



## THYROID SURGERY WITH OR WITHOUT USE OF DRAIN- A COMPARITIVE STUDY

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Conflicts of Interest: Nil

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### Abstract:

**Background:** The routine use of drain after thyroidectomy arises from the past in order to decrease the risk of acute airway obstruction caused by hemorrhage or postoperative complications.

**Objective:** To compare the feasibility of patients undergoing thyroid surgery with and without placement of drain in terms of hospital stay, operative pain score, amount of fluid collection in the neck and postoperative complications.

**Methodology:** This study was conducted at Jaulkar ENT Hospital, Raipur; from 2007 to 2018. Important variables of the study were duration of hospital stay, post operative pain score, amount of fluid collection in the wound as detected on ultrasound and postoperative complications. Visual Analogue scale was used to assess postoperative pain on completion of 24 hours.

**Results:** The study included 560 patients; The duration of hospital stay was found less in the patients without drain. The average length of hospital stay was 1.10 (1-3) ± 0.33 days for group 1 and 1.53 (1-6) ± 0.80 days for group 2. There was a statistically significant difference noted. The mean follow-up period was 2.60± 0.51 months for group 1 and 2.80± 0.71 for group 2. Comparitively the post operative complications found to be very less in Group 2 than Group 1. Suture reaction, transient recurrent laryngeal nerve paralysis and wound infection observed as most prevalent post operative complications in both groups.

**Conclusion:** In conclusion, the current practice of post-surgical drainage in thyroidectomy did not offer any significant advantage. On the contrary, post-surgical complications and duration of hospital stay was higher in patients in the drain group.

**Keywords:** Thyroid surgery, Drain, Surgical outcomes, Hematoma, Postoperative complications.

### Introduction

A thyroidectomy is an operation that involves the surgical removal of all or part of the thyroid gland. General, Endocrine or ENT Surgeons often perform a thyroidectomy when a patient has thyroid cancer or some other condition of the thyroid gland (such as hyperthyroidism) or goiter. Other indications for surgery include cosmetic or symptomatic obstruction.<sup>1</sup> Thyroidectomy is a common surgical procedure that has several potential complications or sequelae including: temporary or permanent change in voice, temporary or permanently low calcium, need for lifelong thyroid hormone replacement, bleeding, infection, and the remote possibility of airway obstruction due to bilateral vocal cord

paralysis. Complications are uncommon when the procedure is performed by an experienced surgeon.<sup>2,3</sup>

**Indications-** Colloid goiter, Thyroid cancer, Toxic thyroid nodule, Multinodular goiter, Graves' disease, Thyroid nodule, if fine needle aspirate (FNA) results are unclear.

### Types of thyroid surgery-

- Hemithyroidectomy—Entire isthmus is removed along with 1 lobe. Done in benign diseases of only 1 lobe.
- Subtotal thyroidectomy—Removal of majority of both lobes leaving behind 45 grams (equivalent to the size of a normal thyroid gland) of thyroid tissue on one or both sides—this used to be the most common operation for multinodular goiter.

- Partial thyroidectomy— Removal of gland in front of trachea after mobilization mostly in nontoxic Multinodular goiter.
- Near total thyroidectomy— Both lobes are removed except for a small amount of thyroid tissue (on one or both sides) in the vicinity of the recurrent laryngeal nerve entry point and the superior parathyroid gland.
- Total thyroidectomy— Entire gland is removed mostly in case of papillary or follicular carcinoma of thyroid, medullary carcinoma of thyroid. This is now also the most common operation for multinodular goiter.
- Hartley Dunhill operation—Removal of 1 entire lateral lobe with isthmus and partial/subtotal removal of opposite lateral lobe.

