

Surgical Treatment of Multinodular Goiter in Young Patients

Antonio Ríos,¹ José M. Rodríguez,¹ Pedro J. Galindo,¹
Mariano J. Montoya,¹ Manuel Canteras,² and Pascual Parrilla¹

¹Departamento de Cirugía. Servicio de Cirugía General y del Aparato Digestivo I; and ²Departamento de Bioestadística, Universidad de Murcia, Hospital Universitario Virgen de la Arrixaca, El Palmar 30120, Murcia, Spain

The objectives of this study were to analyse the results of surgical treatment of multinodular goiter (MG) in a population with under 30 yr of age; (2) to determine the incidence and evolution of related thyroid carcinomas; and (3) to evaluate the rate of relapse. Eighty-one patients operated for MG and under 30 yr of age were analyzed. The control group used consisted of 510 patients between 30 and 60 yr of age, operated on for MG. Cervical surgery for thyroidectomy was performed in all patients. The main outcome measures were postoperative morbidity and mortality; related thyroid carcinoma (number, type and evolution); remission of symptoms; and relapse of goiter. There were neither cases of hypoparathyroidism nor definitive recurrent lesions. In patients with symptoms, there was total remission of these. Although more than half were treated on suspicion of malignancy, only 9% were related to a carcinoma and most were papillary microcarcinomas. The average follow-up was 124 ± 68 mo. Of the 48 patients with partial surgery, 40% had relapse ($n = 19$). After 5 yr, the rates of relapse were 11% for the Dunhill technique, 20% for bilateral subtotal thyroidectomy, 17% for hemithyroidectomy, and 50% for unilateral subtotal hemithyroidectomy. These rates increased by 25%, 50%, 44%, and 60% respectively, after 10 yr, and up to 33%, 50%, 62%, and 70% after 15 yr; 89% of the cases of relapse were operated on—there were two hypoparathyroidisms and two recurrent lesions, one of the cases of recurrent lesion becoming definitive. MG in young people is mainly treated because of the suspicion of malignancy, although this occurs in less than 10% of cases. Surgery can be carried out with a low rate of morbidity, although the results are only definitive with total thyroidectomy, with a high level of relapse when partial techniques are used given that these are patients with long life expectancy.

Key Words: Multinodular goiter; young people; surgery; relapse; postsurgical morbidity.

Introduction

Multinodular goiter (MG) is the most common thyroid pathology and represents a large volume of patients in the surgical services (1,2). However, during adolescence and youth, MG is very uncommon except in populations with a deficiency in iodine (3). The growth of the thyroid gland during adolescence should be considered as a pathological process, and it is relatively frequently related to carcinoma, especially in solitary nodules, which is why the evaluation of these patients should include definitive tests in order to rule out malignancy (3–5). The role of fine needle aspiration (FNA) has extensively been studied in adults, in which there is a higher incidence of benign nodules. In adolescents and young people, experience is more limited, so the incidence of this pathology is lower and, because the thyroid carcinoma which occurs is usually very differentiated, it is difficult to make a differential diagnosis between adenoma and carcinoma by cytology (3,6). This situation is more pronounced in MG. For these reasons, extirpation is more important than FNA for establishing the definitive histological diagnosis in these patients with MG (3).

The objectives of this study in MG in the population under 30 yr of age are: (1) to analyze the results of surgical treatment, in terms of morbidity and remission of the symptoms; (2) to determine the incidence and evolution of thyroid carcinomas related to these goiters; and (3) the evaluation of the rate of relapse and reintervention in those patients in which partial thyroid surgery is carried out.

Results

Epidemiology

As observed in Table 1, the group of young patients is characterized by a lower goiter evolution time (34 vs 87 mo; $p < 0.0001$), a greater presence of asymptomatic goiters (80% vs 59%; $p = 0.0001$), and a lower percentage of goiter with an intrathoracic component (11% vs 37%; $p = 0.0001$), when compared with the group of goiter cases operated on with patients' between 30 and 64.

