

# To Compare the Outcome of Lobectomy and Isthmusectomy with and without Drain in Case of Solitary Nodule in Thyroid Surgery

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## ABSTRACT

**Background:** Thyroidectomy is a common surgical procedure. The results of some clinical trials suggest that routine drainage does not offer advantages, but the evidence is not strong either in favor of or against this intervention. Several studies, however, have suggested that use of drains could increase the risk of infection, the length of hospital stay, treatment costs, and discomfort for the patient.

**Aim:** To compare the outcome of lobectomy and isthmusectomy with and without drain in case of solitary nodule in thyroid surgery.

**Study design:** Randomized control trial

**Settings:** Department of Surgery, Mayo Hospital, Lahore

**Duration:** 6 Months

**Methods:** The data from 60 patients were collected from the patients admitted in east surgical ward through outpatient department with history, examination and investigation which were included according to inclusion criteria mentioned above. Informed and written consent was taken from each patient. Surgery was Performed by Consultant. Patients were divided into Two Groups by Lottery method. Patient were observed postoperatively and followed up for mean pain score for 24 hours and mean hospital stay till discharged.

**Results:** Mean age of patients in Group-A and in Group-B was  $36.86 \pm 12.30$  and  $40.20 \pm 9.28$  years. n Group-A there were 6 male and 24 female while in Group-B there were 9 male and 21 female patients. Mean hospital stay of Group-A and Group-B patients was  $1.85 \pm 0.59$  and  $1.27 \pm 0.19$  days. In Group-A and in Group-B mean pain score at 1<sup>st</sup> post operative day was  $2.63 \pm 0.49$  and  $2.13 \pm 0.34$ . Both hospital stay and mean pain score at 1<sup>st</sup> post operative day was significantly lower in Group-B patients.

**Conclusion:** Results of this study confirms the hypothesis that thyroid surgery in case of solitary nodule without drain is more beneficial for patients in terms of short hospital stay and less pain score as compared to routine use of drain.

**Keywords:** Thyroid surgery, Solitary nodule, Lobectomy, Isthmusectomy, With drain, Without drain

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## INTRODUCTION

The thyroid is a butterfly-shaped gland in the neck below the thyroid cartilage in front of the trachea. The thyroid has two side lobes, connected by a isthmus in the middle. When the thyroid is its normal size, you can't feel it. Brownish-red in color, the thyroid is rich with blood vessels. Nerves important for voice quality also pass through the thyroid<sup>1</sup>.

Thyroid lobectomy and isthmusectomy is one of the most common surgical procedures<sup>2</sup>. It is usually performed for benign thyroid disorders<sup>3</sup> like solitary nodule. Post operative bleeding can be a devastating complication of thyroid surgery. An unrecognized or rapidly expanding hematoma can cause airway compromise and asphyxia<sup>4,5</sup>.

It is a common practice for surgeons to routinely insert a drain after every case of thyroid surgery<sup>6</sup>, whether it is total thyroidectomy or unilateral

lobectomy and isthmusectomy. This is mainly due to the fear of postoperative hemorrhage or accumulation of excess lymphatic fluid which needs to be drained<sup>4</sup>. Most complications are clinically apparent within 6 hours after surgery<sup>7</sup>.

Some authors have been selective in the use of drains after thyroidectomy, with the specific indications being a large dead space, total thyroidectomy<sup>7,8</sup>, hypervascularity and cancers<sup>9</sup>.

Insertion of drain contribute to the discomfort of the patients<sup>10</sup>, increased analgesic requirement<sup>2</sup>, prolong the length of the hospital stay and thereby increase the cost, and deteriorate the cosmetic result<sup>10</sup>.

A study reported that Mean pain score (maximum=10) was 2.9 in drain groups and 3.0 in non drain groups with no statistical difference, i.e., p-value = 0.803<sup>11</sup>. While another study reported mean pain was significantly higher in drain group, i.e., mean pain (VAS) was in non-drain group was  $2.08 \pm 0.74$  and in group with drain the mean pain score was  $3.09 \pm 0.77$ , p-value=0.001<sup>12</sup>. That is a controversy with above cited literature<sup>11</sup>.

