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# Hyperthyroidism Anatomical and Clinical Aspects and Surgical Management at the IGNACE DEEN University Hospital in Conakry

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**Abstract:** Introduction: Hyperthyroidism corresponds to a dysfunction of the thyroid gland, which secretes hormones in excessive quantities on the one hand and on the other hand clinical and/or biological manifestations of thyrotoxicosis. The objective of our study was to evaluate, through a retrospective study, the anatomical-clinical aspects and the surgical management of hyperthyroidism in the general surgery department of the Ignace Deen national hospital. Material and method: This was a retrospective study of descriptive type with a duration of 5 years from January 1, 2013 to December 31, 2017. This study included all the records of patients admitted to the general surgery department of the Ignace Deen hospital with the diagnosis of hyperthyroidism with biological confirmation during the study period. The diagnosis of hyperthyroidism was evoked in front of clinical signs of thyrotoxicosis and confirmed by the collapse of the thyroid stimulating hormone (TSH) below 0.25 mUI/L and elevation of free T4 higher than 22 pmol/L. Results: During this study period, we collected 6210 patient files, among which 133 cases of hyperthyroidism, i.e. 2.14% of the total number of pathologies received in the department. Predominance of women and an average age of 39.73. Among the signs of compression recorded, dyspnea was the most frequent, followed by dysphagia and dysphonia. We noted abnormalities of tracheal deviation and/or compression on cervical radiography in our study. We had mostly heteromultinodullary goiter, followed by diffuse goiter and basedow disease. Subtotal thyroidectomy was the most used surgical procedure with 69.1% followed by loboisthmectomy with 29.3% and finally total thyroidectomy with 1.5%. Conclusion: In our practice, subtotal thyroidectomy gave good results with an acceptable rate of hypothyroidism and no recurrence of hyperthyroidism in the short term. Radioactive iodine therapy remains a challenge in our context.

**Keywords:** Hyperthyroidism, Thyrotoxicosis, Graves' Disease, Thyroidectomy, Ignace Deen National Hospital

## 1. Introduction

Hyperthyroidism corresponds to a disorder of the thyroid gland, which secretes hormones in excessive quantities on the one hand and clinical and/or biological manifestations of thyrotoxicosis on the other hand [1]. This situation is frequent, affecting 1 to 2% of the world population and predominantly in the female sex (sex ratio 1/8) [2]. It is the most common thyroid disease after endemic goiter and is estimated to account for 24% of total thyroid disease [3]. Hyperthyroidism is serious because of its cardiovascular complications with mortality of 16% [4].

The clinical and biological signs are directly related to the hyper secretion of thyroid hormones. Ultrasound plays a very important role in the etiological orientation [5]. The diagnosis

of hyperthyroidism is easy, but the etiological investigation can sometimes be more complex [6]. The etiologies of hyperthyroidism are diverse [7]. Among these etiologies we can mention: basedow disease, toxic thyroid adenoma, toxic multi nodular goiter, iodine induced hyperthyroidism, sub-acute and silent thyroiditis, factitious thyrotoxicosis. [8].

In Guinea, goiter is a frequent condition with a national prevalence estimated at 63.6% [9].

The treatment of hyperthyroidism is well codified. It is based on three therapeutic modalities (synthetic antithyroid drugs, radioactive iodine and surgery) which may be complementary [6]. Thyroid surgery has a privileged place in the treatment of multiple thyroid pathologies and is an act requiring multidisciplinary skills [10].

In our practice we have difficulties in the etiological diagnosis of hyperthyroidism because of the complementary examinations which are not available or are very expensive.

Socio-cultural and financial obstacles and the absence of radioactive iodine therapy are other difficulties in the management of the disease.

The objectives of this study were to determine the hospital frequency, to report the diagnostic, therapeutic and evolutionary aspects of hyperthyroidism in the general surgery department of the Ignace DEEN University Hospital of Conakry.

## 2. Materials and Methods

This was a retrospective descriptive study of 5 years duration from January 1, 2013 to December 31, 2017.

