

Does The Usage Of Drain Reduce Post Thyroidectomy Complications? A Case Control Study

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ABSTRACT

Background: Thyroid surgery is a common operation worldwide. The use of drains in thyroid surgery has been controversial, majority of the surgeons routinely put a drain after thyroid surgery to drain a possible postoperative hemorrhage and prevent formation of seroma. This study was aimed to find comparison in occurrence of complications in relation to use of drain versus no drain after thyroidectomy.

Patient and Method: This prospective randomized cross-sectional study included 156 patients who underwent thyroid surgeries between the periods of January 2017 and January 2022 with a minimum period of 7 days of follow up. These patients were randomly selected, preoperatively, into two groups whether to put or not to put a drain. Group 1 was 76 patients without drains and group 2 was 80 patients with drains.

Results: The mean age of patients was 42.2 years. The majority were females 144 (92.3%). Presentation was with single nodule or multi-nodular goitre (MNG) was more common than diffuse goitre. Pain was present in only 13.5% of them and pressure symptoms presented in 28.8% of them. The main indication for surgery was suspicious nodule in 44.23% of cases, followed by MNG with pressure symptoms in about 28.85%, then MNG with pain in 12%, diffuse toxic goitre in 13.46% and lastly cystic lesion in 1.28%. The incidence of seroma and subcutaneous hematoma was examined in relation to certain patient and surgical operation-related factors, such as age, which showed a statistically significant relationship with a p-value of 0.019, but the incidence of seroma did not show a significant relationship with the length of the surgical procedure or hospital stay, and whether or not a drain was placed did not significantly affect the incidence of seroma or subcutaneous hematoma post-operatively this difference was statistically not significant with a p-value of 0.82.

Conclusion: Minor complications are more common following thyroid surgery, routine drain placement after thyroidectomy does not reduce complications such as seroma or hematoma, as there is no significant difference between those patients with and without drainage. Moreover, avoiding drain improve the possibility of post operative outcomes like

decreasing morbidity and recurrent hospital admissions by reducing such complications

Keyword: Complications, Hematoma, Drain, Seroma, Thyroidectomy

1. INTRODUCTION

thyroid gland, largest endocrine organ in body and it plays an essential role in the functioning of all systems, its diseases present a significant public health challenge, with a worldwide incidence ranging from 5% to 10% (1).

Past thyroid surgery, begins In 952 AD, Albucasis wrote about his experience having a big goiter removed. After thereafter, it saw a number of ups and downs throughout history. At one point, thyroid surgery was regarded as a very scary procedure with a very bad prognosis. But history shows that thyroid surgery has a lengthy history because of pioneers like Theodor Billroth and his student Theodor Kocher, who entered this field and perfected the method, as it improved with the time until it can be done endoscopically, so THEODOR KOCHER who was named as a father of thyroid surgery from 1850 to 1877 worldwide as he reported 146 thyroidectomies with mortality 21%, but in 1898 he also reported 600 cases performed with mortality rate of 0.5% which revolutionizing the procedure and method of thyroid surgery, from an dreadful operation to once which considered the safest operation that are tried to make incision as small as possible (2).

Thyroid disorders most commonly manifest as nodular disease as the frequency has been increasing over the past few decades as a result of the greater accessibility of precise and sensitive diagnostic tests for cytology, radiology, and biology and thyroid cancer detection and diagnosis also have been made easier after development of "fine needle aspiration biopsy" (FNAB) and ultrasonography screening so thyroid nodules and/or hyperthyroidism were the main conditions treated with procedures like less than total thyroidectomy (also known as "lobectomy", "partial", or "subtotal thyroidectomy"). Even in cases of differentiated thyroid carcinoma, less invasive thyroid surgery has drawn surgical interest recently (3).

All the types of thyroid diseases are more common in the female than in the male because thyroid tissue has estrogen receptors which can be influenced by hormonal changes in women during puberty, pregnancy, and menopause and the main.



indications for surgery are malignant nodules, when there is suspicion of malignancy, in certain situations like in “follicular adenoma” (because rarely cytological examination can differentiate a follicular adenoma from follicular carcinoma), “Toxic adenoma”, “Pressure symptoms”, “Cosmesis” and “Patient’s wishes”(4) .