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Author to whom all correspondence and reprint requests should be addressed: Dr. Antonio Ríos Zambudio, Avenida de la Libertad nº 208, Casillas, 30007, Murcia, Spain. E-mail: ARZRIOS@teleline.es

Table 1
Comparative Study of the Clinical and Epidemiological Characteristics between Goiters Treated in the Adult Population Aged between 30 and 64 yr, and Young People under 30 yr of Age

Variable	<30 yr <i>n</i> = 81	30–64 yr <i>n</i> = 510	<i>p</i> *
Sex			
Male (<i>n</i> = 45)	3 (4%)	42 (8%)	0.1332
Female (<i>n</i> = 546)	78 (96%)	468 (92%)	
Family medical history			
No (<i>n</i> = 544)	77 (95%)	467 (92%)	0.1091
Yes (<i>n</i> = 47)	4 (5%)	43 (8%)	
Residence in goitergenic area			
No (<i>n</i> = 461)	59 (73%)	402 (79%)	0.4707
Yes (<i>n</i> = 130)	22 (27%)	108 (21%)	
Previous thyroid surgery			
No (<i>n</i> = 552)	76 (94%)	476 (93%)	0.5826
Yes (<i>n</i> = 39)	5 (6%)	34 (7%)	
Asymptomatic			
No (<i>n</i> = 225)	16 (20%)	209 (41%)	0.0001
Yes (<i>n</i> = 366)	65 (80%)	301 (59%)	
Hyperthyroidism			
No (<i>n</i> = 497)	72 (89%)	425 (83%)	0.1653
Yes (<i>n</i> = 94)	9 (11%)	85 (17%)	
Compressive syndromes			
No (<i>n</i> = 470)	76 (94%)	394 (77%)	0.0001
Yes (<i>n</i> = 121)	5 (6%)	116 (23%)	
Consistency on exploration			
Hard (<i>n</i> = 106)	13 (16%)	93 (18%)	0.5793
Elastic (<i>n</i> = 485)	68 (84%)	417 (82%)	
Intrathoracic component of MG			
No (<i>n</i> = 395)	72 (89%)	323 (63%)	0.0001
Yes (<i>n</i> = 196)	9 (11%)	187 (37%)	
Evolution time of the goiter	34.2 + 45.5	87 + 104	0.0001

*The bold faced entries are significant ($p < 0.05$).

Surgery

Surgery was mainly carried out when there was suspicion of malignancy ($n = 43$; 53%): pathologic FNA in 17 patients (follicular proliferation in 12 cases and suspicion of malignancy in 5), previous neck radiotherapy in 3 cases, and in the rest of the patients by clinical suspicion [hard consistency of the nodule on exploration ($n = 13$), quick growth of some nodule ($n = 7$), or cervical adenopathies ($n = 3$)]. Other indications of surgery were at the request of the patient [cancerophobia, aesthetic reasons ($n = 13$; 16%)], progressive growth of the goiter ($n = 8$; 10%), and hyperthyroidism ($n = 8$; 10%) (Table 2).

With respect to when surgery is carried out, there is a higher number due to suspicion of malignancy (53% vs 29%; $p = 0.0002$) than in the control group, and a lower number due to compressive symptoms (5% vs 21%; $p = 0.0012$) (Table 2).

All the patients were operated on via the neck (Kocher's cervicotomy), and 75% ($n = 61$) by surgeons with experience in endocrine surgery. As far as the surgical technique

is concerned, in the five patients with previous surgery thyroidectomy was performed. In 28 cases (35%) total thyroidectomy was carried out, and in the remaining 48 cases (59%) partial thyroid surgery was carried out [Dunhill's almost complete thyroidectomy ($n = 9$; 11%), bilateral subtotal thyroidectomy ($n = 5$; 6%), hemithyroidectomy ($n = 24$; 30%), and unilateral subtotal hemithyroidectomy ($n = 10$; 12%)]. Unilateral surgery was carried out on MG with a normal lobule on neck examination, in the neck ultrasound, and on examination during surgery.

