



The Prevalence of Thyroid Malignancy in Multinodular Goiter in Erbil Governorate

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Abstract

Background and objectives: thyroid malignancy is relatively a rare tumor, but it represents the most common form of malignancy of endocrine glands. The common scenario in multinodular goiter is finding of incidental thyroid carcinoma after histopathological evaluation of specimens for assumed benign thyroid lesions. The objective of the study was to estimate the prevalence and types of malignancy in multinodular goiter in Erbil governorate, in order to choose the best surgical options for their treatment. **Methods:** This prospective cross-sectional study has been conducted from 1st March 2017 to 1st March 2018 on 72 patients with multinodular goiter in Rizgary teaching hospital and private hospitals in Erbil city. All patients evaluated preoperatively by history, clinical examination, thyroid function test, ultrasound study, fine needle aspiration cytology. Then, offered operative treatment for compressive symptoms, thyrotoxicosis, cosmetic concerns, undetermined cytology, suspicious or proved malignancy by fine needle aspiration cytology. **Results:** Among 72 cases, 90.3% were females and 9.7% were males, with mean age distribution at the time of surgery was 41.6 ± 12.6 years. 8.3% of patients found to have malignancy on final histological examination and papillar carcinoma constituted 83.3% of cases. **Conclusions:** -we recommend near-total or total thyroidectomy to eliminate the need for re-operation in case of thyroid cancer.

Keywords: Multinodular goiter; Incidental thyroid carcinoma; Fine needle aspiration cytology; Total thyroidectomy.

Introduction

Multinodular goiter (MNG) is an enlargement of the thyroid gland with multiple nodules of variable sizes^{1,2}. In countries with sufficient iodine supplementation, its incidence is 4%, while it is endemic in low iodine consumption areas as in mountain areas. Multinodular goiter is more common in females; it increases in incidence with age, multiparity, increase in body mass index, smoking, exposure to radiation especially to head and neck area^{2,3}. On examination of the neck, by palpation, thyroid nodule has been reported in 4% to 7% of population; while by ultrasound examination, its incidence is higher, it's reported in 30% to 50% of the population⁴; with high-resolution ultrasound, it may reach 70%^{4,5}. Multinodular goiter is frequently seen by surgeons. Indications of operation in MNG are mainly due to compressive symptoms; thyrotoxicosis; suspicious or proved malignancy and cosmetic concern.

Thyroid malignancy is a relatively rare tumor, but it represents the most common malignancy of endocrine glands. The risk factors for thyroid malignancy are ionizing radiation, MNG, and thyroid adenoma. The diagnostic

approach for patients with MNG, specific differentiation between malignant and benign lesion, is of great challenge for surgeons and is based on physical examination, imaging study and laboratory investigations. The incidence of thyroid carcinoma has been increased in the last 30 years by a rate of 48% in men and 66.7% in women⁶. The main points in the diagnosis of carcinoma are suspicious features in imaging analysis, as solid thyroid nodules, high internal blood flow in Doppler image, the presence of microcalcification, irregular borders and hypoechogenicity on ultrasound study, decrease in radionuclide uptake in scintigraphy and suspicious or positive FNAC⁷.

The most common clinical scenario is finding of incidental thyroid carcinoma (ITC) after histopathological examination of thyroidectomy specimens for assumed benign MNG. Previously prevalence of ITC for MNG was estimated to be 5-10%⁸; but, latest studies have reported the higher prevalence rate of ITC ranges from 8.6% to 22%^{9,10}. There is a long unresolved debate on MNG and its associated malignancy¹¹. Multinodular goiter traditionally had been thought to harbor the minimal risk of malignancy in

comparison with solitary thyroid nodule¹²⁻¹³; however, in recent studies risk of malignancy in patients with MNG have been underestimated, and a prevalence ranging from 17% to 35% has been reported in surgical series^{14,15}.

Recently, a surgical dilemma exists about the choice of operation in multinodular goiter, considering such high prevalence of carcinoma¹⁶. The argument is not just because of increase in ITC among cases of MNG; but also because of increase in the incidence of thyroid carcinoma in recurrent multinodular goiters⁹.

