ORIGINAL ARTICLE

# COMPARISON OF OUTCOME OF SOLITARY THYROID NODULE SURGERY WITH AND WITHOUT DRAINAGE

**Muhammad Mansoor Iqbal[1], Muhammad Jawed[2], Muhammad Iqbal Khan[3], Shazia Ubed Shaikh[4], Ubedullah Shaikh[5]**

[1]Surgical Unit, Jinnah Postgraduate Medical Centre Hospital,[2]Surgical Unit, Dow University Hospital, OJHA Campus,[3]Jinnah Postgraduate Medical Centre,[4]Radiology Department, Jinnah Postgraduate Medical Centre and [5]Liver Transplant & Hepatobiliary Surgery Unit, Dow University Hospital, OJHA Campus, Karachi, Pakistan

## ABSTRACT

**Background:** Majority of surgeons place a drain following thyroid surgery to evacuate collected blood and serum. The aim of this study was to compare the outcome of thyroid surgery with and without drainage.

**Material & Methods:** This randomized clinical trial was conducted at Surgical Department, Jinnah Postgraduate Medical Centre and Dow University Hospital, Karachi from August 2013 to January 2014. Inclusion criteria were age between 18-65 years, either gender, solitary thyroid nodule with maximum size 3x3 cm, ASA physical status I and II, euthyroid patients undergoing thyroidectomy and duration of disease >6 months. Exclusion criteria were bleeding diathesis, multinoduler goiter, thyroid cancer, previous thyroid surgery and anticoagulant therapy. In group A drain was placed and in group B no drain was placed. Pain score on first postoperative day and duration of hospital stay were noted on visual analog scale (VAS).

**Results:** In Group A the median IQR of postoperative hospital stay was 2(1-2) and in Group B 1(1-1). In Group A the median IQR of pain on 1st postoperative day on VAS was 2(2-3) and in Group B 1(1-1). Pain was observed in Group A in 6.7% patients VAS score 1, in 53.3% patients 2, in 36.7% patients 3 and in 3.3% patients 4. In Group B 83.3% patients had VAS score 1, 13.3% had 2, 3.3% had 3 and 0% VAS score 4. In group A 36.7% patients were discharged on 1st postoperative day, 53.3% on 2nd and 10.0% on 3rd postoperative day. In Group B 93.3% patients were discharged on 1st postoperative day, 6.7% on 2nd and 0% on 3rd postoperative day.

**Conclusion:** Routine drainage of thyroidectomy bed is unnecessary after uncomplicated thyroid surgery, as it is not effective in decreasing the rate of postoperative complications resulting from post thyroidectomy haemorrhage.

**KEY WORDS:** Drain; Visual analog score; Recurrent laryngeal nerve; Lobes of thyroid gland.

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## INTRODUCTION

Development of thyroid gland is as the midline descent of the thyroid tissue from the foramen caecum to the level of the larynx. It descents along with the thyroglossal tract.[1,2] Majority of surgeons places a drain following thyroid surgery with the hope that this will obliterate the dead space and evacuate collected blood and serum. This belief is further reinforced by the fact that postoperative drains usually yield fluid. Drainage has been questioned after various types of surgeries with much larger potential dead spaces like cholecystectomy and colonic anastamosis.[3,4] These procedures are now routinely not drained as these usually gets blocked by the serum. Furthermore, it causes discomfort and increase the hospital stay. In a study conducted in Turkey between January 2004 and August 2005, found the mean visual analogue score on first postoperative in drained group was 2.63±1.04 and in non drained group, it was 1.96±0.66. The mean hospital stay was found to be 2.46±0.73 and 1.62±0.69 in drained and non drained groups respectively.[5] The complications rates of seroma, wound infection and hematoma were minimal in both the groups.[3] The same findings regarding complications were found in other studies as well, and none of the patients required redo surgery for bleeding or for any other complications.[6-7]

In a study published in 2006 found seroma in 1 (1.5%), wound infection in 2 (2.9%) and hemorrhage in 2 (2.9%) patients in drained group. Where as in non-drained group seroma 1 (1.5%), haemorrhage