Results of Surgical Treatment

Postoperative complications occurred in 14% of the patients ($n = 11$), a rate which is lower than that of the control group (28%; $p = 0.0473$) (Table 3). These complications correspond to eight transitory hypoparathyroidisms (10%), three transitory recurrent nerve injuries (4%), one upper laryngeal nerve lesion (1%), and one infection of the cervicotomy (1%). There were neither cases of hypoparathyroidism nor definitive recurrent nerve injuries. With respect

Table 2
Surgical Indications in MG^a

Variable	<30 yr <i>n</i> = 81	30–64 yr <i>n</i> = 510	<i>p</i> *
Suspicion of malignancy:			
No (<i>n</i> = 398)	38 (47%)	360 (71%)	0.0002
Yes (<i>n</i> = 193)	43 (53%)	150 (29%)	
Compressive symptoms			
No (<i>n</i> = 478)	77 (95%)	401 (79%)	0.0012
Yes (<i>n</i> = 113)	4 (5%)	109 (21%)	
Asymptomatic intrathoracic goiter			
No (<i>n</i> = 525)	78 (96%)	447 (88%)	0.0812
Yes (<i>n</i> = 66)	3 (4%)	63 (12%)	
Progressive increase in goiter			
No (<i>n</i> = 551)	73 (90%)	478 (94%)	0.1210
Yes (<i>n</i> = 40)	8 (10%)	32 (6%)	
Hyperthyroidism			
No (<i>n</i> = 518)	73 (90%)	445 (87%)	0.1145
Yes (<i>n</i> = 73)	8 (10%)	65 (13%)	
Related hyperparathyroidism			
No (<i>n</i> = 582)	81 (100%)	501 (98%)	0.6701
Yes (<i>n</i> = 9)	0 (0%)	9 (2%)	
Radiological tracheal compression			
No (<i>n</i> = 570)	79 (97%)	491 (96%)	0.8340
Yes (<i>n</i> = 21)	2 (3%)	19 (4%)	
Asymptomatic: at patients request			
No (<i>n</i> = 515)	68 (84%)	447 (88%)	0.1005
Yes (<i>n</i> = 76)	13 (16%)	63 (12%)	

^aComparative study between adult population aged between 30 and 64, and young people under 30 yr of age.

*The bold faced entries are significant ($p < 0.05$).

to the control group, there are no significant differences in the incidence of any of the complications, as can be seen in Table 3. The average stay in hospital was of 4 ± 1 d (2–8 d).

All complications were only in two surgical technique groups: total thyroidectomy ($n = 11$: seven transitory hypoparathyroidisms, two transitory recurrent nerve injuries, one upper laryngeal nerve lesion, and one infection of the cervicotomy), and reoperation ($n = 2$: one transitory hypoparathyroidism, and one transitory nerve recurrent injury). In the 48 cases with partial thyroid surgery there were no complications ($p < 0.05$).

Associated Cancer

The histological study showed that the goiter was related to seven carcinomas (9%), all of which were papillary, except one which was follicular. Only in one case of the preoperative FNA was there suspicion of malignancy, in the rest it was colloid.

Three of the carcinomas were multifocal, and four were incidental microcarcinomas. As far as its spread is concerned, only one papillary cancer showed capsular affectation, and the follicular case showed vascular and follicular affectation. Apart from the three papillary microcarcinomas, which were unifocal and less than 0.5 cm, ablative therapy with

¹³¹I was carried out on the remaining four according to the postsurgical remnants detected using scintigraphy. Currently all the patients are disease-free, most after a follow up of more than 5 yr (Table 4).

Evolution

After treatment the patients are checked after 1 mo, 6 mo, and thereafter annually in consultations. The cases which remained hypothyroidic were treated with hormonotherapy (L-thyroxine) at substitutive doses for the TSH [33 cases with total thyroidectomy or after completing thyroidectomy; 10 and 17 patients with partial thyroidectomy which at some point in its evolution develop hypothyroidism [Dunhill's almost complete thyroidectomy ($n = 7$), bilateral subtotal thyroidectomy ($n = 3$), and hemithyroidectomy ($n = 7$)]].

