Safety of thyroidectomy and cervical neck dissection without drains

Bassam Abboud, MD*

Ghassan Sleilaty, MD*

Habib Rizk, MD*

Gerard Abadjian, MD†

Claude Ghorra, MD†

From the *Department of General Surgery, Hotel Dieu de France Hospital, and the †Department of Pathology, Hotel Dieu de France Hospital, Faculty of Medicine, Saint-Joseph University, Beirut, Lebanon

Correspondence to:
B. Abboud
Department of General Surgery
Hotel Dieu de France Hospital
Alfred Naccache St.
Beirut, Lebanon
dbabboud@yahoo.fr

Background: Many studies have reported that drainage after thyroidectomy does not decrease the rate of local postoperative complications. We sought to review the safety of thyroidectomy combined with cervical neck dissection (CND) without drainage.

Methods: The medical records of consecutive patients who underwent thyroidectomy without drainage were retrospectively reviewed. Two groups were defined depending on whether CND was or was not performed. The main outcome was identification of patients with cervical bleeding, hematoma or seroma.

Results: We included 1127 patients (139 who had CND and 988 who did not). Of these, 207 patients (18%) had transient postoperative hypocalcemia, 9 (0.8%) had permanent postoperative hypoparathyroidism, 56 (5%) had transient postoperative hoarseness and 7 (0.6%) had permanent vocal cord paralysis. A total of 44 patients (4%) experienced postoperative hematoma and/or seroma: 8 patients (6%) who had CND and 36 (4%) who did not. There was no major bleeding in the 2 groups; all patients had minor bleeding or seroma not requiring surgical intervention. The postoperative stay in hospital for both groups was 1 day in 92% of patients. Wound infection occurred in 0.8% of all patients: 1 (0.7%) who had CND and 8 (0.8%) who did not. There was no significant difference between the groups in overall perioperative complications or in time of hospital discharge.

Conclusion: Thyroidectomy without drains is safe and effective, even in combination with CND.

Contexte : De nombreuses études ont signalé que la pose de drains après une thyroïdectomie ne réduit pas le taux de complications postopératoires locales. Nous avons voulu revoir l'innocuité de la thyroïdectomie alliée à une dissection cervicale sans pose de drains.

Méthodes : Nous avons passé en revue de manière rétrospective les dossiers médicaux de patients consécutifs soumis à une thyroïdectomie sans pose de drains. Nous avons établi 2 groupes selon qu'une dissection cervicale centrale (DCC) avait ou non été réalisée. Le paramètre principal était la survenue de saignements, d'hématomes ou de séromes cervicaux chez les patients.

Résultats : Nous avons inclus 1127 patients (139 ayant subi une DCC et 988 qui n'en n'avaient pas subi). Parmi eux, 207 patients (18 %) ont présenté une hypocalcémie postopératoire transitoire, 9 (0,8 %), une hypoparathyroïdie postopératoire irréversible, 56 (5 %), une raucité postopératoire transitoire et 7 (0,6 %) une paralysie irréversible des cordes vocales. En tout, 44 patients (4 %) ont présenté un hématome ou un sérome postopératoires : 8 patients (6 %) ayant subi une DCC et 36 (4 %) qui n'en n'avaient pas subi. On n'a observé aucune hémorragie majeure dans les 2 groupes; tous les patients ont manifesté un saignement ou un sérome légers ne nécessitant pas d'intervention chirurgicale. Le séjour hospitalier postopératoire pour les 2 groupes a été d'une journée pour 92 % des patients. La plaie s'est infectée chez 0,8 % de tous les patients : 1 (0,7 %) ayant subi la DCC et 8 (0,8 %) qui ne l'avaient pas subi. On n'a noté aucune différence significative entre les groupes pour ce qui est des complications périopératoires ou la durée de l'hospitalisation.

Conclusion : La thyroïdectomie sans pose de drains est sûre et efficace, même en association avec la dissection cervicale.

T he major complications associated with thyroid and parathyroid surgery are injury of the recurrent laryngeal nerve or external branch of superior laryngeal nerve, hypoparathyroidism and wound complications.[1] In these cases, the incidence of serious postoperative hematoma is very low in the

hands of experienced surgeons and does not seem to increase in the absence of drains. Moreover, several studies have failed to show any benefit from neck drainage. Despite these facts, thyroid surgeons diverge in their attitudes. Many surgeons still perform neck drains routinely, mainly owing to concerns about wound hematoma and seroma and, ultimately, airway compression and obstruction. Others have suggested selective or no use of drains after thyroidectomy, since the use of drains does not prevent the development of postoperative hematoma and increases the length of postoperative stay in hospital.[2–7] Other authors have concluded that thyroidectomy without drains is safe, even when combined with central neck dissection (CND).[8]

The present paper aimed to evaluate the feasibility and safety of thyroidectomy without drains, especially in cases of combined CND (central and/or lateral).

