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Drainage after total thyroidectomy or lobectomy for benign thyroidal disorders

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Abstract: Objective: This prospective randomized clinical trial was conducted to evaluate the necessity of drainage after total thyroidectomy or lobectomy for benign thyroidal disorders. Methods: A total of 116 patients who underwent total thyroidectomy or lobectomy for benign thyroidal disorders were randomly allocated to be drained or not. Operative and postoperative outcomes including operating time, postoperative pain assessed by visual analogue scale (VAS), total amount of intramuscular analgesic administration, hospital stay, complications, necessity for re-operation and satisfaction of patients were all assessed. Results: The mean operating time was similar between two groups (the drained and non-drained groups). The mean VAS score was found to be significantly low in the non-drained group patients in postoperative day (POD) 0 and POD 1. The mean amount of intramuscular analgesic requirement was significantly less in the non-drained group. One case of hematoma, two cases of seroma and three cases of transient hypoparathyroidism occurred in the non-drained group, whereas one case of hematoma, two cases of seroma, two cases of wound infections and two cases of transient hypoparathyroidism occurred in the drained group. No patient needed re-operation for any complication. The mean hospital stay was significantly shorter and the satisfaction of patients was superior in the non-drained group. Conclusion: These findings suggest that postoperative complications cannot be prevented by using drains after total thyroidectomy or lobectomy for benign thyroid disorders. Furthermore, the use of drains may increase postoperative pain and the analgesic requirement, and prolong the hospital stay. In the light of these findings, the routine use of drains might not be necessary after thyroid surgery for benign disorders.

Key words: Analgesic requirement, Complications, Drainage, Postoperative pain, Total thyroidectomy
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INTRODUCTION

Thyroidectomy is one of the most commonly performed operative procedures in general surgery (Foster, 1978). Many surgeons routinely use drains after thyroidectomy. The main reason is to drain off a possible postoperative haemorrhage, which may compress the air passages and produce respiratory failure (Matory and Spiro, 1993; Shaha and Jaffe, 1993). Haemorrhage might be life-threatening and require immediate re-operation. This fear prompts to surgeon to use routine drains after any type of thyroid surgery. Although the rate of bleeding might increase in subtotal thyroidectomy or in Graves disease due to leaved vascularised remnant tissue, in fact, postoperative bleeding has been reported as rare as 0.3%~1% after thyroidectomy (Bergqvist and Kallero, 1985). In addition, used drains are usually small diameter in practice and might be not appropriate for this goal. Bergqvist and Kallero (1985) analyzed the re-operated cases for postoperative haemorrhage after thyroid surgery and they could not find any benefit of drainage. They suggested that drains may block with clotted blood and do not alert the surgeon, even if major bleeding occurs. Numerous studies have also failed to show any benefit of drainage in thyroid

surgery (Hurtado-López *et al*., 2001; Suslu *et al*., 2006). In contrast, drains might increase the rate of surgical wound infections (Ariyanayagam *et al*., 1993; Tabaqchali *et al*., 1999), contribute to the discomfort of the patients (Peix *et al*., 1992), prolong the length of the hospital stay and thereby increase the cost (Suslu *et al*., 2006), and deteriorate the cosmetic result (Clark *et al*., 2002). Since current management of benign thyroid disorders has favored total lobectomy or thyroidectomy (Colak *et al*., 2004), which obviously lowers the postoperative bleeding risk, the usefulness of drains has become increasingly questioned.

The present study aimed at evaluating the necessity of drains after current therapeutic surgical options (total thyroidectomy or lobectomy) for benign thyroid disorders.

MATERIALS AND METHODS

Patients

Between January 2004 and August 2005, a total of 120 consecutive patients undergoing total thyroidectomy or lobectomy for benign thyroidal disorders were enrolled in this study. This study was approved by the local Ethical Committee at the Mersin University Hospital, Turkey. Informed consent was obtained from all the patients. Patients with thyroid cancer or coagulopathy were excluded from the study. Finally, 116 patients were enrolled in this study and randomly assigned to use closed suction drains (n=58) or not (n=58) according to a computer-generated table of random numbers. The randomization was provided by an independent computer consultant. The surgeon was informed of the drains insertion just before the closure of the wound.

Methods

Total thyroidectomy was performed by a uniform technique of capsular dissection. Closed suction drains were placed before wound closing, if the patient was in the drained group.

