

# Efficacy of Drainless Total Thyroidectomy in Intrathyroidal Lesions of Thyroid

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## Abstract

**Introduction** There is difference of opinion about the placement of the drain in thyroid surgeries, and, to the best of our knowledge, the efficacy of drainless total thyroidectomy regarding various parameters of thyroid lesions has not been well-established.

**Objective** To report our experience with drainless total thyroidectomy, and to define an appropriate patient population for its performance.

**Methods** This is a retrospective case analysis of the patients who underwent total thyroidectomy for intrathyroidal lesions with or without central neck dissection in a tertiary referral hospital (number = 74). The patients, who had undergone total thyroidectomy without any drain insertion, were analyzed, and the relationships among various parameters of thyroid lesions were noted in relation to seroma and hematoma formation.

**Results** Seroma formation was noted only in 5 out of 74 patents (6.75%). All of the seromas that occurred were observed in patients with thyroid lesions < 4 cm, and 4 out of 5 seromas were observed in patients with a malignant pathology. There was no statistically significant difference in seroma formation between patients younger or older than 50 years of age.

The nature of the lesion, whether benign or malignant, did not affect the formation of seroma. Of interest is the fact that none of the 10 patients who had central neck dissection performed as part of their treatment developed seroma.

**Conclusions** Drainless total thyroidectomy is safe across all age groups for patients harboring either benign or malignant thyroid pathologies. However, caution is to be observed in opting for drainless total thyroidectomy in patients with large lesions (> 5 cm)

## Keywords

- ▶ total thyroidectomy
- ▶ seroma
- ▶ intrathyroidal lesions

## Introduction

Drains have been placed perioperatively during thyroid surgery with the notion that doing so would prevent complications like hematoma and seroma formation postoperatively, but the literature lacks any candid data to support this concept. The incidence rates of hematomas requiring surgical intervention

are low, reportedly ~ 0–1.5%.<sup>1,2</sup> A number of trials have been published to evaluate the need for placing drains in thyroid surgery, and a meta-analysis of 25 randomized trials involving 2,939 patients found no difference in seroma formation between the groups who underwent the procedures with and without a drain; however, the degree of heterogeneity was high (MD = 2.30 [–0.73 to 5.34] mL; I<sup>2</sup> = 93%).<sup>3</sup> The studies

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included in this meta-analysis described all kinds of thyroid surgeries performed for various thyroid lesions, ranging from lobectomies to subtotal thyroidectomies to total thyroidectomies. The heterogeneity in the inclusion criteria of the individual studies further clouds the definition of the target population suited for drainless thyroidectomy.

Upon analyzing the published data, the questions regarding the safety of drainless total thyroidectomy across various age groups, thyroid lesion size, pathologies and the influence of neck dissection remain unanswered.

Our institute is a tertiary care cancer center that has a dedicated head and neck unit where thyroid surgeries for neoplastic lesions are performed. We follow a policy of not placing neck drains in patients undergoing thyroidectomy for intrathyroidal lesions. We hereby report our experience with drainless total thyroidectomy in these patients, and define an appropriate target population for its performance.

## Methods

All of the patients who were referred to our unit for the management of thyroid tumors between September 2013 and October 2016 were analyzed. Data was collected from a prospectively maintained database, after obtaining formal approval from the institute's ethical committee. As a departmental policy, all patients with thyroid lesions classified as Bethesda III<sup>4</sup> and upwards upon fine needle aspiration cytology (FNAC) undergo total thyroidectomy, and a drain is placed only for the patients who also undergo lateral neck dissection. It is pertinent to mention here that we do not routinely cut any strap muscles (except if infiltrated), and the bulk of the dissection is performed with bipolar diathermy. All of the patients are evaluated pre-operatively with an ultrasonography (USG) of the neck to establish the location, size, morphology, any extrathyroidal extension of the lesion, or to detect any cervical lymphadenopathy. Magnetic Resonance Imaging is used to evaluate the airway and esophageal involvement in appropriate cases.

All the patients who underwent total thyroidectomy for intrathyroidal lesions with or without central neck dissection were included in the study ( $n = 74$ ). The patients were excluded if they had undergone completion thyroidectomy, or had retrosternal extension or gross extrathyroidal extension, or had anaplastic histology.

Any serous collection which was subjectively reported by the patient as a bulge or objectively felt by the clinician to require aspiration was taken as seroma and aspirated. All of the patients were analyzed for demographic, epidemiologic, and clinicopathological details, and seroma formation was noted in relation to these factors. Seroma formation in relation to age was noted, and the age of 50 years was taken as a cut-off point, as our local data suggests that our population ages comparatively earlier; moreover, this is also the World Health Organization's (WHO) cut-off for many developing countries (further details can be found on <http://www.who.int/healthinfo/survey/ageingdefnolder/en/>). The incidence of seroma formation in patients with thyroid lesions smaller than 4 cm was compared with larger lesions, as was the rate of seroma

formation in patients with benign and malignant pathologies. The difference between the incidences of seroma formation among the patients who did and did not undergo central neck dissection was also noted.

