

## **Diagnostic and Therapeutic Strategy in the Management of Goiters in a Surgical Setting: Report of 89 Cases**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All the authors have contributed to this study and have read and approved the final manuscript.*

### **Article Information**

#### Editor(s):

(1) Dr. Wagih Mommtaz Ghannam, Mansoura University, Egypt.

#### Reviewers:

(1) Meer Chisthi, Government Medical College, India.

(2) Kostoglou-Athanassiou Ifigenia, Asclepeion Hospital, Greece.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/64182>

**Case Study**

**Received 20 October 2020**

**Accepted 26 December 2020**

**Published 28 January 2021**

### **ABSTRACT**

**Introduction:** The goiter is a very common endocrine pathology throughout the world.

**Objectives:** The objectives of our study is to analyse the anatomo-clinical aspects of goiters, its means of investigation, as well as their management in a surgical environment

**Materials and Methods:** Our work is a retrospective study concerning 89 cases operated on for goiter in the general surgery department (wing 3) of the Ibn Rochd University Hospital in Casablanca, over a 2-year period from June 2015 to June 2017.

**Résultat:** The average age of our patients was 49 years old and the sex ratio was 11.71 (82W/7M) The reason for consultation was an asymptomatic mass in 58% of cases. Our patients were euthyroid in 100% of cases. Ultrasound showed a multi-hetero nodular goiter in 89% of cases and 34% of cases were classified as TIRADS 3A. The plunging character was not objectified in any patient.

Total thyroidectomy was carried out in 100% of the cases in our series, with a systematic search for recurrent nerves and parathyroid glands. 86% of the cases were benign, while only 14% were malignant, with papillary carcinoma being the most common (9.76% of cases).

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**Conclusion:** The diagnostic approach in front of a goiter is based on the search for clinical signs supplemented by multiple paraclinical examinations allowing the orientation of the practitioner and a better definition of the surgical indication.

*Keywords: Thyroid; goiter; thyroidectomy complication.*

## 1. INTRODUCTION

The goiter is a diffuse or localised thyroid hypertrophy, it continues to present a real health problem throughout the world. The prevalence of goitre varies according to socio-economic status, geographical factors and iodine deficiency, which is the primary etiology of goitre in the world [1]. It can be caused either by gland stimulation, neoplastic or cystic infiltration, or inflammation. Thus, a thyroid goiter can be benign or malignant, which explains the perplexity of the practitioner in the diagnostic process and the therapeutic decision [2].

## 2. METHODS AND MATERIALS

Our study is a retrospective study of 89 cases operated on for goiter in the general surgery department of the Ibn Rochd University Hospital in Casablanca, over a 2-year period from June 2015 to June 2017.

## 3. RESULTS

We found a female predominance with a sex ratio of 11.71. The average age of our patients was 49 with extremes between 20 and 71. Twenty-five patients (28% of the cases) had a family history of thyroid disease. The consultation period ranged from 4 months to 15 years with an average of 9 years. Thus, the reason for consultation was dominated by asymptomatic cervical tumefactions in 58% of cases.

Cervical examination revealed nodular goitre in 52 patients (58% of cases) and diffuse goitre in 37 patients (42% of cases). Eighteen thyroid goitres were accompanied by cervical adenopathy (20% of cases). ENT examination was performed in nine patients (10% of cases) and was normal.

Cervical ultrasound was performed on all patients and found a multi-nodular goiter in 79 patients (89% of cases) and a homogeneous diffuse goiter in 10 patients (11% of cases). Out of all cases, 34% of goitres were classified as

TI-RADS3A, 22% were classified as TI-RADS4B, 13% were classified as TI-RADS4A, 5% were classified as TI-RADS 2 and 26% were not classified. This examination also revealed cervical adenopathies in 18 patients (i.e. 20% of the cases), but the plunging nature was not objectified in any patient.

The thyroid scintigraphy was carried out in 15 patients (17% of cases) who were found to have a hypo-fixing multi-nodular goiter in six patients and a multi-nodular goiter with inhomogeneous fixation in nine patients. Chest X-rays were performed in all patients, revealing a deviation of the trachea in six patients (7% of cases).

