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Surgical Treatment of Thyroid Cancer

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Abstract

In this work, all patients with malignant thyroid tumours (367 Patients) who presented to the National Cancer institute (NCL) and Kasr El-Aini University Hospitals in the period from 1985 to 1992 were reviewed retrospectively. Females represented 61.04% of cases while males constituted 38.96% of cases. The mean age for both sexes was 47.16 years, while that of females only was 46.59 years and of males was 48.06 years. Most of our patients presented with a thyroid swelling with or without cervical lymphadenopathy. Eight pathalogical types were identified, the commonest was papillary carcinoma (48.23%) and the rarest was Hurthle cell carcinoma (054%). Total thyroidectomy was the commonest procedure adopted (60%). Each of the subtotal thyroidectomy and hemithyroidectomy was odopted in 12.17% of the cases, while biopsy was adopted in 15.65% of the cases. Lymph nodes were retrieved from 49 cases, 43 cases, 43 of these were positive and 6 were negative.

Introduction

THYROID cancer has an incidence of 4.1 cases per 100.000 population in USA [1]. In Egypt thyroid cancer constitutes 90% of endocrine malignancies and 12.47% of head and neck tumours [2]. Due to the high long-term survival of patients with well-differentiated thyroid cancer and the indolent nature of most of these neoplasms, a lot of controversy has

existed as regards the proper management of this disease.

The management depends upon many factors, the most important of which is the pathological type of the tumour and its expected natural history [3]. Whatever the pathological type of the tumour, surgical resection remains the milestone of any control of these tumours [4]. The traditional treatment of carcinoma of the thyroid gland generally consisted of total thyroidectomy with pyramidal lobe and central type, modifications of the standard surgical treatment were developed. The choice of operation and adjuvant therapy depends upon many factors including the degree of differentiation, and thus a more conservative view is now accepted in the well differentiated tumours [6]. On the other hand, more aggressive surgery is now practiced in advanced cases and in undifferentiated tumours which were previously considered only candidates for tracheostomy followed by external irradiation and chemotherapy [5].

This work is a retrospective study of all cases of thyroid cancer treated at the National Cancer Institute and Kasr El-Aini University Hospitals in the period from 1985 to 1992.

Material and Methods

All patients with malignant thyroid tumours who presented to the National Cancer Institute (NCI) and Kasr El-Aini University Hospitals in the period from 1985 to 1992 were reviewed retrospectively. A total number of three hundred and sixty seven cases with thyroid cancer were treated at the NCI and Kasr El-Aini University Hospitals during that period. Most of our patients presented with a thyroid swelling with or without associated cervical lymphadenopathy. Several patients were referred after surgery which was done outside our institutions. Routine laboratory investigations and chest X-ray were done for all patients on presentation. Thyroid scan was among the investigations employed. Biopsies included fine needle aspiration cytology, core needle biopsy, drill biopsy and open biopsies for advanced lesions. Whole body scan was done when indicated. All patients were studied with regards to age, sex and pathological type and all data for the eight years period were submitted for statistical analysis. In addition, all cases that presented in the period from 1990-1992 were studied regarding the type of surgical management and lymph node involvement. One hundred and fifty two cases were seen at our institutions during this period. Thirty seven of them were found to have undergone surgery outside the NCI and Kasr El-Aini Univerisity hospitals and had been referred to us for postoperative management and were subsequently excluded from the study due to the inaccuracy of their operative data. The number of patients who underwent lymphatic

dissection was also studied in relation to the pathological type and type of operation and incidence of positive lymph node involvement was studied. Postoperative adjuvant therapy was offered in the form of TSH suppression by L thyroxine, radioactive iodine, external beam irradiation, or chemotherapy when indicated.

Results

A. Age and Sex (Tables 1 & 2):

The total number of cases with thyroid cancer presenting to the National Cancer Institute and Kasr El-Aini University Hospitals during the period 1985-1992 was three hundred and sixty seven cases. Females were two hundred and twenty four cases constituting 61.04% of cases. Males were one hundred and forty three cases constituting 38.96% of cases. The female to male ratio was 1.567:1.

