Kurdistan Journal of Applied Research (KJAR) | Print-ISSN: 2411-7684 – Electronic-ISSN: 2411-7706 | kjar.spu.edu.iq
Volume 1 | Issue 2 | December 2016 | DOI: 10.24017/science.2016.1.2.5

Drain versus non drain in thyroid surgery

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Abstract: ***The use of a suction drain in thyroid surgery is common practice in order to avoid hematomas or seromas. The aim of this study was to determine the efficacy of inserting a routine drainage tube after thyroid surgery. In this retrospective study, 102 patients who underwent either a total thyroidectomy for thyroid disorders were assigned to either the drained or the non-drained groups. The length of hospital stays, postoperative pain, patient comfortability and complications were retrieved. Both groups were homogeneous according to age, gender, type of procedure performed, histopathological diagnosis residency and marital status. No significant difference was found between the two groups in post-operative complications, but the length of hospital stay was significantly reduced in non-drained group (p<0.0001), and drained group needed one more dose of analgesics compared to non-drained group to alleviate the post-operative pain.***
Our findings, suggesting that the use of drain for thyroid surgery cannot lower the incidence of complications. Furthermore, the use of drains may increase length of hospital stay, postoperative-pain, and the need of analgesic and contribute to the discomfort of the patients. Hence, the routine insertion of drains after total thyroidectomy for benign disorders might not be necessary.

Key words: drain, non- drain, and thyroidectomy

1. Introduction

Thyroidectomy is one of the most commonly performed operative procedure in general surgery with a prevalence of between 4.2 to 51.3% [1, 2]. The likelihood of hematoma after thyroid surgery ranges between 0 to 30%, hematoma, if developed, may enlarges then compresses respiratory airway and it will be a life threating complication. [3]. Therefore, for many surgeons, placing a drain routinely after any type of thyroid surgery is essential to perceive early postoperative hemorrhage [4], and to avoid its risk of blocking the respiratory passage [5]. The blockage of the drain with clotted blood is a common problem that making the drains become useless in alerting the surgeon even if major bleeding occurs[1]. Additionally, past study have failed to confirm that the insertion of drains prevents the hematoma formation. However the chances of postoperative seromas forming is higher in the absence of drains but they can be noticed and allowed to resorb themselves or, if severe, aspirated [6]. Past study conducted on the usefulness of drain placement after thyroid surgery have failed to show any benefits [7]. Instead, it was found that usage of drains increased the chances of surgical wound infections[8]. Numerous studies in deferent places reported that, if strict principles of haemostasis are followed, the use of drains is not mandatory after thyroidectomy[6, 9]. In contrast drains may increase rate of wound infections, patients discomfort and analgesic required to alleviate pain. Additionally, use of drain prolong the hospital stay and consequently rise the cost. Furthermore, in a study done in 2005 no difference in the prevalence of post thyroidectomy hematoma formation was observed whether drains were used or not [6] while another study reported greater fluid collection and more postoperative complications in the group of patients with drains than those without [9]. Despite the fact that, the use of drains after thyroid surgery is being questioned worldwide now, and regardless of improvements in surgical techniques for thyroid disorders, in our clinical setup, drains are still commonly placed postoperatively. We have conducted this study to see if our results are relevant to others, and if disadvantages of the use of drains significantly outweigh its advantages in our setting. So, this study aims to assess the necessity of drains and to evaluate their routine use after thyroid surgery.

2. Subjects and methods

1.1. Study setting:

The study was conducted at four hospitals in Sulaimani city, Shorish, Shar, Zhian, and International hospitals.

1.2. Study design:

A retrospective study (review cases) was used for the implementation of the study.

1.3. Target population:

A single cohort of patients with thyroid diseases diagnosed within the past 7 years (between 2/1/ 2008 and 30/12/2015) were enrolled, in order to compare the effect of drain versus no drain thyroidectomy in term of postoperative complications and hospital stay.

1.4. Study procedures:

The medical records of a single cohort of a group of patients whom underwent surgery between 2008 and 2015 of the above hospitals diagnosed as thyroid diseases were retrospectively reviewed. Then the patients were divided in to two groups (drain versus no drain groups). The researchers then contacted the patients by phone, or home or clinic visit to request a meeting with the researchers for obtaining informed consent. Following consent, socio-demographic data were collected using a structured interview questionnaire, which was researcher-administered. Clinical data were retrieved from the patients' hospital records under the supervision of the managing physician. Surgeries performed included total thyroidectomy. All operations were performed by a senior surgeon.

