



Research Article

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Sociodemographic, endocrine, Histopathological characteristics and management of goiter in Greater Katanga

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Abstract

Introduction: Goiter is the most common endocrinopathy in the world and is defined as any enlargement of the thyroid gland. The aim of this study was to determine the socio-demographic, endocrine, histopathological characteristics and to assess the management of goiter in Greater Katanga. **Patients and method:** This is a cross-sectional descriptive study for analytical purposes with prospective data collection, including 101 cases of thyroid goiter collected in the surgery department of the Jason Sendwe General Reference Hospital over a period of April 30, 2015 as of March 31, 2017. We have summarized the quantitative variables as an average and / or median. Qualitative variables have been summarized as a percentage. To compare the means (or medians), the Mann-Whitney U test was applied and a Pearson correlation test between two quantitative variables was used. In order to assess the association between two qualitative variables, we used the Pearson chi-square test or the likelihood chi-square test, and the Fisher exact test. A significance level $\alpha = 0.05$ was set and the test was considered significant if $p\text{-value} < 0.05$. **Results:** In our series, the average age was (49.5 ± 10.8) years, and the sex ratio (W / M) was 2.6 with a female predominance (74%). Anterior cervical swelling was the main reason for consultation (100%). The province of Haut-Katanga was more represented in 50.5%. The clinical examination found the diffuse bilateral masses in 62% of the cases. On ultrasound the goiter was heterogeneous in 85.1% of cases and on radiography, tracheal deviation was present in 67.0% of cases, more to the right (40%) than to the left (27%). The hormones TSH, T3 and T4 were normal in 85 patients (84.15%). The most encountered anatomopathological form was colloid goiter (86.1%). The treatment was medical and surgical. The surgery consisted of a subtotal thyroidectomy in all cases. The course was simple in 69.3% of cases, and complications were dominated by hemorrhage in 77.4% of cases.

Keywords: Goiter, Epidemiology, Histology, Endocrinology, Treatment.

INTRODUCTION

Goiter is the most widespread endocrinopathy in the world, whether sporadic or endemic, diffuse or nodular without discrimination of its etiopathogeny. It is defined as any increase in the size of the thyroid gland. Its pathophysiology involves mitogenic and mutagenic phenomena and its constitution is favored by goitrogenic factors, represented mainly, but not exclusively, by iodine deficiency [1].

It is a generally mild condition. It can be either in the form of a diffuse enlargement, or in the form of a localized hypertrophy, or in mixed form. This condition can be benign, or malignant after years of development and sometimes giving rise to complications requiring surgery [2]. The management of this pathology has changed enormously in recent years, thanks to clinical and para-clinical arguments, notably because of ultrasonography, scintigraphy, dosing of thyroid hormones, cervical ultrasound and needle aspiration, after a long period of evolution. Its management goes from simple monitoring, to total thyroidectomy with lifetime supplementation of thyroid hormones in the affluent environment and or a subtotal thyroidectomy. The therapeutic indications remain poorly coded and require in-depth knowledge [2].

According to the World Health Organization, the global prevalence of goiter was estimated in 2003 at 15.8%. This prevalence in general varies from one environment to another. In endemic areas, which are

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areas of high iodine deficiency, its prevalence is enormous. It was estimated that 39.7% of Pakistanis living in the Himalayan region were affected and that 30 million Chinese were carriers of goiter [3].

In Europe, there were 97 million goiter in 1992 [1] and in countries not benefiting from iodine prevention (Southern, Central and Eastern Europe), the prevalence of goiter could exceed 50% in certain regions [4].

In the United States, in 2005, the prevalence of goiters varied from 15 to 30% across the United States [5].

In Africa, several studies have been carried out. In Mali the frequency of euthyroid goiter was 48.1% in 2002 [6] while in Ouagadougou it was 50% in 2000 and 17% in Togo, the same year at the Lomé hospital center [3]. A study carried out in Ivory Coast resuming the prevalences in black Africa had found 60% of cases more in the North-East and North-West of Zaire (DRC), 47% of the cases in Tanzania in the region of Mbeya and Nkas whereas 'it was 50.5% of cases in Zambia in the northwest [6].