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Moreover it is also reported that hospital stay was significantly higher in drain group (2.07 days) as compare to non-drain group (1.06 days),  $p$ -value  $< 0.05$ <sup>13</sup>. While another study reported Mean length of postoperative stay (days) was 2.3 in drain groups and 2.1 in non drain groups,  $p$ -value=0.477<sup>11</sup>. That is another controversy with above cited study<sup>12</sup>.

The rationale of this study is to compare pain and hospital stay in patients undergoing lobectomy and isthmusectomy with and without drain in thyroid surgery in our patients at Mayo hospital Lahore. Although a lot of research work has been published, but there is a controversy in both procedure regarding hospital stay and mean pain score after using drain and non-drain. After this study we will be able to adopt the procedure following lower in-hospital stay (so to reduce the hospital burden) and lower pain score using visual analogue scale.

## MATERIAL AND METHODS

This randomized control trial was carried out in East surgical ward, Department of surgery, Mayo Hospital, Lahore for a period of 6 months. The calculated Sample size of 60 patients (30 in each group) is by using 95% confidence level, 5% margin of error and 95% power of study. We used expected mean pain  $2.08 \pm 0.74$  and in group with drain the mean pain score was  $3.09 \pm 0.77$ . Non probability consecutive sampling technique was used. Patients of age 20 years upto 65 years with solitary thyroid nodule assess by thyroid scan were included.

### Exclusion criteria

- Patients with malignant thyroid swellings assessed by Fine Needle Aspiration Cytology
- Patients with huge thyroid swelling greater than 6cm in size assessed by Thyroid Scan
- Patients with hyperthyroidism Assess by Thyroid Function Tests i.e., Serum T<sub>3</sub>  $> 5.8$  pmol/L, Serum T<sub>4</sub>  $> 23.0$  pmol/L & TSH  $< 0.30$  mIU/L Levels
- Patients with bleeding disorder Assess by Clotting Time  $> 6$  min)

The data from 60 patients were collected from the patients admitted in east surgical ward through outpatient department with history, examination and investigation which was included according to inclusion criteria mentioned above. The data collection procedure was explained to each patient and informed and written consent was taken. Confidentiality of the patient was maintained. Study is approved by Hospital Ethical Committee. Patients were divided into two groups by lottery method. Hypertension can be a confounder that was well managed pre-operatively, per-operatively and in post operative period. Patient were observed postoperatively and followed up for mean pain score for 24 hours and mean hospital stay till discharged.

Data was tabulated and analyzed by SPSS version 20. The quantitative data like age, hospital stay and pain score was presented in form of mean  $\pm$  S.D and qualitative data like gender was given in frequency (%). Independent sample T-test was used to compare mean hospital stay and mean pain score in both study groups. A  $p$ -value  $\leq 0.05$  was taken as significant. Data was stratified for age, gender, current smoking, pan chewing and hypertension. T-Test was used post stratification with  $P$ -value  $\leq 0.05$  considered as significant.

## RESULTS

Mean age of patients in Group-A and in Group-B was  $36.86 \pm 12.30$  and  $40.20 \pm 9.28$  years (Table 1). In Group-A there were 6 male and 24 female while in Group-B there were 9 male and 21 female patients (Table 2). There were 11 patients who were smokers in Group-A and in Group-B 10 patients were smokers (Table 3). In Group-A there 11 patients who chew pan and in Group-B 8 patients told that they chew pan (Table 4). In Group-A 10 patients and in Group-B 7 patients were hypertensive (Table 5). Mean hospital stay of Group-A patients was  $1.85 \pm 0.59$  days while in Group-B mean hospital stay of patients was  $1.27 \pm 0.19$  days respectively. According to  $p$ -value mean hospital stay was significantly lower in Group-B as that of Group-A patients. i.e., ( $p$ -value=0.000) (Table 6). In Group-A and in Group-B mean pain score at 1<sup>st</sup> post operative day was  $2.63 \pm 0.49$  and  $2.13 \pm 0.34$ . Mean pain score of Group-B patients at 1<sup>st</sup> post operative day was significantly lower than that of Group-A patients. i.e., ( $p$ -value=0.000) (Table 7). In the age group 20-30 years mean hospital stay of patients in Group-A and in Group-B was  $1.73 \pm 0.49$  and  $1.28 \pm 0.27$  days. In the age group 31-40 years mean hospital stay of patients in Group-A and in Group-B was  $1.76 \pm 0.51$  and  $1.25 \pm 0.13$  days. While hospital stay of patients in the age group 41-50 and  $> 50$  years for Group-A was  $1.91 \pm 0.50$  and  $2.16 \pm 0.89$  days. For Group-B mean hospital stay of patients for the age group 41-50 and  $> 50$  years it was  $1.25 \pm 0.00$  and  $1.33 \pm 0.22$  days respectively. As per  $p$ -value in Group-B and in the age groups 20-30 and 31-40 years mean hospital stay was significantly shorter as compared to that of Group-A patients. However in the age group 41-50 and  $> 50$  years  $p$ -value shows no statistically significant difference for hospital stay in both treatment groups but it was observed that Group-B patients in these age groups as well had shorter hospital stay (Table 8).

