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Graves' disease: a review of surgical indications, management, and complications in a cohort of 59 patients

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Abstract. An analysis of 59 patients who underwent total thyroidectomy for the treatment of Graves' disease over a 6-year period was conducted in order to assess the current indications and identify any specific factors that may influence the patient's decision to opt for surgical treatment. A comparison of outcomes between the current study and a similar one from Hong Kong was also attempted. Patient preference was the most common reason for opting for surgery over radioactive iodine in both studies. Other indications for surgery, such as Graves' ophthalmopathy, patient refusal for radioactive iodine, large goitre with pressure symptoms, planning for pregnancy, young age, and intolerance to anti-thyroid drugs, were also similar in the two groups. There were no statistically significant differences in laryngeal nerve palsy between the two groups. The rates of permanent hypoparathyroidism in patients in Hong Kong and in the present study were 5.4% and 5.1%, respectively. No patient in either study had recurrent Graves' disease after total thyroidectomy. Our findings confirmed that patient preference is the leading indication for surgery, implicating a continuous misconception of radioactive substances and increasing confidence in surgical outcomes. In experienced hands, the risks of recurrent laryngeal nerve injury and permanent hypoparathyroidism remain minimal.

Key words: Graves' disease; postoperative complications; total thyroidectomy.

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Introduction

Graves' disease is an autoimmune condition characterized by diffuse goitre and hyperthyroidism, frequently accompanied by infiltrative ophthalmopathy and dermopathy. Thyroid-stimulating antibodies that activate the thyrotropin-releasing hormone receptor lead to increased synthesis and production of thyroid hormones in follicular cells. Graves' disease is the most common cause of hyperthyroidism, affecting approximately 2% of the female and 0.2% of the male population.[1,2]

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Treatment options include anti-thyroid drugs, radioactive iodine therapy, and thyroidectomy. In general, anti-thyroid medication is the first-line preferred treatment, with radioactive iodine and surgery considered the second-line options in the case of relapse. Indications for surgery may be divided into either absolute or relative and can be used as a guide for endocrinologists and surgeons to identify those patients who would benefit from surgical treatment. The accepted absolute indications for surgery include large goitre with Graves' and compressive symptoms, pregnancy or planning for pregnancy, young age, relapse after medical treatment, severe Graves' ophthalmopathy, suspicion of malignancy, and patient's preference.[3–6] The selection of the preferred surgical procedure is based on the thyroid multidisciplinary team's estimation of recurrence risk if not enough thyroid tissue is excised and the need for lifelong thyroid hormone replacement therapy when a total thyroidectomy is performed.

Recent cost-effectiveness analyses have suggested that surgery may be a more effective treatment modality than radioactive iodine or anti-thyroid drugs for Graves' disease.[7,8] Therefore, we considered it significant to review our selection of indications for surgery and to assess our results with respect to definitive treatment and complication rates.

This study was conducted in a consecutive group of 59 patients with relapsed Graves' disease over a 6-year period. We also attempted a comparison of our indications for surgery and surgical outcomes with the results of a similar contemporary study that was conducted in an endocrine surgical unit in Hong Kong.[9]

Patients and methods

A retrospective analysis of all patients who underwent total thyroidectomy for the treatment of Graves' disease in our unit from April 2005 to September 2011 was conducted. All 59 patients treated over this 6-year period underwent total thyroidectomy for relapsed Graves' disease or poor control of the condition with medication. All patients were followed up for at least 12 months prior to review in a joint clinic with surgeon and physician, who explained the merits and potential complications of both surgery and radioactive iodine therapy. A recurrence of hyperthyroidism after 15 months of treatment with anti-thyroid medications was considered a relapse.

