



## Epidemiological, Clinical and Therapeutic Characteristics of Patients undergoing Goiter Surgery in Beni, Democratic Republic of the Congo

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### Authors' contributions

This work was carried out in collaboration between all authors. Authors MKI, RM and PB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors MMV, JKK, FKS and AAM managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.

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### ABSTRACT

**Background:** Iodine deficiency disorder is one of the world's public health problems and affects millions of people in developing countries. Its diagnosis is often easy, while its management is still difficult in our countries. This work aims to determine the epidemiological, clinical and therapeutic characteristics of patients undergoing goiter surgery at Beni General Referral Hospital, DRC.

**Methods:** It was a prospective descriptive cross-sectional study that was carried out from

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November 2016 to November 2017 at Beni referral Hospital, in Democratic Republic of the Congo.

**Results:** Overall, 23 patients underwent goiter surgery. The predominance of women demonstrated in 95.7% and the most affected age group was 40 years and above. The majority of patients came from rural areas and was farmers. Physical asthenia and palpitation were the most important chief complaints in 39.2% and 30.4% respectively. The diving, multinodular and toxic goiters were more founded at stage IV or no defined in most of the cases. General anesthesia combined with oro-tracheal intubation was the type of anaesthesia used in all cases. Subtotal lobectomy and subtotal thyroidectomy were the surgical techniques used. All postoperative suites were favourable, with only one case of tracheomalacia as a complication.

**Conclusion:** Iodine deficiency disorder remains a public health problem in our environment. The sensitization of the population who is vulnerable and the thorough knowledge of its management by caregivers are of paramount importance in our country.

*Keywords: Characteristics; epidemiological; clinical; therapeutic; Goiter; Beni.*

## 1. INTRODUCTION

Goiter is the often visible enlargement of the thyroid gland. It is an enlargement of the thyroid gland that may indicate hyperthyroidism, a hypothyroidism or a euthyroidism. It is clinically manifested by swelling of the anterior region of the neck [1,2]. In the world population, the prevalence of goiter is high, estimated at 15.8% [3].

Iodine deficiency and subcarency constitute a major public health problem in the world as they reach 130 countries and 38% of the world population is concerned (more than billions of individuals) [4].

According to the World Health Organization (WHO), people with goiter constitute 12% of the world's population, with a female predominance [2]. In Belgium, endemic goiter is not a problem. However, some foci of goiter exist in the Ardennes region [5]. In developing countries, iodine deficiency is a major public health problem [6]. Iodine deficiency disorders (IDD) affect millions of people in developing countries, mainly because of dietary iodine deficiency and aggravating factors that affect the bioavailability of iodine in the body [7]. In Ethiopia, iodine deficiency disorder is one of the public health problems. Recent results show that endemic and non-endemic areas have high rates of goiter [7]. In Burkina Faso, the endemic state with a prevalence rate is estimated at more than 20% [8]. In the Democratic Republic of the Congo (DRC), goiter endemicity is especially intense in the region limited to the North by Ubangi and Uélé, to the South by Mongala and Dua, to the West by the Lokame basin, to the East and South-East by the Ebola Basin (50 to 63.2% of cases). In the territories between the Lokame

and the Moto River, we find a percentage between 20 and 30% [9]. In the province of North Kivu, many patients come from rural areas with a problem of goiter, having hope and certainty to find either an aesthetic or functional solution.

Given the above, it has proved useful to conduct a study on patients operated under our working conditions. Therefore, this work aims to determine the epidemiological, clinical and therapeutic characteristics of patients undergoing goiter surgery at the Beni General Referral Hospital.

## 2. METHODOLOGY

### 2.1 Study Site

Our study was conducted in the surgery Department of Beni General Referral Hospital, in Beni City, North Kivu Province, Democratic Republic of the Congo.

### 2.2 Methods

This was a prospective descriptive cross-sectional study that ran from November 2016 to November 2017. We included in this study, all patients diagnosed and operated for goiter at the Beni referral Hospital, during the study period. All cases of goiter diagnosed and operated outside of the aforesaid hospital were excluded from this study.

We found 23 cases of goiter diagnosed and operated during a Goiter Surgery Campaign. The sample was exhaustive.

The information for each patient was collected on individual survey cards previously prepared with the following elements (age, sex, origin, profession, clinical sign, type of goiter, clinical

stage, type of anesthesia, type of intervention, outcome and postoperative complication).