The TSHus dosage was carried out in all patients (100% of cases). LT4 was measured in 24 patients (27% of cases), while LT3 was measured in 15 patients (16.85% of cases). Euthyroidism was found in all our patients.

However, three patients benefited from cytopuncture, which revealed a benign lesion in one patient and dubious lesions in the other two patients. Calcitonin was measured in three patients and was found to be normal. None of the patients were tested for thyroglobulin or thyroid antibodies. Nine patients underwent a cervical-thoracic CT scan and three patients had tracheal deviation, but no plunging goiter was diagnosed.

All the patients in our series underwent a total thyroidectomy and one patient received preoperativetreatment with synthetic antithyroid drugs for multi-nodular goitre, but no patients were put on thyroid hormones. No intraoperative complications were reported in our series.

Some postoperative complications were observed in 22 patients (i.e. 24.71% of cases) (Table 1).

The anatomopathological examination concluded that 86% of the cases were benign and 14% were malignant. Of these, papillary carcinoma was found in 9 patients, vesicular carcinoma in 2 patients, medullary carcinoma in one patient and lymphoma in another patient.

**Table 1. The complications of thyroid surgery in our series and their possible treatments**

<b>Complications</b>	<b>Number of cases</b>	<b>Percentage</b>	<b>Treatment received</b>
<b>Hypocalcemi</b>			
Transitional	15	16,85%	Calcium replacement with good evolution
Definitive	0	0%	
<b>Recurrential Paralysis</b>			
Transitional	5	5,61%	Corticotherapy with good evolution
Definitive	0	0%	
<b>Compressive Hematoma</b>	1	1,12%	Surgical reoperation for evacuation and haemostasis
<b>Acute Thyrotoxic Crisis</b>	1	1,12%	symptomatic treatment + hormone therapy with good evolution
<b>Wall Suppuration</b>	0	0%	local care + antibiotherapy
<b>Death</b>			

#### 4. DISCUSSION

The frequency of thyroid goitres increases with the age of the subjects, with an average age of 49 [3,4] Female involvement is a risk factor for this pathology, it is 81% for Bouttin, 90% for Bruneau, 87% for Moreau, and 91.7% for Morea [4] There are other risk factors such as reduced iodine intake, exposure to X-rays, obesity, smoking, and alcohol consumption [5].

The questioning should look for the notion of iodine deficiency which favours the development of diffuse goitre and in the long term the appearance of nodule within the goitre [5], family antecedents of thyroid disease, thyroid cancer or other endocrine affections [6], as well as the notion of cervical irradiation [7] The duration of evolution of thyroid goitres varies according to the different studies carried out with an average of 8 years [3,8]. however, a sudden increase in thyroid volume is most often indicative of intracystic bleeding or a thyroid cyst [7]. Also other differentiated cancers increase in volume very gradually and that the stability of the size does not eliminate the diagnosis of cancer [9].

The increase in thyroid volume is generally asymptomatic in more than 50% of cases. Symptomatic tumefaction reflect the involvement of anatomical structures closely related to the thyroid body, either by compression or by extension of an infiltrating process which is mainly represented by dysphonia, dyspnoea and/or dysphagia [7,10]. 58% of the cases in our series had asymptomatic progressive cervical

tumefaction. Alteration of the general state is only reported in the rare differentiated cancers with synchronous metastasis or anaplastic carcinomas [11] In our series no patient had presented an alteration of the general state.

The clinical examination brings signs in favour of malignant pathology, in particular the presence of cervical adenopathies, signs in favour of an inflammatory or infectious pathology or of a compression [7,11] In our series we found 20% of the cases of cervical adenopathy without any inflammatory signs in front of them. Laryngoscopy has a privileged place in the evaluation of the recurrential lesion before surgery. Thus, according to Grégory and Echternach 6% of recurrential paralysis was observed preoperatively [12,13] In our series this examination was carried out in 10% of cases which was normal.