The routine use of drainage after thyroidectomy arises from the past in order to decrease the risk of acute airway obstruction caused by hemorrhage or postoperative hematoma or seroma.<sup>3</sup> However, many problems have been reported by the use of drainages without any significant proving of its advantages.<sup>4</sup> As a result, using drainages in thyroid surgery as a routine surgical practice, with no scientific evidences to support their benefits, has become controversial. It is believed that many surgeons use a drain following thyroid surgery to obliterate the dead space and evacuate collected blood and serum. This is further reinforced by the fact that postoperative drains usually yield fluid. Hemorrhage can be life threatening, thus necessitating an immediate reoperation. This fear prompts surgeons to use a routine drain after any type of thyroid surgery. The Indications for placement of drain were extensive dead space, excessive tissue manipulation and dissection. Although the rate of bleeding might increase in a subtotal thyroidectomy due to vascularized remnant tissue, postoperative bleeding is actually quite rare and occurs in only 0.3–1% of patients after a thyroidectomy.<sup>4,5</sup> Many studies have suggested that drains may be blocked with clotted blood; therefore, the surgeon is not alerted even if major bleeding occurs.<sup>1,15</sup> In addition, numerous studies have also failed to show any benefits of drainage in thyroid surgery. Hence, the goal of this prospective study was to evaluate the necessity of drainage after thyroid surgery. These trials could not identify a statistical difference in the rates of neck hematoma/ seroma between groups using drains or not. The hospital stay and postoperative complications were compared between the two groups.

## MATERIAL AND METHODS

This was a Comparative and observational study performed to evaluate efficacy of drain in thyroid surgery. Total 560 patients of age range between 30-50 years of thyroid surgeries were evaluated since 2007 to 2018. All the surgeries were operated by single surgeon and single anesthetist in Dr. Jaulkar ENT Hospital, Raipur, Chhattisgarh.

After taking proper case history, diagnosis by FNAC, CT scan and ultrasonography patients were grouped in two. Thyroid gland volumes were calculated according to the ultrasound measurements of all the patients, and the correlation between thyroid volume and volume of fluid was evaluated in the thyroid bed. Pre anaesthetic confirmation was done after hematological, cytopathological investigations and physician's consent. Thyroid disorders indicated for surgeries were benign and malignant, in benign disease adenoma and colloidal goiter cause thyroid swellings. In case of malignant, papillary and follicular type were common. Hemithyroidectomy were planned for benign type of thyroid swellings. Total thyroidectomy were planned for malignant disease

Depending on the thyroid disorder, a total thyroidectomy or a lobectomy plus an isthmectomy was performed. The duration of the operation was defined as the time from the first incision to the last suture placement. Wound closure was done via subcutaneous 4/0 absorbable vicryl sutures (see atlas). A closed suction drain with negative pressure was inserted through a separate wound in the patients in group 1. The drains were removed from all of the patients after 24 hours since less than 100 cc had been collected. Postoperative pain was assessed according to a visual analogue scale (VAS) with scores ranging from 0 (no pain) to 10 (worst pain imaginable) at the postoperative sixth hour and postoperative first day. A standard protocol comprised of antibiotics and analgesic was given to the patients. Differences in the pain scores were analyzed using the Mann-Whitney U test. The differences between the two groups were analyzed with Student's t-test, and a value of  $P < 0.05$  was accepted as being significant. Our series of non-drainage total thyroidectomy were presented, comprising of 66 patients over an 8-year period. Adult patients admitted for elective total thyroidectomy with preoperative diagnosis of benign or malignant condition participated. No case selection for non-drainage was employed. Total and

Hemithyroidectomy plus isthmectomy was performed to the patients.

