Benign thyroid disease
Treatment notes

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AIM: *The treatment of benign thyroid disease is a topic widely debated, ranging from "Lobectomy" to "Total Thyroidectomy". This study aims to contribute to the thinking on treatment strategies for benign thyroid disease.*
MATERIALS OF STUDY: *Thirty five patients underwent surgical treatment following the pre-surgical diagnosis of benign thyroid disease between 2003 and 2005 at the Complex Unit of General and Geriatric Surgery at the Second University of Naples (S.U.N.). In 26 cases total thyroidectomies were performed, in 3 subtotal thyroidectomies, in 6 simple lobectomies.*
DISCUSSION: *Post-surgical course was optimal in the majority of cases. The large number of total thyroidectomies performed is consistent with the trend favoured by this type of strategy.*
When backed by FNA, non-radical surgery can be opted with greater confidence for single nodules and when surgical risks are high. The refinement of surgical techniques and directions for the identifying and preparing the recurrent nerve have enabled a radical approach in treating thyroid nodular disease.
CONCLUSIONS: *In our opinion, for a solitary nodule with residual diseased parenchyma we believe total thyroidectomy should be prescribed. If, however, the residual parenchyma is unharmed a lobectomy may be considered.*
In conclusion, we recommend the individual assessment of each pathology, though we favour total thyroidectomy

KEY WORDS: Lobectomy, Thyroid disease, Total thyroidectomy.

Introduction

The treatment of benign thyroid disease is a highly controversial topic with various solutions ranging from "Lobectomy" to "Total Thyroidectomy".
The debate is still open in benign pathologies localized with only in one lobe, in view of the incidence of the malignancy in solitary nodules that has been shown to be around 10-15% and up to 20% or higher according to some authors [1,2].
It is thus essential to make as a diagnosis as sure as possible for deciding what treatment the patient should receive: total or subtotal thyroidectomy or lobectomy.
In case of plurinodular disease, the following conditions are also indications for surgical intervention: lack of response to organotherapy, marked deviation of the laryngeal-tracheal axis, suspected neoplastic degeneration, hyperfunction not responding to treatment, aesthetic damage.
For a single nodule presumed to be likely benign and displaying no contralateral disease, lobectomy (ETI) can be prescribed, extending to a complete excision if the histological exam shows evidence of carcinomatous

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degeneration. The advantages of this approach are a lower risk of post-surgical hypoparathyroidism, and a shorter surgery time, not to consider a minor danger of laryngeal nerve injury.
On the other hand, a multinodular thyreopathy needs a total thyroidectomy to avoiding the risk of reoperations also taking in account the risk of damage the inferior laryngeal nerves and a post-surgical hypoparathyroidism.
Supporters of total thyroidectomy, even in the presence of a single nodule, emphasize the advantage of avoiding reoperations on the patient in the event of a positive histological result for neoplasia, at times with the presence of multiple microfoci. Reoperation results in higher morbidity, even if during the first operation the anatomical integrity of the contralateral thyroid is maintained so as to avoid cicatricle alterations in the area. Furthermore, the possibility of using follow-up radioactive iodine for diagnosis and treatment is not negligible.
This study aims to contribute to the thinking on treatment strategies for benign thyroid disease.

Materials and methods

35 patients underwent surgical treatment following the pre-surgical diagnosis of benign thyroid disease between 2003 and 2005 at the Complex Unit of General and Geriatric Surgery at the Second University of Naples (S.U.N.).
This group included 28 women and 7 men between the ages of 33 and 78, with a prevalence of patients in their 40s and 50s. In 26 cases total thyroidectomies were performed, in 3 subtotal thyroidectomies, in 6 simple lobectomies and one of these became a thyroidectomy following a histological result of atypical follicular adenoma (Table I).

