The clinico-pathological findings of surgically treated goiter

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ABSTRACT

Background: Goiter is one of the most common conditions that affect people's at different age groups with its effect on the metabolic status of the body through the hyper&/hypo functioning gland that may needs surgical resection. This prospective study had been conducted on 100 patient (85 females&15 males} at the specialized center for endocrinology and diabetes mellitus in Baghdad city, between Jan.2013-Oct.2014;Their ages were ranging between 11-75 years ; the median age is (40.5 years) .

Objectives: define the clinic-pathological pattern of goiter in the center .

Methods: This is a prospective study at the specialized center for endocrinology & diabetes in Baghdad at ALRissafa district; including 100 patients (84 females&16 males). They have their thyroid operation at Al-Kindy teaching hospital and AL-Jadirya privet hospital during the period extending between January 2013 to October 2014. The histopathological results were grouped into Colloid nodular goiter ,thyroid adenoma , thyroiditis ,toxic nodular goiter ;diffuse toxic goiter and thyroid malignancy.

Results: Goiter affect females (85%) more than males (15%) with ratio of 5.6/ 1 & the most affected age group is those between 30-49 years68%. The most common presenting symptom was mass in the neck (45%).The most common pathology of goiter was colloid nodular goiter (69%) the most common malignant lesion was papillary carcinoma(4%)& follicular (1%).(7%) of goiterous patients were affected by diabetes mellitus type 2 . (35%) of the patients give positive family history for goiter.

Key words: Goiter, Goiter histopathology,thyroiditis.

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The thyroid gland is a highly vascular ; homogenous structure ;composed of two lobes connected by an isthmus ;its normal weight is 10-25 grams.[1-3]The gland is under the control of the hypothalamic-pituitary axis hormones (TRH; TSH).[4] The TSH hormone affect the growth &differentiation of the thyroid follicular cells &its hormonal production & secretion (T3,T4);TSH work on special receptors on the surface of the follicular cells of the thyroid gland; any stimulation to these receptors by TSH;TSH agonist (chorionic-gonadotropin)or TSH receptors antibody will stimulate cellular hyperplasia & colloid storage in the thyroid follicles causing thyroid enlargement which is known clinically as goiter.[4]

The incidence of goiter is highly dependent on the iodine intake[4];the prevalence of goiter in areas with sever iodine deficiency can be as high as 80% [4] ; iodinization programs prevent goiter development &decreasing goiter size [5] ;The prevalence increases markedly during childhood and reach its peak at puberty, It is higher in girls than in boys because of the difference of iodine metabolism during adolescent growth; goiter prevalence decreases during adulthood in men than in women.[6]

Thyroid nodules are common & are mostly benign ; the incidence of thyroid nodule increases with the age and it affect females more than males; the prevalence of thyroid nodule depend on the population & the method used to detect nodules; nodular goiter increases with age {2% in men at the age of 26-30 years and 6% at the age of 36-40 years) and(in women 2.7%-8.7% for the same ages) and it become 18%(for women) and14.5% (for men) at 55 years of age }. [7] Many Studies shows prevalence of 2% by palpation and 19-35% by ultrasound study and 8-65% at autopsy data.[8]

Many etiological factors play a rule in simple & nodular goiter; some of these factors may act synergistically in the following sequences of events that cause nodular goiter:-

First:- Iodine deficiency ;nutritional goiterogenuos and autoimmunity causes diffuse thyroid hyperplasia . [9] Second :- the production of H2O2 during thyroid hormones synthesis &release will cause some DNA damage that causes higher mutation load which stimulate cAMP cascade which increases the growth & function of the gland . [9]Finally in proliferating thyroid the expression of growth factor [IGF1];transforming growth factor B and epidermo-growth factor will increase causing small cells division and small clones formation .[9]

Patients and methods This is a prospective study at the specialized center for endocrinology & diabetes in Baghdad at ALRissafa district; including 100 patients (84 females&16 males) ; their ages ranging between 11-75 years with a mean age of (40.57 years).They have their thyroid operation at Al-Kindy teaching hospital and AL-Jadirya privet hospital during the period extending between January 2013 to October 2014. Special form filled for every patient includes the following information:-

1:- Name ,age ,sex ,residency ,chief complaint &its duration ,any associated diseases ,family history ,social history ,past medical & surgical history and any previous exposure to irradiation.