Work carried out in Kinshasa by Bidingija *et al* [7] had identified potential candidates for Graves' disease. It made it possible to follow the evolution of patients treated with synthetic antithyroid drugs, among carriers treated at the University Clinics of Kinshasa. In Greater Katanga, two studies have been carried out on goiter and all based on iodine deficiency. Mbuya K [8] had demonstrated the problem of goiter and its impact on reproductive health in the upper Lomami district. His results had shown that the thyroid dysfunction associated with goiter disrupted the menstrual cycle and affected fertility. Twite [9] had described the morphological modifications of the thyroid gland in pregnant women living in an iodine deficient environment.

No study has not yet been conducted in a surgical environment in Greater Katanga, we undertook this work whose main objective is to describe the socio-demographic, histopathological, endocrine and clinical characteristics of goiter, while evaluating the surgical management.

METHODOLOGY

This is a cross-sectional descriptive study for analytical purposes with prospective data collection conducted at the Jason Sendwe provincial hospital located in the city of Lubumbashi, capital of the Haut-Katanga province in the Democratic Republic of the Congo from April 30, 2015 to March 31, 2017 which has collected 101 cases of goiter. The study included all patients who consulted for a tumor in the neck related to the thyroid in the surgical department of this hospital. We summarized the quantitative variables in the form of mean (and standard deviation) and / or median (and interquartile range). Qualitative variables have been summarized as a percentage. To compare the means (or medians) between two groups, a Mann-Whitney U test was applied and a Pearson correlation test between two quantitative variables was used. In order to assess the association between two qualitative variables, we used a Pearson chi-square test or a likelihood chi-square test, and the exact Fisher test. A significance level $\alpha = 0.05$ was set and the test was considered significant if $p\text{-value} < 0.05$. Data was entered using Epi info 7.21.0 software and analyzed using SPSS v.23 software, and finally Microsoft Word 2013, Excel 2013 software packages for processing texts and tables. All patients received information about the research object and had given free informed consent. We ensured anonymity and confidentiality. The research protocol obtained probation from the ethics committee approval number: UNILU / CEM / 106/2016.

RESULTS

Sociodemographic and Clinical data.

The average age of our patients was 49.5 ± 10.8 years (Extremes: 27-70 years). The most affected age group was between 40 and 49 years old with a frequency of 31.6% of cases. The female sex was more represented with 74% of cases or a sex ratio (W / M) of 2.6 and more in the age group of 60-69 with (18 cases).

The majority of our patients came from Haut-Katanga province in 50.5% of cases. (Table 1)

Table 1: Distribution of patients by origin

Origin	Effective	Percentage (%)
Haut-Katanga	51	50.5
Haut-lomami	5	4.9
Hors- Katanga	15	14.9
Lualaba	23	22.8
Tanganyika	7	6.9
Total	101	100

Most patients had a family history of goiter (36%), high blood pressure (19%) and diabetes (27%).

The most important risk factors were represented by goitrogenic foods (64.30%), iodine deficiency (19.80%), environmental factors (10.80%) and familial goiter (4.90%). Consumption of unroasted cassava (64.3%) and cabbage (19.8%) were the most common goitrogenic substances, followed by sweet potato (10.80%) and soybeans (4.90%). The onset was progressive in 100% of our patients. The mass was dragged by the patient for more than 24 months in 55% of cases, ie an average delay of consultation of 27 ± 0.75 months. A low anterior cervical swelling was the most frequent reason for consultation in all our patients (Image 1).