The mean age for both sexes was 47.16 years with a range of 7 to 81 years and a standard deviation of 15.26. The mean age was 46.59 years for females and 48.06 years for males.

B. Pathology (Tables 3, 4, & 5):

Eight pathological types were identified. Papillary carcinoma was the most frequent (177 cases) followed by follicular carcinoma (81 cases), undifferentiated carcinoma (58 cases), mixed papillary and follicular carcinoma (20 cases), medullary carcinoma (16 cases), non Hodgkin's lymphoma (10 cases), squamous cell carcinoma (3 cases) and Hurthle cell carcinoma 2 cases (Fig. 1, 2, 3 & 4).

Mixed papillary and follicular carcinoma was regarded as papillary carcinoma, thus the adjusted percentage of papillary carcinoma was 53.68%. Likewise, Hurthle cell carcinoma was regarded as follicular carcinoma and the adjusted percentage of follicular carcinoma became 22.61%.

C. Type of operation (Tables 6 & 7):

Four types of operations were the most frequent surgical management adopted

Table (1): Frequency of Cases According to Sex.

Sex	Number	Percentage
Females	224	61.04
Males	143	38.96
Total	367	100

Table (2): Mean Ages for all Cases.

Sex	Mean age (Years)	Range (Years)	Standard deviation
Females	46.59	12 - 81	14.35
Males	48.06	7 - 80	16.60
Both sexes	47.16	7 - 81	15.26

Table (3): Frequency of Each Pathological Type.

Pathology	Number	Percentage
Papillary carcinoma	177	48.23 %
Follicular carcinoma	81	22.07 %
Undifferentiated carcinoma	58	15.80 %
Mixed papillary & follicular carcinoma	20	5.45 %
Medullary carcinoma	16	4.36 %
Non-Hodgkin's lymphoma (NHL)	10	2.73 %
Squamous cell carcinoma	3	0.82 %
Hurthle cell carcinoma	2	0.54 %
Total	367	100 %

Table (4): Sex Distribution of Different Pathological Types.

	Males		Females		Total (both sexes)	
Pathology	Number	Percentage	Number	Percentage	Number	Percentage
Papillary carcinoma	85	43.15	112	56.85	197	100
Follicular carcinoma	24	28.92	59	71.08	83	100
Undifferentiated carcinoma	24	41.38	34	58.62	58	100
Medullary carcinoma	8	50	8	50	16	100
NHL	1	10	9	90	10	100
Squamous cell carcinoma	1	33.33	2	66.67	3	100

namely total thyroidectomy, subtotal thyroidectomy, hemithyroidectomy and biopsy with or without tracheostomy. The total number of patients operated upon of the National Cancer Institute and Kasr El-Aini University Hospitals during the period 1990-1992 was one hundred and fifteen cases. Total thyroidectomy was done in sixty nine cases, subtotal thyroidectomy in fourteen cases, hemithyroidectomy in fourteen cases and biopsy in eighteen cases.

Table (5): Mean Ages for each Pathological Type.

Pathology	Mean Age	Standard Deviation	Range	Mode (highest number of cases)
Papillary carcinoma	45.13	15.99	7 - 81	55
Follicular carcinoma	47.82	14.24	9 - 73	55
Undifferentiated carcinoma	52.62	13.50	12 - 80	60
Medullary carinoma	48.63	11.80	27 - 70	40
NHL	46.40	18.34	9 - 65	60
Squamous cell carcinoma	51.67	10.60	42 - 63	-

Table (6): Ferquency of Operations Performed.

Operation	Number	Percentage
Total thyroidecomy	69	60 %
Subtotal thyroideclomy	14	12.17 %
Hemithyroidectomy	14	12.17 %
Biopsy	18	15.65 %
Total	115	100 %

D. Lymph node status (Tables 8, 9 & 10):

Lymph nodes were retrieved from forty nine cases. Forty three of these were positive while six cases were negative.