2:- Detailed general & neck examination including laryngoscopic assessment for focal cord mobility .

3:- laboratory work up including thyroid function tests: (T3,T4,TSH); blood biochemistry (fasting blood sugar ,blood urea ,serum creatinin),hematological work up (hemoglobin ,platelet count ,WBC ,blood group),chest and neck x ray to assess position of trachea & any retro-sternal extension of goiter, fine needle aspiration for solitary nodules & suspected nodules by ultrasound assessment.

4:- All patients had their thyroid surgery under general anesthesia and the specimens were processed by formalin fixation over night ,dehydration in alcohol ,clearing in xylene and embedding in paraffin following slicing and staining with heamatoxylin-eosin.

5:- The histopathological results were grouped in to:- Colloid nodular goiter ,thyroid adenoma , thyroiditis ,toxic nodular goiter ;diffuse toxic goiter and thyroid malignancy.

Results. 35% of the patients give positive family history for goiter in their first degree relatives (30 females 85.7% & 5males 14.2%).
Subtotal thyroidectomy done for 40 patients & neartotalthyroidectomy in 60 patients.
Goiter affect females (85%) ; males (15%) with ratio of (5.6 \1) female\male ; the most affected age is those of 30-49 years 68% {58 females (85.2%),10 males (14. 7%)}.

Table (1) the distribution of goiter according to age &sex.

ge	0-19	0-29	0-39	0-49	0-59	0-75	otal
emale	5	9	23	35	9	4	85%
nale	0	1	5	5	0	4	15%
otal	5	10	28	40	9	8	100
%	5%	10%	28%	40%	9%	8%	100%

The most common presenting symptom of goiter is mass in the neck 45% (39 females 86.6 % ; 6 males13.33 %) followed by the feeling of chocking and mass in the neck 38% (32 females 84.2% ; 6 males 15.7%); palpitation 12% (12 females 100%) and 3% presented as recurrent goiter (2females 66.6%;1male 33.3%). Two percent presented as cervical lymphadenopathy which proved by fine needle aspiration as metastatic papillary carcinoma of the thyroid (2 males 100%).

Table (2) the chief complaint according to the sex of the patient

hief complaint	lo	%	emale	%	nale	
lass in the neck	5	45%	39	86.6%	6	3.33%
hocking& mass	8	38%	32	84.2%	6	5.7%
alpitation	2	12%	12	100%	0	%
ecurrent goiter	3	3%	2	66.6%	1	3.33%
ervical L.node	2	2%	0	0%	2	00%
otal	00	100%	85	85%	15	5%

The most common histo- pathological cause of goiter is colloid nodular goiter 69% (59 females 85. 5% ; 10 males 14.4 %) followed by thyroid neoplasia 18% (14 females 77.77%; 4 males 22.22%); thyroiditis form 9% of the causes (8 females 88.88%; 1 male 11.11%) and toxic goiter 4% all were females .

Table (3) The distribution of histopathological cause of goiter according to gendera

istopathology	lo	%	emales	%	male	
olloid nodular	9	69%	59	85.5%	1	14.4%
eoplasia	8	18%	14	77.77%		22.22%
hyroiditis	9	9%	8	88.88%		11.11%
iffuse toxic	2	2%	2	100%		0%
odular toxic	2	2%	2	100%		0%
otal	00	100%	85		1	

Table (4) distripution of type of thyroid neoplasim according to gender.

eoplasim	No		emales	%	nales	%
denoma	13	2%	11	84.6%	2	5.3%
apillary CA	4	2%	2	40%	2	0%
ollicular CA	1	.5%	1	20	0	
otal	18	00%	14	77.7%	4	2.2%

The most common malignant cause of goiter is papillary thyroid carcinoma 80% (2 females 50%; 2male 50%); the affected males presented with cervical lymphadenopathy which proved by fine needle biopsy as papillary carcinoma; one of the females with papillary carcinoma presented with features of thyrotoxicity. followed by follicular carcinoma 20% (1 female patient).
The most common cause of thyroid toxicity is colloid nodular goiter 64.7% (11 females),followed by thyroiditis 17.6% (3 females); diffuse toxic goiter form 11.7% (2 females) while one female who was complaining of thyroid toxicity her histopathology shows papillary carcinoma 5.8%.

Table (5) distribution of clinically toxic goiter according to histopathological cause.