2. Procedure

Under general anesthesia with endotracheal intubation, positioning the patient in the supine position with 15 degree neck tilt, through putting pillows under the shoulders, a transverse collar incision done with sub-platysmal dissection, creating upper and lower flaps, then separating the strap muscles in the midline, then opening the pretracheal fascia using electro-cautery, the middle thyroid veins ligated or ultrasonic dissector was used and cut, then the thyroid lobes mobilized sequentially then ligating the superior thyroid vessels separately and cut in between or by using ultrasonic dissector(Focus 9mm) ,then focusing on the inferior thyroid pole vessels ligation or ultrasonic dissector were used for dissecting them, then the parathyroid glands with the recurrent thyroid nerve were found ,then either through ligation or using harmonic ultrasonic dissector the inferior thyroid arteries were dissected and ligated or cut, then the drain was put in the cavity in the drained group ,but not put in the non- drained group. Then closure of the anatomical layers were done using absorbable sutures, until the skin which was closed through sub-cuticular non-absorbable monofilament sutures.

3. Data collection tools and methods:

A Structured interview questionnaire was used. The questionnaire was including the following:

1. Socio- demographic data such as; age, gender, address, occupation and marital status were obtained.
2. Data on the complications neurological symptoms.

3.1. Statistical analysis:

Data was collected and coded. The collected data was reviewed and analyzed using the Statistical Package for Social sciences (SPSS version 22). Descriptive statistics such as frequency and percentage was calculated. Measures of central tendency and dispersion around the mean were used to describe continuous variables. P value was obtained for the continuous variable using independent t test and was considered significant if it was less than 0.05

3.2. Ethical consideration

The researchers obtained the approval of the Ethics Committee of the Sulaimani Medical School for conducting of the study and it was in compliance with the international Ethical Research Guidelines. Informed consent was obtained from the participants

4. Results

Of 102 patients 26 (25%) were males and 76 (75%) were females and male to female ratio was 1:3, with mean age of 43 (±8.9). The drained group include 48 patients with mean age of 42 (±8.2), 12 (25%) male and 36 (75%) female and the non-drained group were 54 with mean age of 44 (±8.6). 14 (26%) male and 40 (74%) female. The patients' characteristics are presented in Table 1. There were no significant differences between groups in age, gender, resident and marital status at $p < 0.05$.

Table 1: Characteristic of the patients in the two groups

Patients characteristic	(Drain)	(No drain)	Total
Number of patients	48	54	102
Mean age (years)	42(8.2)	44(8.6)	43 (8.9)
Gender			
Male	12 (25%)	14 (26%)	26 (25%)
Female	36 (75%)	40 (74%)	76 (75%)
Address			
Inside city	32 (66.7%)	38 (70.4%)	70 (69%)
Outside city	16 (33.3%)	16 (29.6%)	32 (31%)
Marital Status			
Married	41 (85.4%)	40 (74.1%)	81 (79%)
Unmarried	7 (14.6%)	14 (25.9%)	21 (21%)

The mean length of hospital stays (LOS) was significantly lower in non-drain group 3.4 (±1.2) days compared to drained group 6.1 (±2.4) days with p value < 0.0001. The mean analgesics requirement was higher in patients who received a drain as compared with those who didn't (p= 0.0002). The patients' comfortability was significantly higher in non-drained compared with those who drained (p <0.0001). All non-drained group discharged from hospital on first post-operative day, whereas drained group were discharged after second or third post-operative day. Those outcomes presented in Table 2.

Table 2: Outcome of drained and non-drained groups.

Outcomes	Drain (n=48)	No drain (n=54)	P value
Mean LOS (in days)	6.1±2.4	3.4±1.2	< 0.0001
Mean amount of analgesics	3.5±1.4 doses	2.5 ± 1.2 Doses	0.0002
Patient comfort	50%	> 85%	< 0.0001
Discharge	2-3 post-operative date	1st post-operative date	

The complication rates were similar between the groups (p value = 0.418). Overall 14 (13.7%) complications were recorded, 8 (16.6%) complications in drained group included one case wound infection, one case haematoma, two cases seroma, two cases of hypertrophic scar, and two cases of transit hypoparathyroidism. While 6 (11%) complications in non-drained group included one case wound infection, one case haematoma, two cases seroma and two cases of transit hypo-parathyroidism occurred. The post-operative complications were showed in Table 3.

