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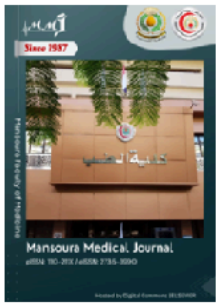

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ABSTRACT

Background : The relative merit of operation in the treatment of Graves' ophthalmopathy as well as the extent of surgical resection is still a matter of debate. This work aimed at reporting the asessment of the impact of near-total thyroidectomy on the course of ophthalmopathy including exophthalmos.

Methods : A total of 20 patients, with thyrotoxic goiters suffering from mild to moderate exophthalmos were enrolled onto this prospective study. Preoperative evaluation of ophthalmopathy was accomplished through the NOSPECS classification, MRI scanning for measuring the extraocular muscle diameters and measurement of the exophthalmos using Hertel's exophthalmometer. Six months postoperatively, ophthalmopathy including exophthalmos was re-evaluated using the same parameters mentioned before.

Results : Clinical activity evaluation, exophthalmometry and extraocular muscles measurement by MRI revealed that the majority of the cases experienced improvement of their ophthalmopathy (65%). This improvement was statistically significant. In addition, no major postoperative complications were observed. However, the study, unlike a number of reported retrospective ones, failed to specify any statistically significant prognostic factors affecting the course of ophthalmopathy possibly due to the limited number of cases in general. In addition, all of the cases were of relatively young age and thyro-

toxic, and the majority were females and non-smoking.

Conclusion : Beside the fact that near-total thyroidectomy adds the advantages of total thyroidectomy (no recurrence) to those of subtotal thyroidectomy (low incidence of temporary and permanent hypoparathyroidism), it has a significant positive impact on thyroid-associated orbitopathy.

INTRODUCTION

Thyroid-associated orbitopathy represents the most frequent extrathyroidal manifestation of Graves' disease [1]. It is a progressive eye disorder characterized by immune-mediated inflammation of the extraocular muscles and orbital connective tissue [2]. The onset of ophthalmopathy is in most cases concomitant with the onset of hyperthyroidism, but the eye disease may precede or follow the hyperthyroidism [3]. The ideal treatment of Graves' disease should provide rapid relief of clinical symptoms by eliminating the source of thyrotoxicosis and constitute a minimal risk for the patient. The long term goal is to maintain the patient in an euthyroid state. Thyroidectomy is an effective treatment of Graves' hyperthyroidism. With respect to radioiodine and antithyroid drug therapy, surgery has the advantage of rapidly eliminating thyroid hyperfunction [4].

Subtotal thyroidectomy has long been advocated as the standard treatment for Graves' ophthalmopathy. Like the case of radioactive iodine therapy, progression of ophthalmopathy after subtotal thyroidectomy was reported early in 1969 [5]. On the other hand, numerous studies reported later on, proved that such progression is observed much less frequently and improvement is evident [6-12]. However, with subtotal thyroidectomy, recurrent thyrotoxicosis develops in 1% to 28% of patients with a possible negative effect on ophthalmopathy [13]. As a result, over the last decade, the trend is for near-total or total thyroidectomy as long as well experienced surgeons are available [14]. In any case, near-total thyroidectomy is recommended whenever total thyroidectomy is deemed unsafe, since in that operation as little tissue as possible is left to prevent injury of the recurrent laryngeal nerve and the parathyroids [15].

Reviewing the current literature indicated that a limited number of retrospective studies [14, 16-20] and very

few prospective studies [21, 22] have been performed correlating the influence of near-total thyroidectomy on the course of ophthalmopathy. However, the outcome was a matter of debate. For example, near-total thyroidectomy in patients with non severe or absent ophthalmopathy is not associated in the short term with significant effect on the course of ophthalmopathy [22]. On the other hand, it was reported [21] that near total thyroidectomy has a major efficacy on the ophthalmopathy. Hence, the aim of the present study is to assess the effect of near-total thyroidectomy on the course of ophthalmopathy in patients with thyrotoxic goiter.

PATIENTS AND METHODS

During the period from June 2003 to February 2004 inclusive, a total of 20 patients with thyrotoxic goiter suffering from exophthalmos were enrolled onto this prospective study conducted at the Endocrine Surgery Unit, Manoura University Hospital.

All patients were required to have a thyrotoxic goiter diagnosed through:

Careful history taking including:, age, sex, smoking, onset, course and duration of the goiter and associated ophthalmopathy, family history of similar condition, weight changes, sleep disturbances, anxiety and tremors, exertional dyspnea and palpitation, bowel disturbances and appetite changes, degree of sweating, past history of psychic traumas, thyroid infections and surgical interferences for the thyroid.