Histopatholog	Females	%	males	%
olloid nodular	11	64.7%	0	0
hyroiditis	3	17.6%	0	0
Diffuse toxic	2	11.7%	0	0
Papillary CA.	1	5.8%	0	0
otal	17	100%	0	0

Discussion :-

Goiter is a common pathological condition affecting females more than males (85females;15 males)of different ages {68% between 30-49 years of age;17% above 50 years of age and 5% below 19 years of age}. Goiter start as diffuse simple enlargement of the thyroid gland in response to primary factors including (genetic; functional &structural abnormalities) and secondary factors (smoking ;stress ;malnutrition ;iodine deficiency & goiterogenouse substances) early in adulthood[9].
The diffuse enlargement will progressing to nodularity formation if the causative factors not reversed back by the time causing multi-nodular goiter with pressure symptoms

on the surrounding structures; or the enlarged nodules may escape the feed back control of the hypothalamic-pituitary- thyroid axis causing features of toxicity (autonomous nodules)[9] as shown in our study that 64.7% of clinically toxic goiter was due to colloid nodular goiter (11 females) table [5].

Thirty five percent of our patients give positive family history for goiter in their first degree relatives which explain the familial tendency of the genetic defect in thyroid hormone synthesis and secretion; several genes have been associated with the development of goiter (Thyro-globulin gene -chromosome 8; multinodular goiter gene-chromosom 14; TSH- receptor-chromosom 14q13; the Na/I symporter gene NIS chromosom 19p 13.2-p12; have all been implicated for potential genetic contribution s to goiter [10].

Seven percent of our patients were found diabetic for the first time and treated with metformin tablets before surgery; diabetes mellitus can exist with hypo & hyperthyroidism . Hyperthyroidism aggravates glucose intolerance by increasing the rate of glucose absorption form the gastrointestinal tract , increasing metabolic rate , debliting the liver glycogen, reducing renal threshold for glucose and reducing secretion and responsiveness to insulin [11,12]. Patients with hashimoto's- thyroiditis show prevalence of islet cell antibodies of 7.6% [13] .The over all prevelance of thyroid disease in diabetes mellitus is 10.81%(36% in hypothyroidisim ; 12% in hyperthyroidism and 11% in post partum thyroiditis) [14].

The most common pathology that causes goiter[table 5] was colloid nodular hypertrophy 69% (59 females, 10males) , followed by neoplasia 18%(14 females , 4 males) the adenoma was the major cause of neoplastic goiter and presented by 13% of all patients (72.22% of neoplastic lesions) while the malignant goiter form 5% of all patient (27.77% of neoplastic lesions). thyroiditis is the third cause of goiter in our study by 9% (8 females 88.88%)& (one male 11.11%); hashimoto's thyroiditis is the most common type (4females &one male) 55.55% followed by lymphocytic throiditis (4females) 44.44%; one of lymphocytic thyroiditis show hurthel cell metaplasia .

Only 3 patients of thyroiditis presented with features of thyroid toxicity 17.6%. Graves disease was the fourth cause of goiter by 2%.When we compare the result of our study with the results of regional &national studies; [table 6,7] we found that thyroiditis is slightly more in occurrences in our study and malignancy is much lower in our study .

Table (6) The results of regional studies in comparison to our study .

Study	linawa[15]	Thiqar[16]	Hilla[17]	ours
C.N goiter	50%	59%	60.6%	69%
Toxic.C.N	-	-	24.4%	2%
Thyroiditis	6.7%	4.4%	3.2%	9%
D.toxic.G	-	-	-	2%
Adenoma	6.6%	21%	-	13%
Malinancy	13.3%	7.8%	11.8%	5%
Female/male	6.5/1	4.8%	3/1	5.6 /1

Table (7) comparison between national studies &our study.

Study	Ours	KSA[18]	W/KSA [19]	Bahrain [20]
C.N.goiter	69%	58%	6.8%	45.5%
Toxic C.N	2%	-		-
Thyroiditis	9%	4.1%	.6%	7%
D.toxic.G	2%	0.3%	.9%	8%
Adenoma	13%	-	1%	15.5%
Malignancy	5%	27.7%	6%	24%
emale/male	5.6/1	3.7/1	.7/1	3.2/1

C.N= colloid nodular; D= diffuse;G=goiter;KSA=kingdom Saudi Arabia;W=west

The indication for surgery was one of the following:-

- Cosmetic factor.
- Risk of neoplasia.
- Failure Of other modalities of treatment.
- Functional effect of goiter on the body.