Summary of surgical Treatment of our Patients:

A total number of one hundred and fifteen cases were operated upon. The extent of neck dissection varied from the berry picking procedure to modified neck dissection or radical neck dissection. The cases were treated as follows:

A) Popillary carcinoma:

The number of cases operated upon was seventy two cases. Twenty six patients were treated by total thyroidectomy and neck dissection. Twenty five patients were treated by total thyroidectomy alone. Four patients were treated by subtotal thyroidectomy and neck dissection. Six patients were treated by subtotal thyroidectomy alone. One patient was treated by hemithyroidectomy and neck dissection. Eight patients were treated by hemithyroidectomy alone. Two patients were treated by biopsy only.

B) Follicular carcinoma:

The number of cases operated upon was fourteen cases. Six patients were treated by total thyroidectomy and neck

Table (7): Frequency of Operations for Each Pathological Type.

	Total Thyroideclomy		Subtotal Thyroidectomy		Hemi-Thyroidectomy		Biopsy		Total Number	
Pathology	No.	%	No.	%	No.	%	No.	%	No.	%
Papillary carcinoma	51	70.83	10	13.89	9	12.50	2	2.78	72	100
Follicular carcinoma	10	71.43	-	-	3	21.43	1	7.14	14	100
Undifferentiated car.	5	26.81	1	4.76	2	9.52	13	61.90	21	100
Medullary carcinoma	2	40	2	40	-	-	1	20	5	100
NHL	1	33.33	1	33.33	-	-	1	33.33	3	100
Total	69	60	14	12.1	14	12.1	18	15.6	115	100

Table (8): Lymph Node Status of Patients Operated Upon Correlated to the Pathological Type.

	Positive lymph nodes		Negative lymph nodes		Total	
Pathology	No.	%	No.	%	No.	%
Papillary carcinoma	27	87.1	4	12.90	31	100
Follicular carcinoma	6	100	0	--	6	100
Undifferentiated carcinoma	7	87.5	1	12.5	8	100
Medullary carcinoma	3	100	0	--	3	100
NHL	0	--	1	100	1	100
Total	43	87.76	6	12.24	49	100

dissection. Four patients were treated by total thyroidectomy alone. Three cases were treated by hemithyroidectomy alone. One case was treated by biopsy only.

C) Undifferentiated carcinama:

The number of cases operated upon was twenty one cases. Five patients were treated by total thyroidectomy and neck dissection. One patient was treated by subtotal thyroidectomy and neck dissection. Two patients were treated by hemithyroidectomy and neck dissection. Thirteen patients were treated by biopsy and tracheostomy.

Table (9): Relation Between Operation for Primary Tumour & Lymph Node Dissection.

Type of operation	Positive lymph nodes		Negative lymph nodes		Total	
	No.	%	No.	%	No.	%
Total thyroidectomy	36	90	4	10	40	100
Subtotalot thyroidectomy	4	66.67	2	33.33	6	100
Hemithyroidectomy	3	100	0	--	3	100
Total	43	87.76	6	12.24	49	100

Table (10): Frequency of Positive Lymph Nodes for each Pathological Type in Patients Operated Upon.

Pathology of lymph nodes	Total cases	Lymph nodes positive	Percentage
Papillary carcinoma	72	72	37.50
Follicular carcinoma	14	6	42.86
Undifferentiated carcinoma	21	7	33.33
Medullary carcinoma	5	3	60
NHL	3	0	0
Total	115	43	37.39

D) Medullary carcinoma:

The number of cases operated upon was five cases. Two patients were treated by total thyroidectomy and neck dissection. One patient was treated by subtotal thyroidectomy and neck dissection. One patient was treated by subtotal thyroidectomy only. One patient was treated by biopsy only.

E) Non-Hodgkin's lymphoma:

The number of cases operated upon was only three cases. One patient was treated by total thyroidectomy and neck dissection. One patient was treated by biopsy only.