This study included all the records of patients admitted to the general surgery department of Ignace Deen Hospital with the diagnosis of hyperthyroidism with biological confirmation during the study period. Pregnant patients, patients with cardiothyreosis, and those under 15 years of age were not included.

The diagnosis of hyperthyroidism was evoked by clinical signs of thyrotoxicosis and confirmed by the collapse of thyroid stimulating hormone (TSH) below 0.25 mIU/L and elevation of free T4 above 22 pmol/L.

Thyrotoxicosis includes several of the following symptoms: fine resting tremor of the extremities, palpitations, tachycardia, exophthalmos, hypersudation, thermophobia, motor diarrhea, nervousness and anxiety, insomnia, headache, myasthenia gravis, muscle wasting, and weight loss.

The etiological diagnosis of hyperthyroidism was based on clinical criteria (goiter, ophthalmopathy), ultrasound criteria of the thyroid. The search for thyroid-specific antibodies (TSH receptor antibodies) was not possible in all cases.

The diagnoses of multinodular goiter and toxic nodule were made on thyroid ultrasound the diagnosis of Graves' disease was based on the combination of at least two of the following three criteria: vascular goiter, exophthalmos and the presence of TSH receptor antibodies [11].

Treatment was based on carbimazole (or carbimazole equivalent) followed by surgery. Radioactive iodine is not present in our practice.

Monitoring was based on clinical examination and free T4 measurement, performed at 2 months, 4 months, 6 months and 8 months.

Remission was considered by the absence of clinical and biological signs of thyrotoxicosis at six months.

The parameters studied were age, sex, occupation, geographical origin in the country, reasons for consultation, signs of thyrotoxicosis, clinical signs suggestive of compression, thyroid hormone level, site of thyroid swelling, appearance of the thyroid on ultrasound, results of cervical radiography, drugs used, surgical procedure performed, postoperative course and duration of hospitalization.

## 3. Results

Total patients received = 6210.

Other thyroid pathologies = 508 (8.18%) of total patients receive.

Hyperthyroidism = 133 (2.14%) of total patients seen.

***Table 1.*** *Distribution by socio-demographic characteristics of patients.*

| Age (n=133) | Workforce | Percentage |
|---|---|---|
| Average age (years) | | |
| 20-29 | 25 | 18,79 |
| 30-39 | 40 | 30,07 |
| 40-49 | 39 | 29,03 |
| 50-59 | 25 | 18,79 |
| 60-69 | 3 | 2,25 |
| 70-79 | 1 | 0,75 |
| Sexes (n=133) | | |
| Sex ratio (M/F) | | |
| Female | 115 | 86,47 |
| Male | 18 | 13,53 |
| Provenance (n=133) | | |
| High Guinea | 32 | 24,06 |
| Medium Guinea | 75 | 56,39 |
| Lower Guinea | 17 | 12,79 |
| Forestry Guinea | 9 | 6,77 |

***Table 2.*** *Distribution of patients according to time to consultation.*

| Duration of evolution (years) | Workforce | Percentage |
|---|---|---|
| ≤ 1 | 4 | 3 |
| 2 – 5 | 88 | 66 |
| 6-10 | 27 | 20 |
| 11-15 | 10 | 8 |
| 16 years and older | 4 | 3 |
| Total | 133 | 100 |

verage time = 4 years extreme = 1 and 17.