Data entry and analysis was performed using the EPI INFO software version 3.5.4 of July 30, 2012.

The standards of ethics were respected in carrying out this work. Informed consent of patients was obtained as part of their inclusion in the study. Confidentiality was guaranteed for everyone because a code was given to them instead of the name. Those unable to give their point of view, a relative or parent had to consent.

### 3. LIMITATION OF THE STUDY

Patients had not benefited from preoperative paraclinical exams for lack of financial means. This same problem was also at the base of the non-realization of the pathological examinations of the tissues of the gland removed as well as the hormonal dosage.

## 4. RESULTS

### 4.1 Sociological Characteristics of Patients

Females represent 95.7% of patients and the age groups from 41 years and beyond are more concerned. Most of patients (87%) come from rural regions and 69.6% are farmers.

**Table 1. Distribution of patients according to their socio-demographic characteristics**

Socio-demographic characteristics	Number	Percentage
<b>Sex</b>		
Female	22	95.7
Male	1	4.3
<b>Age range (in years)</b>		
0-20	0	0
21-40	3	13
41-60	11	47.8
61 old and above	9	39.2
<b>Origin</b>		
Urban	3	13
Rural	20	87
<b>Profession</b>		
Farmer	16	69.6
Trader	4	17.4
Other	3	13

### 4.2 Clinical Characteristics of Patients

Most of patients complain for asthenia (39.2%), palpitation (30.4%) and vertigo (13%). The diving (34.8%), multinodular and (26%) and toxic goiters (21.8%) was the most frequent types of goiter diagnosed and treated. Most of patients come at an advanced stage of the diseases, stade III (17.5%) and stade IV (30.4%) using the WHO classification.

**Table 2. Distribution of patients according to their clinical characteristics**

Clinical characteristics	Number	Percentage
<b>Clinical signs at admission</b>		
Physical Asthenia	9	39.2
Palpitation	7	30.4
Vertigo	3	13
Dyspnea	2	8.7
Other	2	8.7
<b>Goiter type</b>		
Diving	8	34.8
Multi nodular	6	26
Toxic	5	21.8
Asphyxiating	2	8.7
Undetermined	2	8.7
<b>Evolutionary stage</b>		
Stade Ia	1	4.4
Stade Ib	2	8.7
Stage II	3	13
Stage III	4	17.5
Stage IV	7	30.4
Undetermined stage	6	26

### 4.3 Type of Anesthesia

The general anesthesia was used in all cases and it was associated with OTI by halothane (30.4%) or OTI by other products (69.6%).

**Table 3. Distribution of patients according to the type of anesthesia**

Type of anesthesia	Number	Percentage
GA/ OTI by halothane	7	30,4
GA/ OTI by other products	16	69,6
<b>Total</b>	23	100

### 4.4 Type of Intervention

Most of patients benefited frpm subtotal lobectomy (73.9%) and 26.1% benefited from subtotal thyroidectomy.

**Table 4. Breakdown of patients by type of intervention**

Type of intervention	Number	Percentage
Subtotal Lobectomy	17	73,9
Subtotal thyroidectomy	6	26,1
<b>Total</b>	<b>23</b>	<b>100</b>

#### **4.5 Postoperative Complications and Result of the Treatment**

One case (4.3%) of tracheomalacia was observed as post-operative complication. All the patients (100%) were healed.

### **5. DISCUSSION**

During the study period, 23 patients with goiter were operated. Women were more represented with 95.7% in this study. This finding is similar to the one of Kouamé and his collaborators in Ivory Coast, who also found a predominance of women [6]. Ntyonga-Pono and his collaborators also found a female predominance in their study on the prevalence of goiter in Gabon [10]. Similar results were noted in Congo by Mbadinga. He found a sex ratio of 8 [11]. The sex ratio was 7.7 for Lokrou and colleagues' survey [12]. In France, Bilosi and colleagues, in their study on 128 patients, found similar results [13]. The female predominance is explained by the fact that the hormonal factors especially estrogen, promote epithelial hyperplasia and reduce the entry of iodine into the thyroid. In addition, goiter is frequent in periods when the need for synthesis of thyroid hormones is increased: during pregnancy and breastfeeding [14].