Important variables of the study were duration of hospital stay, postoperative pain score and postoperative complications. Visual Analogue scale was used to assess postoperative pain on completion of 24 hours. A horizontal line marked upto 100 as a millimeter scale was used with wording expressing words in terms of pain. Patients were put on Diclofenac sodium administered intramuscularly or orally. Postoperative analgesic requirement was noted. All the patients were subjected to ultrasound of the neck on the 1st postoperative day. Fluid collection was assessed in 3 dimensions. Amount of fluid collection in the drains was noted. Drains were removed when output in the drain became less than 50 ml per 24 hours. Lack of any collection of fluid in without drain patients were sent home whereas the patients with drain were discharged only after removal (extrusion) of the drain. Follow up dates were explained to the patient that was at two and six weeks after surgery. A doctor who did not know the actual grouping of patients collected all the data. The data was entered on a preformed structured Performa and analyzed on SPSS 21. Mean, standard deviation were used for continuous data while frequency and proportions for categorical or dichotomous data. Tests of significance included independent sample T test was performed to evaluate / asses continuous data where as Chi-square test was used for categorical or dichotomous data. 95% confidence interval was used. P value of less than 0.05 was considered significant.

The indications for surgery, procedure performed and local complications (seroma, bleeding, hematoma), were recorded for all of the patients. The outcomes were observed and recorded.

## RESULTS

This was a prospective and Comparitive analysis of thyroid surgery in which two variation of thyroidectomy compared by use of drain. Out of 560 patients of thyroidectomy surgery, group 1 included 64 patients in which drain was used and group 2 had 496 patients undergone surgery without drain. All patients were in between 20-50 year age group. In group 1 there were 22 (34.375%) males and 42

(65.625%) females. In group 2, 56 (11.29%) males and 440 (88.71%) females were included. In group 1, out of 64 cases, 10 (15.625%) cases were total thyroidectomy and 54 (84.375%) cases were Hemithyroidectomy. In group 2, out of 496 patients, 48 (9.67%) cases were total and 448 (90.32%) cases were Hemithyroidectomy. In group 1, out of 64 cases, 18 (28.125%) cases were of benign i.e. adenoma and 36 (56.25%) cases were colloidal cyst or goiter. In group 2 out of 496 cases, 140 (28.22%) cases were benign adenoma and 308(62.09%) cases were colloidal cyst or goiter. In group 1, out of 64 cases, 4 (6.25%) cases were of malignant i.e. follicular carcinoma and 6 (9.375%) cases were papillary carcinoma. In group 2 out of 496 cases, 20 (4.03%) cases were of malignant i.e. follicular carcinoma and 28 (5.64%) cases were papillary carcinoma. All above findings were described in Table 1.

According to Table 2, most of the patients were kept for a day, very few patients stayed more than 24 hours. The duration of hospital stay was found less in the patients without drain. The average length of hospital stay was  $1.10 (1-3) \pm 0.33$  days for group 1 and  $1.53 (1-6) \pm 0.80$  days for group 2. There was a statistically significant difference noted after conducting an analysis with a two-sample t- test ( $P = 0.001$ ). The mean follow-up period was  $2.60 \pm 0.51$  months for group 1 and  $2.80 \pm 0.71$  for group 2.

Table 3 describes postoperative complications. In Group 1, seroma found in 2 (3.125%) patients, suture reaction in 8 (12.5%) patients, transient recurrent laryngeal nerve paralysis in 6 (9.375%) patients and wound infection found in 4 (6.25%) patients. In Group 2, hematoma found in 4 (0.806%) patients, seroma found in 8 (1.61%) patients, suture reaction in 10 (2.01%) patients, transient recurrent laryngeal nerve paralysis in 14 (2.82%) patients, permanent recurrent laryngeal nerve paralysis in 3 (0.604%), Paralysis in 2 (0.403%) patients, Hypocalcaemia in 2 (0.403%) and wound infection found in 12 (2.42%) patients.

Comparitively the post operative complications found to be very less in Group 2 than Group 1. Suture reaction, transient recurrent laryngeal nerve paralysis and wound infection observed as most prevalent post operative complications in both groups.