**Corresponding Author:**
Muhammad Mansoor Iqbal
Senior Registrar
Surgical Unit-I Jinnah Postgraduate Medical Centre Hospital Karachi, Pakistan
E-mail: mansooriqbal118@gmail.com

in 1 (1.5%) and no case of wound infection. Only 3 (2.2%) of the 135 patients in this series experienced serious postoperative hemorrhage; 2 from the group with drainage and 1 from the group without drainage.[8] Similar findings were noted in other study as well.[9]

**Table 1: Different variables used.**

| Variables | N (%) |
|---|---|
| **Gender** | |
| Male | 6(10.0) |
| Female | 54(90.0) |
| **Groups** | |
| With drainage | 30(50.0) |
| Without drainage | 30(50.0) |
| **Outcome/procedure** | |
| RHI | 41(66.7) |
| LHI | 20(33.3) |
| **Age groups** | |
| 15-25 | 15(25.0) |
| 26-35 | 25(41.7) |
| 36-45 | 10(16.7) |
| 46-55 | 8(13.3) |
| 56-65 | 2(3.3) |

Many authorities advocate draining the neck routinely after thyroid surgery with no scientific evidence to support this practice. The rationale of the study is to determine if the routine use of drains following thyroid surgery is of any value, so the same will be followed in subsequent surgeries. The aim of this study was to compare the outcome of thyroid surgery with and without drainage

## MATERIAL AND METHODS

This is randomized clinical trial study conducted at Surgical Department Unit-III Jinnah Post Graduate Medical Centre Karachi and Dow University Hospital from August 2013 to January 2014.

Patients of ASA I and II meeting the inclusion criteria scheduled for elective thyroidectomy by capsular dissection technique for benign thyroid disorder were selected. The patients were admitted through OPD of General Surgery Ward. The selected patients were allocated by balloting into two groups. In group 'A' drain were placed and in group 'B' no drain were be placed. Surgery was done by a consultant having more than five years of experience. Pain score on first postoperative day and duration of hospital stay were noted. Inclusion Criteria were age between 18-65 years, either gender, solitary thyroid nodule with maximum 3cm x3cm swelling size, patients admit through OPD after investigating thyroid profile, ASA physical status I and II, euthroid patients undergoing thyroidectomy and duration of disease

**Table 2: Median (IQR), Mean (SD).**

| Variable | Age groups | | | | |
|---|---|---|---|---|---|
| | **15-25** | **26-35** | **36-45** | **46-55** | **56-65** |
| **With drainage** | | | | | |
| n | 8 | 10 | 5 | 5 | 2 |
| Age, Median (IQR) | 22(20-24.75) | 30(27.75-35) | 45(39-45) | 51(49-52.5) | 58(56-60) |
| Weight, Mean (SD) | 505(5.37) | 49.8(5.45) | 53(1.87) | 54.6(6.11) | 51.5(50-53) |
| **Without drainage** | | | | | |
| n | 7 | 15 | 5 | 3 | 0 |
| Age, Median (IQR) | 22(17-23) | 30(28-32) | 40(38.5-42.5) | 50(50-50) | — |
| Weight, Mean (SD) | 48.71(3.25) | 50.13(3.54) | 54.8(6.65) | 54.67(6.35) | — |
| **Right hemithyroidectomy with isthemusectomy** | | | | | |
| n | 9 | 19 | 5 | 5 | 2 |
| Age, Median (IQR) | 21(19-24) | 30(28-35) | 45(40-45) | 50(49-50) | 58(65-60) |
| Weight, Mean (SD) | 49.56(5.08) | 50.16(3.5) | 51.8(3.56) | 55.8(7.0) | 51.5(2.12) |
| **Left hemithyroidectomy with isthmusectomy** | | | | | |
| n | 6 | 6 | 5 | 3 | 0 |
| Age, Median (IQR) | 22.5(18.75-23.5) | 29(26.75-23.5) | 40(37.5-42.5) | 50(50-55) | — |
| Weight, Mean (SD) | 49.83(3.76) | 49.5(6.66) | 56(5.1) | 52.67(2.89) | — |