The average postoperative follow up time has been of 124 ± 68 mo (12–348 mo). The results were excellent as far as remission of the symptoms is concerned. Thus, the nine patients with thyrotoxicosis and the five with compressive symptoms (four tracheal affectations and one recurrent) showed remission from this illness.

Of the patients treated with partial surgery ($n = 48$), 40% had relapse of goiter ($n = 19$). In Table 5 it can be seen how the rate of relapse increases as evolution time also increases,

Table 3
Distribution of the Postoperative Complications^a

Variable	<30 yr <i>n</i> = 81	30–65 yr <i>n</i> = 510	<i>p</i> *
Transitory hypoparathyroidism			
No (<i>n</i> = 536)	73 (90%)	463 (91%)	0.6243
Yes (<i>n</i> = 55)	8 (10%)	47 (9%)	
Definitive hypoparathyroidism			
No (<i>n</i> = 583)	81 (100%)	502 (98%)	0.2764
Yes (<i>n</i> = 8)	0 (0%)	8 (2%)	
Transitory recurrent nerve lesion			
No (<i>n</i> = 525)	78 (96%)	447 (88%)	0.0502
Yes (<i>n</i> = 66)	3 (4%)	63 (12%)	
Definitive recurrent nerve lesion			
No (<i>n</i> = 579)	81 (100%)	498 (98%)	0.0745
Yes (<i>n</i> = 12)	0 (0%)	12 (2%)	
Upper laryngeal nerve lesion			
No (<i>n</i> = 582)	80 (99%)	502 (98%)	0.5196
Yes (<i>n</i> = 9)	1 (1%)	8 (2%)	
Seromas			
No (<i>n</i> = 588)	81 (100%)	507 (99%)	0.2134
Yes (<i>n</i> = 3)	0 (0%)	3 (1%)	
Cervicotomy infection			
No (<i>n</i> = 584)	80 (99%)	504 (99%)	0.6151
Yes (<i>n</i> = 7)	1 (1%)	6 (1%)	
Systemic complications			
No (<i>n</i> = 587)	81 (100%)	506 (99%)	0.3653
Yes (<i>n</i> = 4)	0 (0%)	4 (1%)	
Tracheotomies			
No (<i>n</i> = 587)	81 (100%)	506 (99%)	0.3653
Yes (<i>n</i> = 4)	0 (0%)	4 (1%)	
Cervical hematomas			
No (<i>n</i> = 587)	81 (100%)	506 (99%)	0.3653
Yes (<i>n</i> = 4)	0 (0%)	4 (1%)	
Global complications			
No (<i>n</i> = 433)	70 (86%)	384 (72%)	0.0473
Yes (<i>n</i> = 158)	11 (14%)	126 (28%)	

^aComparative study between treated goiters in the adult population aged between 30 and 64, and young people under 30 yr of age.

*The bold faced entries are significant ($p < 0.05$).

mainly with the unilateral techniques. Therefore after 5 yr of evolution, the relapse rates are 11% for the Dunhill technique, 20% for bilateral subtotal thyroidectomy, 17% for hemithyroidectomy, and 50% for unilateral subtotal hemithyroidectomy. These rates increase by 25%, 50%, 44%, and 60% respectively after 10 yr, and up to 33%, 50%, 62%, and 70% after 15 yr of postsurgical evolution.