In the study, operating time, postoperative pain, the total amount of intramuscular analgesic administration, hospital stay, complications (such as wound infection, seroma, bleeding, hematoma, recurrent laryngeal nerve palsy or hypoparathyroidism), and necessity for re-operation, all these were recorded. The operating time was defined as the time from the first incision to the last suture's placement. Postoperative pain was assessed according to a visual analogue scale (VAS) from 0 (no pain) to 10 (worst pain imaginable) on the postoperative day (POD) 0 and POD 1, if the patient was not discharged. A standard analgesic protocol was used according to VAS scores. Dipyrone (Sanofi Aventis Co., Istanbul, Turkey) was given intramuscularly when the pain score was five or more and oral paracetamol was given for a pain score of four or less, if necessary. The quantity of analgesics was regulated according to the patients' requirement and the total amount of administered dipyrone was noted for each patient. The patients were discharged when the patients did not have any complication or no longer required intramuscular analgesics, regardless of whether the patient felt enough to discharge, after the drain was pulled, if drained.

The patients were examined by a standard physical examination after one week, after one month and every three months thereafter. The patients were also asked to measure their overall level of satisfaction (1=poor, 4=excellent) one week after their thyroidectomy.

Statistical analysis

Differences between the two groups were analyzed with χ^2 test and student t-test. Results were expressed as mean±SD. χ^2 test was performed for the gender, hormonal status of glands, amount of analgesic requirement, complication rates and histopathological examination. Student t-test was performed for the age, hospital stay, operating time, weight of specimen and VAS score. Power analysis was calculated by test for non-inferiority hypothesis (Chow *et al*., 2003). We consider that a difference in complication rate of less than 5% is of non-clinical importance and the non-inferiority margin is chosen to be 5%. According to the non-inferiority test, approximately 40 patients in each group should be detected with a clinically important difference in complication rate with α error of 5% and β error of 10%. The sample size was established at 58 patients in each group to provide appropriate statistical power analyses.

RESULTS

The drained group consisted of 9 men and 49 women with a mean age of (45±10.6) years. The non-drained group comprised of 15 men and 43 women with a mean age of (47±10.8) years. There was no significant difference in the gender, age, hormonal status and histopathological results of the patients between the two groups (P=0.17, P=0.26, P=0.24 and P=0.54, respectively).

The mean operating time was similar in drained [(133.10±30.14) min] and non-drained [(128.10±31.59) min] patients (P=0.27). The mean weight of the specimens was (222.74±232.85) g (40~995 g) for drained group vs (225.41±213.16) g (60~954 g) for non-drained group (P=0.59). The mean VAS score was significantly reduced more in the non-drained group (4.58±1.12) than the drained group (5.13±1.23) patients in POD 0 (P=0.02) and a similar result was obtained in POD 1 when we compared the non-drained group (1.96±0.66) with the drained group (2.63±1.04) (P=0.003). Twenty-eight patients (48.3%) in the non-drained group did not need intramuscular analgesic, whereas 18 patients (31.0%) did not in the drained group (P=0.01). In addition, the mean amount of intramuscular analgesic requirement was significantly less in the non-drained group than in the drained group (P=0.03). These data were presented in Table 1.

The complication rate was similar between the two groups. One case of hematoma (1.7%), two cases of seroma (3.4%) and three cases of transient hypoparathyroidism (5.2%) occurred in the non-drained group, whereas one case of hematoma (1.7%), two cases of seroma (3.4%), two cases of wound infections (3.4%) and two cases of transient hypoparathyroidism (3.4%) occurred in the drained group (P=0.69). No patient needed surgical revision or re-operation for any complication and all complications were successfully managed with palliative care. The postoperative complications were presented in Table 2.

Approximately half of the patients (48%) patients were discharged before 24 h, 25 patients were discharged between 24 and 48 h, and five patients were discharged after 48 h in the non-drained group. In the drained group, only one patient was discharged before 24 h, whereas 35 patients were discharged between 24 and 48 h, and 22 patients after 48 h. The mean hospital stay was significantly shorter in the non-drained group when compared to the drained group (P=0.0001). The satisfaction of patients was noted as superior in the non-drained group (P=0.01).

Table 1 The operative and postoperative values of the patients

	Operating time (min)	Weight of specimen (g)	VAS score		Amount of intramuscular analgesic (A)	Hospital stay (d)
			POD 0	POD 1		
Drained	133.10±30.14	222.74±232.85	5.13±1.23	2.63±1.04	1.48±1.42	2.46±0.73
Non-drained	128.10±31.59	225.41±213.16	4.58±1.12	1.96±0.66	0.89±1.00	1.62±0.69
P value	0.27	0.59	0.02	0.003	0.03	0.0001

Data were presented as mean±SD; χ^2 test was done for the intramuscular analgesic amount and student t-test was done for others; VAS: Visual analogue scale; POD: Postoperative day

Table 2 The postoperative complications (P=0.69*)