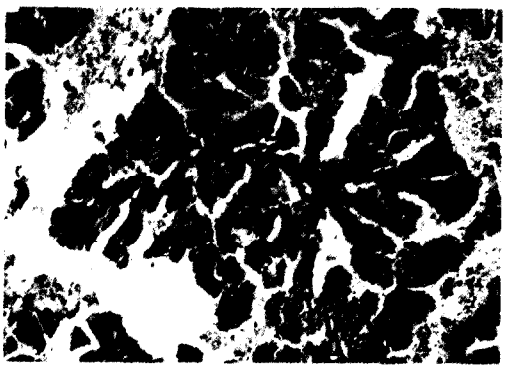

Fig. (1): A case of papillary thyroid carcinoma (H & E x 100)

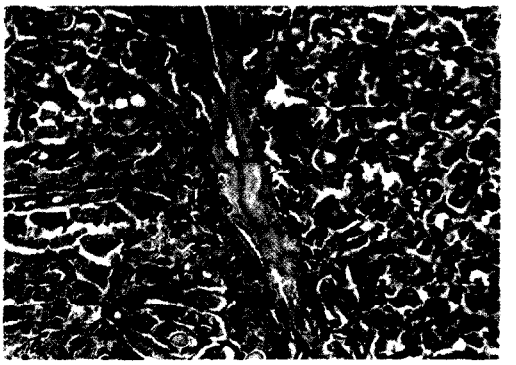

Fig. (2): A case of follicular thyroid carcinoma (H & E x 200)

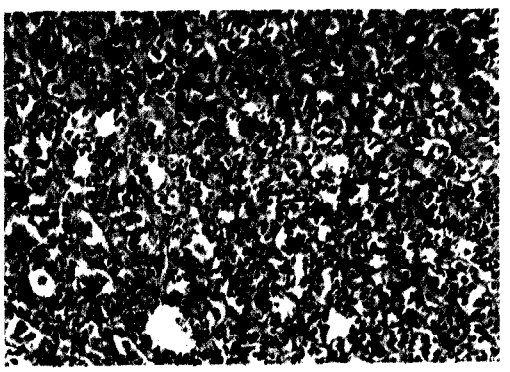

Fig. (3): A case of medullary thyroid carcinoma (H & E x 200)

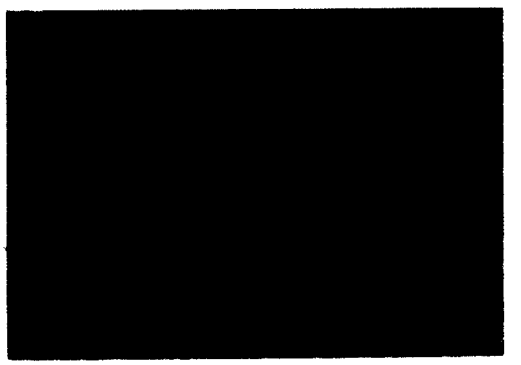

Fig. (4): A case of Hurthle cell carcinoma (H & E x 100)

Discussion

The incidence of thyroid carcinoma is reported to be 4.1 cases per 100.000 population in USA [1]. In Egypt, it is the most frequent endocrinal malignancy constituting 90% of endocrinal malignancies and 12.47% of head and neck malignancies [2]. Four main pathological types are most commonly met with namely papillary, follicular, medullary and undifferentiated carcinoma. Other types are also recognized although they are much more rare [7].

Papillary carcinoma is the most common pathological entity met with, with an incidence of about 60% of all malignant thyroid tumours. It tends to occur throughout the third to seventh decades of age but it accounts for about 80% of thyroid cancer in patients less than 40 years. It is about two times more common in females [3]. In our study papillary thyroid cancer accounted for 53.68% of all thyroid tumours. Females outnumbered the males with 112 females, in contrast to 85 males with a ratio of 1.3 to 1. The mean age of our patients was 45.13 years with a mode (highest number of cases) of 55 years.

Follicular carcinoma accounts for about one quarter of all cases of thyroid carcinoma and is more common in females. It is biologically more aggressive than papillary carcinoma. Two patterns were described; those with minimal vascular and capsular invasion and those with moderate to marked invasion [8]. In our study follicular carcinoma accounted for 22.61% of all cases, with females accounting for most of the cases. We had 59 females while males were only 24 cases with a female to male ratio of 2.46 to 1. The mean age was 47.82 years.

Hurthle cell carcinoma is regarded by most authors as a variant of follicular carcinom with the same criteria of malignancy but they are regarded as the most aggressive type of the well differentiated thyroid cancers [9]. In our study only 2 cases showed Hurthle cell differentiation. Both cases were females.