***Table 3.*** *Distribution of patients according to the location of the swelling on the thyroid.*

| Siège de la tuméfaction | Workforce | Percentage |
|---|---|---|
| Diffused (Goiter) | 62 | 46,6 |
| Bilateral lobar | 7 | 5,26 |
| Right lobe | 37 | 27,8 |
| Left lobe | 10 | 7,5 |
| right isthmolobar | 11 | 8,27 |
| Left Isthmolobar | 5 | 3,7 |
| Isthmus | 1 | 1 |
| Total | 133 | 100 |

***Table 4.*** *Distribution of patients according to symptoms of thyrotoxicosis.*

| Symptoms of hyperthyroidism | Workforce | Percentage |
|---|---|---|
| Fine tremor of the extremities | 85 | 64 |
| Tachycardia | 74 | 56 |
| Insomnia | 50 | 38 |
| Weight loss | 72 | 55 |
| Nervousness | 65 | 49 |
| Exophthalmos | 54 | 41 |
| Hypersudation | 42 | 32 |
| Anxiety | 39 | 29 |
| Diarrhea | 38 | 29 |
| Headaches | 30 | 23 |
| Myasthenia | 34 | 26 |
| Myxedema | 1 | 0,8 |

***Table 5.*** *Clinical signs suggestive of compression.*

| Clinical signs | Workforce | Percentage |
|---|---|---|
| Dyspnea | 42 | 31, 58 |
| Dysphagia | 17 | 12,78 |
| Dysphonia | 17 | 12,78 |

***Table 6.*** *Distribution of patients according to the result of the cervical radiography.*

| cervical radiography | Workforce | Percentage |
|---|---|---|
| Normal | 98 | 73,6 |
| Tracheal deviation | 30 | 22,5 |
| Deviation + tracheal compression | 5 | 3,7 |
| Total | 133 | 100 |

***Table 7.*** *Distribution of patients according to the appearance of the thyroid on ultrasound.*

| Ultrasound appearance of the thyroid | Workforce | Percentage |
|---|---|---|
| Heterogeneous | 94 | 71 |
| Hypoechogenic | 31 | 23 |
| Hyper echogenic | 8 | 6 |
| Total | 133 | 100 |

Biologically, the mean TSH was 0.097 ± 0.14 mIU/l, the mean free T4 was 59.1 ± 24 pmol/l (extremes: 26 and 98 pmol/l). Four patients tested positive for TSH receptor antibodies.

***Table 8.*** *Distribution of patients according to the surgical procedure performed.*

| Surgical procedure | Workforce | Percentage |
|---|---|---|
| Subtotal thyroidectomy | 92 | 69,1 |
| Total Thyroidectomy | 2 | 1,5 |
| Loboisthmectomy | 39 | 29,3 |
| Total | 133 | 100 |

***Table 9.*** *Distribution of the patients according to the surgical follow-up.*

| Post-operations | Workforce | Percentage |
|---|---|---|
| Simple | 115 | 86,5 |
| Hemorrhage | 8 | 6 |
| Transient recurrent paresis | 9 | 6,7 |
| Death | 1 | 0,7 |
| Total | 133 | 100 |

***Table 10.*** *Répartition des malades selon la durée d'hospitalisation.*

| Duration of hospitalization in days | Effectif | Percentage |
|---|---|---|
| ≤ 5 | 8 | 6 |
| 6 – 10 | 110 | 83 |
| 11 – 15 | 9 | 7 |
| 15 – 20 | 5 | 4 |
| ≥ 21 | 1 | 0,7 |
| Total | 133 | 100 |

# 4. Discussion

In order to improve the quality of surgical management of hyperthyroidism, we conducted a retrospective descriptive study over a period of 5 years, from January 1, 2013 to December 31, 2017, based on the search of hospital archives that allowed us to identify 133 cases of hyperthyroidism in the general surgery department of the Ignace Deen National Hospital. The results we obtained allowed us to highlight the different clinical and management aspects of this pathology.

During this study period we collected 6210 patient files, among which 502 cases of thyroid pathology 8.18% and 133 cases of hyperthyroidism 2.14% of the total number of pathologies received in the department.

The frequency of hyperthyroid goiter in the indications for thyroidectomy is variously assessed by the authors.

In Spain, Rios [12] reported 122 cases of thyroidectomies performed over 29 years.

According to Sani [13] only 37 cases of thyroidectomy were performed over 2 years in Niger and 112 cases over 7 years in Mali were reported by Togo [14].