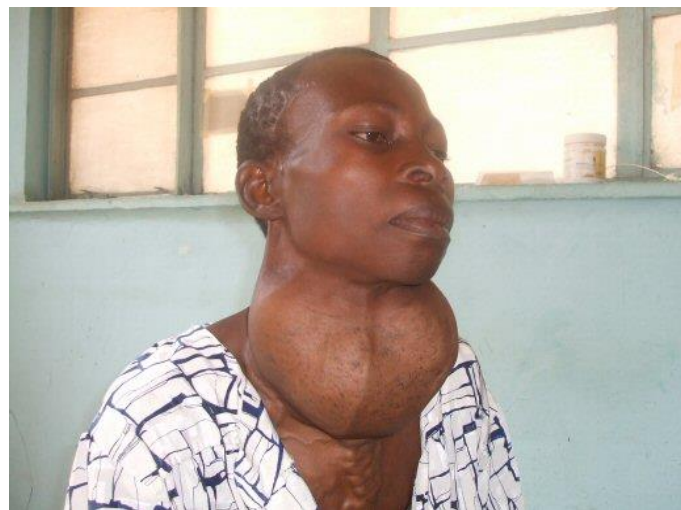


Image 1: Iconography of a goiter clinically manifested by a large cervical mass with dyspnea.

The signs of hyperthyroidism found represent 42.5% of cases and mainly palpitation (37.2%), nervousness (25.5%), anxiety (16.2%), insomnia (13 , 9%), thermophobia (4.6%), and diarrhea (2.3). Dyspnea was the most common sign of compression (30.6%), followed by dysphagia (26.7%), raucitis of the voice (18.8%) and turgor of the jugular veins (17.8%). The majority of our patients were classified in stages II (47.5%) and III (28.7%) of the WHO.

Exophthalmos was the most observed sign of toxicity on inspection (15.8%), followed by asthenia (13.8%), extremity tremor (9.9%) and enophthalmia (7, 9%). The clinical examination found diffuse bilateral masses (62%), plunging (19%), left lobe (12%), and right lobe (7%). In 72.0% of cases, the mass was firm and soft in 28% of cases.

An ultrasound morphological assessment was systematically carried out in all our patients. The mass was more bilateral in 83.1% of cases, non-cystic and non nodular in 50.4% of cases, heterogeneous in 87.1%

of cases. The cervico-thoracic radiography had shown a tracheal deviation in 63.3% of cases (Table 2).

Table 2: Imaging results

CERVICAL ECHOGRAPHY		
Mass location	Effective	Percentage (%)
Left	13	12.8
Right	5	4.9
Bilateral	83	83.1
Mass appearance		
Nodular	19	18.8
Cystic	16	15.8
Multi-nodule	15	14.8
Without nodule or cyst	51	50.4
Nodule		
≤ 2 cm	4	21
2-4 cm	9	47.3
≥ 4 cm	6	31.5
Echostructure		
Heterogeneous	88	87.1
Isoechoic	6	5.9
Hyperechoic	7	6.9
CERVICO-THORACIC RADIOGRAPHY		
Picture	Effective	Percentage (%)
Tracheal	67	63.3
Thyroid	17	16.8
Plunging	17	16.8

Endocrine data

The thyroid hormone assay was performed in all patients. The values of the references TSH (0.3-4.2 μ / l), T4 (64-155 μ / l), T3 (0.9-2.33 μ / l). The hormones TSH, T3 and T4 were normal in 85 patients (84.15%) (Table 5).

In our series, the patients were euthyroid in 73.3%, hypothyroid in 19.8% and hyperthyroid in 6.9% of cases.

Table 3: Distribution of patients according to their thyroid hormone levels

Hormone	Normal	High	Decreased
TSH	85 (84.1%)	3 (2.9%)	13 (12.8%)
T3	85 (84.1%)	16 (15.8%)	0 (0.0%)
T4	85 (84.1%)	16 (15.8%)	0 (0.0%)

TSH: Thyreostimulin hormone, T3: Tri-Iodo-Thyronine, T4: thyroxine

When comparing the hormonal variables (TSH, T3, T4) between the sexes (Male, female), there was no statistically significant difference ($p > 0.05$), or sex was not a factor. risk. (Table IV).

