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RECURRENT LARYNGEAL NERVES INJURY DURING THYROID SURGERY

Tiroid ameliyatlarında Nervus Rekürrens sinir yaralanması

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ABSTRACT

The technique of thyroidectomy has been in evolution for many years. It is a fundamental principle of surgery that a structure must be identified clearly during the procedure to prevent its damage. To evaluate our routine identification of the recurrent laryngeal nerves (RLNs) during thyroidectomy aiming lessen the inadvertent injury of the RLN during surgery.

A convenience sample, non probability total coverage multicentre Hospital based descriptive prospective study (December 2009 to May 2012) included all patients managed by subtotal thyroidectomy after acceptance the informed consent. All operations were undertaken in both hospitals by the same surgical team. Data collected using a predesigned questionnaire. All thyroidectomies were evaluated, and the various types of recurrent laryngeal nerves were recorded. Data was analyzed using SPSS version 15.0.

It included 82 patients [69 (84.15%) females and 13 (15.85%) males], with male to female ratio of 1:5.3. Their mean age was 42.8 years (SD±8.4 years). All were treated by subtotal thyroidectomy. The rate of identification of the RLN was 100% for all patients. The overall frequency of RLN injury was 1.2% seen in one patient. Study proved that surgical exposure of the RLNs avoids the incidence of its damage.

Key words: Thyroidectomy, recurrent laryngeal nerve, identification, and injury**.**

ÖZET

Tiroidektomi tekniği yıllar içerisinde değişim göstermektedir. Cerrahiye bağlı hasarın önlenmesi için klasik olarak dokuların tanımlanması temel kuraldır. Sinir hasarını önlemek için ameliyatlarımız sırasında Rekürrent laryngeal siniri rutin olarak tanımlıyoruz.

Aralık 2009 ile Mayıs 2012 arasında subtotal tiroidektomi yapacağımız bütün hastalardan muvafakat alarak multisentrik bir çalışma gerçekleştirdik. Ameliyatlar iki hastanede de aynı ekip tarafından gerçekleştirildi. Veriler önceden belirlenmiş bir formata göre toplandı. Rekürrent laryngeal sinir tiplerine göre veriler toplandı ve SPSS 15.0 ile analiz edildi. 69'u erkek, 13'ü kadın 82 hasta çalışmaya alındı. Erkek / kadın oranı 1/5.3, yaş ortalaması ise 42.8 yıl (SD±8.4 yıl) olarak saptandı. Rekürrent laryngeal sinir yaralanması %1.2 vakada görüldü. Sonuç olarak, rekürrent laryngeal sinirin ameliyatta görülmesinin yaralanma insidansını azalttığı saptandı.

Anahtar kelimeler: Tiroidektomi, nervus laryngeus recurrences, tanımlama ve yaralanma.

INTRODUCTION

Thyroidectomy is globally practiced to treat a wide range of thyroid swellings and is considered as a safe procedure in well equipped settings with suitable experience to anticipate and avoid the occurrence of possible surgical complications (1). Complications of any surgical procedure are a sensitive measure of the quality. Reported complications following thyroid surgery are rare but their consequences can often be life -threatening as compared to the some other surgeries being performed routinely (1,2).

One of the most feared complications of thyroid surgery is the Recurrent Laryngeal Nerve (RLN) injury (3,4), also the most common reason of litigation related to the complications of thyroid surgery (5). RLN injury is an annoying but avoidable complication which results from severing, clamping or stretching of the nerve during surgery and may result in severe untoward sequelae for the patient (6)

Review of literature revealed that the prevalence of RLN palsy varies from centre to centre depending upon the level of experience in thyroid surgery and the nature of surgery (1,2,6,7). The exact incidence of recurrent laryngeal nerve injury is unknown and varies widely (6,8). There is controversy in whether the identification of the recurrent laryngeal nerve during the procedure will affect the incidence of it is damage or not (9). In an attempt to improve our results of thyroidectomy we have undertaken a careful study using RLN visualization technique to determine the incidence of RLN injury in our practice.

PATIENTS AND METHODS

A convenience sample, non probability total coverage multicentre Hospital based descriptive prospective study was carried out in Charity teaching hospital and Omdurman teaching hospital between December 2009 and May 2012. All adult patients from both genders with thyroid disorder that were managed surgically by subtotal thyroidectomy were enrolled into study after being accepted the pre given informed consent. Patients with previous thyroid surgery or with malignant thyroid disease were excluded from the study. Preoperative diagnosis and status of thyroid disease was done clinically, thyroid function tests and histopatologically by fine needle aspiration or Tru cut needle biopsy when needed. Our routine operative strategy to thyroid glands and the surgical technique that we have adopted has been described and standardized earlier (10). Subtotal thyroidectomy is carried out through a transverse 'collar' incision, two fingers' breadth above the suprasternal notch. This lies in the line of the natural skin folds of the neck. Skin flaps are reflected, together with platysma, and the investing fascia opened longitudinally between the strap muscles and between the anterior jugular veins. If more room is required in the case of a large goitre, the strap muscles are divided; this is carried out at their upper extremity because their nerve supply (the ansa hypoglossi) enters the lower part of the muscles and is hence preserved.. The pretracheal fascia is then divided, exposing the thyroid gland. The thyroid is then mobilized and its vessels ligated after identification of the RLN during the ligation of the inferior thyroid artery and superior laryngeal nerve during the ligation of the superior thyroid artery in each side separately. All operations were undertaken in both hospitals by the same surgical team. Data collected using a predesigned questionnaire. All thyroidectomies performed during the period of study were evaluated, and the various types of recurrent laryngeal nerves were recorded.

Data analysis was performed using SPSS version 15.0 for Windows.