The relationship among many variables was analyzed with the help of a  $2 \times 2$  contingency table (multiple categories of a few variables were grouped up as per similarity to make the  $2 \times 2$  analysis feasible). The chi-squared test was performed if all expected cell frequencies were  $\geq 5$ ; otherwise, the Fischer exact test was performed. The Yates value was corrected for continuity; the Pearson value was not. A  $p$ -value  $< 0.05$  was considered statistically significant. These calculations were performed using the statistical software MedCalc (MedCalc Software, Ostend, Belgium), version 16.2.1

## Results

Between September 2013 and October 2016, 74 patients who underwent total thyroidectomy fulfilled our inclusion criteria. The demographic, epidemiologic, and clinical data of these cases are shown in **Table 1**. Most patients were younger than 50 years of age (76%, 56/74), and had thyroid tumors  $< 4$  cm (87%, 64/74). Total 10 patients had thyroid lesions  $> 4$  cm but  $< 6$  cm. Total 21 patients had benign lesions, and 43 had malignant lesions. Among the patients with malignant histopathology, ten patients also had central neck dissections performed along with the total thyroidectomy, as part of the primary treatment.

The incidence of seroma formation in relation to various clinico-histopathological factors can be seen in **Table 2**. Seroma formation was noted only in 5 out of 74 patients (6.75%), 3 of which occurred in patients younger than 50 years of age. All the seromas that occurred were observed in patients with thyroid lesions  $< 4$  cm; 4 out of 5 seromas were observed in patients with malignant pathologies. Of interest is the fact that none of the ten patients who had central neck dissection performed as part of their treatment developed seroma. Only one patient developed neck hematoma in this whole cohort. None of the clinicopathological factors showed any correlation with seroma formation.

## Discussion

The issue of whether to put drains or not in thyroid surgeries continues to be debated, and various studies have been published to answer this question. A few randomized clinical trials have also tried to answer this question; however, in our opinion, there is lot of heterogeneity in these trials, and an appropriate target population has not been clearly defined. Our study has analyzed the performance of drainless total thyroidectomy in patients with thyroidal lesions without any extrathyroidal extension. Moreover, we have not included any patients with retrosternal extension, as well as those with aggressive thyroid malignancies, like poorly differentiated and anaplastic carcinomas. We do not advocate the performance of drainless thyroidectomy in very large thyroid lesions, although in our study there were 4 patients with lesions between 5 cm and 6 cm. We have looked at seroma

**Table 1** Demographic, epidemiologic, and clinical data of the cases of intrathyroidal lesions

Variable	Number (%) (Total = 74)
<b>Age</b>	
≤ 50 years	56
> 50 years	18
<b>Gender</b>	
Female	62
Male	12
<b>Fine needle aspiration cytology*</b>	
Bethesda III	03
Bethesda IV	25
Bethesda VI	41
Medullary thyroid carcinoma	03
<b>Clinical lesion size</b>	
≤ 4 cm	64
> 4 cm	10
<b>Clinical T-stage**</b>	
T1	13
T2	32
T3	08
<b>Neck dissection</b>	
Central neck dissection performed***	10
Central neck dissection not performed	64
<b>Lymphovascular invasion</b>	
Present	28
Absent	25
<b>Capsular invasion</b>	
Present	28
Absent	25
<b>Tumor histopathology</b>	
Papillary thyroid carcinoma	44
Follicular thyroid carcinoma	06
Medullary thyroid carcinoma	03
Follicular Neoplasm	16
Colloid Goiter	04
Hashimoto Thyroiditis	01
<b>Post-operative complications</b>	
Seroma formation	05
Hematoma formation	01
Permanent recurrent laryngeal nerve palsy****	01
Transient recurrent laryngeal nerve palsy	03
Permanent hypocalcemia	00
Transient hypocalcemia	04

Notes: \*Two cases had iliac and sacral metastasis, and were diagnosed as having follicular carcinoma; \*\*for malignant lesions only; \*\*\*three central neck dissections were bilateral; \*\*\*\*in this case, the patient had a nerve going through the tumor; since he underwent a preoperative fine needle aspiration cytology of Bethesda IV and malignancy could not be ruled out, sacrificing the nerve was deemed justifiable.