**Table 1: Demographic characteristics. (Group 1- with drain, group 2- without drain)**

Characteristics		Subgroup	Group 1		Group 2	
			N=64	%	N=496	%
Age	Years		20-50		20-50	
Gender	Male		22	34.375	56	11.29
	Female		42	65.625	440	88.71
Type of surgery	Total		10	15.625	48	9.67
	Hemi		54	84.375	448	90.32
Type of disease	Benign	Adenoma	18	28.125	140	28.22
		Colloidal	36	56.25	308	62.09
	Malignant	Follicular	4	6.25	20	4.03
		Papillary	6	9.375	28	5.64

**Table 2: Detail of hospital stay and follow up period.**

Variables	Group 1	Group 2	p- value
Hospital stay	24-48 hr	6-10 hr	
Postoperative sixth hour VAS	3.60(27±1.04)	2.06(15)±0.72	0.01
Postoperative 24 hour VAS	2.06(15±0.72)	1.86(15)±0.75	0.001
1 month follow up	1.05±0.03	1.0± 0.11	0.001
3 month follow up	2.60± 0.51	2.80± 0.71	0.001

**Table 3: Postoperative complications in both groups**

Postoperative Complications	Group 1		Group 2		p- value
	N	%	N	%	
Hematoma	0	0	4	0.806	0.001
Seroma	2	3.125	8	1.61	0.002
Suture reaction	8	12.5	10	2.01	0.002
Transient recurrent laryngeal nerve paralysis	6	9.375	14	2.82	0.002
Permanent recurrent laryngeal nerve paralysis	0	0	3	0.604	0.001
Paralysis	0	0	2	0.403	0.001
Hypocalcaemia	0	0	2	0.403	0.001
Wound infection	4	6.25	12	2.42	0.01

**DISCUSSION**

Most surgeons insert drain at the completion of thyroidectomy to prevent the collection of fluid in the dead space; however the use of drains is a controversial topic. This is considerable debate over the pros and cons of drains. Many authors have reported that the drains are ineffective in preventing a life threatening haematoma formation after thyroidectomy.

This was a prospective and Comparitive analysis of thyroid surgery in which two variation of thyroidectomy compared by use of drain. Out of 560 patients of thyroidectomy surgery, group 1 included 64 patients in which drain was used and group 2 had 496 patients undergone surgery without drain. All patients were in between 20-50 year age group. In group 1 there were 22 (34.375%) males and 42 (65.625%) females. In group 2, 56 (11.29%) males and 440 (88.71%) females were included. In group 1, out

of 64 cases, 10 (15.625%) cases were total thyroidectomy and 54 (84.375%) cases were Hemithyroidectomy. In group 2, out of 496 patients, 48 (9.67%) cases were total and 448 (90.32%) cases were Hemithyroidectomy. In group 1, out of 64 cases, 18 (28.125%) cases were of benign i.e. adenoma and 36 (56.25%) cases were colloidal cyst or goiter. In group 2 out of 496 cases, 140 (28.22%) cases were benign adenoma and 308(62.09%) cases were colloidal cyst or goiter. In group 1, out of 64 cases, 4 (6.25%) cases were of malignant i.e. follicular carcinoma and 6 (9.375%) cases were papillary carcinoma. In group 2 out of 496 cases, 20 (4.03%) cases were of malignant i.e. follicular carcinoma and 28 (5.64%) cases were papillary carcinoma. All above findings were described in Table 1.

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A statistically proven difference between groups in terms of pain at 24 hours was evident that could be due to the irritating factor of having a drain placed. Similar results were evaluated by the previous studies which were conducted by Mekel M. et al in 2010,<sup>11</sup> Hurtado Lopez et al in 2001<sup>13</sup> and Suslu et al in 2006.<sup>19</sup> The duration of hospital stay was found lesser in the patients without a drain and these findings were also reported by Sahai et al in 2005 and McHenry CR et al in 1997 in their studies. Short hospital stay is useful in our setup as it lessens the burden on hospitals. Short hospital stay is also economical for our patients as majority of them are underprivileged, belong to distant areas and they can't take long leave from work.

