

Prevalence of hypothyroidism among patients with isthmus-preserved thyroid lobectomy

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Abstract

Objective: To investigate the prevalence of hypothyroidism following thyroid lobectomy with isthmus preservation.

Methods: This retrospective, case series study included patients who had undergone thyroid lobectomy with preserved isthmus that was reversed onto the contralateral lobe. Neck ultrasound was performed in all patients and the patients were followed for 2 years.

Results: Out of 170 patients enrolled into the study, three were excluded due to preoperative hypothyroidism and one due to isthmusectomy; of the remaining 166 included in the final analyses, 139 patients (83.7%) were female, 27 (16.3%) were male, and patient age ranged between 17 and 77 years. The indication for intervention was thyroid swelling in 141 patients (84.9%). Final diagnoses following histopathological examination comprised benign lesion in 145 cases (87.3%), malignancy (follicular carcinoma and papillary thyroid carcinoma) in 12 cases (7.2%) and thyroiditis in nine cases (5.4%). During the 2-year post-surgery follow-up, 165 patients (99.4%) were euthyroid and one patient (0.6%) developed hypothyroidism.

Conclusion: Postoperative hypothyroidism following thyroid lobectomy appears to be very rare when the isthmus is preserved and reversed onto the contralateral lobe.

Keywords

Hypothyroidism, hemithyroidectomy, lobectomy

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Introduction

Thyroid lobectomy has become common practice for some thyroid diseases,¹ and is

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indicated in cases of a single thyroid nodule, single toxic adenoma and, rarely, unilateral goitre.² The nodule in the vast majority of cases is benign or has suspicious or indeterminate characteristics on fine-needle aspiration cytology.²

The prevalence of hypothyroidism following thyroid lobectomy (including hemithyroidectomy with isthmusectomy) is reported to range between 6.5% and 45%,¹ and the published literature shows considerable heterogeneity regarding risk factors for developing hypothyroidism following different types of thyroid lobectomy.³ For example, risk factors including age, high serum thyrotropin (thyroid stimulating hormone [TSH]) levels, lower free thyroxine (T4) levels, and the preoperative presence of thyroid antibodies have been suggested.^{1,4-8} A few studies, however, do not support the involvement of some of these risk factors.^{6,9} Published investigations into the postoperative effect of isthmus preservation during thyroid lobectomy remain scarce.^{2,9} Thus, the aim of the present study was to investigate the prevalence of postoperative hypothyroidism following thyroid lobectomy that involved preserving the isthmus.

Patients and methods

Study population and design

This retrospective, case series included consecutive patients who underwent thyroid lobectomy with isthmus preservation, for various clinical presentations, at the Department of Surgery, College of Medicine, University of Sulaimani, Iraq, between January 2010 and December 2016. Exclusion criteria were preoperative hypothyroidism, obligatory isthmusectomy due to isthmus involvement in the presenting disease, and malignancy that required total thyroidectomy. Relevant socio-demographic and clinical data were extracted from medical

records and any missed data were retrieved (if possible) by contacting the patients. Neck ultrasound results and 2-year postoperative follow-up data, that included thyroid function tests and associated management, were collected for every patient. Postoperative management comprised 200 µg iodine, oral tablets, once daily, for the first 3 months following surgery. In those patients who developed hypothyroidism, thyroxine treatment was administered at a dose that was titrated according to the level of thyroid hormone.

The study was approved by the Scientific and Ethics committee, University of Sulaimani College of Medicine and verbal informed consent was obtained from each patient or the patient's legal proxy.

Data are presented as *n* (%) prevalence and were analysed using descriptive statistics.

Surgical procedure

All surgeries were performed under general anaesthesia with the patient in a supine position. Anaesthesia was induced with 1 µg/kg fentanyl, 2 mg/kg propofol and 0.5 mg/kg rocuronium, all intravenous; and was maintained with MAC 1.2 inhaled isoflurane. Collar incision was performed that extended more to the side of the lobectomy, and the contralateral extension just traversed the midline. After ligation and division of blood vessels on the lobectomy side, thyroid lobectomy was performed using standard instruments (Army Navy retractors and standard blade and dissecting scissors), in the sequence of lower, upper and middle tissue, in order to prevent damage to the recurrent laryngeal nerve. The isthmus was preserved, reversed and sewn, using 2-0 polypropylene sutures, onto the lobe that was contralateral to the one being removed (Figure 1). The wound was dressed and oral analgesics were provided as required (day 1, 3 × standard oral liquid dose of acetaminophen, followed by 500 mg acetaminophen

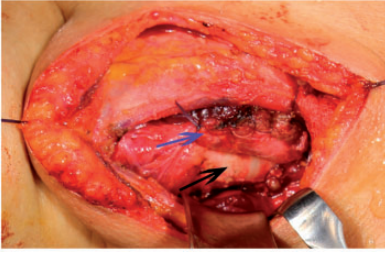


Figure 1. Representative intraoperative image of a thyroid lobectomy with preserved, reversed and over-sewn isthmus (blue arrow) and the exposed anterior portion of the trachea (black arrow).

oral tablet, 3 times daily for the second and third day following surgery).