METHODS

Study population

This retrospective study was undertaken to evaluate the feasibility and safety of thyroid surgery without drains, including cases of combined CND. Our local hospital's ethical committee approved the database review. We performed a thorough search of our institutional database, retrieving all medical records of patients who had thyroid surgery between January 1996 and June 2008. At this level, the medical records corresponding to patients with medullary or anaplastic thyroid carcinomas were excluded from the study. Likewise, we excluded the medical records of patients with thyroid carcinoma invading adjacent structures (larynx, trachea, esophagus) treated by large resection of these organs. The following parameters were recorded for all patients: age, sex, preoperative symptoms and diagnosis, thyroid hormonal status, substernal extension of goitre, preoperative and postoperative calcium and phosphorous values, perioperative complications, length of stay in hospital and final histology.

Surgical technique

All the operations were performed by a single surgeon (B.A.). Iodine-free solutions (chlorehexidine) were used to swab the operative field. Thyroidectomy was performed via a transverse cervicotomy under general anesthesia. During careful dissection along the thyroid capsule, identification and preservation of parathyroid glands with their vascular supply, as well as the recurrent laryngeal nerves were attempted. Total thyroid resection was conducted intracapsularly when necessary to preserve the vascularization of the parathyroid glands. When at least 1 parathyroid gland was identified during the operation, further thorough dissection to search for missing glands was avoided. Inadvertently removed parathyroid glands during dissection and/or un-

equivocally devascularized parathyroid glands were removed and immediately autotransplanted into a pocket fashioned in the ipsilateral sternocleidomastoid muscle. The transplantation site was closed with permanent silk suture. Lymph node exploration was systematically performed centrally and bilaterally in patients with papillary thyroid carcinoma. Macroscopically enlarged lymph nodes and adenopathies detected on preoperative imaging studies were all removed for pathologic study. No prophylactic lymph node dissections or picking procedures were undertaken. Our institutional policy was to perform CND in patients with papillary thyroid cancer if the primary tumour size was larger than 1 cm and when there was preoperative or intraoperative evidence of enlarged lymph nodes in the paratracheal lymph node group. The central compartment lymph node group consists of level VI lymph nodes (prelaryngeal, pretracheal and paratracheal) and contains the lymph nodes in the space limited by the hyoid bone superiorly and by the suprasternal notch inferiorly. On each side, the lateral boundary is formed by the medial border of the carotid sheath. Lateral neck dissection (level II, III, IV, V and VII) was performed when there was pre- or intraoperative evidence of enlarged lymph nodes in these areas. A Valsalva manoeuvre was performed at the end of thyroidectomy in all patients to detect hemorrhage. The cervical wound was closed without drain tubes in all patients.

We defined 2 groups: group 1 included the patients who underwent thyroidectomy with CND (central and/or lateral), and group 2 included the patients who underwent thyroidectomy without CND.

Perioperative care and follow-up

All patients with hyperthyroidism were treated with methimazol and β-blockers. All had normal thyroid function before the operation. The cervical wound was monitored closely in the postoperative period. The following parameters were queried: volume of the resected thyroid gland, presence of local complications (hemorrhage, hematoma, seroma) and time to hospital discharge. Postoperative seroma and hematoma were examined for at least 2 weeks postoperatively. Postoperative complications, mainly vocal cord paralysis and temporary or permanent hypocalcemia were recorded. The presence and the type of hypocalcemia signs were recorded by the surgeon and/or the nurse, with the evaluation of the Chvostek sign. The patients were discharged from hospital when they were asymptomatic or when the serum calcium level rose above 2 mmol/L. The patients were also instructed to contact the surgeon if symptoms of hypocalcemia developed. Clinical follow-up ranged from 12 to 162 months.

Definitions

We defined biochemical hypocalcemia as a serum calcium

level less than 2.0 mmol/L on more than 1 postoperative measurement. Postoperative hypocalcemia was defined as the condition of the patients requiring medications to maintain normocalcemia at the time of hospital discharge. During follow-up, postoperative hypocalcemia was considered transient when normocalcemia was restored and maintained for at least 2 weeks after withdrawing all medications. Postoperative hypocalcemia requiring treatment to maintain normocalcemia associated with a low serum parathyroid hormone level (reference range 10–65 ng/L) lasting more than 1 year postoperatively was considered permanent.