Although thyroid surgery is currently regarded as the most common and safe procedure performed worldwide, thyroidectomy carries some dangers because of the unique anatomical structure and physiological functions of the thyroid gland, which can result in problems or even death (5).

Minor complications are the most common in thyroid surgery, in approximately 40% of patients and include following: “Mild dysphagia”, “hoarseness”, “a degree of voice alteration”, “seromas and poor scar formation”, postoperative seromas may develop, and their treatment depends on its symptoms and size, small, asymptomatic seromas should be monitored clinically until they are fully absorbed while larger seromas may require initial aspiration under sterile conditions, so for prevention of such complication drainage (gravity or suction-driven) placed as per preference of the surgeon’s, however, it is important to know that drain increases the risk of wound infection and hospitalization and does not stop a dangerous or potentially fatal hematoma from forming (6).

The risk of bleeding after surgery is the reason why wound drains are used however, when any significant bleed happens, these drains may block and it does not eliminate the need for surgery or meticulous hemostasis. Since there is conflicting information about the use of drains after thyroid surgery, a systematic review of the best available data was conducted (7).

Therefore, the use of drains in thyroid surgery is still controversial and frequently depends on the surgical technique and the experience of the surgeon. Although most surgeons use drains after thyroid surgery, there are a variety of reasons for doing so. The primary one is to prevent postoperative hemorrhage that could compress the airway and cause respiratory failure. They are also used when there is a large dead space (large tumors or large goitres), which increases the risk of seromas developing during the postoperative period. Another indication for their use is during subtotal thyroidectomies, especially in cases of Graves' disease, where leaving behind highly vascularized tissue could increase the risk of hematoma. Lastly, in simple surgeries with minimal drainage, the placement of a drain may increase the risk of infection (8).

In a recent systematic review and meta-analysis, Woods et al. found that the reoperation rate for neck hematoma following thyroid surgery is 1% for patients with drains and 0.4% for those without, indicating that the use of drains does not reduce the risk of reoperation for neck hematoma. Neck hematoma following thyroid surgery is a potentially fatal complication, and drains are frequently used to detect postoperative bleeding early. However, in some cases, the drain may become blocked by clotted blood, and the hemorrhage may only become apparent through neck swelling and respiratory symptoms (9) .

Regarding the “dead space” that remains after thyroidectomy, it has been proposed that it would accumulate fluid and that drains would be required to remove it. However, this notion has been misused, as the surrounding tissues collapse around the remaining gland under atmospheric pressure following thyroidectomy, essentially closing up any space. This occurs because the soft tissues of the neck are pliable, and upon skin closure, the neck never appears to have the fullness as in the preoperative state (10) .

The incidence of seroma after thyroidectomy has been reported to be between 1.3% and 7%. Studies indicate that the major cause of seroma after thyroid surgery is extensive raising of skin flaps, and that avoiding the raising of flaps could reduce the risk of seroma. A seroma is a fluid collection that can be clinically observed within a surgical cavity in the postoperative period. Following thyroid surgery, it may result in noticeable swelling, poor cosmetic outcomes, and a higher risk of infection(11).

Also recent studies have shown that volume of the cervical effusion was significantly lower in patients who did not have drains because existence of a drainage tube should lead to the rise of the postoperative exudation, potentially due to the stimulation of serous fluid secretion, additionally, the negative pressure from vacuum drainage might prevent lymphatic vessels in the neck from closing properly, leading to an increased amount of drained lymph being (12) .

Aim of the study;

To compare the incidence of complications in patients with drainage and without drainage after thyroidectomy and to see whether the drain should be or not routinely used following thyroidectomy

2. PATIENTS AND METHODS

This prospective, randomized, case control, interventional study, conducted in Duhok- KRI-Iraq in azadi teaching hospital and Duhok private hospitals, the study was approved by the local ethics committee at Directorate of Duhok health authority, and informed written consent was obtained from all patients. The number of patients were 156 who underwent thyroid surgery between January 2017 and January 2022. These patients were randomly selected, preoperatively, into two groups whether to put or not to put a drain. Group 1 was 76 patients without drains and group 2 was 80 patients with drains. The drains used were suction drains (Redi-vac drain) through a separate stab incision, local complications (seroma,

bleeding, hematoma, recurrent laryngeal nerve palsy, and hypoparathyroidism) and length of hospital stay were recorded for all of the participants. Those patients with malignant disease requiring cervical lymph nodes dissection and patient with bleeding tendency, any patient unwilling to give consent for their data being involved in research purpose, patients younger than 18 years of age and patients with recurrent goiter after previous surgeries were excluded from the study.

