

The impact of no placement of drains in hemithyroidectomy on the postoperative course: A single-institutional study in Japanese patients

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Background: Recently, the placement of drains in thyroidectomy has been debated. In this study, we evaluated the efficacy and safety of no placement of drains in hemithyroidectomy.

Methods: After obtaining approval from the Institutional Review Board, we started not placing drains during surgery in adult patients who underwent hemithyroidectomy with or without central neck lymph node dissection for benign thyroid nodules or well-differentiated thyroid cancer, with informed consent being obtained. We compared the clinical data of the patients without drain placement (n=19) to the historical data of consecutive patients with a suction drain (n=20).

Results: The operative wound and amount and characteristics of the drainage fluid were monitored every 2 h after the operation until the following morning, in addition to monitoring the oxygen saturation and an electrocardiogram. The proportion of patients undergoing cervical lymph node dissection was identical between the groups. The drain was removed on Day 1 after surgery in 19 patients and on Day 2 after surgery in 1 patient. The patients without a drain showed a significantly shorter postoperative hospital stay than those with a drain (4.0 vs. 4.5 days, respectively, p=0.03). No patients in either group experienced postoperative bleeding or seroma or wound infection.

Conclusion: The hemithyroidectomy patients without a drain were able to be discharged earlier than those with a drain and without any adverse events, provided they received close monitoring after surgery.

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Key words: drain; thyroidectomy; thyroid cancer; thyroid nodule; hospital stay

Introduction

Drains have long been believed to be necessary and useful following thyroidectomy, as monitoring the drainage fluid can alert physicians to potential complications such as hematoma or seroma. Recently, however, the routine placement of drains in thyroidectomy has become controversial. Postoperative hematoma is rare but can be fatal due to the compression of the trachea or edema of the larynx. However, placement of a drain has been suggested to be ineffective in preventing the formation of hematoma, as the drain can be-

come clogged by clotted blood (1). Furthermore, some reports have suggested that the duration of the hospital stay in thyroidectomy patients without drains was shorter than that in patients with drains (2-5). In addition, the placement of a drain creates an additional wound, which leads to scarring in a sensitive area (6).

However, regardless of these reports, the placement of drains remains acceptable at most institutions in Japan. We previously reported that, in a retrospective study of 246 patients, drains placed in the thyroid could be safely removed provided the drainage fluid was serous and less than 15 ml

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during 6 h after surgery, and the drains in 70.0% of the patients were removed within 24 h after surgery [7].

In this study in a single institution, we started not placing drains in hemithyroidectomy prospectively and compared the outcomes in these patients with the historical data of patients with drains in order to clarify the efficacy and safety of our no-drain strategy in hemithyroidectomy in Japan.

Patients and methods

Patients

After the Institutional Review Board of our institution approved our prospective study in April 2013, we started a clinical study in which we did not place drains in hemithyroidectomy patients for first-time thyroid surgery, provided informed consent was obtained from the adult patients. The inclusion criteria were planned hemithyroidectomy with or without central neck dissection and a diagnosis of benign thyroid nodules or well-differentiated thyroid cancer. The exclusion criteria included previous neck surgery, the administration of anti-coagulant and/or anti-platelet drugs, a non-pathological thyroid around the tumor, and mediastinal goiter. Before starting this new protocol, we routinely placed a closed suction drain in all such patients. We compared the clinical data of the patients without drains with the data from consecutive patients with a 3.5-mm suction drain before April 2013.

All of the surgical procedures were performed with conventional open surgery under general anesthesia by the same surgical team. We used vessel-sealing systems for blood vessels or thyroids, including electrothermal bipolar-activated devices or ultrasonic systems without ligation. In all of the patients, the wound was closed by interrupted subcuticular sutures using 4-0 monofilament absorbable thread, with the application of skin closure tape. The wound was covered with a film dressing.

Postoperative assessment and management

We compared the clinical factors, including the complications and duration of the postoperative hospital stay, between the patients with and without drains. After the operation, the patients were monitored using an oxygen saturation monitor and an electrocardiogram, and additionally, the medical staff examined the operative wound and recorded the amount and characteristics of the drainage fluid every 2 h until the next morning. The patients had breakfast on the day following the surgery. The drain was removed once the drainage fluid

decreased in amount and contained serous fluid after a meal (7). The patients were discharged once no further wound treatment was required. Patients were examined for post-operative seroma and hematoma, evaluated by a physical examination, for at least two weeks postoperatively.

Statistical analyses

The results are expressed as the median (range). Mann-Whitney's U test was used for the comparison of two groups. The chi-squared test was used for the comparison of categorical data. A p-value of less than 0.05 was considered statistically significant. The statistical analyses were performed using the StatMate III software program for Macintosh (ATMS Co., Ltd., Tokyo, Japan).

