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Drainage after thyroid surgery: a prospective randomized study

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Abstract

Between November, 1996 and May, 1997 a series of 100 consecutive unselected patients undergoing all types of thyroid surgery – including even those inducing large dead space e.g. substernal goitre and carcinoma thyroid with recurrent nerve dissection – were randomly allotted to either receive drainage (n = 43) or not (n = 57). Patients with cervical dissection for lymph node metastasis were not included. Severe intra-operative haemorrhage was not a reason for exclusion. No complications such as haematoma or seroma were found in the undrained group whereas only minor complications such as haematoma (n = 4) were noted in the drained group. Whatever the group, none of the patients required re-exploration. The difference in overall hospital stay (1.72 days in the group of undrained patients versus 2.09 days in the drained group) was not statistically significant.

Key words: Thyroid gland, surgery; Drainage; randomized controlled trial

Introduction

The question of routine wound drainage after thyroid surgery remains controversial among experienced surgeons (Ruark and Abdel-Misih, 1992; Shaha and Jaffe, 1993).

It has been common practice in some centres to drain wounds routinely after such surgery. The aim of this study was to determine whether routine prophylactic drainage of thyroid wounds was justified, based on our personal experience of a prospective and randomized series including 100 thyroidectomies.

Materials and methods

Between November, 1996 and May, 1997, 100 thyroidectomies were prospectively randomized to undergo drainage or not in the ENT unit of the Centre Hospitalier Intercommunal of Poissy, France (Table I). The type of surgery is presented in Table II. For each patient entering the study decision to drain or not was based on a pre-determined list according to random number tables: even numbers were drained while odd numbers were undrained.

TABLE I
ANALYSIS OF THE POPULATION

	Males	Females
N	14	86
Average age (in years)	49.8	46

TABLE II
TYPE OF SURGERY

Surgery	No. drained SSG −	No. drained SSG +	No. undrained SSG −	No. undrained SSG +
Isthmusectomy	2	0	2	0
Right lobectomy	7	3	12	3
Left lobectomy	8	2	18	3
Total thyroidectomy	15	3	15	3
Total thyroidectomy with recurrential dissection	3	0	1	0
Total	35	8	48	9

SSG −: no substernal goitre; SSG +: substernal goitre

Only two patients refused to enter the study. Whatever the type of thyroidectomy all others were eligible except cases of thyroid carcinoma with metastatic cervical lymphadenopathy requiring extensive neck dissection (two cases) which were routinely drained (hence not included in our study). Prophylactic antibiotics were not used either pre- or post-operatively. Fifty-seven patients had no drains *versus* 43 in whom we placed post-operatively. Redon closed suction drainage. The following criteria were studied: post-operative complications including infection or haematoma, detected clinically and if in doubt sonographically, intra-operative haemorrhage as determined by the difference between dry and wet (blood-soaked) pads weighed during surgery (in grams); time of hospital discharge after operation. Statistical analysis was performed using chi-square test.

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TABLE III
MICROSCOPIC ANALYSIS OF THYROID PATHOLOGY

Microscopic analysis	N =
Adenoma	43
Adenoma associated with thyroiditis	3
Grave's disease	10
Bilateral polyadenoma dystrophia	36
Hashimoto's disease	3
Thyroid carcinoma	4
Haemorrhagic cyst	1

The study was approved by the CCPPRB ethical committee (with authorization number 941055, July 21, 1994).

Results

Results of the microscopic analysis after surgery are summarized in Table III. In 16 per cent of cases, a family history of thyroid pathology was found. Postoperative complications are summarized in Table IV. No haematoma was noted in the undrained group, whereas in the drained group four patients presented haematoma detected either clinically or sonographically (n = 2). In three of these four patients haematoma appeared within the first 24 hours while the fourth one was on day 5. This difference was statistically significant ($p<0.02$). None of the four required re-exploration.

It was possible to measure the difference in weight between dry and wet pads in only 79 patients. No statistically significant difference was found between the two groups: the average weight for undrained patients was 126.8 grams *versus* 128.3 for drained patients. Of interest is the fact that among the three patients with post-operative haematoma in whom the weight difference could be assessed, average blood loss accounted for 98 g. Although this series is too small to allow any statistical analysis, this result would suggest that there is no correlation between per-operative bleeding and the occurrence of post-operative haematoma.

Mean overall hospital stay was 1.89 days with 2.09 days for the drained group *versus* 1.72 day for the undrained one (difference not statistically significant). No post-operative infections were noted in the drained group. Only five patients (15 per cent) among 33 who answered a written questionnaire complained of pain upon removal of the suction drain.

TABLE IV
POST-OPERATIVE COMPLICATIONS

	Case number		Haematoma	
Surgery	D+	D−	D+	D−
Isthmusectomy	2	2	0	0
Right lobectomy	10	15	1	0
Left lobectomy	10	21	0	1
Total thyroidectomy	18	18	0	2
Total thyroidectomy with recurrential dissection	3	1	0	0
Total	43	57	1	3

D+: drainage ; D−: no drainage

Discussion

Thyroidectomy is a very common procedure performed by many surgeons. Therefore, it would seem difficult to change the traditional practice of placing post-operative drains although it has been suggested in the literature not to routinely drain the thyroid bed. Regarding the retrospective studies, Shaha has reported a series of 400 thyroidectomies over nine years (Shaha and Jaffe, 1993). During the first six years, they drained the operated site in most of the thyroid procedures. Their experience demonstrated that drains had a limited effect in preventing post-operative haematoma or seroma. In fact, all four patients who required re-exploration in their initial series had drains in place. As a result of their initial experience, over the last three years, encompassing 150 thyroidectomies, they used drains only when a large dead space was present, i.e. large substernal goitre, subtotal thyroidectomy for either large multinodular goitre or Graves' disease; 115 patients were not drained. They found no difference in the overall outcome whether drains were employed or not. Most patients who had no drains were ready for discharge within 24–48 hours post-surgery.