Depending on the indication of surgery, either a total thyroidectomy or a lobectomy plus an isthmectomy was performed. The operations were done under general anesthesia with endotracheal intubation. Follow up of the cases was done on day 0, day 1 and day 7, clinically & by ultrasound for assessing any complications, like hematoma, shortness of breath, sound change and symptoms and signs of hypocalcemia. And for some cases, ultrasound was used to assess for any hematoma or seroma collection within the wound. In group 2 The drains were removed from all of the patients in next day when there was no collection.

All operation were done by board certified surgeons whom has experience in thyroid and neck surgery for more than 10 years.

Data were collected and analyzed using (method of analysis and details of the method of analysis) The descriptive purpose of this study is to evaluate the occurrence of complications in drainless thyroidectomy described in terms of frequency and percentages for numerical data and terms of means and standard deviation for categorical ones.

Data were analyzed using the Statistical Package of Social Sciences (SPSS) version 25.

3. RESULTS

A total of 156 patients participated in the study. Their mean age was 42.2 years with a standard deviation of 12.58 yr. Majority were females 144 (92.3%). Presentation with single nodule or multi-nodular goitre was more common than diffuse goitre. Pain was present in only 13.5% of them and pressure symptoms presented in 28.8% of them. About two thirds of them had euthyroid status. These descriptive characteristics are shown in details in table (1).

Table 1: Descriptive characteristics and clinical characteristics of study population (n=156)

Characteristics	No.	(%)
Age in years ; Mean (SD)	42.2	12.58
Gender	144	
Female	12	92.3%
Male		7.7%
Type of goitre		
Multinodular	78	50.0%
Single nodule	72	46.2%
Diffuse	6	3.8%
Presence of pain		
No	135	86.5%
Yes	21	13.5%
Presence of pressure symptoms		
No	111	71.3%
Yes	45	28.8%
Thyroid status		
Euthyroid	107	68.6%
Hyperthyroid	44	28.2%
Hypothyroid	5	3.2%

The main indication of surgery was suspicious nodule in 44.23% of cases ,followed by MNG with pressure symptoms in about 28.85%, then MNG with pain in 12%, diffuse toxic goitre in 13.46% and lastly cystic lesion in 1.28% as shown clearly in figure 1.