The frequency of thyroidectomy for hyperthyroid goiter in our series is close to that of Togo [14] in Mali but there is a significant difference compared to other European and American patients [12, 15, 16].

This could be explained by the fact that in Africa the surgical services are much diversified whereas in the West the services are more specialized.

The mean age of our study does not differ statistically from that of African and European authors [15, 17, 18]. There is a difference with the mean age of 55 years reported by Kang in Canada [19].

We noted a clear female predominance. This tendency has been found by several authors: Bakayoko [20] noted a female predominance of 707 women against 111 men sex-ratio=6. Sani [13] noted a female predominance of 32 women against 5 men sex ratio = 6, 4.

The high female predominance is probably due to the action of estrogens during puberty. The thyroid gland has receptors for these female hormones which reduce the penetration of iodine into the gland.

The role of pregnancy is also mentioned, as the thyroid cells of the fetus cause an autoimmune reaction in the gland once the pregnancy is over.

Origin of patients from a goiter endemic area in guinea:

Of all the regions of Guinea, Middle Guinea and Upper Guinea are goiter endemic areas. The lack of iodine in the diet in these areas would be responsible for the genesis of the disease.

The average delay of consultation in our patients was 4 years with extremes of 1 year and 17 years. This trend has

been reported by various European and African authors [12, 21]. This delay in consultation in our patients would be due to the socio-cultural prejudices of the population. Some populations go so far as to consider it as a mark of beauty for the young girl or as the indispensable sign of a good puberty. We have also observed a fear of our population with regard to neck surgery.

Multi nodular toxic goiter was the most frequently diagnosed clinical form followed by toxic nodules and finally basedow disease with respective rates: 75.9%, 21.8% and 2.3%. These results are higher than those of Togo [14] in Mali, who reported 46% of multi nodular goiter and 14% of toxic nodules in 50 patients, but lower than those of Kang [19] in Canada who reported 78% of multi nodular goiter in 315 patients.

The thyroid is a gland that secretes hormones that participate in the metabolism of the body, so that damage to this gland leads to disturbances at different levels of the body [22].

In our series, the most common symptoms of thyrotoxicosis were fine tremors of the extremities, followed by tachycardia and weight loss.

Among the signs of compression recorded, dyspnea was the most frequent followed by dysphagia and then dysphonia. Sani has also [23] in Niger 27% of dyspnea, 17.9% of dysphonia and 10.8% of dysphagia.

Cervical radiography allows the cervical or name character of the goiter and also allows to highlight the tracheal deviation and to help the anesthetist for the intubation.

We noted more abnormalities of tracheal deviation and/or compression on the cervical radiograph than in the series of Rios [12]. This difference can be explained by the delay in consultation in our series. On the other hand, our results are compatible with those of Bakayoko [20] who reported 20% of tracheal deviation and 11.5% of tracheal deviation and calcification.

We had 71% heterogeneous appearance on ultrasound, 23% hypo echogenicity and 6% hyper echogenicity. Togo in Mali [14] also reported a predominance of heterogeneous appearance on ultrasound.

During the study period 133 patients were operated on for various surgical indications. Synthetic antithyroid drugs are used as the first line of medical treatment to normalize the concentration of thyroid hormones.

It appears that subtotal thyroidectomy was the most used surgical procedure, 69.1%, followed by loboisthmectomy with 29.3% and finally total thyroidectomy with 1.5%. A study carried out in the department had noted a subtotal thyroidectomy at 55.21% followed by lobectomy for thyroid nodules [24].

A study conducted in Dakar by Dieng M et al. found a preference for subtotal thyroidectomy and loboisthmectomy in nodular goiter surgery with 83.6% of indications for both procedures [25].

The surgical procedure depends on the location of the nodules and the appearance of the rest of the parenchyma. The main objective is to remove the pathological areas while leaving the healthy parenchyma in place, depending on the feasibility.