Clinical investigation: General examination including: mental state, built, state of nutrition, weight, pulse, blood pressure and examination of lymph nodes, abdomen, chest, extremities and skin. Local examination of the thyroid gland including: size, shape, surface, symmetry, consistency, tenderness, retrosternal extention, thrill, fixation and the draining lymph nodes. The patients must not have any systemic illness that interferes with a major surgery as near-total thyroidectomy.

Laboratory investigations including: complete blood picture, liver function tests, kidney function tests, total serum T3, T4 and TSH and serum calcium

Radiological investigations including: neck ultrasound and thyroid scanning with ^{99}Tc.

Treatment Plan

Before being operated upon by near-total thyroidectomy, ophthalmopathy was evaluated clinically according to NOSPECS classification [23], exophthalmos was measured using the exophthalmometer and MRI scanning of the orbit was done and diagnosed by an expert radiologist. Euthyroid state was necessarily reached before the near-total thyroidectomy operation through an antithyroid drug (carbimazole), a B-blocker (indral) and Lugol's iodine solution.

Measurement of exophthalmos: Severity of proptosis was measured by a Hertel's exophthalmometer, Carl Zeiss, Jena (Germany). Ocular signs were considered improved or deteriorated by decrement or increment of exophthalmos of 2 or more mm [11, 22].

MRI of the orbit : MRI study was performed in the Radiology Department using 1.5 Tesla MR machine (Siemens-Magnetom Symphony-version Syngo-MR 2002A). In all patients, single loop coil (12cm in diameter) was used.

The appropriate coil was selected to involve both orbits then the imaging proceeds as follows: A sagittal scout view of the orbit was performed for localization of the subsequent axial cuts. Axial T1W1s were performed using TR of 500-800 msec., TE of 20-25 msec. Axial T2W1 were taken using TR of 2000-3000 msec. and TE 30-90 msec. Then coronal and sagittal oblique T1W images were obtained. The sagittal cuts were made parallel to the optic nerve on the axial scout view in which the optic nerve was clearly demonstrated. All obtained slices were reviewed and the thickness of the extraocular muscles was measured using an automatic caliber. The thickness was measured in frontal projection, near the optic foramen, as this is tne best view and sight to show all extraocular muscles in one projection.

The MRI scan gives the diameter of each of the four extraocular muscles viz. the superior rectus, the inferior rectus, the lateral rectus and the medial rectus. The average diameter of the four muscles of each orbit, pre- or 6-month postoperatively, was calculated. Ocular signs were considered improved or deteriorated by regression or progression of extraocular muscles involvement of more than 12% [24].

Operative procedure

Twenty patients with toxic goiter and ophthalmopathy underwent near total thyroidectomy according to the standard procedure with the complete removal of both lobes except a sub-centimeter of the left lobe at the entrance of the recurrent laryngeal nerve into the larynx and around the parathyroids (Figures 1 &2).

Postoperatively, L-thyroxine (50-100 µg once daily) was given to all patients. Six months postoperatively, ophthalmopathy including exophthalmos was evaluated using the same parameters mentioned before.

Statistical Analysis

Statistical analysis was done by using spss statistical package for social science program, version 10, 1999. The data were parametric by using Kolmograv-Smirnov test. The quantitative data were represented in the form of mean and standard deviation. The qualitative data were presented in the form of number and percentage. Chi-square test was used for qualitative data as a test of significance. Significance was considered when p value was less than 0.05, otherwise the data were regarded insignificant.

RESULTS

From June 2003 to February 2004, 75 cases of thyrotoxic goiter had visited the outpatient clinic of Endocrine Surgery Unit of Mansoura University Hospital. Of them, 20 cases had ophthalmopathy and were included in the study. The clinical and laboratory data of each patient at presentation are listed in Table 1. Females constituted the majority of the cases encountered as they represented 70% of the cases (14 cases). The mean age was 27.7 +/- 6.13 years old, while the age range was from 20 to 40 years. Smokers represented 25% of the cases (5 cases). Family history existed in 35% of the cases (7 cases). The goiter volume, calculated postoperatively and ranged from 50 up to 250 cm3 (mean 136.7 cm3).

The mean of duration between the onset of the hyperthyroidism and presentation to the outpatient clinic was 24+/- 1.8 months. However, in the majority of the cases the diagnosis of ophthalmopathy followed the onset of hyperthyroidism by less than 18 months or both occurred concurrently. The values of T3, T4 and TSH at presentation were listed in Table 1. The percentage distribution of the various symptoms of thyrotoxicosis

among the cases was as follows: nervousness (100%), insomnia (70%), palpitation (80%), menstrual disturbances among females (30%), polyphagia (85%) and loss of weight (85%).