There was no statistically significant difference ($p > 0.05$) between the consumption of unroasted cassava (yes / no) and the hormonal parameters (TSH, T3, T4). Consumption of unroasted cassava has no impact on the variation of thyroid hormones. (Table V).

Table 4: Comparison of hormonal variables in relation to gender

Value	Gender		Mann-Whitney	P
TSH	Male	26	922,500	0,68
	Female	75		
T3	Male	26	733,500	0,06
	Female	75		
T4	Male	26	970,000	0,97
	Female	75		

Table 5: comparaison de variables hormonales par rapports à la consommation du manioc non roui

Unroasted cassava			Mann-Whitney	P
TSH	No	98	27,000	0,44
	Yes	3		
T3	No	98	45,000	0,89
	Yes	3		
T4	No	98	44,000	0,86
	Yes	3		

Histopathological data

The macroscopic parenchymatous aspect had predominated in 55.44% of the cases, followed by the nodular (19.80), cystic (14.85%), hemorrhagic (3.96%), cerebroid (2.97%) aspects, and multinodular (2.97%).

Histological examination revealed colloidal goiter in 86.13% of cases and carcinoma in 13.86% of cases including 9.90% of papillary carcinomas and 3.96% of vesicular carcinomas (Table 6). When comparing papillary carcinoma and TSH level there was no statistically significant difference (Likelihood ratio = 0.929; $p = 0.629$), similarly vesicular carcinoma and TSH dosage had no statistically significant difference (Likelihood ratio = 0.929; $p = 0.629$). On the other hand, the colloid goiter and the volume of the mass on ultrasound had a statistically significant difference (Fisher's exact test; $p = 0.007$).

Table 6: Distribution of goiter according to the anatomopathological result

Anatomopathological result	Type	Effective (n)	Percentage (%)	
Macroscopic aspect	Parenchymal	56	55.44	
	Nodular	20	19.80	
	cystic	15	14.85	
	Hemorrhagic	4	3.96	
	Cerebroid	3	2.97	
	Multinodular	3	2.97	
Microscopic aspect	Colloidal goiter	87	86.13	
	Carcinomas:		14	13.86
		- Papillary	10	9.90
		- Vesicular	4	3.96

Therapeutic data

Medical treatment was mainly based on synthetic antithyroid drugs associated with a β -blocker in all series of patients with hyperthyroidism. The aim was to reduce the sympathomimetic manifestations of hyperthyroidism and protect patients from the risks of intraoperative thyrotoxic crises. Sixteen cases of our patients (15.8%), had benefited from a preoperative medical treatment made of Strumazol tablet of 10mg at a dose of 60 to 80mg / day and Atenolol tablet 50mg / day until the normalization of the frequency before any surgery in all patients with hyperthyroidism.

The surgical procedure consisted of a subtotal thyroidectomy associated or not with Lobo-ischmectomy. The weight of the mass varied between 100-200 grams in 46.5% of the cases, more than 200 g in 32.60% of cases, and less than 200 g in 20.70% of cases. Mass weight and tracheal deviation had no statistically significant difference (Pearson's chi-square = 2.298; $p = 0.317$). This means that there is no relation between the weight of the mass and the deviation of the windpipe. On the other hand, there is a relation between the weight of the mass and the dysphagia because it had statistically a significant difference (Chi-square of Pearson = 6.845; $p = 0.033$). In the immediate course, all the patients had left the hospital within 5 days. The course was simple in 69.3% of cases, and complications represented 30.7% of cases mainly made of simple hemorrhage (77.4%), suffocating

hematomas (9.6%), parietal infection (6.4%), and tracheomalacia (6.4%).