Lobo-isthmectomy is performed in case of nodules occupying the whole lobe; if both lobes are involved with healthy parenchyma, we perform a subtotal thyroidectomy. The main indications for nodular goitres in the international literature remain lobo-isthmectomy, subtotal thyroidectomy and total thyroidectomy. The preferred place of lobo-isthmectomy in the management of thyreopathy is still recognized by almost all authors [26, 27].

In a previous study also performed in our department left lobo isthmectomy was the most performed in our series, 86 times, or 44.79% followed by subtotal thyroidectomy 58 times, or 30.21%. [28].

The divergence would be on the choice of subtotal thyroidectomy or total thyroidectomy if the nodules involved both lobes.

Some authors prefer subtotal thyroidectomy because it is more economical for the gland, but also because of the difficulties associated with compliance with opotherapy [25].

Other authors would recommend a more radical excision because of the risk of malignancy that accompanies nodular pathology [13, 23].

This explains why total thyroidectomy remains a desired excisional technique; it remains that in certain anatomical cases a partial thyroidectomy could suffice.

Surgery remains the most effective treatment for lymph node metastases because in about one third of cases, iodine-131 is not concentrated in the affected lymph nodes [29].

In Canada, Kang [19] obtained a cure rate of 80% with radiant iodine. This treatment, which seems to be very effective, is not yet available in Guinea.

The duration of hospitalization depends on the postoperative course and the volume of thyroid disease. In our series, the average length of hospitalization was 6 days. Coulibaly et al. found a slightly shorter average hospital stay of 3.4 days [30]. In the series by Connessa et al. the patients were discharged on the 6th postoperative day [23]. In the West, the patient could return home on the second postoperative day, as demonstrated by Guerrier B et al [28].

This more often prolonged hospitalization in our regions can be explained by:

1) The difficulties associated with the inaccessible or non-existent postoperative check-up.
2) The level of indigence would also contribute to the long stay of patients, given the impossibility of having a follow-up at home.
3) Finally, the length of hospitalization is also strongly influenced by the time it takes to remove the drains.

The postoperative course was simple in 86.5% of cases with complications estimated at 12.7% and 0.7% of cases of death in our series.

Studies carried out in Senegal give a percentage of around 7% [23].

Studies carried out in Côte d'Ivoire and France have reported a morbidity of between 19 and 25% [31, 29, 27].

Another study recently conducted in Senegal reported a

percentage of 4% [26].

This low morbidity can be attributed to the fact that the procedure is performed in a very short time:

1) progress in anaesthesia and intensive care-
2) the refinement of surgical techniques performed by a team experienced in the task-
3) Rigorous postoperative surveillance.

This explains why today thyroid surgery has seen its complications reduced.

Thyroid surgery has a low or even rare mortality.

In our series, one case of death was reported in the monitoring at day 2 after surgery either 0.75%

This frequency is comparable to a study carried out in the department which found a percentage of 0.9%, and is linked to bleeding complications and anaesthetic problems [24].

A mortality of 0.5% was reported by Dieng M et al. in Senegal.

Postoperative mortality in thyroid surgery is often due to compressive hematomas [28] and tracheomalacia [32].

It should be noted that although mortality is rare after thyroidectomy, the risk is real. Therefore, the recommendations must be scrupulously observed in order to reduce operative mortality. In the first hours after thyroidectomies, it is important to ensure that hemostasis is satisfactory. The respiratory function must be carefully monitored, especially after removal of a large goiter. The occurrence of tracheomalacia can rapidly engage the vital prognosis of the patient [32].

## 5. Conclusion

Hyperthyroidism is frequently encountered in hospitals in our country. They represented 1.28% of all thyroid pathologies. The diagnosis is easy to make thanks to clinical and biological findings. Their management was multidisciplinary and their treatment was basically based on surgery.

In our practice subtotal thyroidectomy has given good results with an acceptable rate of hypothyroidism and no recurrence of hyperthyroidism in the short term. Radioactive iodine therapy remains a challenge in our context.

## Conflict of Interest

The authors declare that they have no competing interests.

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