

# Drains after Thyroidectomy for Benign Thyroid Disorders; Are Associated With More Pain, Wound Infection and Prolonged Hospital Stay

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## Abstract

### Background

Prophylactic drainage after thyroidectomy has been a regular practice at Kenyatta National Hospital (KNH). This has been used for the potential to avert post-operative fluid accumulation (hematoma or seroma) and also for detection of continuing bleeding. This is aimed at preventing or delaying airway compression that has potential for serious morbidity and mortality. However their importance in these situations has been questioned in recent literature.

### Objective

To evaluate the difference in outcomes in drained versus non-drained groups after thyroidectomy for benign thyroid disorders.

### Study design

Prospective randomized clinical study consisting of 90 patients who were admitted for total thyroidectomy and were randomized into two groups of 45 participants.

### Setting

The general surgical wards and theatres at Kenyatta National Hospital.

### Methods

Ninety consecutive patients with benign thyroid disorders scheduled for total thyroidectomy or

lobectomy, who met the inclusion criteria were recruited over a study period of 9 months from January to September 2011. They were randomly assigned to one group in whom closed drains were used and another in whom no drains were used after thyroidectomy. They were then evaluated postoperatively for hematoma and seroma formation, pain assessed by the visual analogue scale (VAS), duration of hospital stay and necessity for re-operation.

### Results

The mean VAS score was significantly lower in the non-drained group patients at 6, 12 and 24 hours postoperatively ( $p=0.001$ ). Four cases of hematoma (8.9%) occurred in the drained group, whereas none of patients in the non-drained group developed hematoma ( $p=0.04$ ). None of the patients in the non-drain group had post-surgical wound infection whereas four (9%) of those who had drains developed wound sepsis. No participant required re-operation for any complication nor developed seroma and all complications were successfully managed conservatively.

### Conclusion

Prophylactic drainage after thyroidectomy for benign goiters does not show any benefit in hematoma prevention and is associated with increased hospital stay and post-operative pain.

## Introduction

Prophylactic drains are still regularly used in many surgical units after thyroid surgery. Their use is based on practice rather than scientific evidence and reliant on the surgeon's experiences and teaching (1). Conventionally, the major anticipation for prophylactic drains usage is to avert complications after surgery by draining off the postoperative hematoma or lymphatic fluid and to notify the surgeon concerning early postoperative hemorrhage (2).

Conversely, prophylactic drain usage might be discarded in non-complicated cases since drainage is minimal and might not be required, or since sufficient haemostasis can never be expendable by using drains; and where haemostasis is insufficient, seroma or hematoma would be the inevitable conclusion (3-5). Critical complications, for instance postoperative haemorrhage, compression of air passages or hematoma formation, can be averted in the majority of patients (6,7). In view of these improvements, the requisite of prophylactic

drainage in thyroid surgery might be queried. There is a controversy on the role of drains in thyroid surgery. Many studies have showed that prophylactic drainage is unnecessary after routine thyroid surgery (8, 9). However these studies were done in developed Western countries and it is doubtful if their results maybe generalizable to developing countries like Kenya. Moreover, the goiters in developing countries are much larger than those reported in the Western literature (10). The aim of this study was to evaluate the differences in outcome in drained versus non-drained participants after thyroidectomy for benign thyroid disorders.

## Methodology

**Study population:** all consenting adult patients scheduled to undergo lobectomy or total thyroidectomy, intended for benign thyroid disorders at Kenyatta National Hospital (KNH), a tertiary hospital in Nairobi, Kenya.

**Study design:** This was a prospective randomized clinical study with two 2 treatment arms: one with a drain and the other without a drain.

**Sample size:** was calculated to detect a 40% reduction in the VAS score between drained group and the non-drain group, with a  $\alpha$  of 0.05 and a power of 80%. This gave a minimum of 44 patients in each arm of the study.

**Exclusion criteria:** Patients who had a previous thyroid operation as this may be associated with operative difficulty. Patients with Grave's disease whose operative field is associated with excess oozing. Patients receiving anticoagulation treatment for various indications and patients who refused or were unable to give consent to participate in the study.

**Sampling method:** All eligible patients were counseled and recruited into the study. They were then subjected to randomization based on gender, age, type of procedure and goiter size.

