

## Thyroid Surgery with Drain Versus without Drain

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### ABSTRACT:

#### BACKGROUND:

The nature and indications for thyroid surgery vary and a perceived risk of postoperative complications such as seroma , haematoma , wound infection and haemorrhage post-surgery is one reason why wound drains are frequently inserted. They are generally used as a matter of the surgeon's habit or preference more than a matter of proven benefit in the patient's postoperative period.

#### OBJECTIVE:

To evaluate the differences in outcome and complications following thyroid surgery whether draining the wound or not .

#### PATIENTS AND METHODS:

One hundred forty five patients with different thyroid diseases requiring surgical intervention presenting to the first surgical unit in Baghdad teaching hospital between the first of October 2007 to the 31th of December 2009(27 months period) were enrolled. Patients were divided into two groups : those who had their wounds drained postoperatively ; (the drain group DG) and those who had their wounds closed without drain ; (the non drain group NG).

#### RESULTS:

Seroma occurred in three patients (3%) in the DG, and in two patients (4.4%) in the NG. Small haematoma occurred in three patients (3%) in the DG, and in two patients (4.4%) in the NG. Large haematoma occurred only in one patients (1%) in the DG, and it didn't occur in the NG. Wound infection occurs only in two patients (2%) in the DG, and in one patient (2.2%) in the NG. The mean of in-hospital stay was 2.07 days in the DG, and 1.06 days in the NG.

#### CONCLUSION:

The use of drain showed no effect on the prevention of wound infection , seroma , haematoma formation or the need for re-exploration, indeed the use of drain had lengthened the in hospital stay .So the Routine use of drains after thyroid surgery might be therefore not necessary, if not detrimental.

**KEY WORDS :** thyroid surgery, drains, complications

### INTRODUCTION:

Most surgeons give into tradition of leaving a drain following thyroid surgery with the hope that this will obliterate the dead space and evacuate collected blood and serum. The use of drains in thyroid surgery has been controversial: their use depends on the surgical school and the surgeon's experience<sup>(1)</sup>. in fact, postoperative bleeding has been reported as rare as 0.3%~1% after thyroidectomy. Numerous studies have failed to show any benefit of drainage in thyroid surgery<sup>(1,2)</sup>. Whoever , despite these cautions, drains are still routinely used<sup>(3,4)</sup>.

This study tries to answer if there is any benefit of routine drainage after thyroid surgery, and what are the hazards if the wound is not drained.

#### PATIENTS AND METHODS:

One hundred forty five patients with different thyroid diseases requiring surgical intervention presenting to the first surgical unit in Baghdad teaching hospital between the first of October 2007 to the 31th of December 2009( over 27 month period) were enrolled. The criteria for inclusion in this study were thyroid diseases that required resection in form of lobectomy with isthmusectomy , subtotal thyroidectomy or near total thyroidectomy . Patients with thyroid malignancy , recurrent goiter , retrosternal goiter and coagulation disorders were excluded from

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the study. Patients were divided into two groups : those who had their wounds drained postoperatively ; (the drain group DG) and those who had their wounds closed without drain ; (the non drain group NG). Data were collected to assess risk factors for morbidity and mortality in the DG and NG . Risk factors included the size of the gland , the magnitude of thyroid resection , preoperative toxicity , and sparing or ligation of the inferior thyroid artery.

Classification of goiter as small , medium and large was done according to the WHO Simplified goiter classification were grade 0 is regarded as subclinical goiter , grade 1A and 1B were regarded as small size goiter , grade 2 was regarded as medium size goiter , grade 3 was regarded as large size goiter.

Lobectomy and isthmusectomy was done in 8 patients (5.5%) and subtotal thyroidectomy was done in 110 patients (75.9%) while near total thyroidectomy was done in 27 patients (18.6%) . Status of inferior thyroid artery during surgery was recorded, the artery was usually spared. In the drain group a single or double deep vacuum drain (Redi- Vac drain) was placed beneath the strap muscles before they were approximated and it was brought out through a separate wound in the skin and the drain was removed later after 24 hours and then the patients were discharged home .

