

Cervical neck dissection without drainage in papillary thyroid carcinoma

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Abstract

Objective: To review the safety of thyroidectomy combined with cervical neck dissection without drainage, in patients with papillary thyroid carcinoma.

Materials and methods: Two groups were defined depending on whether cervical neck dissection was or was not performed (groups one and two, respectively).

Results: Group one included 153 patients with central neck dissection and 52 patients with central and lateral neck dissection. Group two included 121 patients. Post-operative drainage was not used in either group. Overall, 17 patients (5 per cent) developed post-operative haematoma and/or seroma: 12 patients (6 per cent) in group one and 5 patients (4 per cent) in group two. There were no major bleeding episodes; only minor bleeding or seroma was encountered, not requiring surgical intervention. Overall, 91 per cent of patients had a post-operative stay of 1 day. The number of peri-operative local complications and length of stay did not differ significantly between the two groups.

Conclusion: Thyroidectomy plus cervical neck dissection without drainage is safe and effective in the treatment of papillary thyroid carcinoma.

Key words: Neck Dissection; Thyroid Cancer; Papillary; Drainage; Suction; Hematoma; Seroma

Introduction

The safety of combined thyroidectomy and cervical neck dissection performed without drainage has not been studied in depth.^{1–9} In thyroid surgery, the main indications for drainage are complicated cases and increased anatomical ‘dead space’.^{1–3} The performance of thyroidectomy plus cervical neck dissection in papillary thyroid carcinoma patients routinely generates large amounts of dead space, presumably justifying widespread use of post-operative drainage.

In this report, we review the feasibility and safety of our non-drainage approach to papillary thyroid carcinoma surgery, involving thyroidectomy plus central and/or lateral cervical neck dissection.

Materials and methods

Study patients

This retrospective study was conducted to assess the feasibility and safety of performing thyroidectomy plus cervical neck dissection without drainage, for the treatment of papillary thyroid carcinoma.

We retrieved the medical records of all patients admitted to our department to undergo thyroid

surgery for well differentiated thyroid carcinoma between January 1998 and June 2011. The hospital ethical committee approved the database review.

Nine patients were excluded based on the following exclusion criteria: (1) thyroid carcinoma invading neighbouring organs (e.g. larynx, trachea or oesophagus) and treated by large organ resection; and (2) incomplete or missing data.

Information extracted from the records included: age, gender, pre-operative symptoms and diagnosis, substernal extension, thyroid hormonal status, pre- and post-operative calcium and phosphorus values, peri-operative complications, length of hospital stay, and final histopathological diagnosis.

Surgical technique

All procedures were performed by a single surgeon (BA).

Chlorhexidine (iodine-free solution) was used to swab the operative field.

Thyroidectomy was performed under general anaesthesia via a transverse cervicotomy. The recurrent laryngeal nerves and the parathyroid glands and their vascular supply were identified and preserved during

dissection of the thyroid capsule. Total thyroid resection was conducted intracapsularly when necessary to preserve vascularisation of the parathyroid glands. When at least one parathyroid gland was identified during the operation, further thorough dissection to search for missing glands was avoided. Any parathyroid glands which were inadvertently removed during dissection and/or irreversibly devascularised were removed and immediately autotransplanted into a pocket fashioned in the ipsilateral sternocleidomastoid muscle. The transplantation site was closed with a permanent silk suture.

Systematic lymph node dissection was performed in the central and lateral cervical areas on both sides. We removed for histopathological study all grossly enlarged lymph nodes, as well as those identified pre-operatively.

Our institutional policy was to perform central neck dissection in cases of papillary thyroid cancer if the primary tumour was larger than 1 cm and there was pre- or intra-operative 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 lymph nodes), which include the lymph nodes situated from the hyoid bone superiorly to the suprasternal notch inferiorly. On each side, the lateral boundary is formed by the medial border of the carotid sheath.

We performed lateral neck dissection (levels II, III, IV and V) when there was pre- or intra-operative evidence of enlarged lymph nodes in those areas.

Conventional vessel ligation (knot tying) was used for haemostasis. The Valsalva manoeuvre was performed at the end of all thyroidectomies to detect haemorrhage. The cervical wound was closed without drain tubes in all cases.

Post-operative bleeding was categorised as either minor or major. Minor bleeding was defined as the development of small, superficial wound haematomas or bruising not requiring intervention. Any bleeding requiring intervention was considered major bleeding.

Wound infection was defined as the post-operative occurrence of wound cellulitis or superficial abscess.

Patients were divided into two groups. Group one comprised patients undergoing thyroidectomy with central and/or lateral cervical neck dissection, while group two comprised patients undergoing thyroidectomy without cervical neck dissection.

