

Assessment of Thyroidectomies in Children at the ENT Department of the Thiès Regional Hospital, about 29 Cases over 16 Years (2003-2018)

Mamadou Mouctar Ramata Diallo^{1*}, Ibrahima Diallo², Mamadou Aliou Diallo², Aminata Mbaye³, Alsény Camara², Ndiassé Ndiaye³, Oumou Amadou Diallo², Abdoulaye Sow¹, Sory Sacko², Sayon Kourouma², Alpha Oumar Diallo⁴, Mamadou Sakoba Barry⁵, Abdoulaye Keita²

¹ENT Department, Mamou Regional Hospital, Mamou, Guinea

²ENT Department Donka National Hospital, Conakry, Guinea

³ENT Department, Thiès Regional Hospital, Thiès, Senegal

⁴ENT Department Ignace Deen National Hospital, Conakry, Guinea

⁵General Surgery Department, Ignace Deen National Hospital, Conakry, Guinea

Email: *mouctarwouro@gmail.com

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Abstract

Thyroidectomy is a complete or partial surgical removal of the thyroid gland. The aim was to review the particularities of thyroid surgery in children, to review our operative indications and our working method as well as the results by comparing them with the data in the literature. This was a retrospective study covering a sixteen-year period from January 2003 to December 2018. We collected 29 patient records from 3 to 15 years of age. The epidemiological aspect, the indication and the operative gesture, the anatomopathological result were studied. Data were processed using Epi Info version 3.5.4 and Microsoft Excel 2010. Our study shows that thyroid surgery in children accounted for 2% of all thyroidectomies performed (1350 cases). Females were most affected, with a sex ratio of 0.16. The mean age was 12 years, with extremes of 3 and 15 years. Three indication groups: Graves' disease 62%, heteromulti nodular goiter (HMNG) 28%, thyroid nodule 10%. Thyroid surgery was total in 65.5% of cases; subtotal thyroidectomy in 20.7%. Partial thyroidectomy was performed in 13.7% of cases. We dissected 54 recurrent nerves, and the parathyroids were controlled. Drainage was systematic. We noted one complication (3.4%). It involved immediate postoperative dyspnea requiring a life-saving tracheotomy, and decannulation was performed 48 hours after surgery.

Keywords

Thyroidectomy, Child, Indication

1. Introduction

Thyroidectomy is a complete (total thyroidectomy) or partial (lobectomy) surgical removal of the thyroid gland. It has always been considered the most important procedure in cervical surgery [1]. Thyroid surgery began in the 12th century. Because of the haemorrhaging that accompanied it, thyroid surgery was banned by the faculties for a long time. Thyroid surgery owes its success to one of its pioneers, Swiss surgeon Emil Theodor Kocher, whose work between 1828 and 1873 earned him the Nobel Prize in 1909. Since then, the procedure has proved effective and reproducible [2]. Thyroidectomy has evolved considerably over the last twenty years, with a significant reduction in the risks associated with the procedure [3].

This spectacular progress, with fewer complications, has been made possible by improvements in anaesthetic and surgical techniques, in particular those for locating and dissecting the recurrent nerve and parathyroids, with perfect haemostasis. And above all, better medical and endocrine preparation of patients prior to surgery, and improved instrumentation. Thorough knowledge of thyroid surgical anatomy, gentle and meticulous manipulation of surrounding structures and meticulous haemostasis are the only ways to minimize the complications associated with this practice. The main complication of thyroid surgery in children is postoperative hypocalcemia in cases of total thyroidectomy [4]. The aim of our study was to outline the particularities of thyroid surgery in children, discuss our operative indications, assess our working methods and compare our results with the literature.

2. Methodology

2.1. Study Setting

This study was carried out in the Otolaryngology Department of the Thiès Regional Hospital, a Senegalese public health establishment.

2.2. Type and Duration of Study

This was a retrospective study covering a 16-year period from 2003 to 2018. We chose this relatively long period because of the rarity of this pathology in children in our context, in order to have more cases. Moreover, no study had been carried out in our department on this subject.