The evaluation of outcome was based on the in-hospital stay and the development of complications in both groups ; the DG and the NG . These complications included wound infection , seroma , small haematoma , large haematoma causing respiratory distress . Follow up of the patients was done for about 2 weeks and cases of seroma and small haematoma were managed by repeated aspiration , antibiotics and dressing only while large hematoma with respiratory distress were treated by exploration , and patients with wound infection were treated by antibiotics , analgesia and follow up only.

### STATISTICAL ANALYSIS

Statistical analysis was performed using Mann-Whitney test and Chi-square test. Variables were compared using Fisher exact test with two sided P-value . Continuous variables were compared using Student's *t*-test. Statistical significance is defined as  $P < 0.05$ .

### RESULTS:

A total of 145 patients were enrolled in this study in the first surgical unit of Baghdad

Teaching Hospital. There were 27 male patients (18.6%), and 118 female patients (81.4%). Age of patients ranged from 22-65 years, with a mean age of 35 years (32 years for males, and 36 years for females). Twenty eight patients in this study (19.3%) had small goiter , 78 patients (53.8%) had medium size goiter while 39 patients (26.9%) had large size goiter. One hundred twenty one patients (83.4%) had nontoxic goiter , while 21 patients (16.6%) had toxic goiter . There was no statistically significant difference between the two groups in regard to age and gender distribution.

In DG 56 patients (56%) had medium size goiter In contrast in the NG 22 patients (48.9%) had medium size goiter. The majority of patients in DG (75%) had subtotal thyroidectomy, that is nearly similar to NG where subtotal thyroidectomy was performed in 77.8% of patients . In the DG 82 patients (82 %) had nontoxic goiter , as compared to NG 39 patients (86.7 %) who had had nontoxic goiter. Inferior thyroid artery ligation was performed unilaterally or bilaterally in 30 patients (30%) of the DG and it was spared in 70 patients (70%) in the DG , while ligation was performed unilaterally or bilaterally in 14 patients (31%) of the NG and it was spared in 31 patients (69%) in the NG .

There was no statistically significant difference between the two groups regarding the size of goiter, type of disease, the magnitude of resection and Inferior thyroid artery ligation Seroma occurred in three patients (3%) in the DG, and in two patients (4.4%) in the NG. Small haematoma occurred in three patients (3%) in the DG, and in two patients (4.4%) in the NG with no significant difference between the two groups (  $p$  value  $< 0.5$ ).

Large haematoma occurred in only in one patient (1%) in the DG, and it didn't occurs in the NG. Wound infection occurs in only in two patients (2%) in the DG, and in one patient (2.2%) in the NG. with no significant difference between the two groups (  $p$  value  $< 0.5$ ).

There was no significant difference between the two groups in seroma formation, small hematoma , large hematoma and wound infection as regard to the size of the gland , type of disease, magnitude of resection used and inferior thyroid artery ligation or sparing .

The mean in-hospital stay was 2.07 days in the DG, and 1.06 days in the NG. This was statistically significant with a  $P$ -value  $< 0.05$ .

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**Table 1: Shows patients characteristics in the DG and NG.**

Patient Character	DG		NG		P-VALUE
	NO.	%	NO.	%	
Size of gland					
Small	15	15 %	13	28.9%	NS
Medium	56	56 %	22	48.9%	NS
large	29	29 %	10	22.2%	NS
Magnitude of resection					
Lobectomy	5	5%	3	6.6%	NS
Subtotal Thyroidectomy	75	75%	35	77.8%	NS
Near-total Thyroidectomy	20	20%	7	15.6%	NS
Toxicity					
Nontoxic	82	82%	39	86.7%	NS
Toxic	18	18%	6	13.3%	NS
Inferior thyroid artery ligation					
yes	30	30%	14	31%	NS
no	70	70%	31	69%	NS