TABLE I - *Surgeries performed*

Type of surgeries	
Total thyroidectomy (TT)	26
Lobectomy (ETI)	6
Subtotal thyroidectomy (STT)	3
Aggregation surgical removal after lobectomy	1

We only considered benign pathologies so as to verify the treatment strategy in light of the pre-surgical diagnosis. The histological results displayed 18 cases of nodular hyperplasia (including the case of extended surgery), 3 cases of follicular hyperplasia, 4 cases of adenomatous hyperplasia, another 4 cases of Hashimoto's thyroiditis, 6 follicular adenomas (one of which was atypical) and a cystic colloid goitre with thyroiditis (Table II).
Although the sample size was small, pre-surgical exams displayed high sensitivity. This is a key element in the formulation of the treatment strategy, particularly if a less radical operation is planned. The predictive value of FNA was confirmed in 32 of 35 cases (91.42 %; the 3 remaining cases were haematic); the sole case requiring reoperation was due to atypical follicular adenoma with residual tissue displaying nodular hyperplasia (Table III). This data varies from average sensitivity[3] but provides additional support for the validity of fine needle aspiration, even more so if combined with instrumental tests.
Similarly, we should report that one case of a lobectomy, not reported in these case histories as they only include benign disease, required reoperation and a total thyroidectomy due to a malignant histological result. In the 9 cases not subjected to TT, since the relative lesions were only located on one side (7 nodular forms, 1 cystic colloid goitre, 1 adenomatous hyperplasia with thyroiditis), no contralateral reappearance of the disease was reported over time.

Results

Post-surgical course was optimal in the majority of cases: in two patients (one of which received a lobectomy) temporary dysphonia was recorded; dyspnoea occurred in one case. Hypocalcaemia, where present (10 cases), was temporary and easily corrected.
Periodical controls at six months interval showed no relapse of the disease in any residual thyroid tissue and generally good tolerance to replacement organotherapy.
The large number of total thyroidectomies performed is consistent with the trend favoured by this type of strategy; however, in the event of a single nodule or elevated risk, a less invasive operation was chosen.
This approach is granted by the aforementioned sensitivity of FNA, which, even though it can be considered non-significant in absolute terms, still offers valuable

TABLE II - *Histological results*

Follicular adenoma	Follicular hyperplasia	Nodular hyperplasia	Nodular hyperplasia (after aggregation)	Hashimoto's thyroiditis	Adenomatous hyperplasia	Cystic colloid goitre with thyroiditis
6 (one atypical)	3	17	1	4	4	1

TABLE III - *Correspondence cytology-histology*

Cytology		Histology	
Follicular	8	Adenomas	5
		hyperplasia	3
Hyperplasia/goitre	17	Hyperplasia	16
		goitre	1
Thyroiditis	3	Hashimoto's thyroiditis	3
Adenoma	4	Adenomatous hyperplasia	4
Hematic	3	Follicular adenoma	1
		Nodular hyperplasia	1
		Hashimoto's thyroiditis	1

information for the chosen strategy. In other words, non-radical surgery can be opted for with greater confidence for single nodules and when surgical risks are high, when FNA results are favourable.
We believe this method is based on precautionary measures and, in any case, consistent with the principles of patient protection.