Inclusion and non-inclusion criteria:

Our study included patients aged between 3 and 15 years who had undergone thyroidectomy.

Excluded from our study were patients aged over 15 who had undergone thyroid surgery, patients with incomplete records and patients with non-thyroidal ENT pathologies.

2.3. Data Collection and Analysis

Clinical observation records, operative protocol registers and consultation registers were used for data collection. Data were collected using a data collection form.

Data were entered and processed using Microsoft Word and Excel software from the 2016 office pack.

2.4. Study Variables

The variables studied were: frequency, age, sex, consultation time, reason for consultation, history, cervical ultrasound results, hormone assays, operative indication, type of surgery, postoperative follow-up, histopathological results.

2.5. Procedure

Initially, we identified files meeting our selection criteria by consulting:

- outpatient consultation forms;
- Patient files;
- Operating theatre report registers;
- Hospitalization records.

Each of the files selected was analysed according to the questionnaire in our file.

2.6. Study Limitations and Difficulties

The retrospective nature of the study, with files that were not found or were incomplete to provide the desired information.

3. Results

Out of a total of 1350 thyroidectomies performed during our study period, thyroidectomy in children accounted for 29 cases, or 2% of all thyroidectomies (**Figure 1**).

Figure 1 shows the age distribution of our patients. The mean age of our patients was 12 years, with extremes of 3 and 15 years.

In our series, the age group most affected was (11 - 15 years) with 22 cases or 76%, followed by (6 - 10 years) with 5 cases or 17%.

Concerning sex, we found 25 (86%) girls and 4 (14%) boys, with a sex ratio of 0.16.

The average consultation time was 2.17 years.

The main reason for consultation was an anterior cervical mass (100%), including 1 case of compressive goiter.

In our study, almost all our patients (93%) had no particular pathological

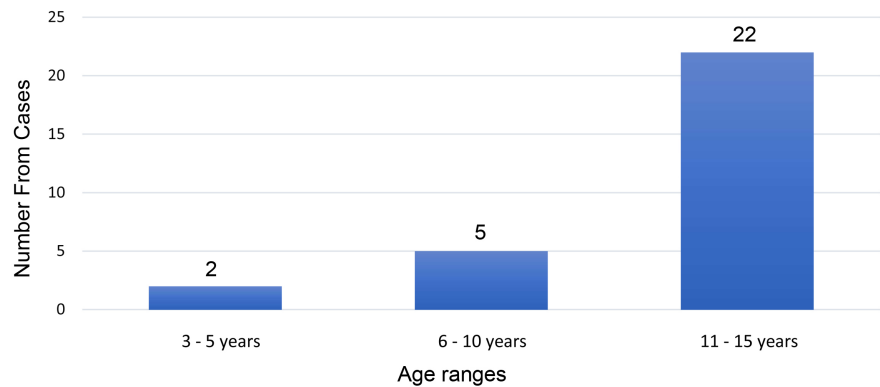


Figure 1. Age distribution of patients.

antecedents, and only 2 patients (7%) had a family history of goiter. We did not note any notion of psychosocial trauma having favored the onset of goiter.

In our series, the most frequent clinical signs were palpitations, weight loss and insomnia, with 18 cases (62.1%), 13 cases (44.8%) and 12 cases (41.4%) respectively (**Table 1**).

Multi-nodular goiter accounted for 17 cases or 59%, followed by diffuse homogeneous goiter with 9 cases or 31% (**Table 2**).

We noted no other endocrine pathologies associated with the goiter.

All our patients had a cervical ultrasound (**Table 3**).

Chest X-rays taking the neck from the front were performed in 3 patients, who presented with a voluminous compressive goiter with a deviated trachea (**Figure 2**).

Hormone assays:

TSH was measured in all our patients, with 18 cases of hyperthyroidism (62.1%), 10 cases of euthyroidism (34.5%) and 1 case of hypothyroidism (3.4%).

Basedow's disease was the main indication for surgery, with 18 cases (62%), followed by heteromulti-nodular goiter and thyroid nodule, with 8 and 3 cases respectively (28% and 10%) (**Table 4**).