Patients in the age group 20-30 [Group-A: 2.50 vs. Group-B; 2.11], 41-50 [Group-A: 2.50 vs. Group-B; 2.50] and  $> 50$  [Group-A: 2.66 vs. Group-B; 2.20] years no statistically significant difference was seen for pain at 1<sup>st</sup> post operative day in both treatment

groups. However in the age group 31-40 [Group-A: 2.80 vs. Group-B; 2.07] years statistically significant difference was seen in pain score at 1<sup>st</sup> post operative day. In all these age groups except 41-50 years it was observed that pain score of patients was less in Group-B as compared to Group-A patients (Table 9).

Among male patients mean hospital stay was 1.80±0.49 in Group-A and 1.29±0.18 in Group B. While among female patients mean hospital stay in Group-A was 1.86±0.62 and 1.27±0.20. It was observed that both male and female patients had shorter hospital stay in Group-B as compared to that of Group-A patients (Table 10).

Mean pain score at 1<sup>st</sup> post operative day in Group-A and in Group-B for male patients was 2.33±0.51 and 2.11±0.33. While for female patients mean pain score at 1<sup>st</sup> post operative day in Group-A and in Group-B was 2.70±0.46 and 2.14±0.35 respectively. Among male patients mean pain score was statistically same in both treatment groups but still in Group-B it was lower than that of Group-A patients while female patients had significantly lower pain score in Group-B when compared with Group-A female patients (Table 11).

Both the parameters hospital stay and pain score was compared in relation to the smoking status of patients. As per this stratification it was seen that among smokers and nonsmokers hospital stay and mean pain score at 1<sup>st</sup> post operative day was significantly shorter for Group-B patients (Table 12).

Pan chewing was also stratified to see if this can influence or had an effect on patients in terms of mean hospital stay and mean pain score in both treatment groups. Here it was observed that among pan chewers and non pan chewers both parameters i.e. hospital stay and mean pain score at 1<sup>st</sup> post operative day was significantly shorter in Group-B patients among whom drain insertion was not done. Hospital Stay [Pan Chewers: Group-A: 2.04 vs. Group-B: 1.39, p-value=0.004, Non Pan Chewers Group-A: 1.74 vs. Group-B: 1.23, p-value=0.002] Pain score [Pan Chewers: Group-A: 2.54 vs. Group-B: 2.12, p-value=0.052, Non Pan Chewers Group-A: 2.68 vs. Group-B: 2.13, p-value=0.000] (Table 13).

Mean hospital stay for hypertensive patients in Group-A and in Group-B was 2.06±0.73 and 1.30±0.13 days. While mean hospital stay of non hypertensive patients in Group-A and in Group-B was 1.75±0.49 and 1.26±0.20 days. Mean hospital stay of hypertensive and non hypertensive patients was short in Group-B. i.e., without drain group. Same trend was seen for pain score among hypertensive and non hypertensive patients for Group-B. They had also less pain score when compared with Group-A patients (Table 14).