**Table 3: Groups and variables.**

| Groups → ↓ | Weight in kig mean (SD) | Duration of disease on months; median (IQR) | VAS score; median (IQR) | Postoperative stay; median (IQR) | Duration of stay in hospital; median (IQR) |
|---|---|---|---|---|---|
| **Gender** | | | | | |
| Male | 59.83(2.927) | 12.5(8.75-17.25) | 1(1-2.25) | 1(1-2.25) | 7.5(7-12) |
| Female | 50.28(4.021) | 13(10-18) | 2(1-2) | 1(1-2) | 7(4-11.25) |
| P-value | 0.000* | 0.738 | 0.340 | 0.894 | 0.333 |
| **Groups** | | | | | |
| With drainage | 51.43(5.029) | 13.5(10-18) | 2(2-3) | 2(1-2) | 7(11.25-4.75) |
| Without drainage | 51.03(4.76) | 12(9-163.25) | 1(1-1) | 1(1-1) | 7(4-11.5) |
| P-value | 0.753 | 0.418 | 0.000* | 0.000* | 0.806 |
| **Outcome/procedure** | | | | | |
| Right hemithyroidectomy with isthmusectomy | 51(4.608) | 13.5(9-18) | 2(1-2) | 1(1-2) | 7(4-11) |
| Left hemithyroidectomy with isthmusectomy | 51.7(5.42) | 12.5(10-16) | 2(1-2) | 1(1-2) | 7(5-11) |
| P-value | 0.603) | 0.825 | 0.787 | 0.736 | 0.924 |

*P-value <0.05 indicating significant results

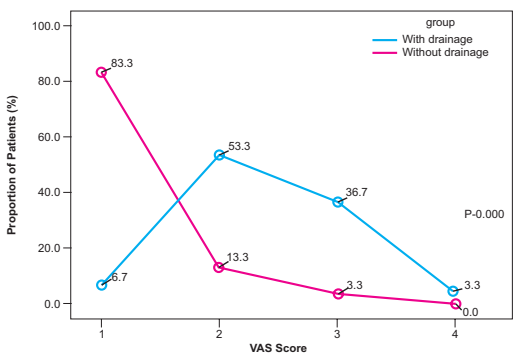


Figure 1: Graphic distribution of VAS Score of with drainage and without drainage group.

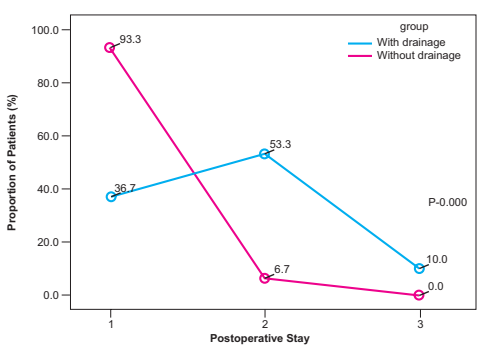


Figure 2: Graphic distribution of postoperative hospital stay of with and without drainage group.

more than 6 months. Exclusion Criteria were non consenting patients, bleeding diathesis, multinoduler goiter, thyroid cancer, patients previously operated for thyroid disease and anticoagulant therapy.

## RESULTS

Total 60 patients were included in this study. Among these 60 patients, 6 were males and 54 females. Female patients had minimum age of 18 years and maximum age of 60 years, while male patients had minimum age of 24 and maximum age of 50 years.

Among these, 40 patients were diagnosed with right solitary thyroid nodule and 20 with left solitary thyroid nodule. Minimum thyroid swelling was of 1.4x1.4 cm and maximum was 3.0x3.0 cm. (Table 1) It was found that in drain group (Group A) median (IQR) of postoperative hospital stay was 2 (1-2) and in non drain group (Group B) median (IQR) of postoperative hospital stay was 1 (1-1). (Table 2)

It was found that in drain group (Group A) median (IQR) of pain on 1st postoperative day on visual analog scale was 2(2-3) and in non drain group (Group B) median(IQR) pain on 1st postoperative day on visual analog scale was 1(1-1). (Table 2 & 3)

