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Original article

Recurrent laryngeal nerve landmarks during thyroidectomy[☆]



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ABSTRACT

Objective: This study was designed to describe the various anatomical relations of the recurrent laryngeal nerve (RLN) during thyroid surgery in a Central African population.

Patients and methods: A prospective study was conducted between January 2012 and December 2012 in 5 otorhinolaryngology and head and neck surgery departments in Cameroon and Gabon. All patients undergoing total or subtotal thyroidectomy or loboisthmectomy with recurrent laryngeal nerve dissection, with no history of previous thyroid surgery, RLN dissection or tumour infiltration of the RLN, were included.

Results: Fifty-six patients were included, corresponding to 36 loboisthmectomies and 20 total or subtotal thyroidectomies. A total of 62 recurrent laryngeal nerves were identified: 32 on the right and 30 on the left. The course of the recurrent laryngeal nerve in relation to branches of the inferior thyroid artery (ITA) was retrovascular in 53.1% of cases on the right and 76.6% of cases on the left; transvascular in 15.6% of cases on the right and 13.4% of cases on the left. The course of the recurrent laryngeal nerve was modified by thyroid disease in 12.9% of cases. Six cases (9.7%) of extralaryngeal division of the recurrent laryngeal nerve were observed. No case of non-recurrent nerve was observed in this series.

Conclusion: The anatomical relations of the recurrent laryngeal nerve with the inferior thyroid artery were very inconstant in this series and were predominantly retrovascular or transvascular in relation to the branches of the artery. The presence of extralaryngeal branches and modification of the course of the nerve by thyroid disease also introduced additional difficulties during recurrent laryngeal nerve dissection. The anatomical relations of the right recurrent laryngeal nerve in this African population differ from the classically described prevascular course.

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1. Introduction

Thyroid surgery is one of the most commonly performed procedures in head and neck surgery. It represents 11.3% of all head and neck procedures in Yaoundé, Cameroon [1] and 12.72% in Libreville, Gabon [2].

Nevertheless, one of the major risks of this surgery is recurrent laryngeal nerve (RLN) palsy, which, when it is bilateral, induces laryngeal diplegia with major respiratory consequences sometimes requiring tracheotomy or segmental posterior cordectomy. The

incidence of recurrent laryngeal nerve complications in the African and international literature currently ranges between 2 and 6% [3,4].

A good knowledge of the anatomy of the thyroid region is essential to avoid RLN lesions. It has now been clearly established that visualization of the RLN remains the main factor determining preservation of nerve function and a decreased incidence of postoperative recurrent laryngeal nerve palsy [5–8]. Systematic dissection of the RLN has therefore become the standard technique to reduce the risk of recurrent laryngeal nerve palsy [7]. Visualization of the anatomical relations of the recurrent laryngeal nerve with branches of the inferior thyroid artery (ITA) remains essential for preservation of recurrent laryngeal nerves. Classically, the right recurrent laryngeal nerve more frequently presents a prevascular course than the left recurrent laryngeal nerve, as it arises higher than the left nerve and has a more oblique course.

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Several studies of the anatomy of the recurrent laryngeal nerve and the anatomical relations with the ITA have been conducted in Africa [9,10]. These studies demonstrated that the RLN has a predominantly posterior course in relation to the ITA. The objective of this study was to describe the various anatomical relations of the RLN during thyroid surgery in a Central African population.

2. Patients and methods

A prospective and descriptive study was conducted in the otorhinolaryngology and head and neck surgery departments in five hospitals in Cameroon and Gabon: Yaoundé university hospital, Yaoundé general hospital, Douala general hospital, Essos Hospital in Yaoundé, and Omar Bongo Ondimba military hospital in Libreville. This study was conducted over a 12-month period, from January 2012 to December 2012.

2.1. Patients

All patients undergoing total or subtotal thyroidectomy or loboisthmectomy with recurrent laryngeal nerve dissection were included and patients with a history of thyroidectomy or RLN dissection, and patients with tumour infiltration of the RLN were excluded.