Surgical procedures: the surgical procedures performed are summarized in **Table 5**.

Total thyroidectomy was the most common surgical procedure, with 19 cases (65.5%), followed by subtotal thyroidectomy (6 cases, 20.7%).

A total of 54 recurrent nerves were dissected.

Operative sequences: in our series, we noted a complication of laryngeal dyspnea immediately postoperatively. An emergency tracheotomy was performed and decanulation was performed 48 hours later. There was no post-operative recurrent paralysis or hypoparathyroidism.

Anatomopathological results: of the 29 thyroidectomies performed, only 11 patients (37.9%) had the results of the histological examination of the surgical specimen. No signs of malignancy were noted.

Follow-up: our patients' post-operative follow-up was evaluated over a 5-year period. We noted 1 case of recurrence.

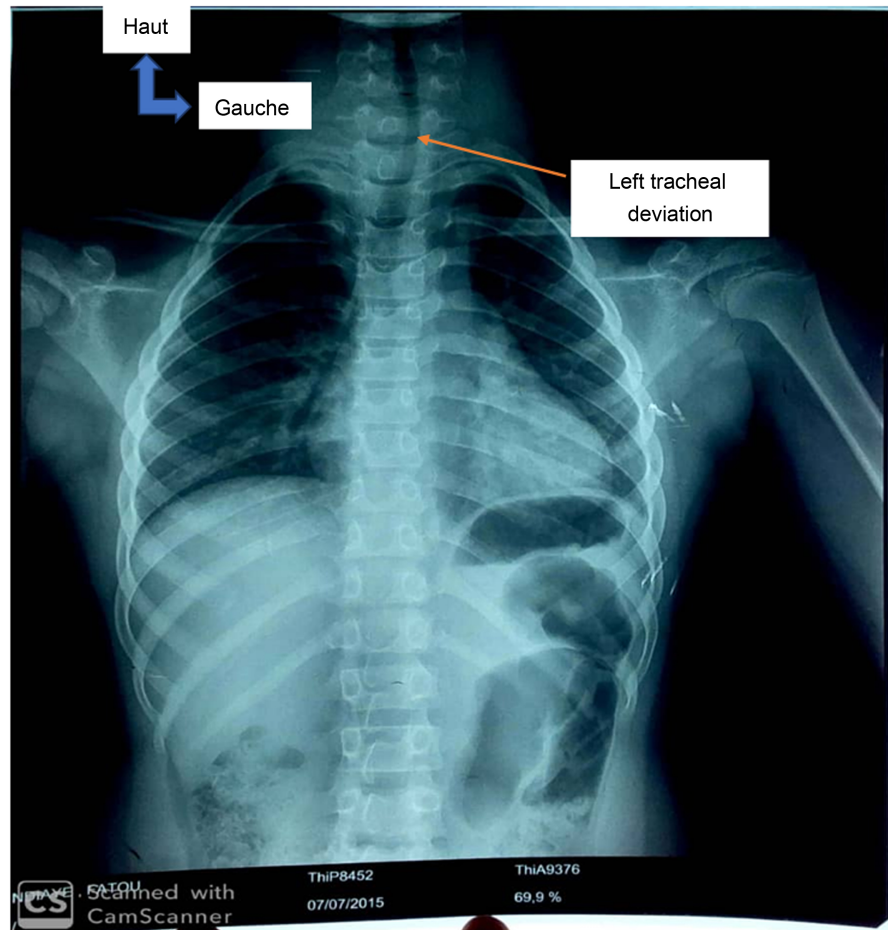


Figure 2. Frontal chest X-ray taking the neck showing a deviation of the trachea to the left in a 15-year-old patient due to a voluminous compressive goiter.

Table 1. Distribution of patients according to the prevalence of other signs.

Signs	Number of cases	Percentage
Palpitations	18	62.1%
Weight loss	13	44.8%
Insomnia	12	41.4%
Tremor	9	31%
Exophthalmos	8	27.6%
Nervousness	7	24.1%
Diarrhea	5	17.2%
Anorexia	1	3.4%
Neck pain	1	3.4%
Dysphagia	1	3.4%
General fatigue	1	3.4%
Weight gain	1	3.4%

Table 2. Distribution of patients according to goiter characteristics on clinical examination.