Postoperative bleeding was divided into minor and major bleeding. We defined minor bleeding as the development of small, superficial wound hematoma or bruising not requiring intervention, whereas any bleeding requiring intervention was considered major bleeding.

We defined wound infection as the postoperative occurrence of wound cellulitis or superficial abscess.

Transient postoperative hoarseness was defined as unilateral vocal cord paresis on laryngoscopic examination that resolved within 6–8 weeks after the operation. We defined permanent vocal cord paralysis as unilateral paralysis at laryngoscopic examination performed 1 year after the operation. Only patients with hoarseness underwent postoperative laryngoscopy.

Statistical analysis

Continuous data are expressed as means (and standard deviations) or as means with ranges. Categorical data are expressed as frequencies and percentages and were compared using the χ^2 test and corrected by a Fisher exact test when appropriate. We compared means using an independent sample t test if normality distribution was respected; otherwise, the nonparametric Mann–Whitney U test was used. All tests were 2-sided, and we considered results to be significant at $p < 0.05$.

RESULTS

Study population

From January 1996 to June 2008, 1127 patients underwent thyroidectomy in our department. Their mean age was 57 (23–81) years, and 878 (78%) were women. The age was not different between the sexes. Substernal thyroid extension was found in 139 patients (12%). The thyroid function was normal in 935 patients (83%), whereas 169 patients (15%) had hyperthyroidism and 23 patients (2%) had hypothyroidism.

Thyroidectomy was performed in 1081 patients (96%): total thyroidectomy in 766 patients (68%) and near total thyroidectomy in 315 (28%). Thyroid lobectomy was performed in 46 patients (4%). Of the 1081 patients who underwent total or near total thyroidectomies, both recur-

rent laryngeal nerves were identified in 886 patients (82%) and 1 recurrent laryngeal nerve in 162 patients (15%); no recurrent laryngeal nerve was identified in the remaining 33 patients (3%). The recurrent laryngeal nerve was identified in the ipsilateral neck in 37 patients (80%) who had thyroid lobectomies. In total, we identified 4 parathyroid glands in 902 patients (80%), 3 in 191 patients (17%), 2 in 23 patients (2%) and 1 in 11 patients (1%). The pathologic diagnoses of the resected tumours included benign multinodular goitres (54%), toxic multinodular goitre (13%), Grave disease (2%), follicular adenomas (7%), Hashimoto thyroiditis (2%), Hürthle cell adenoma (1%) and malignant thyroid neoplasms (21%). Of the malignant thyroid neoplasms, 92% were papillary carcinomas and 8% were follicular carcinomas. The mean weight of the thyroid tissue was 83 (range 53–644) g.

In all, 102 patients underwent CND, and 37 patients underwent central and lateral neck dissection for papillary thyroid carcinoma. Thus, 139 (12%) patients were classified in group 1 according to the definitions specified in the previous section.

Bleeding and/or seroma

A total of 44 patients (4%) experienced postoperative hematoma and/or seroma: 8 patients (6%) in group 1 and 36 patients (4%) in group 2 ($p = 0.14$). There was no major bleeding in the 2 groups; all patients had minor bleeding or seroma not requiring surgical intervention. None of the patients with hematoma experienced a subsequent wound infection.

Wound infection

Wound infection occurred in 9 (0.8%) patients: 1 in group 1 (0.7%) and 8 (0.8%) in group 2 ($p = 0.31$). All patients who experienced wound infections either had a large goitre extending substernally or hyperthyroidism.

Airway compromise

Airway compromise caused by major bleeding did not occur in this series. All patients were successfully extubated in the postoperative period, and none required a tracheostomy.

Postoperative hypocalcemia and vocal cord paralysis

Table 1 shows the results of hypocalcemia and vocal cord paralysis in this series.

Postoperative length of stay in hospital

The postoperative length of stay in hospital for groups 1

and 2 was 1 day for 1037 patients (92%), 2 days for 56 (5%) and more than 2 days for 34 (3%). Asymptomatic hypocalcemic patients were discharged from hospital the day after the operation. The mean length of stay in hospital for hypocalcemic patients was 2 (range 1–3) days. During follow-up, 9 patients required calcium and vitamin D supplementation, and there were no clinical symptoms of hypocalcaemia 12 months postoperatively. The incidence of permanent hypoparathyroidism was 0.8%.