DISCUSSION

Sociodemographic data

In our series, the average age was 49.5 ± 10.8 years. African studies report results that are no different from our results. For M'badinga M. [7], the average age was 38.4 years. The same is true for Moussa K. in Mali [11] (40.3 years), Nia-Nabil in Morocco [13] (52.2 years). These results are close to European, American and Asian studies as shown by the work of Bhattacharyya *et al.* [14] (48.3 years) in the USA, and Miccoli P. *et al.* [15] (49 years old) in Italy and Qari fa [16] (39 years old) in Saudi Arabia. These results show that since goiter is diagnosed at a young age, its care thus concerns young adults. In our series the female sex was the most represented with a sex ratio F / M of 3. This observation had been observed by other African authors in particular M'badinga [10], Habibi [17] and Nia-Nabil [13] who had found an F / M sex ratio of 7, 9.5 and 8.5 respectively. These results remain identical to those found by European authors such as Aytac B. *et al.* [18] (4.29), Miccoli P. *et al.* [15] (2.3). The thyroid pathology being characterized by the predominance of women, which shows the role played by the presence of steroid sex receptors in the follicular cells of the thyroid [21]. Heredity is considered to be a significant factor in thyroid pathology since members of certain families of known goitrous can be affected even if they live outside the places and circumstances known to be goitrogenic.

In our series, the notion of family history of thyroid pathology was found in 5% of cases and in other series, patients had a history of goiter in the family: 15% in the Greisen O. series [27]; 30% for Kotisso B *et al.* [23], 13% for Moussa K. [11], 4.7% of cases for Bidingija *et al.* [7], 7.5% of cases in the series by Fofana S. [12], and 11% for Damoune *et al.* [28].

Iodine deficiency is the intrinsic factor found in endemic goiter [26]. Episodes of genital life (puberty, pregnancy, breastfeeding, menopause), psychoaffective factors are the most involved in sporadic goiter. [26, 30]. In our series, these same factors were found as well as in Asian, American, African and European studies. [11, 29-32].

In our series, the consultation period was more than 24 months in 55% of cases, which is similar to the observation by Radi J. [20] who reports a period of less than a year, whereas for Tefali A. [21] this time was over a year. The consultation period varies according to the different studies and can range from less than a year to more than 10 years. This average consultation time was higher for other authors, in particular Makeieff [19] for whom this time was 15 years, Miccoli P. *et al.* [15] (9 years old), Mishra A. *et al.* [22] (6 years old), Kotisso B. *et al.* [23] (7 years old). We think that this difference would be due to the conception of the disease in the population and the habits of the environment. With us, patients do not consult at the beginning of the disease for fear of surgery for some and for others the disease is attributed to witchcraft and it is therefore incurable. Besides, in some corners of the country goiter is part of beauty. Lack of financial means in an environment without health cover or health insurance. The lower anterior cervical swelling was the most common reason for consultation in our series while in the Habibi series [17], while signs of compression or signs of dysthyroidism were more noted in the series of Radi J. [20].

Hyperthyroidism is manifested by objective signs such as: palpitations, wetness of the hands, trembling of the extremities, sweating, weight loss, asthenia, nervousness, insomnia, anxiety, diarrhea, thermophobia... In our series, these signs were found in 42.5% of cases and dominated by nervousness and palpitation in 37.2% of cases, close to the series by Torquil W. *et al.* [24]

Our study found dyspnea as a sign of compression in 30.6% of cases. The signs of compression reflect a complication of goiter which is most often linked to its large volume. Our results are close to the results of Moussa K. [12], and Radi [20] but differ from the series of Torquil W. *et al.* [24], for whom the sign of compression was dysphonia.

The site of the swelling (goiter) on the thyroid is a crucial element for the surgical technique to be adopted. Thus in our series the localization was unilateral left was found in our series at 66.3% and also in the series of M'badinga M. [10], Radi J. [20], while Colak T. *et al.* [25] had found a predominant location on the right.