Goiter characteristics	Number of cases	Percentage
Multi-nodular goiter	17	59%
Homogeneous diffuse goiter	9	31%
Single nodule	3	10%

Table 3. Distribution of patients according to cervical ultrasound findings.

Cervical ultrasound	Number of cases	Percentage
Basedow	17	58.6%
Heteromulti nodular goiter	8	27.6%
Thyroid nodule	3	10.3%
Heteromulti-nodular basedowified goiter	1	3.4%
Total	29	100%

Table 4. Distribution of patients by initial reason for surgery.

Operative indication	Number of cases	Percentage
Basedow disease	18	62%
heteromultinodular goiter	8	28%
Thyroid nodule	3	10%
Total	29	100%

Table 5. Distribution of patients by surgical procedure.

Type of surgery	Number of cases	Percentage
Total thyroidectomy	19	65.5%
Subtotal thyroidectomy	6	20.8%
Right lobo-isthmectomy	1	3.4%
Left lobo-isthmectomy	3	10.3%
Total	29	100%

4. Discussion

Thyroid surgery began in the 12th century [2]. For a long time, this procedure was banned by the faculties in view of its morbidity and mortality.

It was not until the early 1920s that the principles for safe and efficient thyroid surgery were established. Thyroidectomy has largely evolved, with a significant reduction in the risks associated with its practice [3]. Thyroidectomy in children is rare.

We carried out a retrospective study over a 16-year period from January 2003 to December 2018, during which the ENT department of the Thiès Regional Hospital performed 1350 thyroidectomies, of which 29 patients were children,

representing a hospital prevalence of 2%.

The mean age of our patients was 12 years, with extremes of 3 and 15 years. Our results are lower than those of Al-Adhami [5] and Chen [6], who found a mean age of 14.3 ± 1.9 years and 15.4 years respectively. Our results corroborate those of Akkari *et al.* [4], who noted in their study a mean age of 12.5 ± 0.7 years, with extremes of 13 months and 18 years. In our series, the age range most represented was [11 - 15 years], *i.e.* 76%, followed by [6 to 10 years], *i.e.* 17%.

Thyroid pathology is characterized by female predominance [7], the presence of sex steroid receptors in follicular cells seems to favor this predominance. Akkari M in France found a predominance of female patients in 75% of cases. This female predominance was also found in our study, with 86% of cases. Our results corroborate those found by Jarroug A. [8] and Malika B.Y. [9] in Morocco, with 88% and 54% girls respectively.

Thyroid surgery in children is sometimes performed for the same indications as in adults [10]. Thyroid pathology in children and adolescents is dominated by four main entities: nodules, multiheteronodular goiter, Graves' disease and familial medullary carcinoma (FMC) [4].

Autoimmune thyroiditis, simple colloid goiter and iodine deficiency are the most frequent causes of diffuse goiter, especially at puberty [11].

In our series, we found three groups of indications for thyroid surgery in children: Graves' disease, heteromulti-nodular goiter and thyroid nodule.

4.1. Graves' Disease

As reported in the literature, in iodine-sufficient countries, Graves' disease has always been by far the most frequent etiology of thyrotoxicosis [12]. It was the dominant indication in our series, with 18 cases (62%). We now opt for total thyroidectomy rather than subtotal thyroidectomy. It has the advantage not only of immediately and definitively eliminating signs of thyrotoxicosis, but also of avoiding recurrences and complications of recovery induced by subtotal thyroidectomy [13] [14]. Children of pubertal age were the most interested, with 75.86% of procedures performed in the [11 to 15] age group.

It should be noted that compliance with current medical treatment regimens (12 to 18 months) is poor under our African living conditions, with frequent treatment discontinuations and a high number of patients lost to follow-up.