Pain was observed Group A (with drainage) 6.7% of patients have VAS score = 1, 53.3% of patients have VAS score = 2, 36.7% of patients have VAS score = 3 and 3.3% of patients have VAS score = 4. But in Group B (without drainage) 83.3% of patients have VAS score = 1, 13.3% of patients have VAS score = 2, 3.3% of patients have VAS score = 3 and 0% of patients have VAS score = 4. So it is clear that patients without drain experience less pain than patients with drain. (Fig. 1)

In this study group A (with drainage) 36.7% of patients were discharged on 1st post operative day, 53.3% of patients were discharged on 2nd post operative day and 10.0% of patients were discharged on 3rd postoperative day. But in Group B (without drainage) 93.3% of patients were discharged on 1st postoperative day, 6.7% of patients were discharged on 2nd postoperative day and 0% of patients were discharged on 3rd post operative day. So it is clear that patients without drain have less postoperative hospital stay than with drain. (Fig. 2)

## DISCUSSION

We included 60 patients in this research, 06 patients were male and 54 patients were female with age ranges from 18 to 65 years. Minimum age found in female patient was 18 years and maximum age 60 years whereas in male patients the minimum age found was 24 years and maximum age was 50 years. It was found that in drain group (Group A) median (IQR) of post operative hospital stay and pain on 1st postoperative day on visual analog scale were 2 (1-2) and 2 (2-3) respectively and in non drain group (Group B) median (IQR) of postoperative hospital stay and pain on 1st postoperative day on visual analog scale were 1 (1-1) and 1 (1-1) respectively.

This correlates our study with few other international studies Colak T. et al in their study have included 116 patients (58 patient in drain group and 58 patients in non drain group). In their study it was found that in drain group mean ± SD of postoperative hospital stay and pain on 1st postoperative day on visual analog scale were 2.46 ± 0.73 and 2.63±1.04 respectively and in non-drain group mean ± SD of postoperative hospital stay and pain on 1st postoperative day on visual analog scale were 1.62 ± 0.69 and 1.96 ± 0.66 respectively.[5] In another study conducted by Chalya et al included 62 patients [32 patient in drain group (Group A) and 30 patients in non drain group (Group B)]. In their study it was found that in drain group mean ± SD of length of hospital stay and pain on 1st postoperative day on visual analog scale were 7.4 ± 2.6 and 2.34 ± 1.1 respectively and in non drain group mean ± SD of length of hospital hospital stay and pain on 1st postoperative day on visual analog scale were 4.6 ± 1.2 and 1.4 ± 0.56 respectively.[10] In another study conducted by Khanna et al included 94 patients who underwent 102 thyroid surgeries. Average duration of hospital stay was 3.715 days for the entire group; 4.35 days for drain group and 3.07 days for non-drain group.[6]

In another study conducted by Suslu et al included 135 patients [68 patient in drain group (Group 1) and 67 patients in non drain group (Group 2)]. In their study it was found that mean hospital stay was 2.6 ± 1.0 days in group 1 and 1.3 ± 0.7 days in group 2 (p=0.001). According to them these findings suggest that the routine use of drains may be abandoned in uncomplicated thyroid surgery.[8]

In another study conducted by Tabaqchali MA included a total of 606 procedures (425 thyroidectomy and 181 parathyroidectomy) were performed on 582 patients. Among these, 274 (64.5%) of thyroidectomy and 48 (26.5%) parathyroidectomy patients had neck drains inserted. They routinely used drains in 134 (22%) procedures (drain group) and selectively used in 472 (78%) (selective group) of which 191 (40%) were drained. They found that patients in the drain group had significantly longer hospital stay than the selective group with a median of 5 versus 4 days (Mann Whitney test, $p<0.05$). In the selective group, they found patients with drains had significantly longer hospital stay than those without drains with a median of 4 days (Mann Whitney test, $p<0.05$).[9]