Results

Table 1 shows the patients' backgrounds. The mean age was comparable between the groups, but with regard to sex, the proportion of females was significantly higher among the patients without drains than among those with drains ($p=0.04$). The indications for surgery and the proportion of patients that underwent cervical lymph node dissection did not differ markedly between the groups. The tumor size was bigger ($p=0.03$) and the volume of blood loss was greater ($p=0.04$) in the patients with drains than in those without drains.

Table 1. Backgrounds of patients

	With drains (n=19)	Without drains (n=20)	p value
age, year-old	61 (24-80)	49 (22-68)	0.11
sex, male : female	6:14	1:18	0.04
indication for surgery			0.79
papillary carcinoma	6	5	
adenomatous goiter/nodule	6	5	
follicular adenoma	5	5	
follicular carcinoma	2	2	
poorly differentiated carcinoma	1	0	
functioning nodule	0	1	
malignant lymphoma	0	1	
cervical lymph node dissection	5 (25.0%)	4 (21.1%)	0.77
amount of blood loss (ml)	40 (2-160)	19 (2-220)	0.04
tumor size (mm)	40 (10-100)	30 (3-80)	0.03

Table 2 shows the postoperative courses. The drains were removed at postoperative day 1 in 19 patients and day 2 in 1 (data was not shown). The proportion of the patients that needed analgesics was not markedly different between the

groups. No patients in either group suffered from wound infection or seroma or postoperative bleeding, in which any intervention was required. The duration of the postoperative hospital stay in the patients without drains was significantly shorter than that in the patients with drains ($p=0.03$).

Table 2. Comparison of postoperative courses between the patients with and without drains

	With drains (n=19)	Without drains (n=20)	p value
usage of analgesics	9 (45.0%)	13 (68.4%)	0.14
wound infection	0	0	ns
seroma	0	0	ns
postoperative bleeding	0	0	ns
postoperative hospital stay (days)	4.5 (3.0-8.0)	4.0 (1.0-5.0)	0.03

Discussion

In this study, hemithyroidectomy patients without drains developed no adverse events, such as infection or seroma or hematoma, and showed a shorter postoperative hospital stay than the patients with drains, as reported previously (2-5). Notably, Japanese medical insurance was able to support all of the patients until wound treatment was no longer required, allowing them to stay in the hospital longer than in most Western countries. After thyroidectomy, the amount of drainage peaked at 12-18 h before decreasing, and the drain was removed without adverse events (7). One report noted that there was no significant difference in the volume of fluid after thyroidectomy (as assessed by ultrasonography) (8). Although we did not routinely evaluate the neck after thyroidectomy by ultrasonography, our present data suggested that the fluid that was discharged immediately after uncomplicated thyroidectomy was able to be absorbed without a drain and with no formation of seroma, in which intervention was required. With regard to the selective use of drains, Hurtado-Lopez, et al. reported that the size of the gland, diagnosis, type of surgery, amount of transoperative bleeding, and complications did not affect the postoperative course, regardless of the use of a drain (9). Because amount of blood loss in our study was relatively low in comparison to the report by Hurtado-Lopez et al. (i.e., 107 ml in the patients without drains (8)), the strategy of not placing a drain should be suitable for patients who undergo hemithyroidectomy.

Postoperative hematoma after thyroidectomy is a rare but potentially critical complication that can lead to the compression and obstruction of the airway and the induction of respiratory arrest. Hematoma requiring surgical intervention was reported

to occur in 0.43%-1.0% (10-13) of patients, and the use of suction drains in thyroid surgery was not found to prevent the development of postoperative hematoma (14). Regarding the timing, 34%-73% of hematomas were found within 6 h after thyroidectomy, and 45.5% were found in the recovery room (10, 15). Additionally, significant hemorrhaging was suggested to develop within 1 h after surgery and potential airway obstruction within 4 h (16). Since the occurrence of postoperative hematoma is not prevented completely by the placement of a drain, hematomas should instead be managed by close monitoring for symptoms, such as neck swelling, increasing sense of central neck pressure, choking sensation, and respiratory difficulties (10), especially early after thyroidectomy, in order to enact decompression measures quickly.

Although our study showed that hemithyroidectomy patients without drains enjoyed shorter, uncomplicated postoperative hospital stays than those with drains, a critical limitation of the study was the relatively small population, resulting in differences in the backgrounds of the patients between the two groups. In addition, we evaluated only patients with hemithyroidectomy. However, although the hematoma rate is reportedly higher after total or near total thyroidectomy than after hemithyroidectomy (11), not placing a drain in these patients, including those with lymph node dissection or Grave's disease, has also been reported to be safer and more beneficial in some respects than placing a drain (2). We will therefore continue not placing drains in patients undergoing uncomplicated thyroidectomy, while extending the application to total or near total thyroidectomy patients as well.

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