Insular carcinoma is classified as a variant of follicular or papillary carcinoma, and is placed between the well differentiated and anaplastic carcinoma prognostically. It is also sometimes referred to as poorly differentiated carcinoma [10]. None of our cases showed the insular pattern.

Medullary carcinoma constitutes only about 5 to 10% of malignant thyroid tumours and in contrast to other types which arise from follicular cells it arises from the parafollicular (C) cells. It affects males and females equally. It secretes calcitonin and although 80% to 90% of cases are sporadic about 10 to 15% of cases are encountered in teenagers and children in well-defined genetic syndromes. Medullary carcinoma may be part of the multiple endocrine neoplasia syndromes

(type IIa and b) [11]. In our study medullary thyroid carcinoma accounted for 4.36% of cases with a male to female ratio of 1 to 1 with a mean age of 48.63% years. In our study there were no children of teenagers and the youngest patient was 27 years old.

Undifferentiated carcinoma is reported to account for 10 to 15% of all cases of thyroid cancer. It is a tumour of old age occurring in the seventh and eighth decades with women being affected slightly more than men [12]. In our study undifferentiated carcinoma accounted for 15.8% of all cases with 34 females and 24 males and a female to male ratio of 1.42 to 1. The mean age of incidence was 52.62 years with a mode of 60 years.

Malignant lymphoma may also involve the thyroid gland. Females are reported to be involved three or four more times more commonly than males. The mean age at the time of diagnosis is reported to be 60 to 70 years [13]. In our study we had 10 cases of non Hodgkin's lymphoma, 9 of whom were females with a female to male ratio of 9 to 1. This high ratio is probably due to the small number of cases. The mean age of incidence was 46.4 years with a mode of 60 years. In our study we had no cases of Hodgkin's lymphoma.

Squamous cell carcinoma that arises within the thyroid gland is reported to be an extremely rare tumour. In our study we had only 3 cases, 2 females and one male.

In the literature there are reports of other rare tumours such as fibrosarcoma, haemangiosarcoma and osteogenic sarcoma of the thyroid gland [14]. None of our cases showed such pathology. We also had no cases of metastasis to the thyroid gland from other primary cancers elsewhere.

Due to the fact that thyroid nodules are a very common entity, the diagnosis of malignancy is of paramount importance to avoid unneccessary surgical procedures. Thyroid lobectomy is the procedure of choice for any thyroid nodule not diagnosed by needle biopsy preoperatively. Nodulectomy alone should never be done [15].

In the literature a conservative approach is advocated for small papillary tumours localized to one lobe. Surgery in these cases is hemithyoidectomy or subtotal thyroidectomy. In large tumours or when both lobes are involved total thyroidectomy is mandatory [16]. Some authors, however, advocate total thyroidectomy for all papillary tumours due to multifocality of the tumour [6]. In our study seventy two cases of papillary carcinoma were operated upon. Fifty one cases were treated by total thyroidectomy while ten cases were treated by subtotal thyroidectomy, nine cases underwent hemithyroidectomy and two patients had a biopsy only due to locally advanced lesion

In follicular carcinoma, Thompson [8] suggested a total thyroidectomy for tumours showing substantial angioinvasion and a near total thyroidectomy for lesions showing substantial angioinvasion and a near total thyroidectomy for lesions showing minimal angioinvasion. Other investigators, however, agreed with the view that total thyroidectomy is mandatory for all cases of follicular carcinoma to facilitate radioiodine therapy in patients with metastatic disease or local recurrence. In addition, serum thyrogloblin cannot be used as an indicator of early tumour recurrence except after total thyroidectomy [17]. In our study fourteen cases of follicular carcinoma were operated upon. Ten cases underwent total thyroidectomy. Three cases had hemithyroidectomy and one case had a biopsy only due to locally advanced lesion. One of the cases that underwent hemithyroidectomy showed Hurthle cell differentiation. Hurthle cell tumours are treated according to the same principles as follicular carcinoma but are regarded by many investiqators as having more aggressive behaviour [18].