Comparison of local complications

The mean age and male:female ratios were equally distributed in both groups. The volume of resected thyroid gland and the degree of intraoperative bleeding (the amount of blood in the suction canister or in the sponges) were not significantly different between groups. In group 1, overall perioperative local complications occurred in 8 of 139 patients (6%). In this group, all patients had total thyroidectomy, seroma occurred in 5 patients, and minor hematoma occurred in 3 patients. No hemorrhage requiring reoperation occurred after total thyroidectomy. In group 2, overall perioperative local complications occurred in 36 of 988 patients (4%). In cases of hemithyroidectomy or total thyroidectomy without neck dissection, seroma occurred in 27 patients, and minor hematoma occurred in 9 patients. No reoperation for hemorrhage was performed. Most seromas were detected in the first office visit within 2 weeks after discharge from hospital. In some cases, seromas and minor hematomas were resolved by repeated needle aspiration and compressive dressing.

DISCUSSION

In this retrospective review, it appears that the absence of cervical drainage in thyroid surgery with or without CND is feasible and safe for the patient, corroborating the findings of other retrospective studies and randomized trials.[2–6] Furthermore, no difference in perioperative complications (seroma, hematoma, hemorrhage) was found among the

3 types of surgical procedures (hemithyroidectomy, total thyroidectomy, total thyroidectomy with CND) in either group. There was no major bleeding in either group. All postoperative hematomas/seromas were minor and did not require surgical intervention. Simply put, drains neither prevent postoperative hematomas nor facilitate their early diagnosis. A recent review of the Cochrane Database concluded that there was no clear evidence that using drains in patients undergoing thyroid operations significantly improved patient outcomes.[9] The absence of a drain, however, reduces patient discomfort, pain, length of stay in hospital and risk of infection.[10] There are few specific data available in the literature to identify the safety of thyroidectomy combined with CND without a drain, and our study has added evaluation of concurrent lymph node dissection.

The low rate of postoperative hematoma/seroma (4%) observed in our study is well within the range reported in other published series; the incidence reported in the literature ranges from 0% to 30%.[11,12] Hematomas can result from inadequate hemostasis at the time of closure or increased venous pressure at the time of extubation because of coughing or straining. In this regard, we believe that a meticulous hemostasis is more important than the use of drains, as neither drains nor bulky pressure dressings prevent hematoma development. Pressure dressings may actually occult the early identification of hematoma. Like others, we believe that in cases of major postoperative bleeding, drains are rapidly blocked by clots. According to the previous reports, however, the drain itself could induce inflammation, and its presence might increase drainage. In addition, negative pressure by a suction drain may prevent the lymphatics from sealing off. Many authors have demonstrated that drainage after uncomplicated thyroid surgery, including total thyroidectomy, lobectomy and subtotal thyroidectomy, does not decrease the rate of complications related to postoperative bleeding.[2–7]

Most hematomas are clinically apparent within 2–4 hours after surgery, and some occur 2–48 hours postoperatively. The diagnosis of wound hematoma is made by observing the neck and noticing a progressive collection under the skin or airway symptoms. No airway symptoms due to hematoma occurred in our series, which is in accordance with the range reported in the literature (0.1%–1.1%).[11–14] Early intervention is the key to the management of postoperative hematoma with respiratory distress. It must be considered that complications caused by postoperative bleeding after thyroidectomy, which might produce respiratory failure, cannot be prevented by using a drain without meticulous hemostasis. However, minor hematoma might result in seroma formation through a process of liquefaction, and most seroma formations were detected within 2 weeks after discharge from hospital in our series. Some patients with seroma needed repeated aspirations, and none of the patients with seroma had respiratory distress or wound infection. Furthermore, the procedure of repeated aspirations did not result in any serious discomfort

Table 1. Comparison of morbidity among patients who did (group 1) and did not (group 2) undergo cervical neck dissection after thyroidectomy

Mobidity	Group; no. (%)		
	Group 1, *n* = 139	Group 2, *n* = 988	Total, *n* = 1127
Hypocalcemia	29 (21)	187 (19)	216 (20)
Transient	28 (20)	179 (18)	207 (18)
Permanent	1 (0.7)	8 (0.8)	9 (0.8)
Hoarseness	9 (6)	54 (5)	63 (6)
Transient	8 (6)	48 (5)	56 (5)
permanent	1 (0.7)	6 (0.6)	7 (0.6)
Hematoma/seroma	8 (6)	36 (4)	44 (4)
Wound infection	1 (0.7)	8 (0.8)	9 (0.8)

for the patients. Wound infection occurred in 0.8% of our patients and occurred only in those who had large goitres extending substernally or those who had hyperthyroidism. Some authors showed significantly increased length of stay in hospital and infection rates in patients treated with drainage.[4-8] Some authors suggest that because drain insertion is associated with wound infection and because the routine insertion of neck drains is of no additional benefit, neck drains should only be used selectively after thyroidectomy and parathyroidectomy. Piromchai and colleagues[15] found no significant decrease in fluid collections when pressure dressings were used.

