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Complications of Total Thyroidectomy

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Abstract

Introduction: Thyroidectomy is the total or partial removal of the thyroid gland depending on the type and extent of the lesion. It has become a common surgical procedure and can be performed by surgeons of various specializations.

Objective: The aim of this study was to analyze the postoperative complications of total thyroidectomy.

Methods: A total of 272 patients aged 14 to 82 underwent surgery between January 2011 and July 2019 at the Hospital Instituto de Otorrinolaringologia de Rio Preto (HIORP), São José do Rio Preto, SP.

Results: Of the 272 patients, a majority 215 (79%) were female and 57 (20,9%) were male. Anatomopathological examination revealed malignant disease in 178 patients (65,4%) and benign disease in 97 patients (35,6%). Temporary hypocalcemia occurred in 45 patients (16,5%), permanent hypocalcemia in 51 patients (18,7%), temporary unilateral recurrent laryngeal nerve palsy in 13 patients (4,7%), and permanent unilateral recurrent laryngeal nerve palsy in 10 patients (3,6%). Cervical hematoma occurred in 5 patients (1,8%), 3 patients (1.1%) underwent tracheotomy, and there were no patient deaths.

Conclusion: Complications of thyroidectomy are rare and mainly consist of hypocalcemia, vocal fold paralysis, and cervical hematoma. It is important to provide patients with detailed information on the surgical procedure and the possible complications so that they are aware of the inherent risks of the surgery.

Keywords: Thyroidectomy; Complications; Hypocalcaemia; Thyroid neoplasms

Introduction

The thyroid is 1 of the largest endocrine glands in the human body. It is located in the anterior portion of the neck just before the trachea and at the level of the C5 and T1 vertebrae. It consists of 2 lobes and an isthmus and produces the hormones triiodothyronine and thyroxine, which stimulate the body's metabolism using iodine as the essential element for hormone production. It also produces calcitonin, which plays an important role in calcium homeostasis. The amount of hormone secreted by the thyroid gland is regulated by the pituitary gland through the action of thyroid stimulating hormone [1,2].

Pathological changes in function may occur in the thyroid gland. These changes include increased or decreased hormone secretion, known as hyperthyroidism or hypothyroidism, respectively. Pathological changes in structure may also occur, such as the appearance of a tumor, which may affect the entire gland or half of the gland. Thyroid cancer is considered the most frequent tumor of the head and neck. In adult populations of age 20-65 years, thyroid cancer affects up to 3 times more women than men. The most common types of thyroid cancer are papillary, follicular, medullary, and anaplastic carcinomas [1,3].

Thyroidectomy is the total or partial removal of the thyroid gland depending on the type and extent of the lesion and can be performed by surgeons of various specializations such as general surgery, otorhinolaryngology, oncology surgery, and head and neck surgery. Thyroidectomy has become a common surgical procedure in our country mainly because of increased accuracy in the diagnosis of thyroid lesions using ultrasonography and of malignant or benign lesions using fine needle aspiration [1,4-6].

Thyroid nodules are palpable in the adult population in 4-7% of the cases and are frequent incidental findings at ultrasound and Doppler examinations. Thyroidectomy is indicated for the treatment of patients with malignant lesions, benign lesions with respiratory obstruction, swallowing disorders, cosmetic problems as with large goiters, immature goiters and lesions with follicular characteristics, and undefined diagnosis following fine needle aspiration [1,4,7]. Non-toxic multi nodular goiters, though benign, can undergo malignant transformation [7,8].

The main structures at risk during thyroid surgery are the recurrent laryngeal nerves and the parathyroid glands. It is important to remember that all surgeries are associated with

risks and complications, which range from minor discomfort to permanent sequelae and death [6].

Therefore, complications of total thyroidectomy such as hematoma, hypocalcaemia due to accidental removal of the parathyroid gland or change in function, blood supply problems, voice changes due to temporary or permanent lesions of the recurrent laryngeal nerves, need for tracheotomy, and death may occur [9-11].

It should be noted that these complications were reported in the world medical literature and are inherent in surgical procedures. The most important of these complications include temporary hypocalcaemia, hypo parathyroidism, recurrent nerve palsies, and cervical hematomas [6].

Hypocalcaemia and hypo parathyroidism are disorders of calcium metabolism, which is regulated by 4 small parathyroid glands found posterior to the thyroid lobes, 2 on the left and 2 on the right. Each parathyroid gland is about 3 mm in diameter. In removing the thyroid gland and affected surrounding tissues, the parathyroid glands may be accidentally removed or their blood supply compromised, leading to a decline in their function [9,10].