Ultrasound was an examination done in all of our patients because it had the advantage of being easily accessible and less expensive. It also informed us about the state of the neighboring parenchyma, the size, the weight, the liquid nature or not of the palpated mass, it also informed us about the malignant or benign character. This is a more common examination in other series, notably in the series by Duron F. *et al.* [33], Koike E. *et al.* [34], Colak T *et al.* [25], Tefali A. [21]. The signs of heterogeneity were more common in our series and also by other authors, such as M'Badinga M. [10], Colak T. *et al.* [25], Moussa K. [11], Radi J. [20]. These signs in our series reflected local tissue reorganization through fibrosis at times and also small calcifications in the gland depending on the duration of evolution of the goiter. In our study, the colloidal goiter and the volume of the mass on ultrasound had a statistically significant difference (Fisher's exact test; $p = 0.007$).

Tracheal deviation was present in 67.0% of cases in our series and also in the series by Makeieff M. *et al.* [19], as well as several other authors [10, 11, 16]. This examination was systematic, and made it possible to highlight a rounded or oval cervico-mediatic opacity, of homogeneous, bilateral and or unilateral density located at the level of the superior mediastinum being able to exceed the mediastinum mediastinum in voluminous goiter. The lower pole of the goiter was blurred, while its upper pole was drowned in the soft parts of the neck. The upper chest opening was simply enlarged. It also made it possible to assess the tracheal deviation in both the frontal and sagittal planes. This deviation was a great sign of the presumption of the thyroid nature of media opacity. A tracheal scoliosis could be the witness of a bilateral plunging goiter with uneven development. The radiographs also revealed tracheal stenosis in 16.8% of cases, suggesting that intubation difficulties would appear, as reported in the series by Janati Im. *et al.* [35].

Histopathological data

Capital examination, it alone allows diagnostic certainty. The macroscopic parenchymatous aspect had predominated in 55.4% of cases, followed by the nodular (18.8), cystic (15.8%), hemorrhagic (3.9%), cerebroid (2.9%) aspects, and multinodular (2.9%). In our series, colloidal goiter was the most common histological type with 86.1% of cases and in 13.8% of cases it was carcinomas including 9.9% of papillary carcinomas and 3.9% of vesicular carcinomas. Our results are close to those of several other authors [11, 24, 31].

When comparing papillary carcinoma and TSH level there was no statistically significant difference (Likelihood ratio = 0.929; $p = 0.629$), similarly vesicular carcinoma and TSH level had no statistically significant difference (Likelihood ratio = 0.929; $p = 0.629$).

Endocrine data

The hormones TSH, T3 and T4 were normal in 85 patients (84.15%) while T3 and T4 were elevated in 16% of cases. Comparing the hormonal variables (TSH, T3, T4) between the sexes (Male, female), there was no statistically significant difference ($p > 0.05$). Just like, there was no statistically significant difference ($p > 0.05$) between the consumption of unroasted cassava (yes/no) and the hormonal parameters (TSH, T3, T4). Consumption of unroasted cassava has no impact on the variation of thyroid hormones.

Dysthyroidism is a complication that can occur in the development of goiter. These are hyperthyroidism and hypothyroidism which are determined by the dosage of thyroid hormones (free T4, T3) and TSH. In our series, the patients were euthyroid in 73.3% of the cases, hypothyroid in 19.8% of the cases and hyperthyroid in 6.9% of cases that joins the studies of: Mishra *et al.* [22], Edino *et al.* [31], Aytac B. and Karamerc [18].

Therapeutic data

In our series, medical treatment was based essentially on synthetic antithyroid drugs associated with a β -blocker in patients with hyperthyroidism (15.8%). The aim was to reduce the sympathomimetic manifestations of hyperthyroidism and protect patients from the risks of intraoperative thyrotoxic crises. Thus in 15.8% of our patients we had established a preoperative medical treatment made of Strumazol tablet of 10mg at a dose of 60 to 80mg / day and Atenolol tablet 50mg / day until the frequency normalized heart. In the series of Radi J. [20], 20.33% of the patients had been medically treated before being operated by the available synthetic antithyroid drugs (ATS) such as: carbimazole (Néo-mercazole® and its generic dimazol. the same products that are used in the different series [11, 18, 32] The choice of products depends on the availability of the molecule on the market.