Throughout its evolution, 17 of the patients with relapse (89%) had the goiter reoperated on. In seven cases (41%) this was at the request of the patient (three for cancerophobia, three for aesthetic reasons, one for not wanting to follow the periodic controls with FNA), in five (29%) due to the suspicion of malignancy, in two (12%) due to compres-

sive symptoms of the intrathoracic goiter, in two (12%) due to the increase in progressive size, and in one (6%) due to hyperthyroidism related to bad medication control. In two patients the presence of an intrathoracic goiter was objectivized. All were removed through the neck and by surgeons with experience in endocrine surgery. With respect to surgical technique, the thyroidectomy carried out initially was completed in all the cases, except in two with a unilateral subtotal hemithyroidectomy and with relapse only on one side, in which a hemithyroidectomy was performed on the affected side. The complications were two hypoparathyroidisms (12%), none of them definitive, and two nerve recurrent injuries (12%), one of these definitive (6%). In one case a

Table 4
Evolution of Thyroid Carcinomas Related to MG in Patients Under 30 yr of Age

Case	Age	Carcinoma	Size*	N° Foci	Vascular invasion	Capsular invasion	Ganglionic invasion	Evolution time**	Current situation
1	19	Papillary	0.3	1	—	—	—	119 mo	Disease free
2	27	Papillary	0.4	1	—	—	—	190 mo	Disease free
3	26	Papillary	0.4	1	—	—	—	174 mo	Disease free
4	12	Papillary	0.8*	3	—	Yes	—	60 mo	Disease free
5	27	Papillary	1	1	—	—	—	23 mo	Disease free
6	29	Papillary	1*	3	—	—	—	126 mo	Disease free
7	26	Follicular	2.5*	2	Yes	Yes	—	24 mo	Disease free

*Size of largest tumoral focus.

**Evolution time of thyroid cancer.

Table 5
Relapse of MG in Patients Treated
with Partial Thyroid Surgery When They Were Under 30 yr of Age

Technique	2 yr	5 yr	7 yr	10 yr	15 yr
Dunhill technique (<i>n</i> = 9)	0% (0/9)*	11% (1/9)	11% (1/9)	25% (2/8)	33% (2/6)
Bilateral subtotal thyroidectomy (<i>n</i> = 5)	0% (0/5)	20% (1/5)	25% (1/4)	50% (2/4)	50% (2/4)
Hemithyroidectomy (<i>n</i> = 24)	4% (1/24)	17% (4/23)	30% (6/20)	44% (7/16)	62% (8/13)
Unilateral subtotal hemithyroidectomy (<i>n</i> = 10)	40% (4/10)	50% (5/10)	50% (5/10)	60% (6/10)	70% (7/10)

*Percentage of relapse (cases of relapse / cases with *x* yr of follow up in the column).

multifocal papillary microcarcinoma was related (three foci, the largest being of 0.6 cm) without vascular, capsular, or lymphatic affectation.

Discussion

Thyroid disease is the most common endocrine disorder during adolescence and childhood, mostly autoimmune thyroid disease (3,9–11). Nodular goiter (solitary or multinodular) is not very common in young people, except in populations where there is an iodine deficit (3), although in certain zones it can affect between 1 and 3% of the adolescent population between 11 and 18 yr of age, predominantly among girls (3,12). MG generally occurs as a growth or an asymptomatic thyroid gland detected in a routine medical examination or noted by the patient, family, or friends (3). The main problem of nodular thyroid disease during this age is its evaluation and handling, as it is often associated with carcinomas (3). The initial functional evaluation includes tests on thyroid function, thyroid antibodies to rule out Hashimoto's thyroiditis, and tumoral serological markers, thyroglobulin as well as serum calcitonin (3). The anatomical study of nodular thyroid disease includes thyroid ultrasound and scintigraphy, but rarely FNA (3,13). Ultrasound is recommended for determining whether the nodule is a cyst, a solid, or contains both elements; is solitary or multiple; and

is of homogeneous or heterogeneous echogenicity (3). For the evaluation of the toxic nodules, it is preferable to use a scintigraphy with ¹³¹I rather than a ^{99m}Tc pertechnetate. The role of FNA in young people is limited (3,6); removal is more important than FNA for establishing a definitive diagnosis (3).