Table 1: Age distribution of patients in treatment groups

	Group-A	Group-B
n	30	30
Mean±SD	36.86±12.30	40.20±9.28
Minimum	20	23
Maximum	65	65

Table 2: Gender distribution of patients

Gender	Group-A	Group-B	Total
Male	6	9	15
Female	24	21	45

Table 3: Smoking status of patients in treatment groups

Smoking	Group-A	Group-B	Total
Yes	11	10	21
No	19	20	39

Table 4: Pan chewing in treatment groups

Pan Chewing	Group-A	Group-B	Total
Yes	11	8	19
No	19	22	41

Table 5: Hypertension status of patients in treatment groups

Hypertension	Group-A	Group-B	Total
Yes	10	7	17
No	20	23	43

Table 6: Descriptive statistics for hospital stay (days)

	Group-A	Group-B
N	30	30
Mean	1.85	1.27
SD	0.59	0.19
Minimum	1.17	1.08
Maximum	3.17	2.00

Table 7: Descriptive statistics for pain score 1<sup>st</sup> post operative day

	Group-A	Group-B
N	30	30
Mean	2.63	2.13
SD	0.49	0.34
Minimum	2	2
Maximum	3	3

Table 8: Hospital stay in relation to age stratification

Age group	Group A	Group B	P value
20-30	1.73±0.49	1.28±0.27	0.026
31-40	1.76±0.51	1.25±0.13	0.012
41-50	1.91±0.50	1.25±0.00	0.150
>50	2.16±0.89	1.33±0.22	0.075

Table 9: Pain score at 1<sup>st</sup> day post operative in relation to age stratification

Age group	Group A	Group B	P value
20-30	2.50±0.52	2.11±0.33	0.071
31-40	2.80±0.42	2.07±0.26	0.000
41-50	2.50±0.57	2.50±0.70	-
>50	2.66±0.51	2.20±0.44	0.148

Table 10: Hospital stay of patients in relation to gender stratification

Gender	Group A	Group B	P value
Male	1.80±0.49	1.29±0.18	0.052
Female	1.86±0.62	1.27±0.20	0.000

Table 11: Pain score at 1<sup>st</sup> day post operative in relation to gender stratification

Gender	Group A	Group B	P value
Male		2.11±0.33	0.326
Female	2.70±0.46	2.14±0.35	0.000

Table 12: Hospital stay & pain score at 1<sup>st</sup> day post operative in relation to smoking status

Smoking	Hospital Stay		P value	Pain Score		P value
	Group A	Group B		Group A	Group B	
Yes	1.71±0.52	1.30±0.19	0.032	2.72±0.46	2.10±0.31	0.002
No	1.93±0.62	1.26±0.19	0.000	2.57±0.50	2.15±0.36	0.005

Table 13: Hospital stay & pain score at 1<sup>st</sup> day post operative in relation to pan chewing

Pain chewing	Hospital Stay		P value	Pain Score		P value
	Group A	Group B		Group A	Group B	
Yes	2.04±0.53	1.39±0.15	0.004	2.54±0.52	2.12±0.35	0.052
No	1.74±0.60	1.23±0.18	0.002	2.68±0.47	2.13±0.35	0.000

Table 14: Hospital stay & pain score at 1<sup>st</sup> day post operative in relation to hypertension

Hypertension	Hospital Stay		P value	Pain Score		P value
	Group A	Group B		Group A	Group B	
Yes	2.06±0.73	1.30±0.13	0.010	2.70±0.48	2.14±0.37	0.022
No	1.75±0.49	1.26±0.20	0.000	2.60±0.50	2.13±0.34	0.001

## DISCUSSION

Drains after thyroidectomy have traditionally been used in many centres worldwide despite lack of evidence to suggest any benefit<sup>7,14,17</sup>. Classic teaching in surgery has dictated that drains should be used routinely after thyroid surgery so as to prevent postoperative complications by evacuating postoperative hematoma or lymphatic fluid in the thyroid bed and to alert the surgeon to early postoperative bleeding<sup>6</sup>.

This anecdotal based teaching and practice has been challenged by recent randomized clinical trials<sup>7,14,17</sup>. These randomized clinical trials have failed to provide clear evidence that using drains in patients undergoing thyroid operations significantly improves patient outcomes. Most of these studies have suggested that routine use of drains after thyroid surgery is unnecessary and contribute to the discomfort of the patients, increase the rate of surgical wound infections, prolong the length of the hospital stay and thereby increase the cost, and deteriorate the cosmetic result<sup>7,14,17,18,19</sup>. Although several prospective randomized reports regarding the functioning of drains in thyroid surgery have not justified their use, most surgeons still advocate routine drainage of the thyroidectomy bed with an effort to monitor a potentially life-threatening complication of postoperative bleeding<sup>7,14,17,18,19</sup>.