2.2. Operative technique

All operations were performed under general anaesthesia. The operative technique was performed according to 9 main steps:

- Kocher neck incision and creation of platysma skin flaps;
- exposure of the thyroid gland;
- primary or final isthmectomy;
- dissection of the lateral surface of the lobe with ligation of middle thyroid veins;
- dissection of the inferior pole with ligation of inferior thyroid veins;
- ligation of the superior vascular pedicle as close as possible to the superior pole;
- identification and dissection of the RLN;
- lobectomy;
- closure.

The same technique was performed on the other side in the case of total thyroidectomy. The sequence of operative steps sometimes differed according to the department in which the thyroidectomy was performed and the approach used to identify the RLN. Photographs of the various steps of identification and dissection of recurrent laryngeal nerves were taken to illustrate the operative reports.

Various characteristics were reported for each patient: the type of operation performed and its indication, the method of identification of the RLN, the various anatomical relations of the recurrent laryngeal nerve especially with the ITA, variations of the course of the RLN due to thyroid disease, the presence of any extralaryngeal divisions and the presence of a non-recurrent laryngeal nerve.

2.3. Statistical analysis

All data were recorded on a predefined form comprising all intraoperative data and a description of the various steps. Data analysis was performed with Statistical Package for Social Sciences (SPSS) version 19.0 and Excel 2010 for Windows software. Data were compared between groups, especially left and right sides,

by Fisher's exact test. A *P*-value <0.05 was considered statistically significant.

2.4. Ethical considerations

Informed consent was obtained from all patients before the operation and approval was obtained from the Yaoundé School of Medicine Ethics Committee (Cameroon), and the Department of Medical Affairs and Quality of the Omar Bongo Ondimba military hospital in Libreville (Gabon).

3. Results

3.1. Population

A total of 56 patients were included in this study: 52 women (92.86%) and 4 men (7.14%) with a sex ratio of 0.08 and a mean age of 40.89 years (range: 16 to 62 years). Surgery consisted of 36 loboisthmectomies and 20 total or subtotal thyroidectomies. A total of 62 recurrent laryngeal nerves were identified.

3.2. Methods of identification of the RLN

The approach most commonly used to identify the RLN was a lateral approach in 59.7%, allowing postero-anterior thyroidectomy. The distribution of surgical approaches to the RLN is reported in Table 1.

3.3. Anatomical relations of the RLN with the ATI and its branches (Table 2)

3.3.1. Anatomical relations with the trunk of the ITA

3.3.1.1. *Right.* Thirteen recurrent laryngeal nerves crossed the ITA (40.6%): 7 anteriorly (21.9%) and 6 posteriorly (18.7%).

3.3.1.2. *Left.* The recurrent laryngeal nerve crossed the ITA in 11 cases (36.6%): 10 posteriorly (33.3% of the overall sample). Only one laryngeal nerve crossed in front of the ITA.

3.3.2. Anatomical relations with branches of the ITA

3.3.2.1. *Right.* Of the 32 RLNs dissected, 19 crossed branches of the ITA (59.4% of the overall sample); 11 RLN (34.4%) crossed behind branches of the inferior thyroid artery (retrovascular course); 8 RLN (15.6%) passed between branches of the ITA (transvascular course).

Table 1

Various approaches to recurrent laryngeal nerve (RLN) dissection.

Approaches to RLN dissection	Number of patients	%
Lateral	37	59.7
Anterograde or inferior	20	32.2
Retrograde or superior	5	8.1
Total	62	100

Table 2

Position of the recurrent laryngeal nerve (RLN) in relation to the trunk and branches of the inferior thyroid artery (ITA).

	Right RLN		Left RLN	
	<i>n</i>	%	<i>n</i>	%
Anterior to the trunk of the ITA	7	21.9	1	3.3
Posterior to the trunk of the ITA	6	18.7	10	33.3
Anterior to branches of the ITA	3	9.4	2	6.7
Posterior to branches of the ITA	11	34.4	13	43.3
Between branches of the ITA	5	15.6	4	13.4
Total	32	100	30	100

P = 0.054: no statistically significant difference.

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