In our study it can be seen that suspicion of malignancy is the most frequent reason for surgery, above all clinical suspicion (adenopathies, previous history of radiotherapy, a hard nodule, and so on) more than cytology. However, the real incidence of malignancy, confirmed by the histological study, was less than 10%. The most frequent thyroid carcinoma in these patients is papillary thyroid cancer, and its prognosis is excellent (3), as can be seen in our study.

The results of surgery on this population are positive (3). There is therefore a low level of morbidity in the hands of surgeons with experience in endocrine surgery. In our series, most complications were transitory, without there being any cases of recurrent lesions or transitory hypoparathyroidism, although, it is necessary to point out, that in more than half of the cases we carried out partial resective surgery. On the other hand, in the cases that showed symptoms, either compressive or hyperthyroidism, there was complete remission from this disease. In total thyroidectomy the results were definitive. In the cases with partial techniques, our rate of relapse was 40%. This high level is justified in part by the

long-term follow-up of our patients. Thus, in the few studies with a postsurgical follow-up of over 10 yr, these rates of relapse increase considerably (14,15), as in our series. The extension of the resection during the first operation reduces the incidence of relapse of goiter and subsequently reduces the rate of reinterventions and eliminates the high risk of morbidity related to thyroid resurgery (16). With respect to surgical technique, we have found that in unilateral surgery the rate of relapse is much higher, as expected. In this sense with the unilateral subtotal hemithyroidectomy there was relapse in 70% of the cases before 15 yr had elapsed, and, consequently, it should no longer be used as a treatment for MG. Hemithyroidectomy has a rate of relapse of 44% after 10 yr, and it is necessary to point out the importance of long-term follow-up in order to be able to detect this rate. Thus, the rate of relapse in hemithyroidectomy is similar to that in bilateral subtotal hemithyroidectomy up to approx 13 yr, after which differences are more marked (Table 5). The size of the thyroid remnant left in each technique is an already recognized cause of relapse. Thus, the more thyroid tissue left after intervention, the greater the rate of relapse and the shorter the amount of time in which relapse occurs.

Reintervention should only be carried out under strict circumstances, as previous surgery distorts the surgical field and makes the identification of structures difficult, increasing the risk of comorbidity (17). In our series, the rate of reinterventions among the relapses was 89%, above all due to suspicion of malignancy and at the request of the patient, either because of cancerophobia or for aesthetic reasons. Recurrent lesion has been considered as a definitive complication (6%), but not hypoparathyroidism. In this way, various authors from distinguished endocrine centers already use experienced surgeons to carry out these interventions in order to reduce considerably the rates of complication in surgery for relapse (17). In spite of this, various authors, among them Delbridge et al. (18), consider that partial techniques in MG should be used in a very restricted way given that the risk of complications is very high when surgery is required. This fact is seen more clearly in the youth population, given that life expectancy is higher in this group and the percentage of relapse is therefore higher in the long term.

A different therapeutic option is ablation with radioiodine (^{131}I) (1,19–22), although there are still high failure rates due to a deficit in therapy (hyperthyroidism) (5–70%) and due to excess therapy (hypothyroidism) (5–47%) (1,23). What is more, while relapse of hyperthyroidism after this treatment is between 3% and 9% per year for single nodules or Graves–Basedow disease, for toxic MG it is much more variable (6–64%) (1,21,23,24). On the other hand, when goiter is intrathoracic, as in 11% of our cases, radioiodine is necessary in high doses, and there is a greater risk of provoking acute respiratory insufficiency as a result of tracheal compression, which is why in these cases surgical treatment should be used directly (25). Finally, it should be remembered that radioiodine is not exempt from long-term

risks, above all thyroid dysfunction and the development of cancer (26–28).

To conclude, we can say that MG in young patients is mainly treated due to the suspicion of malignancy, although this occurs in less than 10% of cases. Surgery can be carried out with low morbidity, although the results are only definitive with total thyroidectomy, partial techniques having high levels of relapse given that these are patients with long life expectancy.