**Table 2** Relationship of various epidemiologic and clinico-pathological variables with seroma formation in patients with intrathyroidal lesions

Variable (Total number of cases = 74)	Seroma present	Seroma absent	p
<b>Age</b>			0.35
≤ 50 years (n = 56)	03	53	
> 50 years (n = 18)	02	16	
<b>Gender</b>			0.18
Female (n = 62)	03	59	
Male (n = 12)	02	10	
<b>Clinical lesion size</b>			0.60
≤ 4 cm	05	59	
> 4 cm	00	10	
<b>Lesion histopathology</b>			1.00
Malignant	04	49	
Benign	01	20	
<b>Clinical T-stage*</b>			0.57
T1 + T2	04	39	
T3	00	10	
<b>Neck dissection</b>			0.57
Central neck dissection performed*	00	10	
Central neck dissection not performed	04	39	
<b>Lymphovascular invasion*</b>			0.33
Present			
Absent	03	53	
<b>Capsular invasion*</b>			0.33
Present			
Absent			

Note: \*Since these parameters are features of malignancy, for them, only the malignant cases were considered.

from the clinical perspective (that is, requiring drainage) rather than looking at the objective evaluation of the fluid collection in the thyroid bed by USG.

Kristoffersson et al,<sup>5</sup> in a randomized trial, evaluated the value of drainage in thyroid and parathyroid surgeries. The thyroid surgeries performed included subtotal lobectomies and lobectomies. Seroma formation, however, did not differ between the groups with and without drains.

Wihlborg et al<sup>6</sup> published results of their trial, which included thyroid surgeries of a different extent, and found no difference in seroma formation between the groups with and without drains.

Ariyanayagam et al<sup>7</sup> evaluated 260 consecutive thyroid surgeries in which 18 were re-operations, 5 for carcinoma and 13 for multinodular goiter. Total 80 bilateral procedures were performed. A drain was used only in one case.

Khanna et al<sup>8</sup> conducted a randomized prospective control study on 94 patients undergoing 102 thyroid surgeries over a period of 15 months. Total 8 patients underwent completion thyroidectomies, and they were also included in the analyses as separate cases. No detailed mention is

made of either the extent of the thyroid surgeries performed or the histopathology of the thyroid lesions operated. The thyroid bed showed no significant difference in the volume of fluid assessed by USG on post-operative days one and seven, in groups with and without drains. One patient in the drain group required needle aspiration for collection in the thyroid bed.

Colaket al<sup>9</sup> studied 120 consecutive patients undergoing total thyroidectomy or lobectomy for benign thyroidal disorders. Seroma formation was noted in 2 cases (3.4%) in each of the randomized arms (drain versus no drain)

Neary et al<sup>10</sup> analyzed 93 patients after they were randomized for fluid in the thyroid bed on post-operative days 1 and 2. The fluid collection was significantly higher in the group without drains. One of the fears in the mind of the surgeon performing thyroid surgeries is the presence of dead space left after the removal of the thyroid gland, with subsequent potential for fluid collection. Neary et al, in a subgroup analysis of their no drain randomized arm, found significantly higher fluid collections in total thyroidectomies compared with other thyroid surgeries.

Memon et al<sup>11</sup> randomized 60 patients to assess seroma formation in drain and no drain groups following lobectomy or subtotal lobectomy for non-cancerous thyroid lesions. No seroma formation was noted in either of the two arms.

Deveci et al<sup>12</sup> randomized 400 patients, who underwent either a total thyroidectomy or a lobectomy for all kinds of thyroid disorders, into drain and no drain groups. Seroma formation was noted in 2% of the patients with no drain in place, and in 1.5% of the patients with drains.

Papavramidis et al<sup>13</sup> analyzed 100 patients after randomizing them into the same two groups. All of the patients underwent total a thyroidectomy, and the lesions were predominantly large benign goiters (weight > 50 g). Although they report on various post-operative complications, seroma formation was not one of them.

The studies detailed before reflect the heterogeneity vis-à-vis the inclusion criteria and the thyroid surgeries performed, thus clouding the definition of the target population for the performance of drainless thyroid surgeries. The small number of patients and the retrospective design of our study are limiting factors; however, our patient cohort is comparatively uniform vis-à-vis the extension of the disease (intrathyroidal lesions) and the surgical procedure (total thyroidectomy). Although none of our patients with thyroid lesions > 4 cm, and those undergoing central neck dissection, developed seroma, caution is advised in opting for drainless surgeries in these patient groups until more data becomes available.

Note is to be made of hematoma formation after thyroid surgery; in our series, only one patient developed hematoma. Giovanni et al,<sup>14</sup> in a recent evaluation of 210 papillary thyroid cancer patients, also noted only 1 hematoma formation.

## Conclusions

Our study does not support the use of drains in total thyroidectomies performed for benign and malignant intrathyroidal lesions. This technique should be performed with precaution in large thyroid lesions and in those requiring neck dissection; hence, multi-institutional studies with large sample sizes are needed to shed further light on this topic.

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### Conflicts of Interest

Authors have no conflicts of interest to disclose.

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