Peri-operative care and follow up

All patients had normal thyroid function before their operation.

The cervical wound was closely monitored for local complications (i.e. haemorrhage, haematoma or seroma). Cases of post-operative seroma and haematoma were followed for at least two weeks post-operatively.

We also recorded other post-operative complications, mainly vocal fold paralysis and temporary or permanent hypocalcaemia. Transient post-operative hoarseness was

defined as laryngoscopically documented, unilateral vocal fold paresis resolving within six to eight post-operative weeks. Vocal fold paralysis was considered to be permanent if the one-year laryngoscopic examination disclosed a persistent, unilateral paralysis.

The presence and signs of hypocalcaemia were recorded by the surgeon and/or nurse; this included assessment of Chvostek's sign. Asymptomatic patients and those with a serum calcium level of greater than 2 mmol/l were discharged home and instructed to contact their general physician if symptoms of hypocalcaemia occurred. Hypocalcaemia was considered to be biochemical if the serum calcium level was less than 2.0 mmol/l on more than one post-operative occasion. Patients who required medication to maintain normocalcaemia at the time of hospital discharge were considered to have post-operative hypocalcaemia. This latter condition was said to be transient once normocalcaemia was restored and maintained for at least two weeks following discontinuation of all medication. Permanent post-operative hypocalcaemia was defined as the need for uninterrupted therapy to achieve normocalcaemia together with a low parathyroid hormone level (normal range, 9–55 pg/ml) for more than one year.

Clinical follow up ranged from 6 to 198 months.

Statistical analysis

Continuous data were expressed as mean \pm standard deviation or as mean with range. Categorical data were expressed as frequencies and percentages and were compared by using the chi-square statistic and corrected using the Fisher exact test when appropriate. Means were compared using an independent sample *t*-test if normally distributed; if not, the non-parametric Mann–Whitney U test was used. All tests were two-sided. A *p* value of less than 0.05 was considered to be statistically significant.

Results

From January 1998 to June 2011, 326 patients underwent thyroidectomy for papillary thyroid carcinoma in our department. Their mean age was 54 years (range, 16–86 years). Female patients numbered 241 (74 per cent). There was no statistically significant mean age difference between male and female patients.

Substernal thyroid extension was found in 26 patients (8 per cent). Thyroid function was normal in 313 patients (96 per cent), while 9 patients (3 per cent) were hyperthyroid and 4 patients (1 per cent) were hypothyroid.

Total thyroidectomy was performed in 316 patients (97 per cent), and near-total thyroidectomy in 10 patients (3 per cent). Both recurrent laryngeal nerves were identified in 274 cases (84 per cent), and 1 recurrent laryngeal nerve in 43 cases (13 per cent); in the remaining 9 cases (3 per cent), no recurrent laryngeal nerve could be identified. The number of identified parathyroid glands was 4 in 254 patients (78 per

cent), 3 in 62 patients (19 per cent), 2 in 7 patients (2 per cent) and 1 in 3 patients (1 per cent).

On histopathological analysis, the resected tumour was found to be a papillary carcinoma in all 326 cases (100 per cent). The weight of the resected thyroid tissue averaged 87 g (range, 48–402 g). Central and lateral nodes were involved in 67 and 42 per cent of cases, respectively.

One hundred and fifty-three patients underwent central neck dissection and 52 patients underwent central and lateral neck dissection. Thus, group one comprised 205 patients.

Seventeen patients (5 per cent) developed post-operative haematoma and/or seroma, 12 patients (6 per cent) in group one and 5 patients (4 per cent) in group two ($p = 0.78$). There were no major bleeding episodes in either group: only minor bleeding or seroma were encountered, not requiring surgical intervention.

Post-operative hypocalcaemia and vocal fold paralysis

Seventy-one patients (22 per cent) had transient post-operative hypocalcaemia. At 12 months' follow up, 6 patients required calcium and vitamin D supplementation, with no clinical symptoms of hypocalcaemia. The incidence of permanent hypoparathyroidism was 2 per cent. Nineteen patients (6 per cent) had transient post-operative hoarseness and four had permanent vocal fold paralysis (1 per cent).

Post-operative length of stay

The overall post-operative length of stay was 1 day in 296 patients (91 per cent), 2 days in 14 patients (4 per cent) and more than 2 days in 16 patients (5 per cent). Asymptomatic hypocalcaemic patients were discharged from hospital the day after surgery. The mean duration of hospitalisation for hypocalcaemia patients was 2 days (range, 1–3 days).