Patients and Methods

Criteria Selection

A retrospective study was carried out on patients diagnosed and operated on for MG between January 1970 and January 2000. The selection criteria were: (1) uni- or bilateral MG, defined as that which is present in more than one nodule in the thyroid lobe on neck examination; (2) patients under 30 yr of age at the time of the operation; (3) no associated parathyroid pathology; and (4) diagnosis of MG in the histological study.

Patients' Description

Eighty-one patients under 30 yr of age with a diagnosis of MG have been treated in our service. The average age was of 23 ± 5 yr, most being women ($n = 78$; 96%). In five cases (6%) previous thyroid surgery for nodular goiter had already been carried out, one of these was a subtotal thyroidectomy and four were hemithyroidectomies; 80% ($n = 65$) were asymptomatic and in the others the most frequent diagnosis was hyperthyroidism ($n = 9$; 11%) and compressive symptoms ($n = 5$; 6%) (four esophageal and one recurrent). The patients with toxic goiter were treated with methimazole at a dose of between 30 and 40 mg/d according to TSH figures. The goiter was unilateral in 68% of the cases ($n = 55$), with 11% ($n = 9$) having an intrathoracic component. The consistency of the goiter on exploration was elastic in 84% ($n = 68$) and in three (4%) cervical adenopathies were palpated. The average evolution time of the goiter before surgery was between 34 and 46 mo and in 15 cases (19%) thyroxine treatment with suppressive doses of TSH had been established (Table 1). The thyroid hormones were normal except in nine toxic goiters, which showed an increase of the free T4 and a decrease of the TSH. The antithyroid antibodies were negative. Cervicothoracic radiology was normal except in three patients who had displacement of the tracheal air column, one of these with an image of the mediastinal mass. In two of these patients a CT scan was carried out in order to delimit the intrathoracic goiter. A neck ultrasound was performed in all the patients and the presence of multinodular goiter was confirmed, in the 34 unilateral cases, in 5 patients with previous surgery on the thyroid remnant, and the rest were bilateral. FNA was carried out in 56% of the patients ($n = 45$) reporting colloid in 37 of these, follicular proliferation in 12, suspicion of malignancy in 5, and

Table 6
Clinical and Epidemiological Characteristics,
and Surgical Indications, in Young People Under 30 yr of Age

Variable	≤20 yr <i>n</i> = 22	21–29 yr <i>n</i> = 59
Sex		
Male (<i>n</i> = 3)	0 (0%)	3 (5%)
Female (<i>n</i> = 78)	22 (100%)	56 (95%)
Family medical history		
No (<i>n</i> = 77)	21 (95%)	56 (95%)
Yes (<i>n</i> = 4)	1 (5%)	3 (5%)
Residence in goitergenic area		
No (<i>n</i> = 59)	12 (56%)	47 (80%)
Yes (<i>n</i> = 22)	10 (44%)	12 (20%)
Previous thyroid surgery		
No (<i>n</i> = 76)	21 (95%)	55 (93%)
Yes (<i>n</i> = 5)	1 (5%)	4 (7%)
Asymptomatic		
No (<i>n</i> = 16)	1 (5%)	15 (25%)
Yes (<i>n</i> = 65)	21 (95%)	44 (75%)
Hyperthyroidism		
No (<i>n</i> = 72)	22 (100%)	50 (85%)
Yes (<i>n</i> = 9)	0 (0%)	9 (15%)
Compressive syndromes		
No (<i>n</i> = 76)	21 (95%)	55 (93%)
Yes (<i>n</i> = 5)	1 (5%)	4 (7%)
Consistency on exploration		
Hard (<i>n</i> = 13)	7 (32%)	6 (10%)
Elastic (<i>n</i> = 68)	15 (68%)	53 (90%)
Intrathoracic component of MG		
No (<i>n</i> = 72)	20 (90%)	52 (88%)
Yes (<i>n</i> = 9)	2 (10%)	7 (12%)
Evolution time of the goiter	20 ± 20	40 ± 51
Indications of surgery		
Suspicion of malignancy (<i>n</i> = 43)	15 (68%)	28 (47%)
Compressive symptoms (<i>n</i> = 4)	1 (5%)	3 (5%)
Asymptomatic intrathoracic goiter (<i>n</i> = 3)	1 (5%)	2 (3%)
Progressive increase in goiter (<i>n</i> = 8)	1 (5%)	7 (12%)
Hyperthyroidism (<i>n</i> = 8)	0 (0%)	8 (14%)
Radiological tracheal compression (<i>n</i> = 2)	1 (5%)	1 (2%)
Asymptomatic: at patients request (<i>n</i> = 13)	3 (12%)	10 (17%)