Pre- and postoperative assessment of ophthalmopathy : The assessment was performed according to NOSPECS classification [23] as well as through MRI examination of the orbit.

Preoperative asssessment according to the NOSPECS classification revealed the following (Table 2): Symptoms of soft tissue involvement among the 20 cases were as follows: excessive lacrimation in all cases, sandy sensation in 18 cases (90%), retrobulbar discomfort in 15 cases (75%) and photophobia in 16 cases (80%). Preoperative assessment of the degree of severity of the signs of soft tissue involvement was mild in 19 cases (95%) and moderate in one case (5%). The majority of the cases did not suffer diplopia (80%) while 4 cases (20%) were classified as minimal. Corneal involvement and loss of vision were not reported in any case. The degree of exophthalmos for the right as well as the left eye of each case revealed that the majority of the cases (55%) had minimal degree (21-23 mm) while 45% had moderate degree (24-27 mm).

Postoperative assessment according to NOSPECS classification revealed the following (Table 2): Symptoms of soft tissue involvement were improved in 12 cases (60%), stable in 3 cases (15%) and deteriorated in 5 cases (25%) (Table 3). Signs of soft tissue involvement were improved in 11 cases (55%), stable in 4 cases (20%) and deteriorated in 5 cases (25%) (Table 4). Postoperatively, diplopia was not detected in any of the cases. Six months after near-total thyroidectomy, exophthalmos was remeasured for each eye (Table 2). The percentages of improvement, stability and deterioration of exophthalmos postoperatively are presented in Table (5) The majority of cases (55%) had improvement (i.e reduction of the protrusion by at least 2 mm) while deterioration (i.e. increase of protrusion by at least 2 mm) was recorded in 25% . Stability (i.e. change of the exophthalmos within the range of +/-1) was restricted to 20% of the cases. The range of change in exophthalmos was 1-3 mm. Figures [3-5] represent examples of cases man-

ifesting a distinct improvement of the degree of exophthalmos postoperatively.

Pre- and postoperative assessment of ophthalmopathy through MRI measurement of the extraocular muscle thickness of the right and left orbits of each case revealed the following: Preoperative data (Table 6) indicated an increase in extraocular muscle thickness in all cases. Six months postoperatively, MRI detected reduction in the muscle thickness (ie. improvement) in 26 orbits (65%), stability in 4 orbits (10%) and increased in thickness (ie. Deterioration) in 10 orbits (25%). An examples of a pre- and postoperative MRI image of one case is shown in Figure (6).

Prognostic criteria affecting ophthalmopathy including exophthalmos based on MRI results :
The fate of ophthalmopathy including exophthalmos based on MRI data was correlated with the following patient criteria as prognostic factors: sex, age, smoking habits, family history and past history. The same was correlated with the following disease criteria as prognostic factors: volume of the goiter, duration between onset of hyperthyroidism and presentation to the outpatient clinic and pretreatment T3, T4 and TSH levels. Nothing of these parameters revealed any statistical significant effect on the fate of exophthalmos postoperatively (Tables 7 & 8).

Postoperative complications :
No major complications were observed such as recurrent laryngeal nerve injury, permanent disturbance of vocal cord motility or massive bleeding. However, hypocalcaemia had occurred in 2 cases on the 2nd and 3rd days postoperatively as noticed by tingling and numbness in the face, fingers and toes. In addition, one of the cases suffered from carpopedal spasms. Symptoms were relieved readily by a slow i.v. injection of 10-20 ml of 10% solution of calcium gluconate. On discharge both patients were given calcium tablets as maintenance therapy.

Table (1): Clinical and laboratory data at patient's presentation.

Case no.	Sex	Age (years)	Smoking	Family history	Past history	Volume of goiter (cm^3)	Duration of hyper-thyroidism (years)	Pretreatment hormonal level***		
								T_3 (ng/ml)	T_4 (µg/dl)	TSH (µIU/ml)
1	M	20	-	-	-	50	1	4.92	22.1	0.007
2*	M	22	+	+	-	60	1	3.41	17.93	0.04
3	F	24	-	+	-	50	3	2.32	12.9	0.91
4	F	20	-	+	-	250	2	6.44	24.00	0.04
5	M	30	+	-	-	150	2	5.83	21.6	0.009
6	F	30	-	+	-	50	1	2.85	13.5	0.3
7	F	24	-	-	-	144	2	6.33	25.8	0.009
8	F	20	-	-	-	80	2	3.92	16.8	0.09
9	F	28	-	-	-	100	3	6.5	24.8	0.006
10	F	20	-	-	-	84	2	6.51	22.0	0.005
11*	M	37	+	+	+	150	2	2.16	14.02	0.03
12*	F	35	-	-	-	240	2	4.13	19.82	0.02
13	F	40	-	-	-	250	3	5.34	21.3	0.02
14	F	31	-	+	-	250	2	5.05	20.93	0.01
15*	F	37	-	-	-	216	4	1.93	14.3	1.2
16	M	26	+	-	-	240	1	2.7	12.6	0.008
17	F	40	-	+	-	126	4	2.31	13.4	0.1
18**	M	20	+	-	-	200	3	1.0	1.7	0.7
19	F	23	-	-	-	50	2	5.85	27.8	0.007
20	F	26	-	-	-	60	1	1.5	23.5	0.1