On rare occasions, the parathyroid glands lie within the parenchyma of the thyroid gland or at other sites, such as in the mediastinum. Hypo parathyroidism leads to a drop in blood calcium levels, which can be temporary (0%-87% of cases) or permanent (0%-33% of cases).10 Tingling of the extremities or areas around the mouth, cramps, and even spasms of respiratory muscles, which can result in dyspnea and respiratory obstruction are symptoms of hypo parathyoidism [9,10].

Paralysis of the recurrent laryngeal nerves, which may be unilateral or bilateral, causes dysphonia, which is characterized by hoarseness due to a change in vocal fold movement. It is usually temporary and reverts to normal in a few days or weeks. However, it can be permanent (1.8%-4.8% of cases) [5-6,11]. Its occurrence is strongly associated with nerve manipulation and surgical difficulty. Unilateral paralysis is associated with changes in voice quality and bilateral lesions of the recurrent laryngeal nerve result in vocal fold immobility and respiratory obstruction, which may require tracheotomy [11]. It is a rare complication and is usually due to the presence of a cervical hematoma that causes respiratory obstruction as a result of tracheal compression, which makes intubation difficult for the anesthesiologist or surgeon [3].

Cervical hematoma is the most common life-threatening complication. Despite the great care taken by doctors to ensure that postoperative bleeding does not occur, blood may still accumulate at the surgical site causing a hematoma (0%-4%), [12-14] which can cause pain and dyspnea. This has to be immediately evaluated by the surgeon and reoperation may be required as a matter of urgency. The cervical hematoma may make intubation difficult for the anesthetist and it may be necessary to perform a tracheotomy [3].

In consideration of the risks and importance of this surgical procedure, our study aimed to analyze the postoperative complications of total thyroidectomies performed in our hospital over a period of 7 years and to compare our results with reported results in the world medical literature.

Methods

The study included all patients who underwent total thyroidectomy between January 2011 and January 2019 at the Hospital Instituto de Otorrinolaringologia de Rio Preto (HIORP), São José do Rio Preto, SP. There was a total of 272 patients and no exclusion criteria were applied. All surgeries were performed by 2 clinicians and were classified according to the type of pathology. This study was approved by the Research Ethics Committee of Faculty of Medicine of São José do Rio Preto (FAMERP),São José do Rio Preto, SP, under provision number 2,963,264 (Registration number: CAAE 96739318.0.0000.5415). Postoperative complications were noted and monitored according to the severity of each case and monthly, quarterly, semiannual, and annual reports were prepared.

Results

Of the 272 patients enrolled in this study, 215 (79%) were female and 57 (20.9%) were male. The patients were 14 to 82 years of age, with a mean age of 46 ± 12 years. Biopsy revealed malignant lesions in 178 patients (65.4%) and benign lesions in 97 patients (35.6%) (Figure 1). Most of the biopsy samples were found to be papillary carcinoma in 161 patients (59.2%), nodular hyperplasia in 42 patients (15.4%), and follicular carcinoma in 25 patients (9.2%) (Figure 2).

Postoperative complications occurred in 85 patients (31,2%) and were as follows: temporary hypocalcemia in 45 patients (16,5%), permanent hypocalcemia in 51 patients (18,7%), temporary unilateral recurrent laryngeal nerve palsy in 13 patients (4,7%), permanent unilateral recurrent laryngeal nerve palsy in 10 patients (3,6%), hematoma in 5 patients (1,8%), and tracheotomy was performed on 3 patients (1.1%) (Figure 3). It is important to note that more than 1 complication occurred in some patients, as well as more than one histological type; and that there were no patient deaths in the study period.

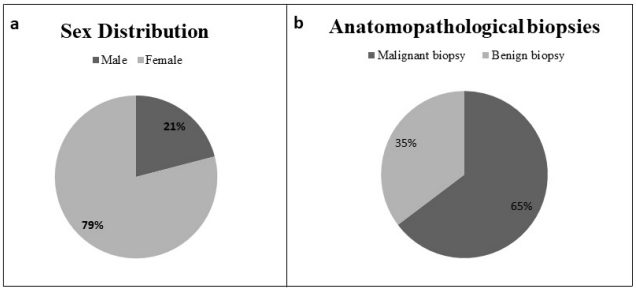

Figure 1: Percentage graph of sex distribution of (a) Operated patients and (b) Anatomopathological biopsies.