This study was conducted to estimate the prevalence of malignancy in multinodular goiter in Erbil governorate, and to assess the best surgical option for treatment.

Patients and methods

This cross-sectional prospective study was approved by the Research Ethics Committee in College of Medicine, Hawler Medical University. Between 1st March 2017 to 1st March 2018, 72 patients who had been diagnosed as MNG by ultrasound and underwent thyroidectomy operation were included. All patients with multinodular goiter were evaluated clinically, biochemically and by fine needle aspiration cytology FNAC. All cases had no previous history of exposure to radiation or family history of malignancy. Cases with single thyroid nodules were excluded from the study. Operation done for most cases due to: compressive symptoms, thyrotoxicosis, cosmetic concerns, undetermined cytology, suspicious FNAC.

All patients sent for thyroid function test (TSH, T4, and T3), neck and thyroid ultrasonography, antithyroid antibodies as antithyroglobulin antibodies (anti-Tg) and antithyroid peroxidase antibodies (anti-TPO) in selected cases, FNAC were conducted in all patients and for those suspicious nodule by clinical examination (hard, irregular, rapidly growing nodule) or by ultrasound, computed tomography (CT scan), for cases of suspected retrosternal extension and in suspected malignancies. Scintigraphy was not performed for any patient. Thyrotoxic cases controlled with antithyroid drugs by neomercazol tablets as a preoperative preparation for surgery.

The choice of surgery was subtotal thyroidectomy, near-total thyroidectomy or total lobectomy according to the underlying pathology. All operations had been done by

general surgeons in Rizgary Teaching Hospital and in Private Hospitals in Erbil city. All thyroid specimens were collected in a container with diluted formalin and sent to histopathological evaluation.

The analysis was conducted toward determination of a number of preoperatively detected malignancies and ITC detected postoperatively on histopathological examination, and types of malignancy presented with MNG and to evaluate the rate of completion surgery required for cases of ITC diagnosed histopathologically after surgery.

Statistical analysis was done with Statistical Package for the Social Science Software (SPSS) program version 23 for windows 10. Frequency tables have been used and for comparison of nominal data Pearson's chi-square (χ^2) test or Fisher's exact test used in the case that observed data were less than 5. A p-value ≤ 0.05 was considered statistically significant.

Results

In this prospective study, a total number of 72 patients of multinodular goiter were collected. Out of 72 cases, 65 patients (90.3%) were females and 7 patients (9.7%) were males. The mean \pm SD. of age at the time of surgery was 41.6 ± 12.6 years, the majority were in 4th and 5th decade of life, Figure 1.

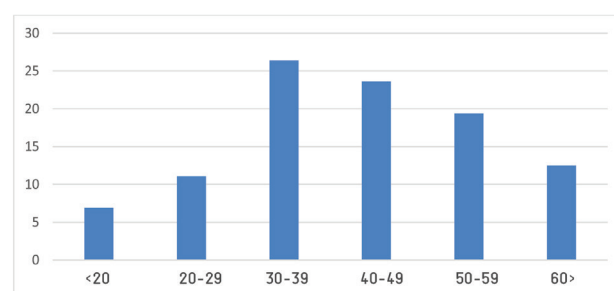


Figure (1): Age distribution of study participants.

Histopathological analysis was revealed that 91.7% of cases were benign (Figure 2); in which, nodular colloid goiter was the most commonly found (81.9%), followed by Hashimoto's thyroiditis in 6.9% of cases and chronic lymphocytic thyroiditis in 2.8% of cases; while 8.3% of cases (6 patients) were found to have malignancy on final histopathological finding, Figure 3.