* For these cases, thyroid scan was performed at presentation and revealed significant increase in thyroid uptake of radioactive element, thus confirming the laboratory data.

** The patient was presented to the outpatient clinic while he was under antithyroid drug therapy

*** Normal values for: T_3, 0.8-2.0 ng/ml ; T_4, 5.1-12.0 µg/dl; TSH (serum), 0.19-4.4µIU/ml

Table (2) pre- and post operative assessment of ophthalmopathy according to NOSPECS classification.

Case no	Symptoms of soft tissue involvement								Signs of soft tissue involvement		Degree of exophthalmos(mm)				Degree of diplopia	
	Excessive lacrimation		Sandy sensation		Retrobulbar pain		photophobia				Right eye		Left eye			
	Before	after	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	after
1	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	Improved	21	19	22	19	Absent	Absent
2	Present	Stable	Present	Stable	Present	Stable	Present	Stable	Mild	Stable	24	25	24	25	absent	Absent
3	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	improved	21	19	21	19	Absent	Absent
4	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	improved	24	22	25	22	Minimal	Absent
5	Present	Deteriorated	Present	Deteriorated	Present	Deteriorated	Present	Deteriorated	Mild	Deteriorated	21	23	21	23	Absent	Absent
6	Present	Deteriorated	Present	Deteriorated	Absent	Present	Absent	present	Mild	Deteriorated	21	23	22	24	absent	Absent
7	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	Improved	24	22	25	23	Minimal	Absent
8	Present	Stable	Present	Stable	Present	Stable	Present	Stable	Mild	Stable	24	25	25	25	absent	Absent
9	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	Improved	24	22	25	23	absent	Absent
10	Present	Deteriorated	Present	Deteriorated	Present	Deteriorated	Present	Deteriorated	Mild	Deteriorated	21	23	21	24	absent	Absent
11	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	Improved	22	21	22	21	absent	Absent
12	Present	Deteriorated	Present	Deteriorated	Present	Deteriorated	Present	Deteriorated	Mild	Deteriorated	21	23	21	23	absent	Absent
13	Present	Deteriorated	Absent	Present	Absent	Present	Absent	Present	Mild	Deteriorated	21	23	21	23	absent	Absent
14	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	Improved	24	22	25	23	absent	Absent
15	Present	Stable	Present	Stable	Absent	Absent	Absent	Absent	Mild	Stable	21	20	21	20	absent	Absent
16	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	Improved	27	25	27	25	Minimal	Absent
17	Present	Improved	Absent	Absent	Absent	Absent	Absent	Absent	Mild	Improved	21	19	22	20	Absent	Absent
18	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Moderate	Improved	27	24	25	22	Minimal	Absent
19	Present	Improved	Present	Improved	Present	Improved	Present	Improved	Mild	Improved	21	19	21	19	Absent	Absent
20	Present	Improved	Present	improved	absent	Absent	Present	improved	Mild	Stable	21	19	21	19	Absent	Absent

Table (3): Changes in symptoms of soft tissue involvement postoperatively according to the NOSPECS classification

Changes in symptoms of soft tissue involvement	*Number of cases*	*Percentage*
Improvement	12	60%
Stability	3	15%
Deterioration	5	25%

P= 0.009

Table (4): Changes in signs of soft tissue involvement postoperatively according to the NOSPECS classification

Changes in signs of soft tissue involvement	*Number of cases*	*Percentage*
Improvement	11	55%
Stability	4	20%
Deterioration	5	25%

P= 0.005

Table (5): Changes of exophthalmos postoperatively as recorded by the exophthalmometer

Changes of exophthalmos	*Number of orbits*	*Percentage*
Improvement	22	55%
Stability	8	20%
Deterioration	10	25%

P= 0.005

Table 6: pre- and postoperative MRI data of the right and left orbits.