Discussion

We believe it is important to report the differences found between what we've observed in the past [4] and the current strategic trend in the treatment of benign thyroid disease. Certainly, 25 years is a long period of time and many things have changed, including in surgery, but this should prompt reflection on the profound diversity of opinions in the field. In 1984, though on a larger sample size (301 patients operated on over 7 years) we reported 41 enucleoresections, 134 subtotal lobectomies and 74 total lobectomies in the 249 cases involving a single lobe; while the 52 cases in which the disease was found in two lobes 37 bilateral subtotal lobectomies were performed along with 15 subtotal lobectomies on one side and total lobectomies on the other.
Data reported was consistent with the treatment strategy at that time, which recommended enucleoresections for small nodules while in the "majority of goitres the operation chosen was the subtotal lobectomy".
Unfortunately, we cannot present a complete follow up for these patients, to confirm the validity of this approach, which now appears to be driven by prudential measures rather than real advantages for the patient.
The refinement of surgical techniques and skills in the identifying and preparing the recurrent nerve have enabled a radical approach in treating thyroid nodular disease, even though this requires increased surgery time, a factor that must be taken into consideration for at-risk patients. This approach is based on general considerations related to benign thyroid disease.
What is generically defined as a "goitre", or thyroid hyperplasia, must have a more complex form and take into account treatment indications as well. In fact, the treatment is nowadays widely debated in the literature, it is believed that the goitre can be treated pharmacologically until assume important dimensions[5]. On the other hand, the presence of nodular lesions directed towards surgical treatment, also for the potential neoplastic degeneration [6].
In addition to nodular disease, the following conditions are also indications for surgical intervention: lack of response to organotherapy, marked deviation of the laryngeal-tracheal axis, suspected neoplastic degeneration, hyperfunction not responding to treatment, aesthetic impairment [7].
Even for nodular forms a further distinction should be made based on number, size, clinical history and volumetric variations; the assessment of residual hormonal function or the cytological study of the lesion can provide useful parameters [1,3].
For a single nodule presumed to be likely benign and displaying no contralateral disease, the Lobectomy (ETI) is the most common treatment, excepting complete excision if the histological exam shows evidence of carcinomatous degeneration. However, several authors are proponents of Total Thyroidectomy even for treating single nodules [8,9], though always involving of the patient in the decision. This is based on practical reasons: the presence of microfoci from neoplastic degeneration cannot be ruled out, if not with a histological exam of the entire gland; a part of the potentially diseased thyroid would be left; a reoperation would be less acceptable psychologically and subject to a higher percentage of complications; the presence of residual thyroid tissue would require repeated controls as well as organotherapy, procedures that are in themselves repetitive and not easily complied with.
Despite this, uncertainties about the standard Total Thyroidectomy (TT) remain, due in particular to the formidable complications connected to this type of operation, specifically damage to the laryngeal nerves[10] and hypoparathyroidism. On the other hand, the refinement of surgical techniques based on experience have made this operation less risky, as long as certain precise standards[11] are adhered to: considering that the superior laryngeal nerve begins in 20% of cases between the division branches of the superior thyroid artery, binding the elements of the superior vascular peduncle should be avoided and thus tying must be performed as close as possible to the parenchyma, also preserving the blood supply to the parathyroid; furthermore, even if the recommended routine preparation of the recurrent nerve is not performed, it still must be identified so as to ensure it remains intact [11].
In reducing the risks connected to the surgery, it should be noted that subtotal Thyroidectomy (STT) or near total Thyroidectomy (TQT) were preferred for a long time in treating benign thyroid disease and are still proposed by several authors as valid alternatives to radical

surgery as they would reduce the mortality rate to 0, as well as guarantee a reasonable margin of safety as concerns complications, which in some case histories are truly disquieting with recurrent paralysis reaching 9.8% [12]. It is a comparison that has long fuelled the debate [13]. The majority of authors claim that, based on data from clinical experience, the advantages and safety margins of STT are more theoretical than practical, as the risk of damage to the recurrent nerve is actually higher [14] since the identification and isolation of the nerve would prevent damage due to an anomalous course [15]; in addition, the residual parenchyma would not guarantee effective hormone synthesis, and still involves all the difficulties of organotherapy [16,17]. In fact, the suppressive hormone treatment required to reduce nodular relapse could induce a state of iatrogenic hyperthyroidism, not well tolerated and a contraindication for cardiovascular diseases (frequent in the age range of pathological incidence), which requires a precise and in certain cases demanding follow up, not easily complied with.
On the other hand, considering the possibility of serious perioperative mortality, in part linked to longer surgery times, a revision of the now generalised radical approach is suggested.
The case histories we reported appear to support the aforementioned claims; for a single nodule, when backed by FNA, we opted for the ETI, while TT was used for multiple nodules.
The elevated number of total thyroidectomies performed, all the more so if compared with our past experience, takes into account the evolution of the treatment strategy toward greater radicality, which is also due to the refinement of methods and precise identification of the recurrent nerve.

Conclusions

In view of the above, it may appear that the surgical treatment of benign thyroid disease is clearly defined.
In realty this is true to a certain extent, but only on the surface.
The first point to consider is that cold thyroid nodules display an incidence of malignant neoplasia ranging from 10 to 15% and more according to some authors.
For a solitary nodule with residual diseased parenchyma we believe total thyroidectomy should be prescribed. If, however, the residual parenchyma is unharmed a lobectomy may be considered, provided that an informed consent is acquired on possible reoperation in the event of a positive histological result for malignant neoplasia.
For a suspected malignant neoplasia or with widespread disease a total thyroidectomy is necessary.
For a Plummer's adenoma with undamaged residual parenchyma a lobectomy can be prescribed.
It is essential to consider that statistics now show that for total thyroidectomy the risk of damage to the recurrent nerve is minimal, provided it is adequately prepared; the risk of post-surgical hyperparathyroidism is also low and nearly equal to, if not less than, that for subtotal or near total thyroidectomy and thus a more radical treatment that offers protection from relapses in glandular residue is advisable.
In conclusion, we recommend the individual assessment of each pathology, though we favour total thyroidectomy.