Cervical ultrasound has been performed systematically in all studies [10,14] and is the initial diagnostic workup for thyroid nodules [15]. This examen is used for the quantitative stratification of the risk of malignancy using the EU-TIRADS European Risk Score, which ranges from 1 to 5 and aims to standardise the thyroid ultrasound reading and limit the number of patients warranting fine-needle cyto-puncture [15] (Table 2).

For some authors, thyroid cytopuncture with a fine needle and cytological study has an important role in the management of thyroid nodules [16]. It is both a diagnostic tool for benign or malignant lesions and a screening tool

with selection of nodules justifying surgery. [17] (algorithm)

In cases where cytopuncture has a doubtful result or is non-contributory on two occasions, the use of scintigraphy is justified. the finding of a capture will exonerate these nodules, if they are at least 1cm in size [18].

Thyroid scintigraphy provide information on the functional status of a nodule. Malignant nodules usually pick up less radio-active material than normal thyroid tissue and will appear as a "cold" or hypofixation zone [6]. Approximately 10% of thyroid nodules pick up iodine123, which is usually indicative of good cell differentiation and benignity [20].

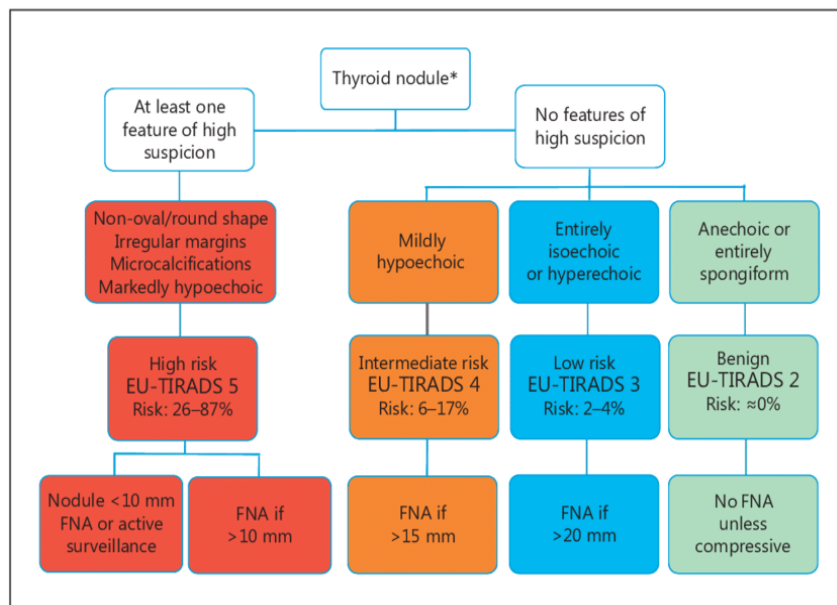
The scintigraphy is of great interest to the surgeon for the localisation of ectopic thyroid tissue, whether during initial surgery or during re-intervention (sublingual goitre, thoracic

recurrence, extra thyroid). It is also used by some people to identify the Lalouette pyramid before surgery for Basedow's disease [21]. In our series this examination was carried out in 17% of cases.

X-rays of the thorax provide impact information of the goiter on the tracheal axis, of its plunging character [22]. It can also show the presence of intra-thyroid calcifications or pulmonary metastases. Scanner and MRI cervical are essential to assess the extent, volume and anatomical relationships of thyroid goitres with endothoracic, mediastinal or retropharyngeal development [23]. Also, cervical MRI has adventures, such as excellent tissue contrast, no risk of dysthyroidism and no radiation, hence its interest in pregnant women [24]. In our series, no plunging goiter has been objectified. 3D ultrasound, Doppler-energy and the use of contrast material in ultrasound are techniques which have not yet been properly evaluated [7].