Case no.	Mean extra ocular muscles thickness (cm)			
	Right orbit		Left orbit	
	Before	*After*	*Before*	*After*
1	0.49	0.42	0.58	0.38
2	o.39	0.42	0.33	0.37
3	0.36	0.30	0.35	0.30
4	0.38	0.31	0.44	0.31
5	0.36	0.41	0.36	0.41
6	0.35	0.41	0.34	0.39
7	0.45	0.39	0.43	0.37
8	0.31	0.34	0.35	0.33
9	0.46	0.38	0.38	0.31
10	0.31	0.45	0.34	0.50
11	0..31	0.24	0.36	0.31
12	0.29	0.34	0.33	0.39
13	0.36	0.42	0.34	0.45
14	0.33	0.28	0.35	0.29
15	0.36	0.30	0.34	0.29
16	0.36	0.30	0.43	0.35
17	0.42	0.34	0.39	0.34
18	0.41	0.30	0.47	0.39
19	0.28	0.22	0.30	0.26
20	0.35	0.29	0.32	0.27

Table (7): patient's criteria as prognostic factors based on MRI results.

Criteria	MRI results			Total	P value
	Improved	*Deteriorated*	*Stable*		
Sex :					
Male	4 (30.8%)	1 (20%)	1	6 (30.0%)	
Female	9 (69.2%)	4 (80%)	1	14(70.0%)	0.793
Total	13	5	2	20	
Age:					
Above 27 years	5 (38.5%)	4 (80%)	-	9 (45.0%)	
Below 27 years	8 (61.5%)	1 (20%)	2	11(55.0%)	0.336
Total	13	5	2	20	
Smoking:					
Smoker	3 (23.1%)	1 (20%)	1	5 (25.0%)	
mm-smoker	10 (76.9%)	4 (80%)	1	15 (72.0%)	0.748
Total	13	5	2	20	
Family history:					
Positive	5 (38.5%)	1 (20%)	1	7 (35.0%)	
Negative	8 (61.5%)	4 (80%)	1	13 (65.0%)	0.736
Total	13	5	2	20	
Post history:					
Positive	1 (7.7%)	-	-	1 (5.0%)	
Negative	12 (92.3%)	5 (100.0%)	2	19 (95.0%)	0.753
Total	13	5	2	20	

Table 8: disease characteristics as prognostic factors based on MRI result.

Criteria	MRI result	No. of cases	Mean	Standard deviation	Min.	Max.	F test	P value
Volume of goiter (cm^3)	Improved	13	145,08	79.51	50.00	250.0		
	Deteriorate	5	154.80	89.92	50.00	240.0		
	Stable	2	70.00	14.14	60.00	80.00	0.197	0.823
	Total	20	140.00	79.34				
Duration of disease (years).	Improved	13	1.69	0.855	1.00	3.00		
	Deteriorated	5	1.80	0.837	1.00	3.00		
	Stable	2	2.50	0.707	2.00	3.00	0.711	0.505
	Total	20	1.80	0.834	1.00	3.00		
Level of hormones*								
T_3 (ng/ml)	Improved	12	3.77	2.09	1.5	6.5		
	Deteriorated	5	4.68	1.44	2.85	6.51	0.460	0.639
	Stable	2	3.92		3.41	3.92		
	Total	19	4.05	1.87	1.5	6.51		
T_4 (μg/dl)	Improved	12	18.29	7.445	12.6	27.8		
	Deteriorated	5	19.36	3.236	13.5	22.00	0.93	0.91
	Stable	2	16.80		16.8	17.93		
	Total	19	18.54	6.18	12.6	27.8		
TSH (μIU/ml)	Improved	12	0.24	0.411	0.01	1.2		
	Deteriorated	5	0.071	0.13	0.01	0.30	0.54	0.59
	Stable	2	0.065	0.035	0.04	0.09		
	Total	19	0.18	0.343	0.01	1.20		

* One case was excluded as he was presented in the outpatient clinic in the euthyroid state under antithyroid drugs.

Figure (1) : Near-total lobectomy of the left lobe leaving a sub-centimeter at the entrance of the recurrent laryngeal nerve into the larynx and around the parathyroids.

Figure (2) : Thyroid bed after total lobectomy of the right lobe isthmusectomy and near-total lobectomy of the left lobe.

A

B

Figure (3) : Case # 7 (side view)

(A) Preoperative showing manifest exophthalmos

(B) Same patient 6-month after near total thyroidecomy showing marked reduction of exophthalmos.

A B

Figure (4) : Case # 16 (front view)

(A) Preoperative showing manifest exophthalmos

(B) Same patient 6-month after near total thyroidecomy showing marked reduction of exophthalmos.

A B

Figure (5) : Case # 18 (front view)

(A) Preoperative showing manifest exophthalmos

(B) Same patient 6-month after near total thyroidecomy showing marked reduction of exophthalmos.