Recommendation:-

Goiter is a common condition that start as simple diffuse enlargement in early adolescents under the effect of primary& secondary factors progressing to colloid nodular stage with or without features of toxicisity so early detection of the goiter in high risk peoples makes medical treatment very useful especially in young patient; surgical treatment is very useful in nodular goiter &in highly suspected cases of thyroid neoplasia .

References:

1- pankow BG,michala KJ,Mc Gee ;Adult human thyroid weight; MK,pubmed,1985 Dec;49 (6): 1097-103.

2- ASM Nurunnabi,A Alim,MSabiha,B Manowara,K monira,A shamim, Weight of the human thyroid gland-post mortem study, Bangladesh Journal of medical science vol.09 No 1 Jan,2010.

3- Dominique Dorion,Md,MSC,FRCS ,Arlen D Meyers,MD,MBA,Thyroid Anatomy Medscape,update March,6,2013.

4- James R mulinda MD.FACP; Goiter, Medscape,update April 9.2013.

5- Mark P .J. Vanderpump,The epidemiology of thyroid disease, British medical /Bulletin,2011,99;39-51.

6-Thyroid -Endemic goiter-Ptolemy project,www.ptolemyca/members/archives/2006/Endemic Goiter.htm.

7- Douglas S Ross,MD,David S Cooper ,Md ,Jean E mulder,MD, Over view of thyroid nodule formation, www.update. come/co nents/ Jul 10,2013.

8- Daina S Dean,MD; Hossain Garib,MD; Epidemiology of thyroid nodules; clinical endocrinology& metabolisim Articles: December 2008 vol:22 issue:6 pages:901-911.

9- Ashraf Khan,Vania Nose Pathology of thyroid gland, ,Endocrin pathology:- differential diagnosis and molecular advances 2010 Ricardo V. Lloyd.P 194-196.

10- Philip T. cagle-MD Jennifer L Hunt, Molicular pathology of endocrine diseases, P47.2010.1st edition.

11- Maral Mouradian,MD and Nicolas Abourizk,MD, Diabetes Mellitus and thyroid disease , Diabetes care September/ October 1983;vol 6;no 5 512-520 Amarican association.

12-Barkley Beidle man,MD.Toxic goiter complicating diabetes mellitus treated with radioactive iodine 131JAMA;November 11,1950 vol 144,No 11.
13- Yoshihiko Yamasaki,Toshiaki Nakanishi,Shoichi Akazawa and shgenobu Nagataki,Islet cell antibodies in patients with autoimmune thyroid disease, Diabetes March 1991;vol 40;no3 319-322; Amarican diabetes association.
14- Patricia Wu; Thyroid Disease in diabetes ; Clinical dibetes Journal ,Vol 18 No 1 winter 2000.
15- Dr Khalida I. Noel; Histological study of thyroid gland in cases of non toxic goiter; Kerbala Journal of Medicine;1990,2012 vol;5.No:2.
16- Kassim Fawzi Abdulkareem M.B.Ch.B,MSC path;Surgical pathology of thyroid biopsies; Thi-Qar medical Journal: vol(4) No (2): 2010 (47-52).
17- Muhammed A.Altae; Hadi.M.Al- Mousawi;Majid m.Alkafaji ;Clinical and pathological Evaluation of patients with nodular goiter; Medical Journal of Babylon 6:4' 2014 published : 25 June 2014.
18- Abdulkader Albasri; Zeinab Sawaf,Akbar Shah Hussainy,Ahmed Alhujaily; Histopathological patterns of thyroid disease in Al-Madinah region of Saudi Arabiaa; Asian Pacific Journal of cancer prevention; vol 15; 2014.
19- Sherine I.Salama (MSC); Muhammed H.Al-Qahtani (PhD); Jaudah A AL-Maghrabi (MD'FRCP'FCAP); Histopathological pattern of thyroid lesions in Western Region of Saudia Arabia; The New Egyption Journal of Medicine Vol:40; No :6 1st June 2009.
20- Abdulla H. Darwish,M.B.Ch.B, MRCpath; Khalid A. Alsindi MD,DCP,MRCpath; Jihene El Kafsi,BA cantab,MBBS;Pattern of thyroid diseases -A Histopathological study; Bahrain Medical Bulliten,vol 28,No 4, December 2006.