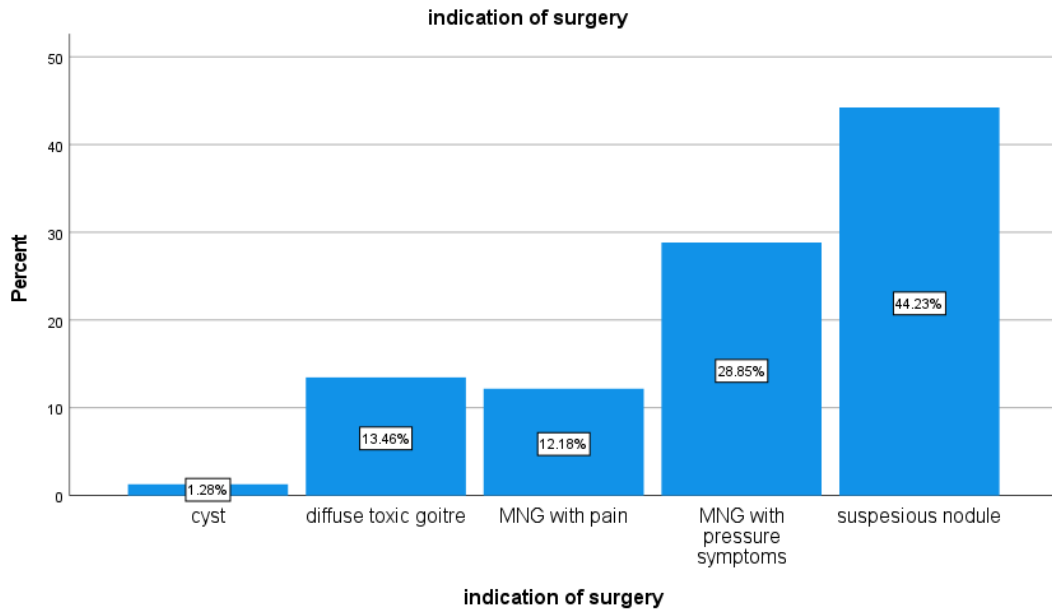


Figure 1: indication of surgery

Total thyroidectomy was the main surgical procedure done for the patients as it was done for 129 of them (82.7%). Lobectomy done for 25 (16%) and near total thyroidectomy done for only 2 patients (1.3%). A drain was put for 80 patients (51.3%) compared to 76 patients (48.7%) with no drain. The mean duration of the surgical operation in general was 89.9 minutes and on average patients stayed in hospital for 22.3 hours. These surgical characteristics are shown in table (2).

Table 2: Characteristics related to surgery

Characteristics	No.	(%)
Surgical procedure	129	82.7%
Total thyroidectomy	25	16.0%
Near total	2	1.3%
Lobectomy		
Putting a drain	80	51.3%
Drain	76	48.7%
No drain		
Duration of operation (in minutes) with 89.9 (27.93) mean (SD)		
Patient stay in hospital (in hours) with 22.3 (7.38) mean (SD)		
Post-operative US	134	85.9%
No seroma	22	14.1%
Seroma		

The occurrence of seroma and subcutaneous hematoma was studied in association with some factors of related to the patients and the surgical operation. There was no clear difference between males and females in regards to the occurrence of seroma and subcutaneous hematoma though the percentage of seroma in females was slightly higher but this difference

was statistically not significant. Putting a drain or no also didn't show a significant difference in regards to the occurrence of seroma or subcutaneous hematoma post-operatively. These association are shown in table (3)

Table 3: Post-operative seroma& subcutaneous hematoma in association with categorical variable like no drain and putting a drain

Seroma + subcutaneous Hematoma No. (%)	No seroma No. (%)	p-value*
Putting a drain	12 (15.0)	68 (85.0)
Drain	10 (13.2)	66 (86.8)
0.82		
No drain		

By Chi-squared test

There was a significant difference of the age of the patients between those with seroma compared to no seroma. The mean age of patients having seroma was 48 yr and of those with no seroma it was 41.3 yr and this difference was statistically significant with a p-value of 0.019. The occurrence of seroma showed no significant association with neither the duration of the surgical operation nor the duration of stay in hospital as shown in table (4).

Table 4: Post-operative seroma and subcutaneous hematoma in association with numerical variables like age of the patients, duration of operation and patient stay in hospital

Factors	Seroma & subcutaneous hematoma Mean (SD)	No seroma Mean (SD)	p-value*
Age in years	48 (11.01)	41.3 (12.6)	0.019
Duration of operation (min)	94.6 (26.63)	89.1 (28.16)	0.398
Patient stay in hospital (hr)	24.5 (10.86)	21.9 (6.63)	0.138

By independent t-test

4. DISCUSSION

Use of drains in the thyroid surgery are controversial and many practices are determined through tradition rather than scientific data and depends on experience of the surgeon's (8) .

In the current study females constituted about 144 patients and while males about 12 patients and their mean age was 42.2 years (SD: 12.58), the number of females is much higher than males this is because of that the majority of the involved patients in our study were females and because thyroid diseases are more common in females as the gland has estrogen receptors(4) .

In this study presentation with single nodule or multi-nodular goitre was more common than diffuse goitre because our country regarded as iodine deficient area, similar to other studies and worldwide that show to some extent that there is high prevalences of thyroid nodule or multinodularity in the iodine-deficient countries and most of these goitres were classified as nodular goitres, Few studies have demonstrated that an excessive iodine intake may result in the development of diffuse goitres, but globally, this has been a small issue in comparison to the development of nodular goitres. The majority of these goitres were categorized as nodular goitres (13).