in the remaining patient it was hematic. A scintigraphy was carried out in 38 patientes (47%), showing MG. In the nine cases with hyperthyroidism some of the nodules were warm.

In Table 6 the patients' characteristics have been divided into two subgroups according to their age (≤20 yr, and between 21 and 29 yr).

Variables of Study

The variables analyzed were:

1. *Socio-personal variables*: Age; sex; family history of thyroid pathology; residence in goitergenic areas in our community.
2. *Clinical variables*: Being asymptomatic; hyperthyroidism; compressive syndromes; intrathoracic prolongation of the goiter [according to Eschapse's definition (8), who considers this to be goiter totally or partially located in the mediastinum, and which in operating position has its lower edge at least 3 cm below the sternal manubrium].
3. *Surgery*: Indication of surgery; endocrine surgery experience of the surgeon who carried out the first operation, this meaning that the surgeon had previously carried out more than 100 thyroid surgery operations (7); surgical technique [total thyroidectomy; Dunhill technique (hemithyroidectomy with contralateral subtotal resection leaving a remnant of about 2 g); bilateral subtotal thyroidectomy (bilateral

subtotal thyroid resection leaving 2 g thyroid remnants on both sides); hemithyroidectomy; and unilateral subtotal hemithyroidectomy (subtotal thyroid resection leaving 2 g thyroid remnant)].

4. *Postoperative morbidity and mortality*: the following postoperative complications were noted: (i) Hypoparathyroidism: it was considered during the postoperative period for calcium figures below 7.5 mg/dL or when the patient had symptoms of hypocalcaemia with figures below 8.5 mg/dL. If the calcemia remained below 8.5 mg/dL 1 yr after surgery, it was labeled as permanent. (ii) Recurrent laryngeal nerve injury: it was considered for alteration in the tone, timber, or intensity of the voice following surgery and with vocal chord paralysis confirmed by laryngoscopy. It was labeled as permanent when persisting for more than 12 mo. (iii) Superior laryngeal nerve lesion: normal voice that after speaking reveals a loss of tone and timber, with normal laryngoscopy. (iv) Surgical wound complications, (v) Systemic complications. Postoperative mortality was also evaluated.
5. *Related thyroid carcinoma*: Number and type; and evolution.
6. *Evolution*: remission of symptoms; relapse of goiter; and second surgery by relapse.

Control Group

The control group was made up of 510 patients treated for MG in our service with the same selection criteria except being between 30 and 65 yr at the time of the operation (Table 1). As far as the surgical technique is concerned, in the 20 (4%) patients with previous surgery, thyroidectomy was carried out. In 321 cases (63%) total thyroidectomy was carried out, and in the remaining cases (33%) partial thyroid surgery was carried out [Dunhill's almost complete thyroidectomy ($n = 15$), bilateral subtotal thyroidectomy ($n = 36$), hemithyroidectomy ($n = 78$), and unilateral subtotal hemithyroidectomy ($n = 15$)]. The partial thyroid surgery in this group is smaller than in the study group. In 49 cases the goiter was related to thyroid carcinoma. The average postoperative follow up time has been of 97 ± 73 mo (12–360 mo).

Statistical Study

The statistical study includes descriptive statistics, the chi-squared test complementing the analysis of the residues, and Fisher's exact test if necessary, and Student's *t*-test. The differences were considered significant at levels above $p < 0.05$.

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