Complications	Hematoma	Seroma	Wound infection	Transient hypoparathyroidism
Drained	1 (1.7%)	2 (3.4%)	2 (3.4%)	2 (3.4%)
Non-drained	1 (1.7%)	2 (3.4%)	0 (0.0%)	3 (5.2%)

The data are presented as the number of patients and percentiles in parenthesis; χ^2 test was done for all the complications; *P value was presented for the total complications number

DISCUSSION

Drains are still routinely used in most surgical clinics after thyroid surgery. However, use of drains is based on tradition rather than evidence and dependent on the surgeon's experiences and training (Defechereux *et al*., 1997). Traditionally, the main expectation for drains usage is to prevent postoperative complications by evacuating postoperative hematoma or lymphatic fluid and to alert the surgeon to early

postoperative bleeding (Wihlborg *et al*., 1988). On the other hand, drain usage might be rejected in non-complicated cases because drainage is very low and might be not necessary, or because adequate haemostasis can never be replaceable by using drains; and in the case of incomplete drainage, seroma or hematoma would be the unavoidable conclusion (Karayacin *et al*., 1997; Peix *et al*., 1992; Ruark and Abdel-Misih, 1992). Or drains might be associated with possible infection (Ariyanayagam *et al*., 1993; Kristoffersson *et al*., 1986; Teboul *et al*., 1992). In addition, surgical techniques for benign thyroidal disorders have improved greatly over the past several years and postoperative morbidity and mortality rates have further decreased. Life-threatening complications, such as postoperative bleeding, hematoma, compression of air passages or suffocation, can be avoided in most patients (Colak *et al*., 2004; Müller *et al*., 2001). In the light of these improvements, the value of drainage in thyroid surgery might be newly questioned.

Until today, numerous randomized trials have failed to resolve this question. Most of these studies revealed that drainage is unnecessary after routine thyroid surgery (Hurtado-López *et al*., 2001; Khanna *et al*., 2005). However, this result might not yet be directly accepted in practice.

In the present study, only the patients who underwent total thyroidectomy or lobectomy for benign thyroidal disorders were investigated. Despite this study being conducted in an endemic region, with greater thyroidal volume and dead space (Hurtado-López *et al*., 2001), the complication rates were comparable with the literature (Khanna *et al*., 2005; Schoretsanitis *et al*., 1998). In this study, similar complications rates were observed with regard to hematoma (1.7%) and seroma (3.4%) between groups. These results might be explained by a similar homogeny haemostasis procedure. Serious haemorrhage did not occur in any patient. But minimal hematoma was diagnosed in one patient in each group by neck ultrasonography in POD 3. In this patient, neck oedema and swelling was observed. Unfortunately, drains did not alert the surgeons in the case of the drained group. In this case, 90 ml serohemorrhagic fluid was yielded in POD 1, whereas 30 ml in POD 2, which is accepted as normal and the drains were pulled in POD 2. Similarly, two seroma in each group were ultrasonographically diagnosed in POD 7. However, neither seroma in either group nor a hematoma in the non-drained group needed any surgical manipulations. These patients were only treated by palliative care, but the hematoma in the drained group needed needle aspirations twice.

A possible relationship between drains insertion and infective complications was observed in this study. The fact that wound infections developed in two of our patients in the drained group, supports the belief that drains predispose the area to infective complications (Ariyanayagam *et al*., 1993; Kristoffersson *et al*., 1986; Tabaqchali *et al*., 1999).

Only one previous study has investigated the relationship between drains insertion and postoperative pain. Schoretsanitis *et al*.(1998) noted that an approximately 50% reduction in the VAS score occurred in the non-drained group. Similarly, in this study, postoperative pain dramatically decreased in most of the non-drained patients, especially in POD 1. These results showed that drains insertion might be directly associated with increasing postoperative discomfort of the patient by increasing postoperative pain. This is reflected in patient satisfaction and early discharge, independently of any complications.

A discharging decision is not only related to fluid drainage but also to postoperative pain, comfort and satisfaction of the patient. Previous studies established that the greatest risk of respiratory failure caused by hematoma occurs during the first 6 h after thyroid surgery and this result disencourages the discharging of the patients on the day of the operation (Hurtado-López *et al*., 2001; Matory and Spiro, 1993; Shaha and Jaffe, 1994). In the present study, developed two hematomas were minimal and possibly developed over a long time. Thus, these complications did not affect our discharging decision.

CONCLUSION

The present prospective randomized study verifies that routine drain placement after thyroid surgery for benign diseases is not necessary and therefore is not effective in decreasing the rate of postoperative complications. By contrast, the use of drains prolongs the hospital stay, increases postoperative pain and may be associated with an increased risk of infective complications.

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