**Table 2: Show overall complications and in-hospital stay in drain and non drain groups**

Complication	DG No. %	NDG No. %	P- VALUE
Seroma	3 (3%)	2 (4.4%)	NS
Small haematoma	3 (3%)	2 (4.4%)	NS
Large haematoma	1 (1%)	0	NS
Wound infection	2 (2%)	1 (2.2%)	NS
In-hospital stay	2.07	1.06	Significant <0.05

### DISCUSSION:

Drains have been traditionally used in most of the surgical procedures with limited evidence to suggest any benefit<sup>(5,6)</sup>.

The use of drains in thyroid surgery is still controversial<sup>(7,8)</sup>; as there are many practices determined by tradition rather than scientific data. However, in 1913, Halsted stated that if "Haemostasis is attended to with scrupulous care and the wound is closed without drainage," so that not using a drain in thyroid surgery is no novelty<sup>(9)</sup>.

Many previous studies have shown that drains should only be used in complicated cases or when the dead space is very large. This study evaluated the effectiveness of drains by analyzing the complications in two groups. The presence or absence of drains did not affect the incidence of seroma haematoma or wound infection.

Neither thyroid volume will justify the use of drains nor the diagnosis or the reason for which patient is operated on will do, infact the diagnosis will determine the extent of the surgery, either lobectomy with ischmusectomy, subtotal thyroidectomy or near-total thyroidectomy. In cases of hypervascularity, such as Grave's disease there is no justification for the use of drains<sup>(10)</sup>.

A total of 145 patients were enrolled in this study, compared to 150 in Hurtado-Lopez study<sup>(11)</sup>, while in Khanna et al study<sup>(12)</sup> a total of 94 patients were enrolled In their study.

In this study there was no difference in seroma formation in the DG and the NG as compared to L.M. Hurtado-Lopez study<sup>(11)</sup> in which four patients (4%) in the DG and 2 patients(4%) in the NG developed seroma, while in Khanna et al study<sup>(12)</sup> three patient(6.3%) in the drain group

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developed seroma and another three patient (6.3%) in the non drain group also . In J. Herranz and J. Latorre study<sup>(13)</sup> only one patient (2%) develop seroma, and it occurred in 2 (2.8%) patients in DG and in 4 patients (6.6%) in NG in Yoon Woo Koh, study<sup>(14)</sup> .

All cases of seroma in this study in DG & NG treated by repeated aspiration , only, and that management was also used by Hurtado-Lopez , Khanna et al and by Yoon Woo Koh, while the only case in Herranz and J. Latorre study required surgical draining and the placement of a drain for 48 hours .

This shows that the use of drain didn't reduce the incidence of seroma formation , and in fact some authors believe that the drains by virtue of the inflammation induced due to their presence may actually increase the drainage<sup>(15,16,17)</sup>.

The vacuum created by the negative suction of the drain may prevent the lymphatics from sealing off and thus cause increase in the seroma formation and drainage<sup>(18,19,20)</sup>. it must be emphasized that the only way to prevent complications related to hematomas and seromas is to use an adequate surgical technique, carefully handle the tissues, and ensure adequate transoperative haemostasis<sup>(11)</sup>.

In this series small haematoma occurred equally in the DG and in the NG which goes with L.M. Hurtado-Lopez study in which two patients(2%) in the DG and in one patient (2%) in the NG developed small haematoma , while in Khanna et al study two patients (4.2%) in the drain group developed small haematoma and only one patient (2.1%) in the non drain group , in Yoon Woo Koh, study only 2 patients (2.8%) in DG and one patient (1.6%) developed small haematoma . All cases of small haematoma in this study were treated by repeated aspiration ,antibiotics and dressing only, and that management was also used in the other studies . The procedure of repeated aspirations did not result in any serious discomfort for the patients.