We compared patient demographic data, indications for surgery, and surgical outcomes with the results of a similar contemporary study that was conducted in an endocrine surgical unit in Hong Kong.[9] In that study, the cases of 166 patients who underwent thyroidectomy for the treatment of relapsed Graves' disease over a 14-year period were reviewed. All of these patients had at least 12 months of follow-up, and relapse was defined as a recurrence of hyperthyroidism after 18 months of treatment with anti-thyroid drugs. All patients were treated and cared for by a single surgical team. Our purpose was to assess the current indications for surgical treatment in patients with Graves' disease, identify any demographic characteristics that may influence the patient's decision, and evaluate our results.

We maintained the same strategy for treating patients with Graves' disease throughout the whole period of 6 years. Radioactive iodine therapy or surgery was considered as second-line treatment after a failed attempt to control the disease with anti-thyroid drugs for 15 months. The two reasons for considering second-line treatment were either poor medical control or relapsed hyperthyroidism. All relapsed patients were provided with an ample explanation of the risks and benefits of each treatment and an agreement was reached on the choice of treatment modality between the clinicians and the patient. Patients with a universally accepted indication for surgery were advised to opt more for surgical intervention instead of radioactive iodine and this indication was recorded. Total thyroidectomy is the operation of choice in our unit, as this eliminates the risk of recurrent thyrotoxicosis. In the case that a patient did not have an absolute indication for surgery but wanted to proceed with a total thyroidectomy instead of radioactive iodine, this was recorded as patient preference.

Anti-thyroid drugs were prescribed to all patients in order to achieve euthyroidism before total thyroidectomy. Vitamin D analogues were prescribed for patients preoperatively where a deficiency was identified. Patients who achieved normocalcaemia within 12 months after surgery and subsequently discontinued vitamin D supplements were recorded to have experienced temporary hypoparathyroidism as a postoperative complication. Those patients for whom we had to continue prescribing vitamin D at $\geq$12 months after the operation were recorded to have permanent hypoparathyroidism. In addition, patients who continued to have a serum parathormone level below the normal limits at 12 months postoperatively were also categorized as having permanent hypoparathyroidism. Hormonal replacement was secured with the prescription of oral thyroxine supplement on the day of discharge.

Function of the vocal cords was assessed by routine direct laryngoscopy preoperatively and by clinical examination of the patient 1 week after the surgical intervention. All those patients who had a hoarse voice that improved within the first year after thyroidectomy were documented to have transient recurrent laryngeal nerve palsy. Clinical, laboratory, demographic, and perioperative data were collected prospectively and data from follow-up were recorded systematically. Lugol's iodine solution was not administered routinely. Parathyroid re-implantation was performed on occasion, according to the surgeon's judgement.

The statistical analysis was performed using the χ^2 test to compare discrete variables; data were processed using IBM SPSS Statistics version 21.0 software for Windows (IBM Corp., Armonk, NY, USA). Comparisons between the data of the present study and the Hong Kong study were carried out using Stata version 12.0 (StataCorp LP, College Station, TX, USA). A P-value of <0.05 was considered statistically significant.

Results

A comparison of patient demographic data, surgical indications, and complications between the Hong Kong study and ours is presented in Tables 1 and 2; patients in both study groups underwent total/near total thyroidectomy. Although the patients in the Hong Kong study were younger (32.0 years vs. 41.9 years), the gender ratio (30:136 vs. 9:50) and presence of ophthalmopathy (41.6% vs. 44.1%) were similar in the two studies. Patient preference was the most common reason for opting for surgery over radioactive iodine therapy in both studies (31.9% and 37.3%). Other indications for surgery such as Graves' ophthalmopathy (30.1% vs. 28.8%), patient refusal for radioactive iodine (10.2% vs. 15.2%), large goitre with pressure symptoms (6.0% vs. 5.1%), planning for pregnancy (6.0% vs. 8.5%), young age (3.0% vs. 1.7%), and intolerance to anti-thyroid drugs (4.8% vs. 3.4%), were also similar in the two groups (Table 1).

Table 2 shows a comparison of surgical complications following total/near total thyroidectomy between the two studies. There were no statistically significant differences in temporary and permanent recurrent laryngeal nerve palsy between the