Wound infection occurred following 1 per cent of all procedures, i.e. in two patients in group one (1 per cent) and in one patient (0.8 per cent) in group two ($p = 0.99$). There was no airway compromise due to major bleeding. All patients were successfully extubated in the post-operative period and none required a tracheostomy.

Comparison of local complications in groups

A total of 17 patients (5 per cent) developed post-operative haematoma and/or seroma: 12 patients (6 per cent) in group one and 5 patients (4 per cent) in group two. The mean age and male:female ratio were similar in both groups. The mean volume of resected thyroid gland did not differ significantly between groups.

In group one, peri-operative local complications occurred in 12 of 205 (6 per cent) patients. In this group, seroma occurred in seven patients and minor haematoma in five. There were no cases of haemorrhage requiring re-operation after total thyroidectomy.

In group two, peri-operative local complications occurred in 5 of 121 patients (4 per cent). In this

group, seroma occurred in four patients and minor haematoma in one. No re-operation for haemorrhage was performed. Most seromas were detected in the first clinic visit, within two weeks of hospital discharge. In some cases, seromas and minor haematomas resolved with repeated needle aspiration and compressive dressing.

Discussion

In this retrospective review of thyroid surgery and cervical neck dissection for papillary thyroid carcinoma, a non-drainage approach was found to be feasible and safe. We found no significant difference in the incidence of peri-operative complications (i.e. seroma, haematoma and haemorrhage) between the two study groups. There was no major bleeding in either group. All episodes of post-operative haematoma and seroma were minor and did not require surgical intervention.

Some authors describe the use of selective drainage after thyroidectomy, in cases such as those involving substernal goitre, a large amount of dead space, a raw thyroid bed upon completion of subtotal thyroidectomy, hypervascularity (e.g. Graves' disease), or following extensive dissection for cancer.^{2,3}

A recent review of the Cochrane Database concluded that there was no clear evidence that the use of drainage in patients undergoing thyroid surgery significantly improves outcomes.⁸ However, the absence of a drain reduces patient discomfort, pain, hospital stay and cost, and risk of infection.⁹ In cases of papillary thyroid carcinoma, cervical neck dissection produces large amounts of dead space; however, one study deemed routine prophylactic drainage unnecessary even in cases of thyroidectomy with cervical neck dissection. Moreover, a significant reduction in length of stay was achieved in the non-drain group, reducing costs for these patients.³ Drains neither prevent post-operative haematomas nor facilitate their early diagnosis. In the current series, local complications and hospital stay were not increased despite large amounts of dead space created by cervical neck dissection (without drainage).

The low incidence of post-operative haematoma and seroma in this study (5 per cent) is well within the previously reported range of 0 to 30 per cent.^{8–15} Haematomas can result from inadequate haemostasis at the time of closure, or from increased venous pressure at extubation due to coughing or straining. In this regard, we believe that meticulous haemostasis is more important than the use of drains, as neither drains nor bulky pressure dressings prevent haematoma development. Pressure dressings may actually hinder the early identification of haematoma. As for drainage, like others, we believe that in cases of major post-operative bleeding drains rapidly become blocked by clots. The drain may in itself induce inflammation, with a consequent increase in exudate requiring drainage. In addition, negative pressure by a suction drain may prevent the lymphatics from sealing off.^{3,4} Many authors have demonstrated that drainage after

uncomplicated thyroid surgery (including total thyroidectomy, lobectomy and subtotal thyroidectomy) does not decrease the incidence of complications related to post-operative bleeding.^{4–8}

Most haematomas are clinically apparent within 2 to 4 hours after surgery, although some cases occur up to 48 hours post-operatively. The diagnosis of wound haematoma is essentially clinical, made by observing the neck for progressive subdermal collection or airway symptoms. In our series, there were no airway symptoms due to haematoma, in accordance with the reported incidence (which ranges from 0.1 to 1.1 per cent).^{10–12} Early intervention is the key to the management of post-operative haematoma with respiratory distress.^{12–15} We emphasise that acute respiratory failure due to major post-thyroidectomy bleeding cannot be prevented by the use of drains. Meticulous haemostasis remains crucial in this regard. Should minor haematoma develop, it may result in seroma formation through a process of liquefaction, detectable within two weeks of hospital discharge. Some seromas require repeated aspiration; however, in our series none caused respiratory distress or wound infection. Furthermore, repeated aspirations were not a source of discomfort for the patient.

- **The safety of thyroidectomy plus cervical neck dissection without drainage is poorly researched**
- **This study assessed this issue in papillary thyroid carcinoma patients**
- **Overall, 17/326 patients (5 per cent) developed post-operative haematoma and/or seroma, none serious**
- **There was no rise in local complications, and 91 per cent of patients were discharged 1 day post-operatively**
- **This treatment seems safe and effective for papillary thyroid carcinoma patients**

In our series, wound infection occurred in patients with large goitres extending substernally and those with hyperthyroidism, with an overall incidence of 1 per cent.