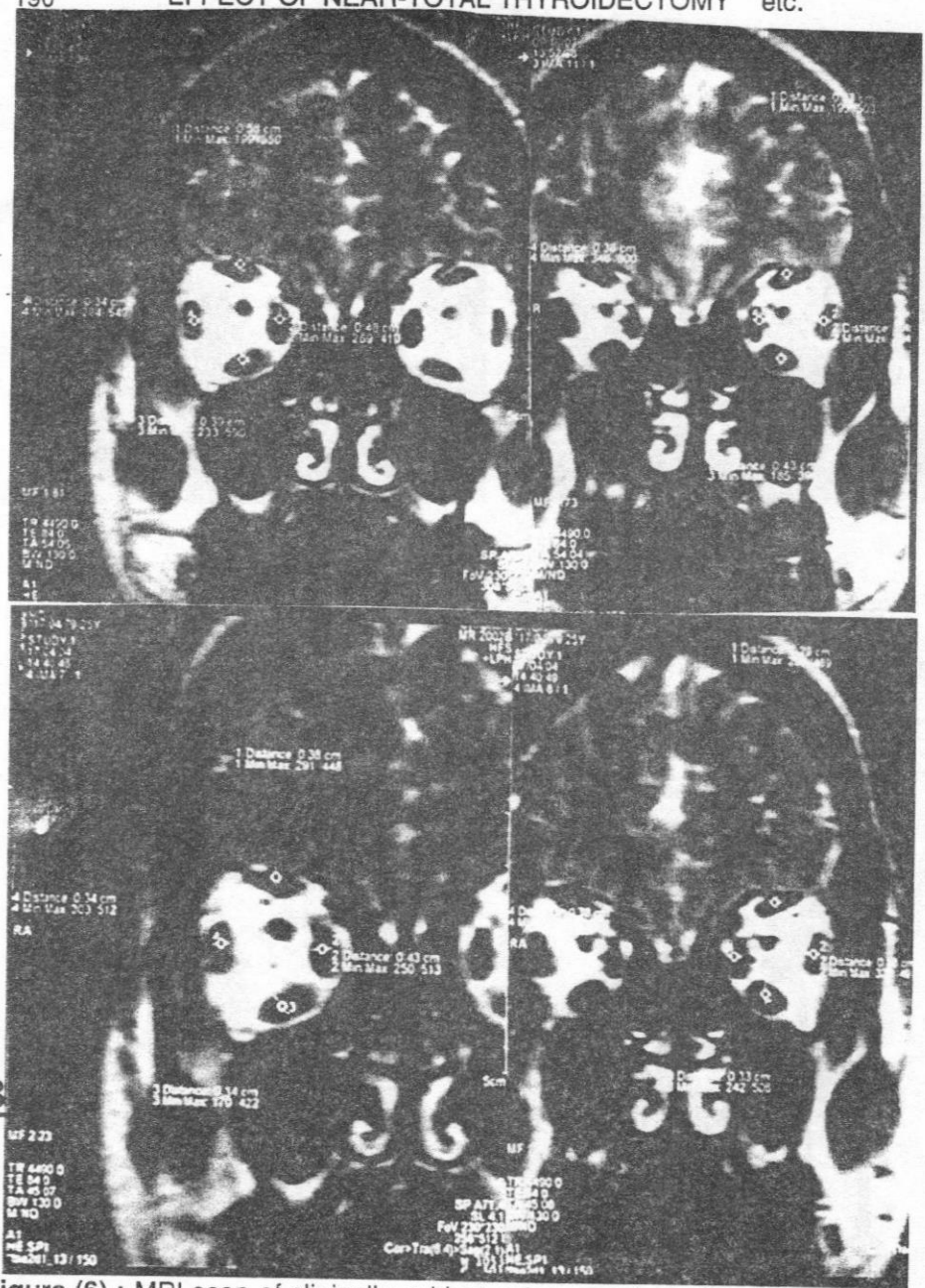

Figure (6) : MRI scan of clinically evident enlargement of the extraocular muscles before surgery (A) and their reduction in thickness 6 month postoperatively .

DISCUSSION

Thyroid-associated orbitopathy represents the most frequent extra-thyroidal manifestation of Graves' disease. The disease even in its milder expressions has a profound impact on the quality of life of the affected individuals [25]. Consequently, a major goal should be to prevent the progression and if possible the occurrence of ophthalmopathy.