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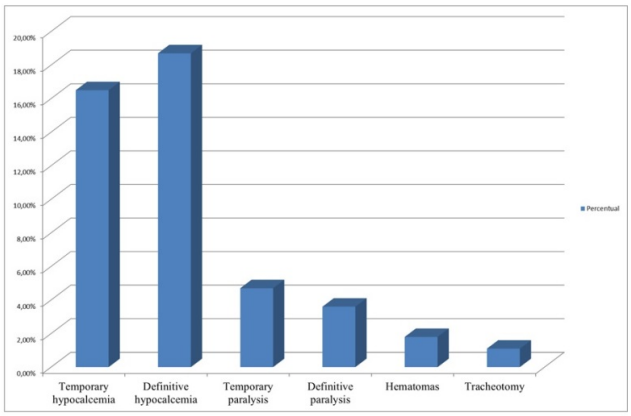

Figure 2: Graph of the anatomical pathology results.

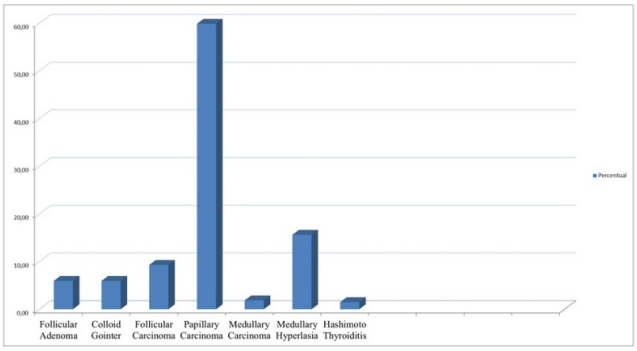

Figure 3: Percentage of surgical procedure complications.

Discussion

Although complications do not occur frequently after total thyroidectomies, the postoperative complication rates reported in published literature vary from 7.4% to 53% [2,7,9]. In our study, postoperative complications occurred in only 31.25% of the patients. Despite advancements in technology, thyroid surgeries still expose patients to various risks, which generally depend on anatomical relationships and variations [5].

Temporary and permanent hypocalcemia occur in patients at rates of up to 87% and 33% respectively and are a result of accidental removal or disturbance of blood supply to the parathyroid. The parathyroid glands are 4 in number and 3 of them are usually not active. They have different localizations; 2 are located at the upper poles of the thyroid gland and are difficult to identify while the other 2 are found at the lower poles and are juxtaposed to the thyroid gland [9,10]. In our study, at patient evaluation after 6 postoperative months, temporary and permanent hypocalcemia were found in 16.5% and 18.7% of patients, respectively. To maintain adequate serum calcium levels, exogenous calcium administration is necessary [10].

Paralysis of the vocal folds may be unilateral or bilateral. The incidence of permanent recurrent laryngeal nerve injury is reported in published literature to range from 0% to 4.8%.5 Recurrent laryngeal nerve injury is classified as temporary when resolution occurs within days or weeks or as permanent when the injury persists for more than 1 year after surgery.11 In our study, patient evaluation performed between 6 months and 1 year after surgery revealed temporary paralysis of the vocal folds in 4,7% of the patients and permanent unilateral paralysis of the vocal fold in 3,6% of the patients.

The incidence of hematoma is reported in published literature to vary from 0% to 4% of cases [9,12]. Patients with hematoma typically present with an initial complaint of cervical discomfort or pain that may progress to respiratory obstruction that rarely requires tracheotomy [13]. Hematomas are typically resolved by opening the surgical incision, evacuating the hematoma, and subsequently controlling the bleeding [14]. In this study, 1.8% of patients presented with postoperative cervical hematoma requiring surgical treatment.

Even though tracheotomy is needed in extremely rare cases [3], we had to perform it on 3 patients (1.1%) in this study. This was due to the presence of a hematoma and a resulting inability to intubate in 2 of the patients and due to respiratory obstruction resulting from temporary vocal fold paralysis in 1 patient.

In 1 patient presenting with hematoma, it was impossible to intubate, and tracheotomy was performed. However, we did not verify the incidence of death in this study. With respect to reports in the world medical literature, the complications observed in this study are within acceptable margins.

Conclusion

Though they are not frequent, complications of total thyroidectomy do occur. It is therefore important to present the patient with detailed information regarding the surgical procedure and explain all the risks and possible complications. Most patients who undergo thyroidectomy are female. Only a third of the patients suffer complications but there are no incidences of patient death. The complications include permanent and temporary hypocalcaemia, permanent and temporary unilateral paralysis of the recurrent laryngeal nerve, and cervical hematoma. The incidence of complications in this study is within the acceptable limit reported in the world medical literature.

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