Subtotal thyroidectomy was the technique of choice in our series as in several other studies [32-34]. While total thyroidectomy was the method of choice in the Colak T *et al.* [25], Spanknebel K. *et al.* [37], and Radi J. [20]. The isthmolobectomy was reported in the series of Moussa K. [11]. We believe that the difference in technique used by the different authors was more related to the habits of each surgical house, the availability of inputs (hormone replacement) and mastery of the technique by each operator. The weight of the mass varied between 100-200 grams in 46.5% of cases, more than 200 gr in 32.60% of cases, and less than 200 gr in 20.70% of cases. Comparison of mass weight and tracheal deviation had no statistically significant difference (Pearson's chi-square = 2.298; p = 0.317). This means that there is no relation between the weight of the mass and the deviation of the windpipe. On the other hand, there is a relation between the weight of the mass and the dysphagia because it had statistically a significant difference (Chi-square of Pearson = 6.845; p = 0.033). The evolution was simple in 69.3% of cases in our series close to the series of: Ouaba K. *et al.* (84.5%) [39], Serdar *et al.* (98.2%) [38], Spanknebel K. *et al.* (98.3%) [37], Wang X. *et al.* (97.2%) [36], Moussa K. (95.5%) [11].

In our series, the evolution was considered satisfactory in 69.3% of cases with 30.7% of complications with early bleeding from the head wound (77.4%), followed by suffocating hematomas (9.6%), tracheomalacia (6.4%), and surgical site infection (6.4%). We did not record any deaths related to surgery in our series, which joins the series of Serdar O. *et al.* [38] and Radi J. [20] but the percentage of deaths was low in the series by Ouaba K. *et al.* (1.9%) [47], Bhattacharyya N. *et al.* (0.2%) [14] and Moussa K. 0.9%. [11]. Mortality directly attributable to the nature of the surgical procedure was none, this reflects dexterity of surgical techniques by the different teams. Thyroid surgery, performed by expert hands and respecting the technique, its morbidity is reduced. In our series, we noted hemorrhagic complications at (77.4%). Intraoperative cataclysmic hemorrhagic complications had become exceptional [36, 37], and were generally related to a lesion of a large vessel. Indeed when this vessel was high located or when it was a goiter plunging it could be injured [35]. On the other hand, the possibility of a postoperative hematoma is more frequent [37]. Recurrent paralysis, along with definitive hypoparathyroidism, is the main source of morbidity after thyroidectomy. This complication was described at the beginning of thyroid surgery with a rate of 32% in 1844 by Bill Roth, and thanks to standardized surgical techniques, the risk decreased but it persists (varying from 0.5% to 5%) [38].

In our series, we noted the absence of transient unilateral recurrent paralysis, however, some rare cases were noted in the series published by: Wang X. *et al.* (0.2%) [36] Spanknebel K, *et al.* (1%) [37], Serdar O. *et al.* (0.6%) [38], Alimoglu O. *et al.* (4%) [41], Ouaba K. *et al.* (1.9%) [39], Prim Mp. *et al.* (2%) [40], Radi J. (2%) [20], Tefali A. (3%) [21].

CONCLUSION

Thyroid pathology is the most widespread endocrine pathology in the world with a great disparity from one region to another mainly according to the iodine intake. Our study had shown that the consumption of unroasted cassava had no impact on the variation of thyroid hormones; colloid goiter was the most common histological type in Greater Katanga, while carcinomas are not uncommon; and the majority of goiter were euthyroid. The Democratic Republic of the Congo is a country in the world goiter endemic belt. A careful clinical examination, a biological examination (TSH, T3, and T4), a morphological examination: cervical ultrasound, and a histopathological examination are essential. Recurrent, parathyroid, hemorrhagic and infectious complications should not be ignored. If surgical indication, the subtotal thyroidectomy is better indicated in our environment because it avoids us hormone replacement therapy for life.

Authors' Contributions

This work was carried out in collaboration between all authors.

Competing Interests

Authors have declared that no competing interests exist.

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