**Table 2. Score de risque européen EU-TIRADS H**

TIRADS recommendation	EU-TIRADS score	Signification	Risk of malignancy in relation to histology
	1	Normal	
R2	2	Bénin	0
R3	3	Low risk	2-4%
R4	4	intermediate risk	6-17%
R5	5	high risk	26-87%



**Fig. 1. EU-TIRADS algorithm for the stratification of the risk of malignancy and the indication of fine needle cytopuncture [19]**

The TSHus level is the parameter of choice for the detection of thyroid dysfunction, as it has a very high sensitivity because a small change in T4L causes a very amplified TSHus response [25]. This is why it is carried out as a first-line test [9,26]. In a study of the practice patterns of almost 900 endocrinologists, more than 99% requested TSH measurements [27]. Antibodies against TSH receptors are present in 98% of Basedow's diseases, and their presence when antithyroid treatment is stopped can be predictive of recurrence [9]. However, the presence of anti-TPO (antithyropoxidase) antibodies in the serum of a patient with dysthyroidism is in favour of an autoimmune disease. Their role in the therapeutic decision remains limited [9,28].

It's recommended that only patients with euthyroidism can be operated, although there are cases where it is difficult to obtain normalisation of thyroid hormones even with well-conducted treatment [29]. In our series a patient was treated with synthetic antithyroid drugs for toxic goitre.

For a multi-hetero-nodular goiter, even if there's no consensus, it seems reasonable when an operative indication is posed to perform a total thyroidectomy from the outset [30]. It is only when the nodular dystrophy is almost unilateral with in contralateral a soft, anterior, and infra-centimetric nodule that it will be possible to propose, if the extemporaneous histology of the suspect nodule is negative, a lobo-ishmectomy associated with enucleo-resection of this contralateral nodule [11,31], according to Rienzo-Madero et al for patients who underwent lobo-ishmectomy on unilateral multi-nodular goitre, 30% of cases were reoperated for contralateral recurrence [32].

-For lesions revealed by lymph node metastasis, total thyroidectomy is associated with bilateral mediastinal curage [29,33]. Also, enlarged thyroidectomy is usually indicated for cancer that has spread beyond the limits of the thyroid compartment. Resection of both uni- or bilateral subhyoid muscles is essential if the cancer has spread beyond the limits of the capsule, which facilitates the removal of the underlying thyroid gland in one piece [33]. All the patients in our series had undergone a total thyroidectomy.

The average length of hospitalisation for our patients was 6 days, which is consistent with the literature data [30]. The mortality rate for thyroid surgery is extremely low; in fact, most recent studies have found a mortality rate of less than 1% or even zero in most cases. This mortality

rate is almost always linked to acute haemorrhage [34]. In our study, we did not report any deaths, so our results are consistent with those in the literature [30]. Nevertheless, thyroid surgery can lead to three major complications, often reversible and potentially preventable: reccurrential paralysis, secondary hypoparathyroidism and compressive haematoma.

The great specificity of the extemporaneous examination conditions the practitioner's attitude. However, its contribution remains limited for the diagnosis of microcarcinomas and carcinomas of micro vesicular architecture [35]. Cancer constitutes less than 5% of thyroid pathology [36], of which papillary carcinoma is the most frequent since it accounts for 65 to 80% of thyroid cancers [9,37] followed by vesicular carcinoma and then squamous cell carcinoma which is extremely rare - less than 1% of all thyroid carcinomas [38]. In our series, 13 patients had thyroid cancer, nine of whom had papillary carcinoma.

After total thyroidectomy, patients are treated with l-thyroxine at a dose of 1.6-2 µg/kg body weight per day [39]. This treatment has a two-fold benefit, firstly a substitutive role to correct hypothyroidism, and secondly a suppressive role to reduce relapses by inhibiting TSH secretion and thus prevent the stimulation of the growth of possible metastases [40]. Post-operative clinical and biological monitoring after total thyroidectomy is essential [41]. In our series, all patients were put on hormone replacement therapy for life.

## 5. CONCLUSION

The search for clinical signs in front of a thyroid goiter, completed by multiple paraclinical examinations, often allows practitioners to be guided in the management and to establish a correct surgical indication.

## CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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