Riassunto

OBIETTIVO: Il trattamento delle malattie benigne della tiroide è un argomento ampiamente dibattuto, che va dalla "Lobectomia" alla "Tiroidectomia Totale". Questo lavoro si propone di contribuire alla riflessione sulle strategie di trattamento per la patologia benigna tiroidea.
MATERIALI E METODI: 35 pazienti sottoposti a trattamento chirurgico dopo la diagnosi pre-chirurgica della patologia tiroidea benigna tra il 2003 ed il 2005 presso l'Unità Complessa di Chirurgia Generale e Geriatrica della Seconda Università degli Studi di Napoli (S.U.N.). In 26 casi è stata eseguita una tiroidectomia totale, in 3 una tiroidectomia subtotale, in 6 una lobectomia semplice.
DISCUSSIONE: Il decorso post-chirurgico è stato ottimale nella maggior parte dei casi. Il gran numero di tiroidectomie totali eseguite è in linea con la tendenza che preferisce questo tipo di strategia.
Se è affiancata da FNA, la chirurgia non radicale può essere scelta con maggior fiducia per i noduli singoli e quando i rischi chirurgici sono alti.
L'affinamento delle tecniche chirurgiche e le indicazioni per la individuazione e la preparazione del nervo ricorrente hanno consentito un approccio radicale nel trattamento delle malattie della tiroide nodulare.
CONCLUSIONI: A nostro parere, per un nodulo solitario con parenchima residuo malato crediamo dovrebbe essere prescritta una tiroidectomia totale. Se, tuttavia, il parenchima residuo è illeso una lobectomia può essere considerata. In conclusione, si consiglia la valutazione individuale di ogni patologia, anche se siamo favorevoli a tiroidectomia totale.

References

1. Shaha AR: *Controversies in the management of thyroid nodule*. Laryngoscope, 2000; 110:183-93.

2. Wong CKM, Wheeler MH: *Thyroid nodules: Rational management.* World J Surg, 2000; 24:934-41.

3. Mazzawi SJ, Rosen G, Luboshitzky R, Dharan M: *Management of benign thyroid nodules based on the findings of fine-needle aspiration*. J Otolaryngol, 2000; 29(2):95-97.

4. Petronella P: *La terapia chirurgica del gozzo eutiroideo*. Corso di aggiornamento Politematico "La Chirurgia Oncologica degli organi pelvici", 1984.

5. Milas Z, Shin J, Milas M: *New guidelines for the management of thyroid nodules and differentiated thyroid cancer*. Minerva Endocrinol, 2011; 36(1):53-70.

6. Dobrinja C, Trevisan G, Piscopello L, Fava M, Liguori G: *Comparison between thyroidectomy and hemithyroidectomy in treatment of single thyroid nodules identified as indeterminate follicular lesions by fine-needle aspiration cytology*. Ann Ital Chir, 2010; 81(6):403-10; discussion 410-11.

7. Dogan L, Karaman N, Yilmaz KB, Ozaslan C, Atalay C: *Total thyroidectomy for the surgical treatment of multinodular goiter*. Surg Today, 2011; 41(3):323-27.

8. Blondeau P: *Surgical treatment of hyperthyroidism (therapeutic and nosologic considerations from a personal experience of 2,395 cases).* Bull Acad Natl Med, 1991; 175(7):1065-73; discussion 1073-75.

9. Liu Q, Djuricin G, Prinz RA: *Total Thyroidectomy for benign thyroid disease*. Surgery, 1998; 123(1):2-7.

10. Newman A, Becker S: *Superior laryngeal nerve paralysis and benign thyroid disease*. Arch Otolaringol, 1981; 107:117-19.

11. Jatzko GR, Lisborg PH, Muller MG, Wette VM: *Recurrent nerve palsy after thyroid operations. Principal nerve identification and literature review*. Surgery, 1994; 115:139-44.

12. Jacobs J, Aland J, Ballinger J: *Total thyroidectomy. Review of 213 patients*. Ann Surg, 1983; 197:542-49.

13. Friedman M, Pacella BL Jr: *Total versus subtotal thyroidectomy. Arguments, approaches, and recommendations.* Otolaryngol Clin North Am, 1990; 23(3):413-27.