In our study the age range of our thyrotoxic cases suffering ophthalmopathy did not exceed 40 years. On the other hand two age peaks were observed in the fifth and seventh decades in western countries [3]. Females constituted more than double the number of males and this goes in harmony with the published literature like that of Teshome and Seyoum [26]. However, as in other studies [27,28] the severer forms of ophthalmopathy in this study were more encountered in males. In the majority of our cases the diagnosis of ophthalmopathy followed the onset of hyperthyroidism by less than 18 months or both occurred concurrently. We noticed the tendency towards increased incidence of diagnosing either thyroid dysfunction or ophthalmopathy during the summer season. This contradicts other report where no seasonal variation was noticed [29]. Our observation may not be due to a criterion of the disease but merely reflects the problem of heat intolerance of Graves' disease patients in our humid locality. Although several reports link cigarette smoking to the epidemiology of Graves' disease[3, 30, 31] we could not detect such a link in our study due to the small number of smokers in it.

On evaluating the clinical activity parameters of ophthalmopathy at presentation we detected no case of visual acuity deterioration that usually denoted optic neuropathy while diplopia existed in only 5% of cases. On the other hand, the most frequent ocular symptoms and signs were related to soft tissue involvement (excessive lacrimation, sandy sensation, retrobulbar discomfort and photophobia).

In the present study, near-total thyroidectomy was chosen as the therapeutic management of 20 thyrotoxic cases. All of these cases were suitable candidates for this operation because of the large sizes of their goiters and the consequently expected extensive adhesions around the thyroid.

Assessment of ophthalmopathy, 6-month postoperatively, as improvement, stability and deterioration was found respectively to be: 55%, 20%, 25% by application of NOSPECS classification, the same by the Hertel's exophthalmometer and 65%, 10%, 25% by MRI scanning. The limited discrepancy that exists between the exophthalmometer and the MRI readings can be attributed to the more accuracy and objectivity of the latter.

Our data more or less go in harmony with the results of Grussendorf et al. [21] who investigated the influence of near-total thyroidectomy on the course of endocrine ophthalmopathy. The patients were classified by the use of special ophthalmopathy index. Out of the 30 patients, 53% showed improvement, 34% unchanged and 14% deterioration.

However, our results distinctly differ from those of Marcocci et al. [22]. They compared the outcome of the eye disease in a group of Graves' patients with absent or non-severe ophthalmopathy submitted to near-total thyroidectomy with a matched group of patients treated with methimazole. The ocular parameters in the first group did not change in 17 out of 18 patients with pre-existing mild ophthalmopathy and in all 12 patients without ophthalmopathy. Eye manifestations worsened only in one (3.3%) patient with pre-existing ophthalmopathy. In the other group, ocular parameters did not change in 58 patients (33 with and 25 without ophthalmopathy), while new ophthalmopathy occurred in 2 cases without pre-existing eye disease. They concluded that treatment of Graves' hyperthyroidism with near-total thyroidectomy in patients with non-severe or absent ophthalmopathy is not associated in the short term (up to one year follow-up) with significant effects on the course of ophthalmopathy.

Comparing the data of the present study with those reported for total or subtotal thyroidectomy was difficult due to the significant conflict about the outcome of either surgical operation. For example; improvement of the eye disease after total thyroidectomy ranged from zero% [32] to 81%[5], stability from zero% [12] to 100% [32] and deterioration from zero% [5] to 33% [12]. Similarly, for the subtotal surgical data, improvement of the eye disease ranged from <7% [11] to 81% [10], stability from 5.5% [12] to 77.8% [11] and worsen-

ing from zero% [10] to 33% [33]. Several influencing factors are responsible for such conflicting data such as : selection bias, nonrandomized and uncontrolled or retrospective features of many studies, non standardized evaluation of ocular changes [34], in addition to the unequal distribution of smokers between treatment groups [35].

On the other hand, based on the observation that reduction of the thyroid mass is followed by the remission of the thyroid autoimmune phenomenon as indicated by the progressive decrease in circulating thyroid autoantibodies, Bauer and Catz [36] proposed that total ablation of thyroid tissue might beneficially affect the course of the eye disease. Thus should total thyroid ablation be considered a goal in patients with Graves' hyperthyroidism and ophthalmopathy, a combined therapeutic strategy was suggested by Marcocci et al. [37]. They proposed that near total or total thyroidectomy followed by radioiodine and glucocorticoid (to prevent radioiodine worsening of the eye disease) may have more advantage over either procedure used alone. Their proposal was realized later by another group of researchers [38] who recently performed near-total thyroidectomy on 55 patients with Graves' disease and mild to moderate Graves' ophthalmopathy, and of whom 16 received in addition standard ablative doses of radioactive iodine. They found that the prevalence of inactive ophthalmopathy, both short and long term after treatment , was significantly higher in the group of patients who underwent thyroidectomy followed by ^{131}I ablation, and suggested that this might be a more effective means of inducing and maintaining inactive ophthalmopathy.