The most common indication of surgery in this study is suspicious nodule (44.23%), followed by multinodular goitre with pressure symptoms, then multinodular goitre with pain (41.63%) collectively, diffuse toxic goitre (13.46%) and finally cystic lesion (1.23%) as in similar to other studies because the thyroid nodules are among the common presentations with prevalence of 25% in general population, their prevalence are varies widely as it depend on the demographics like sex and age and also presence of risk factors, as first step in the suspected thyroid nodule are to perform ultrasonography; a fine-needle aspiration biopsy is frequently carried out if additional evaluation is required, and ultrasonography risk stratification methods can categorize and predict the possibility of a nodule's malignancy; A standard cytology reporting system was used to categorize the cytology results. (14).

In recent study total thyroidectomy was the main surgical procedure done for the patients as it was done for 129 of them

(82.7%) then lobectomy done for 25 (16%) and near total thyroidectomy done for only 2 patients (1.3%) because 33 patients of them proved to be malignant nodule (31 papillary cancer, one of them anaplastic cancer other follicular lesion which after operation proved to be malignant), and other 21 patient were diffuse toxic goitre and those 64 patients with multinodular goitre that necessitate total thyroidectomy because of thyrotoxicosis, pain, and pressure symptoms, the reminder 13 patients because of the highly suspicion of the nodule they underwent total thyroidectomy as because in our locality if we do lobectomy most of the patient they do not compliance with follow up and don't accept the concept of lobectomy in the presence of malignancy even if it confined to one lobe only so majority of our surgeon do total thyroidectomy instead of lobectomy or near total thyroidectomy, although for many decades, since the rate of locoregional recurrence of papillary thyroid cancer has been reported to be 8% following thyroid lobectomy, consensus guidelines support total thyroidectomy for PTC > 1 cm due to the debate surrounding the best surgical management of differentiated thyroid cancer. This is based on recent retrospective data (15).

In this study we put a drain in 80 cases and didn't put in 76 cases, there is no complication in 134 patients after one week follow up and 22 of them develop complication (17 of them seroma and only 5 of them simple subcutaneous hematoma), so we found that there is no association between the occurrence of complications (seroma and subcutaneous hematoma) and drainage post thyroidectomy. The occurrence of seroma and subcutaneous hematoma was studied in association with some factors of related to the patients and the surgical operation, there was no clear difference between males and females in regards to the occurrence of seroma and subcutaneous hematoma though the percentage of seroma in females was slightly higher may be because most of our patients were females but this difference was statistically not significant. Putting a drain or no also didn't show a significant difference in regards to the occurrence of seroma or subcutaneous hematoma post-operatively, in similar to other metanalysis found that there was no discernible benefit to the existing practice of post-surgical drainage for thyroidectomies; on the contrary, patients in the drain group had greater rates of post-surgical infection and longer hospital stays (16).

Regarding the age in recent study, we found a significant difference in age of the patients of those with seroma compared to no seroma, the mean age of patients having seroma was 48 yr and of those with no seroma it was 41.3 yr and this difference was statistically significant with a p-value of 0.019, comparing to other literature there is no form of significant difference in age and seroma occurrence, however we suggested that older age is predisposing factor for formation of seroma subsequent to clean the surgeries like thyroidectomies, herniorrhaphy and breast reconstruction the occurrence of seroma showed no significant association with neither the duration of the surgical operation nor the duration of stay in hospital (17).

5. CONCLUSION

Complications after thyroidectomy are not uncommon, but fortunately most of them are minor complications, some factors are associated with higher rates for the development of complications such as increased age but in current study we concluded that routine drain placement after thyroidectomy does not reduce complications such as seroma or hematoma, as there is no difference between those whom put a drain versus those without drainage, moreover avoiding drain improve the possibility of post operative outcomes like decreasing morbidity and recurrent hospital admissions by reducing such complications.

CONFLICT OF INTEREST;

There are no conflicts of interest, according to the author.

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