RESULTS

The study included 82 patients (69 (84.15%) females and 13(15.85%) males), with male to female ratio of 1:5.3. Their mean age was 42.8 years (SD±8.4 years) (Table 1). The indication of thyroidectomy was variable as indicated in Table 2.

Table 1: Patients' characteristics (n=82).

Age (mean ± SD)	42.8± 8.4
Gender (♂ / ♀)	13/69
Type of surgery	
Subtotal thyroidectomy	82
Permanent RLN palsy	0
Transient RLN palsy	1

Table 2: Classification of thyroid disorders.

Indication for surgery	Frequency	Percent
Diffuse goitre with obstructive symptoms	40	48.8
Multinodular goitre	31	37.8
Dominant single large nodular goitre	11	13.4
Total	**82**	**100.0**

All were treated by subtotal thyroidectomy (bilateral resection with leaving a slice of thyroid tissue on each side). The rate of identification of the RLN was 100% for all patients (Figure 1). Variations such as a non-recurrent laryngeal nerve or the absence of the ITA were not found in this study. The overall frequency of RLN injury was unilateral right sided and found to be 1.2% seen in one patient. It

was confirmed by direct laryngoscope. It was temporary injury and recovered full function within 4 weeks postoperatively.

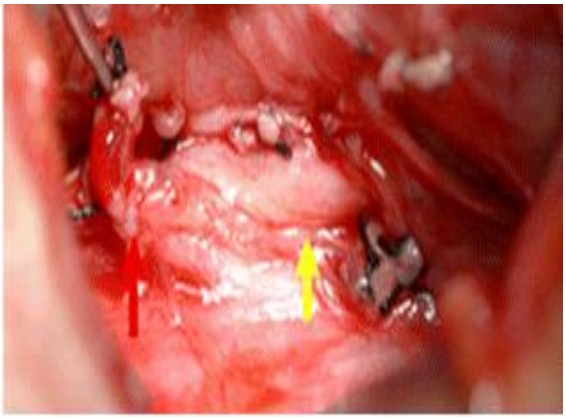

Figure 1: Surgical exposure of the recurrent nerve (*yellow arrow* the recurrent laryngeal nerve, *red arrow* inferior thyroid artery) (n=82).

DISCUSSION

Thyroidectomy is the surgery in which RLN injury occurs most frequently. It is injury is an unwelcome and not infrequent complication during neck dissection (7,11,12). Surgically induced recurrent laryngeal nerve paralyses are frequently not recognized at the time of thyroid surgery (7).

According to our observation in the current study, the overall frequency of RLN injury was found to be 1.2% seen in one patient. It was temporary injury. The injury was noticed immediately after surgery, when on first post operative day patient had hoarseness of voice. This patient had undergone subtotal thyroidectomy for multinodular goitre. Mishra et al, Thomusch et al, Steurer et al, Wagner et al., and Deus et al. at their studies showed that the incidence of recurrent laryngeal nerve injuries ranging between 0.0%-13% (3, 13-16). Others reported incidence of permanent injury to RLN ranges from 0% to 5.2% and for temporary injury from 0.4% to 7.2% (3,4,8).

According to Titche (17), thyroidectomy accounts for 35.71% of surgical causes of injury to the RLN, and accounts for 3.73% of all causes.

Saadeldin A. Idris et al. (18) in the study of outcomes and complication of thyroid surgery among the Sudanese patients, during 1351 thyroidectomies observed incidence of recurrent laryngeal nerve injury was 1.9% (26 cases). Of which, the incidence of transient unilateral RLN paralysis was 1.2% (16 cases), permanent unilateral RLN palsy was 0.5% (7 cases), transient bilateral RLN palsy was 0.2% (3 cases), and no permanent bilateral RLN paralysis detected.

Several studies revealed that depending upon the skill of an individual surgeon principal identification of the nerve reduces the risk of permanent laryngeal nerve injuries from over 5% to less than 1% (16,19-23). Wagner and Seiler (16) in their study of recurrent laryngeal nerve palsy after thyroid gland surgery in 1026 patients, the incidence of transient and permanent RLN was 5.9% and 2.4% respectively. Jatzko et al. (19) in a series of 803 patients the incidence of transient RLN palsy was 3.6% and for permanent RLN palsy it was 0.5%. Sosa et al. (20) in their large study of 5860 patients, they found that the incidence of permanent RLN palsy .0.8 % and they did not recorded any transient RLN palsy. Hermann et al. (21) in their study of laryngeal recurrent nerve injury in surgery for benign thyroid diseases: effect of nerve dissection and impact of individual surgeon in nerves at risk, study analyzed 9,385 patients the incidence a permanent RLN palsy was 3.0%. Rosato et al. (22) in their longitudinal analysis of a multicentric study of 14,934 patients, the incidence of transient and permanent RLN palsy was 2.0% and 1.0% respectively. Goncalves and Kowalski (23) in study of Surgical complications after thyroid surgery in 1020 patients, the incidence nerve palsy was 1.4% for transient RLN palsy and 0.4% for permanent RLN palsy.

Several factors influence the likelihood of injury to the nerve, including the underlying disease, the extent of resection, and the experience of the surgeon. Bleeding should and can be kept to a minimum and the use of diathermy should be avoided in the vicinity of the laryngeal nerves (24). Rosato and other authors have reported on various factors that could lead to voice changes post-thyroidectomy besides iatrogenic injury (24-26). This underlines the importance of both pre and post operative voice assessment, although Yeung has found indirect laryngoscopy of limited value in the preoperative assessment of symptomatic patients (27).

In conclusion, the study proved earlier reports that surgical exposure of the RLNs avoids the incidence of its damage. We advocate the routine identification and dissection of RLN to reduce its injury risk to minimum.

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