Results

A total of 170 patients were enrolled into the study, and of these, three were excluded due to pre-operative hypothyroidism and one patient was excluded due to having undergone isthmusectomy (the nodule extended to the isthmus). The final study cohort comprised 166 patients, of whom, 139 (83.7%) were female and 27 (16.3%) were male (overall mean age, 42.68 years; range, 17–77 years). The main indicating factor for intervention was thyroid nodule (swelling), observed in 141 patients (84.9%). Twenty-five patients (15.1%) presented with palpitation, anxiety and dyspnoea. Duration of presentation was variable among the patients, ranging between a few days to 15 years, with a mean duration of 6 years. In 78 cases (47%), thyroid lobectomy was performed on the left side; right side lobectomy was performed in 88 cases (53%). Preoperative thyroid function was normal in 141 patients (84.9%), while the remaining 25 patients (15.1%) presented with preoperative hyperthyroidism. Final diagnoses by histopathological examination were benign lesion in 145 patients (87.3%), malignancy (follicular carcinoma and papillary thyroid carcinoma)

in 12 patients (7.2%) and thyroiditis in the remaining nine patients (5.4%).

Following thyroid lobectomy, and for the 2-year follow-up period, 165 patients (99.4%) were euthyroid. One patient (0.6%), a 17-year-old house wife, developed hypothyroidism postoperatively. This patient had presented with a nodule in the right side of the neck for one week, and her thyroid function tests were normal before surgery. Fine needle aspiration cytology indicated possible malignancy, and she underwent right thyroid lobectomy. Histopathological examination of the specimen confirmed thyroiditis. Her postoperative hypothyroidism was managed with low dose thyroxine (150 µg per week). Isthmus reversal onto the contralateral lobe was not noticeable in any patients once the wound was closed, and no patients reported any associated bulging. There were no cases of postoperative hoarseness of voice or hypocalcaemia during the 2-year follow-up period.

Discussion

Thyroid lobectomy is regarded as an acceptable treatment option for benign nodules, including those with suspicious features such as hyperplastic nodular goitre and follicular adenoma. According to American Thyroid Association guidelines, lobectomy is sufficient treatment for incidental, small (<1 cm), low-risk, unifocal, intrathyroidal papillary carcinomas.^{2,10–12} In the present study population, thyroid nodule was the sole indication for surgical intervention in most of the patients (141/166 [84.9%]), while the remaining 15.1% (25 patients) had typical features of hyperthyroidism in addition to swelling (palpitation, anxiety and sweating). Benign thyroid nodules are more common among female patients and consequently, they are more liable to undergo thyroid lobectomy compared with males. For example, a retrospective case series

investigating the risk of hypothyroidism following lobectomy, revealed that out of 17 patients who underwent lobectomy, 88% were female,¹³ and a medical record analysis found that 88% of 165 patients who underwent thyroid lobectomy were female.¹⁰ The present findings concur with published figures, in that 139 out of 166 patients (83.7%) were female.

Hypothyroidism following thyroid lobectomy has been highlighted in several studies that show different prevalence rates and risk factors.^{1,3-6,9} Vaiman et al., 2008³ reported that out of 1051 hemithyroidectomy cases, 28% developed permanent postoperative hypothyroidism and 46% developed temporary hypothyroidism, all of which required postsurgical thyroxine. A hypothyroidism prevalence rate of 47% following hemithyroidectomy has also been reported.¹³ An assessment of proposed preoperative risk factors for developing hypothyroidism following hemithyroidectomy analysed sex, age, serological data, underlying pathological diagnoses, and preoperative size of the thyroid gland. The study concluded that the only important risk factor for post-lobectomy hypothyroidism is the preoperative level of TSH, whereby lower levels were associated with a higher rate of postoperative hypothyroidism.⁹ In the present study, post-lobectomy hypothyroidism was extremely rare (0.6%), which may be due to the fact that the isthmus was preserved in all cases. The present incidence rate of hypothyroidism following surgery was lower than that of a published case series of patients from the population of Iraq, which reported a 15% occurrence rate for hypothyroidism following lobectomy without preservation of the isthmus.¹⁴ As in the present study, this published case series included a sample population with size and features that were comparable with the present study (200 patients [90% female], 85% of whom were diagnosed with benign

lesions, 10% with thyroiditis and 5% with malignancy).¹⁴

In the published literature, the term hemithyroidectomy (meaning lobectomy plus isthmusectomy) is routinely used interchangeably with the term lobectomy. Almost all authors appear to prefer routine removal of the isthmus during lobectomy to prevent future enlargement and displacement of the isthmus to the lobectomized side, making completion thyroidectomy difficult if indicated.^{1,3} In the present study, the isthmus was preserved and reversed over to the contralateral side to prevent enlargement and displacement into the side that surgery was performed (Figure 1).

The present results may be limited by a number of factors. First, the study design did not include a comparator arm without preservation of the isthmus, making it difficult to conclude whether isthmus preservation was a factor associated with the very low prevalence of postoperative hypothyroidism, however, a study that included a similar study population in which the isthmus was not preserved showed higher rates of postoperative hypothyroidism. Secondly, this was a single-centre study with a relatively small sample size. Thirdly, data were collected retrospectively, resulting in crucial information being missed, including detailed preoperative and intraoperative findings. Further prospective studies, involving a larger study population and comparator group, are required to validate the present findings.

In conclusion, postoperative hypothyroidism following thyroid lobectomy appears to be very rare when the isthmus is preserved and reversed onto the contralateral side.

Declaration of conflicting interests

The author declares that there is no conflict of interest.

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