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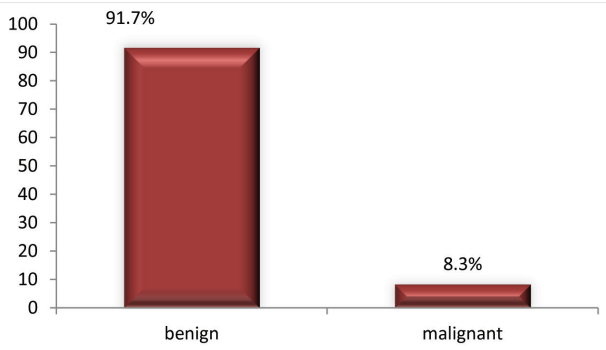
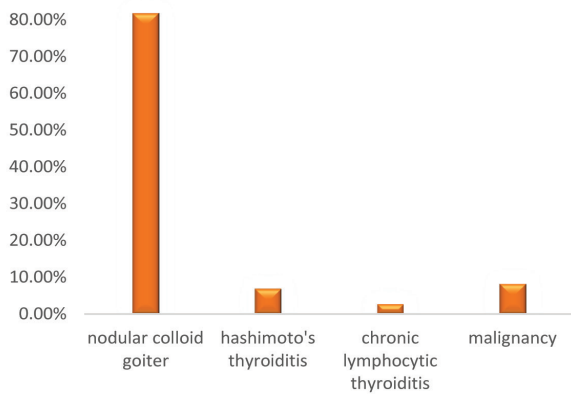


Figure (2): Percentages of malignancy in multinodular goiter.



Figur (3): Histopathological findings of thyroid specimens

Among the types of malignancies found on final reports, this study revealed that papillary thyroid carcinoma constitutes (83.3%) of cases, Table 1.

Table (1): Histopathological pattern of malignancy

Malignant pathological finding	No.	%
Papillary carcinoma	5	83.3
Follicular carcinoma	1	16.7
Anaplastic carcinoma	0	0.0
Medullary carcinoma	0	0.0
Malignant lymphoma	0	0.0
Total	6	100

Table 2 shows an association between age and sex of patients with malignancy, in which the malignant was highest among age more than 40 years (26.1%), and highest among male patients (28.6). These differences were statistically nonsignificant.

Table (2): Association between malignancy and certain characteristics of patients.

Variable	Histopathological finding				Total	*p-value
	Benign		Malignant			
	No.	%	No.	%	No.	%
Age						
<20	4	80.0	1	20.0	5	100.0
20-29	8	100.0	0	0.0	8	100.0
30-39	18	94.7	1	5.3	19	100.0
40-49	15	88.2	2	11.8	17	100.0
50-59	12	85.7	2	14.3	14	100.0
≥60	9	100.0	0	0.0	9	100.0
Sex						
Male	5	71.4	2	28.6	7	100.0
Female	61	93.8	4	6.2	66	100.0
Total	66	91.7	6	8.3	72	100.0

*Fisher's exact test

Among operations for MNGs, total and near-total thyroidectomy were the most common surgeries performed 80.6%, while only 13.9% of cases were total lobectomy and 5.6% of cases were subtotal thyroidectomy had been performed, Figure 4.

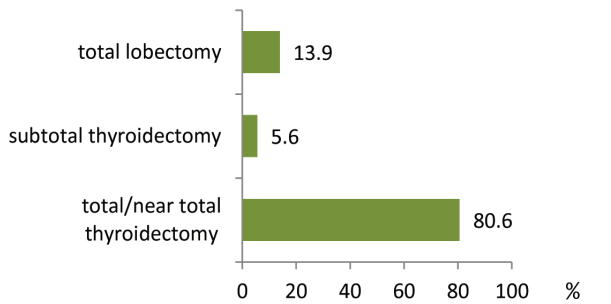


Figure (4): Types of thyroidectomy

Discussion

Multinodular goiter is more prevalent in women than men¹⁷. In this prospective cross-sectional study, 90.3% of MNG patients were females and 7.7% were males. This percent is comparable with a study conducted by Zambudio et al¹⁸ which had 89% of females with MNG. The majority were between 30-50 years old with the mean age group of 41.6 years. This is comparable to a study done on borderline iodine deficient area¹⁹. Overall, females have a higher incidence of thyroid carcinoma²⁰. In this study, 66.6% of thyroid carcinoma was in females and also 66.6% of carcinoma was among age groups between 40-60 years.