Table 3 describes postoperative complications. In Group 1, seroma found in 2 (3.125%) patients, suture reaction in 8 (12.5%) patients, transient recurrent laryngeal nerve paralysis in 6 (9.375%) patients and wound infection found in 4 (6.25%) patients. In Group 2, hematoma found in 4 (0.806%) patients, seroma found in 8 (1.61%) patients, suture reaction in 10 (2.01%) patients, transient recurrent laryngeal nerve paralysis in 14 (2.82%) patients, permanent recurrent laryngeal nerve paralysis in 3 (0.604%), Paralysis in 2 (0.403%) patients, Hypocalcaemia in 2 (0.403%) and wound infection found in 12 (2.42%) patients.

Bergqvist et al in 1985<sup>18</sup> and Wilhborn et al in 1988<sup>22</sup> found that hemorrhage in the dead space around trachea can cause potentially life threatening airway compression and requires urgent exploration. Occurrence of cervical hematoma after thyroidectomy is variable and ranges between 0.3 – 2.5%.<sup>19</sup> The risk of postoperative bleeding is higher in patients with retrosternal goiter and Grave's disease. Hemorrhage usually occurs between two and six hours of surgery. Many studies have reported that the drains are ineffective in preventing blood collection because these often get blocked by clotted blood.<sup>19-21</sup> There are no significant evidences supporting the use of drainages after total thyroidectomy as they do not seem to decrease the rate of post operative complications. Concluding, the

use or not of drains depends on the individual character of each surgeon.

The randomized double-blinded prospective study<sup>9</sup> found that routine use of drain is not necessary for thyroid surgeries including Hemithyroidectomy and not effective in preventing any post-operative complication of thyroid surgery.

In the study conducted by Nawaz s. et al in 2015<sup>24</sup> suggested that "Drain less" Thyroidectomy causes less discomfort, short hospital stay and does not increase the risk of post operative complications. Drains should be used only in selected cases of thyroidectomy.

Comparitively the post operative complications found to be very less in Group 2 than Group 1. Suture reaction, transient recurrent laryngeal nerve paralysis and wound infection observed as most prevalent post operative complications in both groups. All the complications rather than recurrent laryngeal nerve paralysis were manageable.

Some authors have suggested that the presence of drain incites inflammatory reaction, which may lead to increased fluid production. Moreover suction drain due to negative pressure may also prevent the cut lymphatics from closing and hence increase fluid drainage.<sup>17,22,23</sup>

The duration of hospital stay was found less in the patients without drain and the same findings are also reported by other studies.<sup>14,15</sup> Short hospital stay lessens the burden on Hospitals, also economical for our patients as majority of them are from underprivileged group. Mekel et al<sup>11</sup> in his study retrospectively analyzed that patients were diagnosed with papillary carcinoma (85%), medullary carcinoma (10%), or other types of thyroid cancer were operated and post operative drain was useful to avoid fluid collection.

In short the drains are not required in most cases of thyroidectomy. Drains cause discomfort, increase septic complications and prolong hospital stay. These may be useful in patients with recurrent goiter, Graves' disease, substernal goiter, patients on anticoagulants. There were many positive findings evaluated in our study.

## CONCLUSION

Thyroidectomy without drain causes less discomfort, short hospital stay and does not increase the risk of postoperative complications. Meticulous homeostasis

and attention to finer details during surgery are more important for achieving this goal. Hence, routine use of drains for thyroid surgery may not be necessary. It should be reserved for selected cases of thyroidectomy like patients with recurrent goiter, substernal goiter and patients on anticoagulants.7-9

Prevention of complications depends more on the experience of surgeon, meticulous homeostasis and attention to finer details during surgery. Hence author concluded that thyroid surgeries including Hemithyroidectomy without drain are safe in hands of experienced surgeons in addition to that it reduces pain and discomfort to the patient hence reduces hospital stay without increasing morbidity.

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