Large haematoma occurred only in one patient in this study in the DG and it didn't occur in the NG as compared to Hurtado-Lopez study who found similar results with no difference between the two groups with only one patient (1%) in the DG developed large haematoma and it didn't occur in the NG . In J. Herranz and J. Latorre study large haematoma occurred in two patients (2.5%) in the DG and both cases were arterial bleeding and a drain had been placed, while in Yoon Woo

Koh, study large haematoma occurred in one patient (1%) in the NG only.

In our study the haematoma appeared 5 hours after surgery in spite of the use of drains and it was preceded by repeated vigorous coughing in the postoperative period and when the patient start to develop respiratory distress exploration was done to the patient immediately and the cause was due to a slipped ligature of the inferior thyroid vein , and that was the same cause in Hurtado-Lopez study in which the patient developed suffocating haematoma because of slipped venous ligature in the postoperative period following repeated vomiting , while the two cases in J. Herranz and J. Latorre study and the only case of Yoon Woo Koh, study the cause of the large haematoma was arterial bleeding noted between 2-6 hours in the postoperative period and those patients report coughing or vomiting prior to the haemorrhage.

These results shows that surgical drains neither prevent this complication from occurring nor do they contribute to early detection. In fact, haemorrhage can appear and the container may be empty because the blood has clotted inside the drain<sup>(13)</sup> . Bandages do not reduce the risk of haemorrhage either<sup>(13)</sup>. They keep blood from collecting in the subcutaneous plane, but the blood may dissect the deep plane to the prethyroid musculature, in the paratracheal region, compressing the airway at that level<sup>(13)</sup>. And in fact some authors believe that most patients report coughing, vomiting or nausea prior to the haemorrhage and the possible causes include the displacement of an improperly applied suture, the opening of a vessel that had been coagulated using diathermia or “drooling” of an area that has been improperly cauterized<sup>(21,11)</sup>.

In our study, the bleeding vessel corresponded to one of the branches of the inferior thyroid vein. When attempting to ligate the branches of the inferior thyroid vein , the dissection of these small vessels may cause a spasm that hides the haemorrhage, which is then revealed when the blood pressure increases as the patient recovers from the anaesthesia or in the case of coughing or vomiting during the immediate post-operative period<sup>(22,13)</sup> .

Depending on the ability and experience of the surgeon and the surgical extension and diagnosis, no surgeon should conclude a

surgery without adequate haemostasis in the surgical bed; therefore, a drain will never replace adequate haemostasis<sup>(23)</sup>. It must be considered that complications caused by a haematoma, which might produce respiratory failure, occur during the first 6 hours after surgery, hence a patient without drainage could be discharged from the hospital on the first postoperative day. Regarding seromas and small haematomas, these occur later and, in general, do not represent any respiratory risk<sup>(23)</sup>.

Wound infection in this study occurred with no difference in the DG and in the NG, a result similar to Khanna et al study in which only one patient (2.1%) in the DG and another one patient (2.1%) in the NG developed wound infection, all cases presented in form of cellulitis and were managed by antibiotics, analgesia and follow up only.

The Mean in-hospital stay in our study was 2.07 days for the DG and 1.06 days for the NG, while in Hurtado-Lopez study it was 2.7 days for DG and 2 days for the NG, and in Herranz and J. Latorre study it was 1.8 days for DG and 1.3 days for NG. We agree with other studies that there is a significant difference between the groups with drains and those without in regard to the length of hospital stay, leading to a reduction in costs for the patients and minimizing the risk of intrahospital infection. On the other hand, the use of a drain entails additional aggression for the patient, both due to the scar it causes, as well as the discomfort involved when it is removed.<sup>(24,11)</sup>

On the basis of these results, we believe that avoiding routine use of drains does not increase the overall surgical morbidity and reduces overall hospital stays

### CONCLUSION:

The use of drain showed no effect on the prevention of wound infection, seroma, haematoma formation or the need for re-exploration, indeed the use of drain had lengthened the in hospital stay. So the Routine use of drains after thyroid surgery might be therefore not necessary, if not detrimental.

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