One diagnostic approach for MNG is by doing FNAC for suspicious nodules.

according to studies done by Al-Yaarubi et al²¹ and Lin et al²² FNAC is not helpful for differentiation between malignant and benign MNG because of the low sensitivity of 14% to 17%. In this study FNAC was obtained from the most prominent nodules in patients with MNG under ultrasound guide, in which; the sensitivity was 33%.

There is a long-standing conflict of whether MNG is associated with thyroid malignancy. It was traditionally thought that there is a low risk of malignancy in MNG in comparison with single thyroid nodule^{12,13}. However, different studies have shown that the risk of malignancy in MNG is quite high. In this study prevalence of histopathologically benign MNGs was 91.7%, and histopathologically malignant MNGs were 8.3%. This result is consistent with a study done by Memon et al¹² that had 7.6% malignancy among patients with MNG. Benzarti et²³ al had an incidence of 9.5%. A prospective

analysis done by Pradhan²⁴ showed 13.63% of MNG patients had histopathologically proven malignancy, also it was in the same range 13.9% and 13% in studies done by Gandolfi et al and Shrestha et al respectively^{13,25} and 12.2% in a study done by Prades et al²⁶. While; in other studies, the estimated risk of malignancy was reported to be higher, and a prevalence ranging from 17% to 35% has been reported in surgical series^{14,15,27}.

The most common type of malignancy which has been observed and documented in literature for patients with multinodular goiter is papillary carcinoma²⁶⁻²⁸. In this study, 83.33% of malignant MNG had papillary carcinoma and 16.67% had a follicular carcinoma, the result was consistent with other studies. In a study done by Abu-Eshy et al¹¹, 75% of carcinoma that occurred in MNG was a papillary carcinoma, the same finding was in other studies^{12, 29, 30}.

The prevalence of ITC in this study was 5.52% (all were papillary carcinoma). It correlates with a study done in Italy in 9 years interval on 462 patients with 4.54% ITC³¹. In another study Among the 2,306 MNG patients, ITC was detected in 49 (2.12%) patients³². In a prospective observational study done by Laghari et al³³; the prevalence of ITC in MNG was 8% (papillary carcinoma 5%, follicular carcinoma 2% and 1% anaplastic carcinoma). Also in other study done by Giles et al³⁴; the incidence of ITC was 8.2%.

The main goals of surgical treatment of multinodular goiter are the elimination of the disease, decreased complication rate and minimal necessitations for reoperation. Reoperations were performed for thyroid cancers which had been diagnosed on final histopathological examination after surgery and for recurrent multinodular goiters during the follow-up period. This reoperation is associated with higher complication rate in comparison with the primary operation^{34, 35}. Having high prevalence of thyroid carcinoma and ITC in patients with MNG, apparently, conduction of radical surgery will result in a lower rate of completion surgery. In this study 1 out of 6 patients after lobectomy and histopathological study of the specimen, proved to have papillary carcinoma which required completion surgery and another patient present with recurrent MNG after previous subtotal thyroidectomy,

on FNAC there was suspicion of malignancy so reoperation for total thyroidectomy has been done. Different studies demonstrated the effectiveness of total thyroidectomy for MNG treatment^{14, 34-36} and effectiveness of TT is because of the elimination of recurrence³⁷.

The limitation of this study was due to small sample size and short duration of the study. The sample of histopathologically detected thyroid carcinoma and incidental thyroid carcinoma was also small and these could influence the degree of statistical significance at the time of comparing between levels of benign and malignant thyroid lesions.

Conclusions

In this study, we concluded that the prevalence of malignancy in MNG should not be underestimated as the prevalence of ITC is quite significant in patients who operated for benign MNG with no suspicion of malignancy. So, we recommend near-total or total thyroidectomy to eliminate the completion thyroidectomy operation in case of getting thyroid cancer on the final diagnosis.

Conflict of interest

The authors report no conflicts of interest.

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