In the present study sex, age, smoking, family history, past history, goiter volume, duration of disease and preoperative hormonal levels were of statistical non significant impact on ophthalmopathy. This contradicts several literature reports. The poor predictive effect of older ages and male sex and the poor prognostic factor of smoking was reported by several authors including [27, 31, 34]. The risky effect of abnormal thyroid hormonal profile at the time of presentation was reported by several authors [34,39, 40,].

The inability of the present study to specify statistically significant prog-

nostic factors might be due to the limited number of the cases in general. In addition, all of the cases were of younger ages (< or = 40 years) and the smokers did not exceed 25%.

Finally, the limited incidence of post operative complications in the present study ascertained what have been reported by Acun et al. (41), that near-total thyroidectomy adds the advantages of total thyroidectomy (no recurrence) to those of subtotal thyroidectomy (low incidence of temporary and permanent hypoparathyroidism).

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تأثير الاستئصال شبه الكلى للغدة الدرقية على اعتلال العين الدرقى الناتج عن تضخم الغدة التسممى

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باستقصاء المراجع، اتضح أن هناك تباين فى النتائج حول تأثير طريقة علاج مرض جريفز على درجة التغير فى جحوظ العين، فبينما توصل البعض أن الاستئصال شبه الكلى للغدة الدرقية له تأثير فعال على درجة الجحوظ، توصل البعض الأخر الى أن الاستئصال لايؤدى على المدى القصير الى تحسن ملحوظ فى درجة الجحوظ.

يهدف البحث الى دراسة درجة التغير فى جحوظ العين فى مرضى تضخم الغدة الدرقية التسمى قبل وبعد اجراء عملية الاستئصال شبه الكلى للغدة.

وقد تم اجراء هذه الدراسة المستقبلية على ٢٠ مريض بمستشفى المنصورة الجامعى ويعانون من تضخم الغدة الدررقية التسممى وجحوظ العين الدرقى، حيث تم تشخيص الحالات من خلال الاستماع للتاريخ المرضى والفحص الاكلينيكى والمعملى والاشعاعى للغدة المتضخمة، كما تم تقييم الأعراض المرضية بالعينين وكذا قياس درجة الجحوظ باستخدام مقياس هيرتل ومتوسط اقطار عضلات العين الخارجية باستخدام جهاز أشعة الرنين المغناطيسى. وقد وجد أن متوسط عمر المرضى ٧ . ٢٧+/-١ . ٦ سنة وأن الاناث يمثلن ٧٠٪ من إجمالاى الحالات وان كانت الاصابة الأشد، أكثر شيوعا بين الذكور. وتراوح حجم الغدة بين ٥٠ الى ٢٥٠ سم ٣ ودرجة جحوظ العين بين ٢١ الى ٢٧ ملليمتر. ولوحظ تضخم بالعضلات الخارجية للعين بجميع الحالات.وقد تم اجراء عملية استئصال شبه كلى للغدة الدرقية المتضخمة باتباع الخطوات المتعارف عليها وانتهاء بالاستئصال التام لكلا الفصين فيما عدا جزء صغير من الفص الأيسر عند دخول العصب الحنجرى الراجع فى الحنجرة وحول الغدد الجار درقية.

وبعد مرور سنة أشهر من تاريخ إجراء العملية تم اعادة تقييم الاعراض المرضية بالعينين وكذا قياس درجة الجحوظ ومتوسط أقطار عضلات العين الخارجية حيث ثبت حدوث تحسن ملحوظ وذو دلالة احصائية فى اثنين وعشرون مقلة عين (بنسبة ٥٥٪) انكمش جحوظها بمقدار ٢ مم على الأقل. وبنفس النسبة تحسنت الأعراض المرضية الاكلينيكية للعين أما أقطار العضلات الخارجية للعين فقد قلت قيمة تضخمها، بمعنى تحسن الحالة المرضية، فى ستة وعشرون مقلة (بنسبة ٦٥٪). مما يدل ويؤكد كفاءة عملية الاستئصال شبه الكلى للغدة الدرقية فى علاج مررض الجحوظ العينى الدرقى.

وبالاضافة الى ذلك، فقد اثبتت الدراسة الحالية ندرة حدوث مضاعفات عقب اجراء عملية الاستئصال شبه الكلى للغدة الدرقية يؤكد ان هذا النوع من الجراحات يجمع مزايا كل من الاستئصال تحت الكلى للغدة (قلة حدوث اصابة للعصب الحنجرى الراجع وكذا الغدد الجار درقية) والاستئصال الكلى لها (عدم حدوث إرتجاع للمرض بزيادة نشاط الغدة) .