Some authors have reported a significantly increased hospital stay and significantly greater infection rates in patients treated with drainage.^{3–7} Furthermore, Pirochchai *et al.* found no significant decrease in fluid collection volume when pressure dressings were used.¹⁶

The main shortcoming of the current series was its retrospective character. Prospective, controlled trials are needed to confirm the findings suggested by this series.

Conclusion

This retrospective review of 326 patients with papillary thyroid carcinoma treated surgically with ($n = 205$) or without ($n = 121$) cervical neck dissection suggests that avoidance of drainage is safe and effective, and

does not increase the overall surgical morbidity or affect length of hospital stay. Therefore, we believe there is no compelling reason to routinely use drains after thyroidectomy, even in papillary thyroid carcinoma cases with combined cervical neck dissection.

References

- 1 Suslu N, Vural S, Oncel M, Demirca B, Gezen FC, Tuzun B *et al.* Is the insertion of drains after uncomplicated thyroid surgery always necessary? *Surg Today* 2006;**36**:215–18
- 2 Hurtado-Lopez LM, Lopez-Romero S, Rizzo-Fuentes C, Zaldivar-Ramirez R, Cervantes-Sanchez C. Selective use of drains in thyroid surgery. *Head Neck* 2001;**23**:189–93
- 3 Lee SW, Choi EC, Lee YM, Lee JY, Kim SL, Koh YW. Is lack of placement of drains after thyroidectomy with central neck dissection safe? A prospective, randomized study. *Laryngoscope* 2006;**116**:1632–5
- 4 Khanna J, Mohil RS, Chintamani D, Bhatnagar D, Mittal MK, Sahoo M *et al.* Is the routine drainage after surgery for thyroid necessary? A prospective randomized clinical study. *BMC Surg* 2005;**19**:5–11
- 5 Sanabria A, Carvalho AL, Silver CE, Rinaldo A, Shaha AR, Kowalski LP *et al.* Routine drainage after thyroid surgery – a meta-analysis. *J Surg Oncol* 2007;**96**:273–80
- 6 Ahluwalia S, Hannan SA, Mehrzad H, Crofton M, Tolley NS. 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
- 7 Morrissey AT, Chau J, Yunker WK, Mechor B, Seikaly H, Harris JR. Comparison of drain versus no drain thyroidectomy: randomized prospective clinical trial. *J Otolaryngol Head Neck Surg* 2008;**37**:43–7
- 8 Samraj K, Gurusamy KS. Wound drains following thyroid surgery. *Cochrane Database Syst Rev* 2007;(4):CD006099
- 9 Champault A, Vons C, Zilberman S, Labaille T, Brosseau S, Franco D. How to perform a thyroidectomy in an outpatient setting. *Langenbecks Arch Surg* 2009;**394**:897–902
- 10 Lee HS, Lee BJ, Kim SW, Cha YW, Choi YS, Park YH *et al.* Patterns of post-thyroidectomy hemorrhage. *Clin Exp Otorhinolaryngol* 2009;**2**:72–7
- 11 Burkey SH, van Heerden JA, Thompson GB, Grant CS, Schleck CD, Farley DR. Reexploration for symptomatic hematomas after cervical exploration. *Surgery* 2001;**130**:914–20
- 12 Rosenbaum RA, Haridas M, McHenry CR. Life-threatening neck hematoma complicating thyroid and parathyroid surgery. *Am J Surg* 2008;**195**:339–43
- 13 Abbas G, Dubner S, Heller KS. Re-operation for bleeding after thyroidectomy and parathyroidectomy. *Head Neck* 2001;**23**:544–6
- 14 Godballe C, Madsen AR, Pedersen HB, Sørensen CH, Pedersen U, Frisch T *et al.* Post-thyroidectomy hemorrhage: a national study of patients treated at the Danish departments of ENT head and neck surgery. *Eur Arch Otorhinolaryngol* 2009;**266**:1945–52
- 15 Bergenfelz A, Jansson S, Kristofferson A, Mårtensson H, Reihner E, Wallin G *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
- 16 Pirochchai P, Vatanasapt P, Reechaipichitkul W, Phattharak W, Phanaviratnanich S. Is the routine pressure dressing after thyroidectomy necessary? A prospective randomized controlled study. *BMC Ear Nose Throat Disord* 2008;**20**:1

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Dr B Abboud takes responsibility for the integrity of the content of the paper
Competing interests: None declared