Ruark conducted a review of 139 thyroid or parathyroid procedures performed without drainage; 110 thyroid operations were performed, including unilateral lobectomy with isthmusectomy, total or bilateral subtotal thyroidectomy and isthmusectomy (Ruark and Abdel-Misih, 1992). Post-operatively, there were no instances of wound haematoma, infections or rebleeding requiring re-operation. Minor complications included asymptomatic wound seroma in five (3.6 per cent) patients. They were aspirated two weeks after discharge without further recurrence.

Wax evaluated, during a six-year period, 57 patients undergoing thyroid surgery and eight patients undergoing parathyroid surgery (Wax *et al.*, 1995). Twenty-four patients were excluded because drains were placed post-operatively. Reasons for exclusion included presence of a large dead space, substernal goitre, extensive neck dissection for malignant neoplasm and large goitres. Major complications consisted of haematoma requiring re-exploration in one patient. Minor complications consisted of seroma (n = 1), and superior flap oedema that resolved in three months. These authors also concluded that routine prophylactic drainage is not mandatory after uncomplicated thyroid or parathyroid surgery. Nevertheless, the interest of their work is somewhat limited by the fact that they selected their patient population. Moreover, their study should be considered as a simple retrospective series of cases since no randomization was performed.

The prospective randomized studies are more interesting (Table V): Kristoffersson *et al.* (1986) randomly allocated patients to receive drainage (n = 50) or not (n = 50). Although he did not report statistics, he confirmed in both groups a low rate of complications which furthermore, were always

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TABLE V
DRAINAGE IN THYROID SURGERY: SUMMARY OF PROSPECTIVE RANDOMIZED TRIALS

Authors	Number of patients D+	Number of patients D−	Complications D+	Complications D−
Kristoffersson *et al.*, 1986*	50	50	1	0
Wihlborg *et al.*, 1988	75	75	9	8
Ayyash *et al.*, 1991*	50	50	2	2
Taboul *et al.*, 1992	48	49	3	4
Mok *et al.*, 1992	56	46	0	0
Schwarz *et al.*, 1996	50	50	0	0
our study, 1997	40	40	0	4
Total	322	327	15	18

D+: drainage; D−: no drainage
*No statistical report was provided in these studies

minor. This author concluded that a meticulous haemostatic procedure is more important than the use of drains. Ayyash in a series of 100 consecutive patients allocated them to either a drainage group or a no drainage one (Ayyash *et al.* 1991). Seroma developed in the wound in seven out of 50 patients without drainage versus two out of 50 with drainage. There were no residual effects of the seroma which resolved spontaneously. However, the study provided no statistical report for routine use of drains in primary thyroid or parathyroid surgery. Schwartz compared a common high-vacuum drainage system (Redon) with a non-suction system (Robinson) in 80 patients undergoing selective thyroid surgery (Schwarz *et al.* 1996). Non-suction passive drains were applied to 40 patients while the other 40 served as a control group with the high-vacuum system. The wound area was analysed by sonography 24 hours post-operatively after drainage removal. The authors found that patients receiving non-suction drainage had a remaining haematoma of similar volume to that of the patients receiving high-vacuum treatment. No complications were observed.

Wihlborg *et al.* performed subtotal and total thyroidectomies as well as lobectomies on 150 patients (Wihlborg *et al.*, 1988). They found that drainage had no advantage in preventing the post-operative haematoma ($n = 1$ in each group). No difference was found between the groups according to the experience of the surgeon, type of operation, operation time, weight of specimen, diagnosis and hospital stay. Mok randomized a series of 102 consecutive patients but only on simple and unilateral thyroid lobectomy (Mok *et al.* 1992). These authors concluded that suction drainage is not required to prevent wound haematoma. Using a meta-analysis of randomized clinical trials totalling 97 patients Taboul concluded that draining is not useful (Taboul *et al.*, 1992). Their review did not evidence any adverse effect of not draining the thyroid bed.

Our prospective study encompassing a non-selected patient population has confirmed the minimal rate of complication observed by other authors. From the result of our experience we feel that there is no special reason to selectively use drains in thyroid surgery, even on large dead space, substernal goitre, carcinoma or per-operative bleeding. An additional reason to prefer not to drain patients is that the absence of suction removal avoids pain associated with such a procedure. Since no earlier hospital discharge was observed in the undrained group, the expectation of a cost reduction induced by a non-draining approach could not be fulfilled.

Conclusion

The minimal complication rates observed with undrained neck incisions suggest that routine propyhlactic drainage of thyroid wounds is unnecessary. In our study no increased adverse events were noted in cases of undrained thyroid beds. Based on these results we are no longer performing draining.

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