**Method:** Pre-study ethical approval was obtained from the ethics committee. The principal investigator and the research assistant who were trained clinicians recruited the patients. Consent for participation in the study was sought from the patients after counseling. Randomization was carried out using a computer-developed table of random numbers. This randomization was done by an autonomous

information technology consultant based on gender, age, type of procedure and goiter size. The surgeon was made aware of the group designation just before the closure of the wound. Total thyroidectomy or total lobectomy was carried out for various indications, with the technique and method of wound closure being similar. All patients received three doses of prophylactic antibiotics within 24 hours; the first dose being given intra operatively. Closed suction drain French Gauge 10 was inserted before wound closure, for those in the drainage group. Intra-operative surgical wound status was observed and recorded at the beginning of the operation. Patients were reviewed at 6, 12, 24, 48, 72 and 96 hours. Hematoma and seroma development, postoperative pain, hospital stay, wound infection and necessity for re-operation, were noted. Visual analogue scale was used to assess postoperative pain (11). The patients were discharged when they were free of complication or when pain was well controlled on oral analgesics with drain removal when drainage volume was less than 30cc in 24 hours. The time when the decision to discharge was made was recorded.

**Data analysis:** Differences among the participants in the two groups were analyzed using student t-test and chi squared test. Results were expressed as mean  $\pm$  SD.  $\chi^2$  test was performed for the hematoma and seroma formation and histopathological diagnosis. Student t-test was done for the age, hospital stay, and VAS score.

## Results

A total of 90 adult patients over a nine month period divided into two groups of 45 participated in the study. The main surgical indications were symptomatic multinodular goiter (MNG) in 61(67.8%) patients, solitary nodular goiter 26(28.9%) and diffuse thyroid enlargement in 3(3.3%).

### Gender, age, procedure, preoperative diagnosis and histopathological results

There was no significant difference in the gender, age, procedure, preoperative diagnosis, histopathological results and weight of the glands removed among the two groups (P=0.12, P=0.13, P=0.38, P=0.78, P=1.0 and P=0.47, respectively)(Table 1).

Table 1: Distribution of gender, diagnosis, procedure and histopathology results by treatment group

	<i>Non-Drained</i>	<i>Drained</i>	<i>P-Value</i>
<b>Mean age</b>	40.7 ( sd 12.5)	44.6(sd 11.6)	0.13 <sup>†</sup>
<b>Gender</b>			
Female	41(91.1%)	40(88.9%)	0.73 <sup>†</sup>
<b>Diagnosis (preoperative)</b>			
Multinodular	30(66.7%)	31(68.9%)	
Solitary nodule	14(31.1%)	12(26.7%)	0.78 <sup>‡</sup>
Other****	1(2.2%)	2(4.4%)	
<b>Procedure</b>			
Total thyroidectomy	25(55.6%)	29(64.4%)	0.38 <sup>‡</sup>
Total lobectomy	20(44.4%)	16(35.6%)	
<b>Histopathology</b>			
Benign	39(86.7%)	39(86.7%)	1.00 <sup>‡</sup>
Malignant	6(13.3%)	6(13.3%)	
<b>Weight of gland removed (g)</b>	118.8( SD 82.5)	104.4 (SD 104.)	0.47 <sup>†</sup>

P ≤ 0.05 was considered significant

<sup>†</sup> -- Calculated with Student's t-test

<sup>‡</sup> --Calculated with the chi-square test

SD ...standard deviation

\*\*\*\* ....diffuse thyroid enlargement

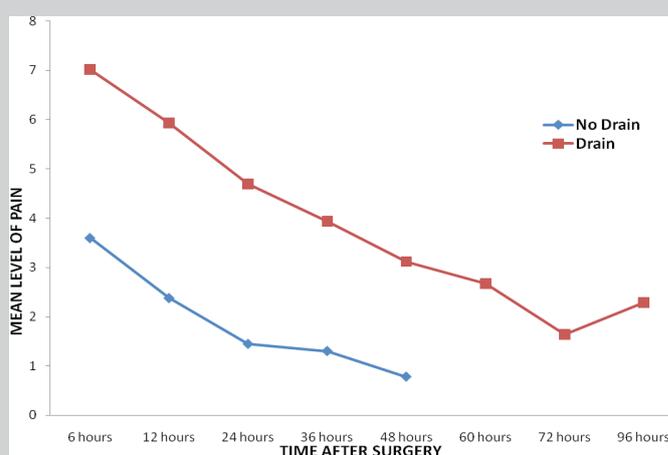
#### Mean VAS score for level of pain

The mean VAS score for level of pain was significantly lower in the non-drained group (3.6±1.5) compared to the drained group (7.0±2.2) patients at 6 hours postoperatively (P=0.001) and a similar result was demonstrated at 12 hours and 24 hours postoperatively when the non-drained group (2.3±0.9), (1.4±0.8) was compared with the drained group (5.9±1.8), (4.7±2.0) respectively (P=0.001).