The age group of 40 years and above was the most represented with 87% of cases. Ntyonga-Pono and his collaborators have found that goiter volume increases with age [10]. Our results are similar with those found in the study conducted by Pierre Aubry in tropical climates. This author found that the distribution of goiter prevalence is strongly influenced by age and sex. The frequency of goiter increases with age. The need of thyroid hormone synthesis also increases with age [14].

The majority of patients came from rural areas and were farmers, this is explained by the excessive consumption by this population group of foods rich in cyanogenic glucosides, including cassava and sweet potatoes. Foods rich in cyanogenic glucosides are among the factors

implicated in goitrogenesis [15,16,17]. Our results are similar with those found in the studies of Pierre Aubry in the European population in 1995. He found that farmers are the most affected because of the very low social and economic level, unlike in the Alps, where endemic goiter has considerably decreased in high socio-economic countries [14].

Physical asthenia, palpitation, vertigo and dyspnea were the main chief complaints in our patients. These symptoms may be correlated to the gravity of the disease. Nafissatou Diagne and colleagues in a study conducted at Ledantec University Hospital, in Dakar (Senegal) found that the main reasons for consultation were: palpitations and weight loss in 46.3% and 39.8% of cases respectively [18]. In Algeria, Nouikes Zitouni and colleagues found mainly palpitations and weight loss in 59% and 41% of cases as a reason for consultation [19].

Regarding the type of goiter, the diving, multi nodular and toxic goiter were the most represented and the majority of our patients consulted at the fourth stage, the indeterminate stage and the third stage. According to the WHO classification, 12.9% of subjects had goiter stage Ia, 1.8% stage Ib, 0.3% stage II, but none had stage III goiters. Our results are explained by the fact that in our country, the population always consults when the disease is at the terminal stage or at the moment when complications begin to appear [20].

This study shows that general anesthesia (GA) combined with oro-tracheal intubation (OTI) was the type of anesthesia used in all cases and no complication related to anesthesia was reported. In Morocco, especially at the Avicenne Military Hospital in Marrakech in 2010, in a study conducted by Sdigui and Zoubir on anesthesia for goiter surgery, general anesthesia alone was the type used and the operative follow-up was favorable in 88% of cases. No complications related to anesthesia have been reported too [21].

In this study, subtotal lobectomy and subtotal thyroidectomy were the techniques used. The surgical procedure was based on the location of the nodules and the appearance of the rest of the parenchyma. In a study conducted by Atoumane Faye and his collaborators on the epidemiological, clinical, therapeutic and evolutionary aspects of Grave's disease at CHU of Ledantec in Dakar (Senegal), only 3 out of 108

patients underwent thyroid surgery, i.e. 2.8%. This was a subtotal thyroidectomy [18].

In literature, it is said that medical treatment can be effective in the treatment of goiter but only in half of the cases. Nevertheless, recurrence is very common after medical treatment. After therapeutic failure, the only alternative is radical treatment such as thyroidectomy, which is rarely performed in Africa [22].

All 23 operated patients for goiters were cured. Nevertheless, only one case of tracheomalacia was found as complication of this surgery in our patients. In Senegal, in a study on the epidemiological, clinical and etiological profile of goiters in Saint Louis, conducted by Dia and colleagues, 81 patients underwent gland surgery, no complication in operative follow-up and no deaths were recorded [23]. In Morocco, especially at the Avicenne Military Hospital in Marrakech in 2010, in a study carried out by Sdigui and Zoubir on anesthesia for goiter surgery, out of 100 cases of goiter operated, the operative follow-up was favorable in 88% of cases. Some complications were recorded: 4 cases of transient laryngeal paralysis, 1 case of definitive laryngeal paralysis, 4 cases of transient hypoparathyroidism, 1 case of compressive hematoma and 1 case of death by thyreotoxic crisis [21].

Conessa and colleagues [24] found out of 155 procedures performed at the main hospital in Dakar, 3 cases representing 1.9% of bleeding complications, 1 case representing 0.6% of recurrent paralysis and 3 cases or 3% hypoparathyroidism. The low percentage of complication in our study proves that the surgical technique used in goiter surgery was well controlled by surgeons.

## 6. CONCLUSION

Goiter represents a public health problem in rural areas in the territory of Beni. Sensitization of the population on the preventive means as well as the continuous training of the medical staff in the medical and surgical management of this disease could contribute to its control.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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