In cases of fomilial medullary carcinoma total thyroidectomy is regarded as the surgical procedure of choice. Regarding the sporadic form, a less than total thyroidectomy is advocated, however, a total thyroidectomy is appropriate as this form of disease shows multifocality in 20 to 30% of cases [18]. In our study five cases of medullary carcinoma were operated upon. Two cases underwent total thyroidectomy and two underwent subtotal thyroidectomy. The fifth case had a biopsy only.

Insular carcinoma which is an aggressive variant of papillary or follicular carcinoma should be treated by total thyroidectomy [10]. None of our cases showed the insular pattern.

Surgical resection is indicated in small anaplastic tumours or in those in whom resection is technically feasible, however most tumours are unresectable on presentation [20]. If resection is impossible, then biopsy and tracheostomy followed by combined chemoherapy and radiotherapy is the rule [5]. In our study twenty one cases of undifferentiated carcinoma were operated upon. five cases underwent total thyroidectomy, one case underwent subtotal thyroidectomy, two cases underwent hemithyroidectomy and thirteen cases had a biopsy and tracheostomy.

In cases of lymphoma the role of surgery is resection of operable disease without respect of the parathyroids, recurrent laryngeal nerves or cosmosis, such that minimal disease is present in the neck before radiation therapy [21]. In our study three cases of non Hodgkin's lymphoma were operated upon. One case underwent total thyroidectomy, one underwent subtotal thyroidectomy and one had a biopsy only.

For cases of primary squamous cell carcinoma, if resectable, the only hope for palliation to avoid upper airway obstruction is extensive local ablative surgery with laryngectomy, resection of the cervical trachea and possibly hypopharynx [5]. None of the cases operated upon in our series showed squamous cell differentiation.

Noguchi and Murakami [22], recommend a modified neck dissection as the treatment of choice for patients with clinically evident lymph nodes in well-differentiated carcinoma. They also recommend it for patients over forty years with primary tumours greater than 1.5 cm in size with or without clinically palpable lymph nodes. This is because at least 75% of these patients have metastasis and their discovery at operation is unreliable [22]. In medullary carcinoma most authors recommend an extensive central compartement cleanout and if metastatic disease is discovered in this area, the operation is converted to a classic neck dissection with retrieval of upper mediastinal lymph nodes [23]. In a small percentage of cases of papillary carcinoma extranodal extension or massive nodes may warrant a formal neck dissection. A central compartement cleanout is always recommended for cases with large tumours or extrathyroidal extension [24].

In our cases lymph nodes were retrieved at the primary operation in forty nine cases. six of the cases showed negative nodes while forty three cases had positive cervical lymph nodes. The lymph nodes were retrieved either by a berry-picking procedure, modified neck dissection or formal radical neck dissection.

When the lymph nodes data were correlated to the pathological type of the primary tumour the highest incidence of nodal involvement was seen in papillary carcinoma with twenty seven cases with positive nodes and four cases with negative nodes. Lymph nodes dissection was done in six cases with follicular carcinoma and all of them showed positive lymph nodes. Seven cases of undifferentiated carcinoma had positive lymph nodes while one case showed negative lymph nodes. In medullary carcinoma three lymph nodes dissections were carried out and all showed positive lymph nodes. In non Hodgkin's lymphoma lymph nodes dissection was done in single case and they were negative. When these figures are compared with other series, we find that in cases of papillary carcinoma they are comparable to most of the other series with the highest incidence of lymph nodes being in the papillary group. Likewise, the incidence of positive lymph nodes is less in the follicular carcinoma group [22]. In cases of medullary carcinoma, three out of the four cases (75%) that underwent thyroidectomy showed positive lymph nodes, while in undifferentiated carcinoma, positive lymph nodes

were discovered in seven out of the eight cases (87.5%) that underwent thyroidectomy. These results are comparable to those reported by Coburn and Wanebo [23]. In non-Hodgkin's lymphoma the single case that had a thyroidectomy showed negative lymph nodes, however, the number of cases is inadequate for proper evaluation.

When the lymph node status was correlated with age, the mean age for case with positive lymph nodes was found to be 47.57 years with the highest number of cases (mode) of 40 years. This is also in accordance with most published data [24].

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