There was a consistent reduction of mean level of pain with time post-operatively which was observed in both the drained and non-drained groups. However, the pain reduction was more marked and experienced

for fewer hours in the non- drain group compared to the drain group. Figure1.

Figure 1: Mean VAS Score over time



### Complication rate

The complications rate was higher in the drained group. Four cases of hematoma (8.9%) occurred in the non-drained group, whereas none of patients in the non-drained group developed hematoma. There was a significantly higher number of participants with haematoma formation in the drain group compared to the non-drain group after thyroidectomy ( $p=0.041$ ).

None of the patients in the non-drain group developed post-surgery wound infection whereas four (9%) of those who had drains developed wound sepsis. No participant required re-operation for any complication nor developed seroma and all complications were successfully managed conservatively.

### Length of hospital stay

The mean length of hospital stay for all the 90 patients was 2.2 days (SD 0.13). 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).

### Discussion

Drains have been used habitually in the majority of the surgical procedures with limited evidence to recommend any benefit (12, 13). Much discussion has arisen concerning the need for drains after total thyroidectomy for benign thyroid disorders (14, 15). Though major postoperative complications are rare after thyroid surgery, bleeding may be critical. Drains are thus placed with an aim of potentially evacuating hematoma or seroma and to detect continuing bleeding.

Our study sought to evaluate the findings of drain usage in comparison to other centers where the disease burden and expertise differs with our centre. Overall, the results of this local study are equally comparable to those done in developed countries.

**Pain and drains:** Schoretsanitis et al studied the association between drains placement and postoperative pain. They noted that around 50% decrease in the level of pain as per VAS score in the non-drained group (11). Likewise in our study, postoperative pain was significantly decreased in the non-drained patients, at 6, 12 and 24 hours postoperatively compared to the drained patients ( $P=0.001$ ). These results revealed that drains placement might be directly related to increasing

postoperative patient's discomfort by increasing postoperative pain.

**Hematoma and drains:** Four (8.9%) of the patients in the drained group experienced postoperative haematoma formation. No hematoma formation was noted in the non-drained group ( $P=0.04$ ). Thus, neck drainage did not avert hematoma formation in these 4 patients. The hematomas were treated by needle aspiration and none of the patients required reoperation. Therefore drain insertion may not prevent hematoma formation and when the haematoma forms it can be effectively treated with needle aspiration. Similar findings were noted in a study by Tahsin Colak et al who studied 116 participants who had thyroidectomy for benign thyroid disorders and showed that the rate of haematoma and seroma formation was similar between the two groups (16). Shabir in his study revealed that the use of drains was linked to a larger collection of fluids on first postoperative day as assessed by ultrasonography. He postulated that drains stimulate an inflammatory reaction resulting in greater formation of fluid in the drained area (17).

**Wound infection and drains:** None of the patients in the non-drain group had post-surgery wound infection whereas four (9%) of those who had drains developed wound sepsis. This is similar to findings of a study by Tabaqchali et al where wound infection occurred in 1% of the patients and occurred only in those who had drains (18). This may suggest a strong relationship between wound infections and drain placement (18, 19).

**Hospital stay and drains:** The hospital stay is a primary variable for cost analysis, and some studies have shown that application of drains prolongs hospital stay (9, 11). This study also shows evidently that the insertion of drains prolongs the hospital stay. 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). ( $P = 0.001$ ). This is similar to the findings of Nimet Suslu et al which revealed that the insertion of drains prolongs the hospital stay from  $1.3 \pm 0.7$  days in non-drained to  $2.6 \pm 1.0$  days in drained group ( $P=0.001$ )<sup>20</sup>.

### Conclusion

The present study verifies that regular drainage of thyroid bed after total thyroidectomy or total lobectomy for benign disorders is not essential and may induce rather than avert fluid collection. The use of drains was found not to be useful in decreasing

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the rate of postoperative complications such as haematoma and seroma. It was also found to elevate pain after surgery, prolongs the hospital stay and may be related to an increased risk of surgical site infection. From the finding of this study regular use of drains after thyroid surgery for benign disease is discouraged.

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