In a meta-analysis of 11 randomized trials comparing routine drain with no drains done by Brandon Hopkins and David Steward shows that drains have not shown the ability to decrease postoperative complications, but they may increase pain and hospital stay by 1.12-1.49 days.[11] In another study conducted by Sözen et al included 100 patients [50 patient in drain group (Group 1) and 50 patients in non drain group plus fibrin glue sealant (Group 2)]. In their study it was found that in drain group mean ± SD of length of hospital stay and pain on 1st postoperative day on visual analog scale were 2.8 ± 1.2 and 4.38 ± 1.12 respectively and in non-drain group plus fibrin glue sealant mean ± SD of length of hospital hospital stay and pain on 1st postoperative day on visual analog scale were 1.5 ± 0.8 and 1.87 ± 0.66 respectively.[12]

In another study conducted by Nimet et al included 135 patients, [68 patient in drain group (Group 1) and 67 patients in non drain group (Group 2)]. In their study it was found that the mean hospital stay was 2.6 ± 1.0 days in group 1 and 1.3 ± 0.7 days in group 2 (p=0.001).[13] In another study conducted by Christian Debry et al included 100 patients, (43 patient in drain group and 57 patients in non drain group). In their study it was found that the mean hospital stay was 1.72 days in the group of non drained patients versus 2.09 days in the drained group.[14]

In another study conducted by Lee et al included 198 patients, (101 patient in drain group and 97 patients in non drain group). In their study it was found that time of hospital discharge after operation was significantly shorter in the no-drain group than in the in-drain group (9.3 ± 4.6 days for drain group and 6.8 ± 1.4 days for no-drain group; $p< 0.05$).[15]

In another study conducted by Morrissey Andrew T. et al which showed that in the no drain group, there was a 1.12-day reduction in hospital

stay ($p<0.01$), with no increase in postoperative complications. This translated into a cost savings of $ 2177 per patient.[16] In another study conducted by Hurtado-López et al included 150 patients divided into three groups: group A, without drain; group B, with a Penrose drain; and group C, with a semirigid suction drain. The results of their study showed that Group A had length of hospital stay of 2 days, Group B had length of hospital stay of 2.6 days and Group C had length of hospital stay of 3.11 days. So this was concluded by them that Hospital stay was longer in patients with the suction drain.[7]

In a meta-analysis done by Sanabria et al on the effect of routine drainage compared to no drainage in patients subject to thyroidectomy. Suitable randomized clinical trials were selected for analysis after an extensive literature review which showed that there were no statistically significant differences in the incidence of neck hematoma/seroma (OR 1.03, 95% CI 0.59-1.81) between the groups. The mean length of hospital stay was 1.53 days longer for the drainage group (95% CI 1.39-1.68). There was no difference found between routine drainage and no drainage with regard to the frequency of postoperative hematoma/seroma in patients following thyroidectomy. In addition, the mean length of hospital stay was longer in the routine drainage group.[17]

In another study conducted by Tübergen D included 100 patients, (52 patient in drain group and 48 patients in non drain group). Average duration of hospital stay was 4.6 days for drain group and 3.9 days for non-drain group. So the study revealed that patients without drains left the hospital significantly earlier (3.9 vs. 4.6 days, $p=0.006$).[18]

The present randomized clinical study failed to demonstrate any benefit of routine use of drains in uncomplicated thyroidectomy. However, the hospital stay was found to be shorter and visual analog scale pain scores were smaller in the non-drain group (Group B). Therefore, we concluded that routine prophylactic drainage was not essential in uncomplicated cases of thyroidectomy. Importantly, we achieved significant reduction in postoperative pain, the amount of intramuscular analgesics requirement and the duration of hospital stay in no-drain group, leading to a reduction in costs for the patients and increased satisfaction of patients.

## CONCLUSION

This study has demonstrated that routine drainage of thyroidectomy bed is unnecessary and may be abandoned after uncomplicated thyroid surgery, as it is not effective in decreasing the rate of postoperative complications resulting from post-thyroidectomy haemorrhage. Furthermore, drainage causes a prolonged hospital stay and increased postoperative pain and the amount of intramuscular analgesic requirement and gives an extra scar. So, by ensuring meticulous hemostasis drains can be avoided in uncomplicated thyroid surgery.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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None declared.