substitute for topical antibiotic powder when applied to severely polluted wounds.

In a nonrandomized trial, **Morrow *et al.*** [17] reported marked reduction compared to no drain, the rate of wound infection

The biggest comprehensive review and meta-analysis were carried out by **Kosins *et al.*** [18]. This study's goal was to evaluate the evidence-based benefit of surgical prophylactic subcutaneous wound drainage. 52 studies totalling 6930 operations were determined to be appropriate for this study. In the drain group there were 3495 operations, while in the no-drain group there were 3435. Just two outcomes saw a statistically significant benefit from prophylactic subcutaneous drainage: (1) prevention of hematomas during breast biopsy procedures and (2) prevention of seromas during axillary node dissections.

Drainage did not provide a benefit in any of the other methods analysed. After breast reduction, abdominal surgery, femoral wounds, and joint replacements for the hip and knee, surgeons may decide against using drains. Moreover, surgeons should think about avoiding prophylactic drain placement in obese patients. However, the placement of a drain following a surgical treatment is

at the discretion of the surgeon and may depend on a variety of criteria other than the nature of the procedure being performed or the patient's physical characteristics [18].

The use of a drain does not significantly reduce seroma, hematoma, and dehiscence when compared to a group without a drain, according to the overall conclusion of our study and the vast majority of other similar and recent studies.

CONCLUSION

Without drains, thyroidectomy is possible, less uncomfortable, results in an earlier discharge and hence lower costs, and doesn't raise the danger of problems after surgery. Drains should only be utilized in specific situations, such as thyroidectomies with radical neck dissection and those undergoing surgery for cancer. A good surgical technique and meticulous haemostasis are essential for preventing bleeding and hematoma formation.

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