Table 3: Postoperative complications (n= 102)

Complications	Drain (n=48)	No drain (n=54)	P value
Wound infection	1 (2.1%)	1 (1.9%)	0.93624
Haematoma	1 (2.1%)	1 (1.9%)	0.93624
Seroma	2 (4.2%)	2 (3.7%)	0.90448
Nerve injury	0 (0%)	0 (0%)	0
Layrgeal odema	0 (0%)	0 (0%)	0
Hypertrophic scar	2 (4.2%)	0 (0%)	0.13104
Transit hyperparathyroidism	2 (4.2%)	2 (3.7%)	0.90448

The cost of the operation of drained group was more than non-drained group by 100 $. The operation with drain tube insertion takes further 5-10 minutes compared to non-drain tube insertion operations.

5. **Discussion**:

It was common practice for surgeons to routinely insert a drain after every case of thyroid surgery, whether it is total thyroidectomy, subtotal thyroidectomy or lobectomy[5]. This is mainly due to the fear of postoperative hemorrhage[4] or accumulation of excess lymphatic fluid which needs to be drained as it can compromise the airway [5]. Postoperative bleeding after thyroid surgery is reported to be as rare as 0.3 to 1% [1], while the probability of a postoperative cervical hematoma forming ranges between 0.1 to 4.7% [10].

In the current study, our aim was to compare the benefit of the drained versus non drained in thyroidectomized patients. Our results showed that there is no significant difference between drained and non-drained in preventing post-operative patients' morbidity, whereas the difference was significant between the two groups, regarding the length of hospital stay, analgesic requirement, post-operative patients' comfortability, hospital discharge and costs.

Many studies showed no benefit of using drains after thyroid surgery, and it has been observed that if correct surgical techniques and hemostatic procedures were followed, excessive post-operative bleeding can be avoided, decreasing the incidence of hematoma formation [11-13]. Precautions such as staying within the subplatysmal plane during surgery and using coagulation tools and hemostatic principles along with proper securing of bleeding vessels will reduce chances of postoperative hemorrhage[6].

Drains should be inserted on the basis of its value according to the operative procedure performed for complicated cases such as resection of substernal goiter, large dead space, raw thyroid bed [12, 14] or in hyper-vascular conditions of thyroid gland (e.g. Grave's disease) or certain carcinomas [15].

In the present study, there were two cases of seroma formation in either the drain or non- drain group, which coincides with the fact that seroma formation does not specifically occur when drains are not used. This result is consistent with the result of Prichard et al., 2010 that showed there was fluid collection in the surgical field regardless of the use of a drain, the reason being, either the drain triggered inflammation and fluid formation itself or the negative pressure created by the drain sealed off the lymphatics [2]. Whereas studies in other places showed that the insertion of drain after every thyroid surgery increases the risk of wound infection. [1, 7]. In our study there was no significant difference in two groups regarding the rate of wound infection. This can be explained by the difference in procedures of the wound management and aseptic surgical techniques used during surgery that play the major role in the development of wound infection.

Similarly, our study also revealed that insertion of drain after the thyroid surgery increases the post-operative hospital stay [6.1 (±2.4) days] as compared to the non- drained group [3.4 (±1.2) days]. It was found that the length of hospital stay was increased in these patients, which obviously increased overall costs[2] . Another study concluded the use of drain in uncomplicated thyroid surgeries, not only increases the duration of hospital stay but also the chances of infection [16]. Hence, this also increased the cost burden by the hospital.

Patient discomfort and pain were assessed on day 1 and 2 after surgery, it showed that the patients in the drained group felt a less degree of comfortability (50%) than those in non-drained group (85%). This consequently led to a greater use of analgesics. Our results coincided with those of an African study done in 2011 [7].

In current findings, the placement of drains may have been associated with poor cosmetic results and create separate two hypertrophic scars while there is no hypertrophic scar in non-drained group (p value= 0.1310). It also increases operating time by 5-minute s due to the need for an extra, irregularly shaped stab wound to be made in the lower neck or chest. In the current study the other complications such as transient hypoparathyroidism and hypocalcemia, of which there were two cases in each group and it was non-significant deferent between groups (p value= 0.9044)[17].

6. Conclusion

The present study is comparable with international clinical studies, that did not show any difference of routinely placing drains after every thyroidectomy, this study demonstrated that prevention of postoperative hematoma did not require drain placement as much as performance of correct hemostatic techniques were needed and also that seroma formation can be triggered by drains themselves. the use of drain after thyroid surgery is not effective in decreasing the rate of postoperative complications, besides, it increases the hospital stay, more use of analgesics, more time is needed for the operation, and the cost of operation is more after total thyroidectomy

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