14. Kraimps JL, Marechaud R, Gineste D, Fieuzal S, Metaye T, Carretier M, Barbier J : *Analysis and prevention of recurrent goiter*. Surg Gynecol Obstet, 1993; 176(4):319-22.

15. Kube R, Gastinger I, Horntrich J, Marusch F, Horsching P: *Postoperative recurrent nerve paralysis after initial interventions for benign goiter.* Zentrabl Chir, 1998; 123(1):11-16.

16. Phitayakorn R, Narendra D, Bell S, McHenry CR: What *constitutes adequate surgical therapy for benign nodular goiter?* J Surg Res, 2009; 154(1):51-55.

17. Aytac B, Karamercan A: *Recurrent laryngeal nerve injury and preservation in thyroidectomy*. Saudi Med J, 2005; 26(11):1746-749.

Commento - Commentary

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La cosa più importante per un chirurgo dedicato alla chirurgia tiroidea è quella di padroneggiare le caratteristiche anatomiche del collo e dello spazio retrosternale superiore. In tal caso le sue scelte in caso di una tireopatia nodulare saranno guidate da motivi di opportunità a favore del singolo paziente e non frenate dal timore di danneggiare le strutture nobili circostanti alla ghiandola tiroide.
Se una lesione nodulare è ragionevolmente o con certezza di natura benigna, la lobectomia extracapsulare deve essere l'intervento da adottare, lasciando così col lobo controlaterale sufficiente tessuto ghiandolare tiroideo da non rendere necessaria l'adozione di una terapia ormonale di supporto nei giorni a seguire.
Se sfortunatamente l'esame istologico successivo dovesse dimostrare invece la natura tumorale del nodulo, la lobectomia controlaterale potrà essere eseguita immediatamente o in un successivo intervento ravvicinato, nell'ambito del programma radiometabolico, in un campo operatorio esente da alterazioni chirurgiche.
Nel caso di una tiroidopatia multinodulare benigna la tiroidectomia totale è l'intervento di scelta, evitando così al paziente una seconda operazione per l'inevitabile recidiva della lesione nel lobo non asportato, com'è l'esperienza comune nel seguito di meno di 20 anni successivi.
Resta però un dubbio in questo caso, se non sia meglio aspettare i presunti 20 anni senza avere la necessità di prescrivere la terapia ormonale sostitutiva, lasciando per il moment il lobo tiroideo meno colpito, con rischio però di trascurare la presenza di un eventuale nodulo maligno non noto e nascosto tra gli altri del lobo lasciato, o procedere direttamente alla asportazione di tutto il tessuto patologico, ancorchè di natura benigna, anche considerando che nella maggior parte dei casi del genere una qualche terapia ormonale di supporto ormonale si dimostra necessaria anche dopo una semplice lobectomia.

* * *

The most important thing for a surgeon dedicated to thyroid surgery is to master the anatomical characteristics of the neck and the upper retrosternal space. His choices in case of a nodular thyroidopathy are therefore guided from considerations of opportunity in favour of the single patient and not restrained from the fear to harm the noble structures around the gland.

If a nodular lesion is reasonably or with certainty of benign nature, the extracapsular lobectomy must be the operation to perform, so leaving in the contralateral lobe sufficient thyroid gland tissue not to make necessary an hormonal therapy of support in the days to come.
Should the consequent histology demonstrate unfortunately the true neoplastic nature of the nodule, the contralateral lobectomy could be performed immediately or in a second operation in few days, in the strategy of a radiometabolic program, in a field virgin of surgical alterations.
In case of multinodular benign thyroidopathy the total thyroidectomy is the operation to do, so avoiding to the patient a second operation for the unavoidable recurrence of the lesions in the remaining lobe as is the common experience within a follow-up of less than 20 years.
A doubt remains in this case, if it is better to wait the presumed 20 years before the necessity to prescribe the needed opotherapy, leaving for the moment the less affected lobe, but with the risk of missing an unknown malign nodule hided among the tiny ones of the residual lobe, or to make at once a total cleaning of the though benign pathology, also considering that in most cases a supportive hormonal therapy is anyways opportune also after a simple lobectomy.