4.2. Hetero-Multi-Nodular Goiter and Thyroid Nodule

These accounted for 28% and 10% of cases respectively. Relevant clinical and paraclinical analysis is still very helpful in the preoperative identification of factors predictive of malignancy in thyroid nodules [1]. Like other authors [7] [15], we are not in the habit of performing cytopunctures, mainly because of the small number of cytopathologists in Senegal. Indeed, as Baldé *et al.* [16] have pointed out, the high cost of investigations and the poverty of patients limit the possibility of carrying out certain complementary examinations. The clinical presump-

tion is sufficiently strong to authorize treatment and undertake a histological reading of the surgical specimen. Fine needle biopsy can help guide treatment decisions, but its results are less reliable than in adults. Cytopuncture is more difficult to perform in children, requiring sedation and anatomopathological reading by an experienced team, due to morphological differences that can lead to false results [4].

Three surgical modalities were available for children. Total thyroidectomy was performed in 19 cases (65.5%), subtotal thyroidectomy in 6 cases (20.7%) and lobo-isthmectomy in 13.7% of all thyroidectomies performed. Total and subtotal thyroidectomies were performed in the management of Graves' disease. In heteromulti-nodular goiters, thyroid gland removal was total when both thyroid lobes were involved in the surgical exploration. In the case of lobo-isthmectomy, the indication was the thyroid nodule.

In our series, 54 recurrent nerves (100%) were dissected. Dissection was meticulous, as the nerve was as thin as in children. According to Akkari *et al.* [4], surgical difficulties are essentially related to identification of the inferior laryngeal nerve, which is thinner than in adults. Like other authors [17], they recommend the use of a magnifying device (binocular loupe or surgical microscope). Identifying the recurrent nerve has always been the surgeon's main concern.

Systematically searching for it and following it through to its laryngeal penetration helps to minimize damage. Like Conessa *et al.* [1], we prefer to ligate the vessels in this region rather than use coagulation, which could damage the nerve or one of its branches through heat diffusion.

There were no cases of recurrent paralysis in our study. Anatomical variation of the recurrent nerve occurs in both adults and children. The latter presents less anatomical variation of the recurrent nerve (2.2% of cases) [4]. On the right side, this anomaly affects 0.5% to 1% of the population; on the left side, it is much rarer (0.04%). No non-recurrent inferior laryngeal nerve was noted in our study. The parathyroids were seen and preserved in all our patients. Exeresis of the gland was generally easy, with less fibrosed tissue and satisfactory hemostasis. In our practice, we use systematic drainage, and the drain is removed on the second postoperative day.

According to Defechereux *et al.* [2], drainage in this environment after cervicotomy for thyroid or parathyroid resection has often been proposed as a routine technique practised by the majority without any scientific evidence of any benefit. In their Belgian study of 1789 cases, they found no formal indication for drainage (apart from the uncontroversial cases of lymphatic curage or sternotomy). Drainage has never prevented a hematoma from appearing or a seroma from developing after the drain has been removed. Drainage prevents, but does not prevent. What is acknowledged, however, is that drainage increases the length of hospital stay, discomfort and cost of the procedure.

Recent publications have emphasized that the surgeon's experience and the volume of the thyroid are determining factors in morbidity in thyroid surgery

[18]. Postoperative management was straightforward in 28 of our patients (96.5%), with one complication (3.4%).

This was a case of immediate postoperative laryngeal dyspnea in whom a tracheotomy had been performed and then decanted 48 hours later. The patient was 7 years old and had undergone total thyroidectomy for Graves' disease.

The malignancy of thyroid nodules in children remains a controversial issue. In our series, 37.9% of patients had definitive anatomopathological results. No cases of malignancy were reported. According to Mighri *et al.* [8], there is no risk of malignancy before the age of 15. In the series by Akkari *et al.*, the malignancy rate was 6.3%, which is lower than in the literature.

5. Conclusion

Thyroid surgery in children is characterized by the narrowness of the structures, particularly the recurrent nerve, which is thinner than in adults. The indication is dominated by Graves' disease and nodular goiter. The opening up of regional ENT departments and training efforts in the specialty have enabled a significant number of patients to be referred to their terroir.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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