In this study it was observed that patients who were treated with drain among them mean hospital stay was 1.85 days while mean hospital stay of patients who were not treated with drain was 1.27 days. A statistically significant difference was observed for hospital stay in patients who were not treated with drain. i.e., (p-value=0.000)

Muthaa in his study reported that patients in the non-drained group had a significantly shorter length of hospital stay compared to those in drained group (p=0.001). On average, patients in the non-drained group stayed in hospital for 1.2 days [SD 0.06] and those in the drained group stayed on for 3.2 days [SD 0.12]. Results of this study is consistent with the results of Muthaa. Tahsin Colak also reported shorter hospital stay with non drain thyroid surgery<sup>2</sup>.

Ugur Deveci in his study also reported that performing a thyroidectomy without the use of drain decreased the length of hospital stay. 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<sup>12</sup>.

According to the results of a local study from Pakistan also supports that without using drain results in shorter hospital stay as compared to the use of drain in thyroid surgery. i.e., (1.5 days without drain vs. 3.4 days with drain). Results of local study regarding hospital stay without drain is almost same with the results of this study. Morrissey et al. demonstrated that thyroid surgery without the use of a drain decreases the length of hospital stay while producing no increase in patient morbidity<sup>17</sup>.

Short stay thyroid surgery has become routine in many centers and is usually defined by the American Insurance Industry as discharge less than or equal to 23 hours > from the operation. LoGerfo is routinely discharging patients < 8hours. Average length of stay was 0.85 days (about 21 hours) in no drain group and 2 days in drain group.

Tahsin Colak in his study reported that The mean amount of intramuscular analgesic requirement was significantly less in the non-drained group. Twenty-eight patients (48.3%) in the non-drained group did not need

intramuscular analgesic, whereas 18 patients (31%) did not in the drained group ( $P=0.01$ )<sup>2</sup>.

Recently another local study from Peshawar reported that Postoperative pain score 24 hours had revealed finding of a significant higher pain score in the group that had placement of a drain. i.e.  $60.87 \pm 7.06$  SD in the drain group and  $41.19 \pm 4.18$  SD in no drain group<sup>18</sup>.

Our results coincided with those of an African study done in 2011, which also showed the mean VAS to be significantly reduced in the non-drain group on.

Two studies also investigated the relationship between drain insertion and postoperative pain, and the authors noted an approximate 50% reduction in the VAS score in the group in which no drains were used<sup>2</sup>.

A local study from Karachi Pakistan reported that patients in the drain group felt a greater degree of pain and discomfort than those in non drain group. The mean VAS score for PD1 and PD2 in drain group was significantly higher ( $p < 0.01$ ) as compared to non drain group. This consequently led to a greater use of analgesics<sup>4</sup>.

Ugur Deveci in his study reported that mean VAS score was significantly lower in group 1 than in group 2 at the postoperative sixth hour  $3.64 (2-7) \pm 1.06$  and  $4.95 (2-8) \pm 1.05$ , resp.) ( $p$ -value=0.002) and at the postoperative first day  $2.08(1-5) \pm 0.74$  and  $3.09(1-5) \pm 0.77$ , resp.) ( $P=0.001$ ). An intramuscular analgesic was required for all of the patients in group 2, whereas 162(81%) of the patients in group 1 needed this medication<sup>14</sup>.

As per results it was observed that among smokers and non smokers hospital stay and pain score significantly less in non drain group as compared to drain group. Same trend was seen for pan chewing and hypotension status of patients that patients were hypertensive/ non hypertensive and pan chewers/non pan chewers among them hospital stay and pain score was less in non drain group. However male and female patients both in non drain group had shorter hospital stay but pain score for male patients was statistically same in non drain and drain group however for female patients it was significantly different in both treatment groups.

The present study, in conformity with numerous international clinical trials, could not show any benefit of routinely placing drains after every case of thyroid surgery, particularly uncomplicated cases. Although, it did display the complications as well as life threatening conditions which can possibly occur if drains are placed routinely.

## CONCLUSION

Results of this study confirms the hypothesis that thyroid surgery in case of solitary nodule without drain is more beneficial for patients in terms of short hospital stay and less pain score as compared to routine use of drain.

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