Some authors have been selective in the use of drains after thyroidectomy, with the specific indications being a large dead space, resection of a substernal goitre and a raw thyroid bed at the conclusion of subtotal thyroidectomy. Some authors recommend the use of drains in patients with hypervascularity, such as those with Grave disease or extensive dissection of some cancers.[12]

The effect of CND, which produces large dead spaces in patients with well-differentiated thyroid carcinomas, was studied by some authors. They concluded that routine prophylactic drainage was not essential, even in cases of thyroidectomy with CND. Importantly, they achieved significantly reduced length of stay in hospital in the no-drain group, leading to a reduction in costs for the patients.[8] In our series, local complications and hospital stay were not increased despite large dead spaces created by CND without drainage.

Limitations

Our series has some limitations. First, it is a retrospective review, a method that has inherent defects, including potential biases in data retrieval, data analysis and data presentation. However, since this series is a retrospective single-institution study, it is unlikely that these factors could have resulted in major bias. Second, the sample size was relatively small. More large studies are needed to confirm that thyroidectomy and CND without drain is safe.

CONCLUSION

On the basis of our results, we believe that avoiding routine use of drains, even in thyroidectomy with CND, is safe and effective, does not increase overall surgical morbidity and reduces overall length of stay in hospital. Therefore, we believe there is no special reason to routinely use drains after thyroidectomy, even in cases of combined CND, if intraoperative hemostasis is ensured. All patients who experienced wound infections in our series had either a large goitre extending substernally or had hyperthyroidism.

References

1. Bergenfelz A, Jansson S, Kristoffersson A, et al. Complications to thyroid surgery: results as reported in a database from a multicenter audit comprising 3,660 patients. *Langenbecks Arch Surg* 2008;393:667-73.

2. Khanna J, Mohil RS, Chintamani D, et al. Is the routine drainage after surgery for thyroid necessary? A prospective randomized clinical study. *BMC Surg* 2005;5:11.

3. Sanabria A, Carvalho AL, Silver CE, et al. Routine drainage after thyroid surgery: a meta-analysis. *J Surg Oncol* 2007;96:273-80.

4. Ahluwalia S, Hannan SA, Mehrzad H, et al. A randomized controlled trial of routine suction drainage after elective thyroid and parathyroid surgery with ultrasound evaluation of fluid collection. *Clin Otolaryngol* 2007;32:28-31.

5. Suslu N, Vural S, Oncel M, et al. Is the insertion of drains after uncomplicated thyroid surgery always necessary? *Surg Today* 2006;36:215-8.

6. Morrissey AT, Chau J, Yunker WK, et al. Comparison of drain versus no drain thyroidectomy: randomized prospective clinical trial. *J Otolaryngol Head Neck Surg* 2008;37:43-7.

7. Ozlem N, Ozdogan M, Gurer A, et al. Should the thyroid bed be drained after thyroidectomy? *Langenbecks Arch Surg* 2006;391:228-30.

8. Lee SW, Choi EC, Lee YM, et al. Is lack of placement of drains after thyroidectomy with central neck dissection safe? A prospective, randomized study. *Laryngoscope* 2006;116:1632-5.

9. Samraj K, Gurusamy KS. Wound drains following thyroid surgery. *Cochrane Database Syst Rev* 2007;CD006099.

10. Champault A, Vons C, Zilberman S, et al. How to perform a thyroidectomy in an outpatient setting. *Langenbecks Arch Surg* 2009;394:897-902.

11. Lee HS, Lee BJ, Kim SW, et al. Patterns of post-thyroidectomy hemorrhage. *Clin Exp Otorhinolaryngol* 2009;2:72-7.

12. Palestini N, Tulletti V, Cestino L, et al. Post-thyroidectomy cervical hematoma. *Minerva Chir* 2005;60:37-46.

13. Burkey SH, van Heerden JA, Thompson GB, et al. Reexploration for symptomatic hematomas after cervical exploration. *Surgery* 2001;130:914-20.

14. Rosenbaum MA, Haridas M, McHenry CR. Lifethreatening neck hematoma complicating thyroid and parathyroid surgery. *Am J Surg* 2008;195:339-43.

15. Piromchai P, Vatanasapt P, Reechaipichitkul W, et al. Is the routine pressure dressing after thyroidectomy necessary? A prospective randomized controlled study. *BMC Ear Nose Throat Disord* 2008;8:1.