

GIANT GOITER: NOT COMMON IN ENDEMIC AREAS OF PAKISTAN. A 10 YEARS EXPERIENCE

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ABSTRACT

OBJECTIVES: To determine the prevalence of giant goiter and morbidity after surgery and to compare the data with the national and international literature.

STUDY DESIGN: A prospective, observational study.

PLACE AND DURATION: Department of Surgery, Fauji Foundation Hospital, Rawalpindi from May 1999 to April 2008.

METHODOLOGY: All patients with giant multinodular goiter (Grade IV) were operated and prevalence of complications was recorded meticulously, and data compared with national and international literature.

RESULTS: A total of 744 patients operated and majority were female 94.89% (n=706) from 5th decade of life i.e. 35.75% (n=266). Giant multinodular goiter (Grade IV) found in 26.08% (n=194). Among them, 96.90% (n=188) were euthyroid. Near total thyroidectomy was done in 59.79% (n=116) patients, total thyroidectomy in 28.86% (n=56) and subtotal thyroidectomy in 11.35% (n=22) patients. Transient hypocalcaemia was the commonest complication observed, in 8.24% (n=16) patients followed by seroma formation- 7.21%, (n=14). Permanent hypoparathyroidism- 2.66%, (n=4), Permanent recurrent laryngeal nerve injury- 1.03%, (n=2), transient recurrent laryngeal nerve palsy- 4.63%, (n=9), postoperative bleeding- 1.03%, (n=2) and wound infection noticed in 2.57% (n=5) patients.

CONCLUSION: Giant goiter is not uncommon in our setup, with expected high postoperative complications so surgery should be done by experienced hands in the centers where all facilities are available. Public awareness should be created by health authorities and organizations regarding prevention and early treatment.

KEY WORDS: Giant Goiter, Classification, Postoperative, Complications

INTRODUCTION

Goiter or goiter (Latin gutteria, struma), is an enlargement of the thyroid gland, which can lead to a swelling of the neck has been a recognized medical condition since 2700 B.C. Interestingly, the thyroid gland itself was not documented until the Renaissance period. In 1619, Hieronymus Fabricius ab Aquapendente recognized that the goiters arise from the thyroid gland. The actual term

thyroid gland (Greek thyreoeides, shield-shaped) is, however, attributed to Thomas Wharton in Adenographia (1656) ¹. Massive thyroid enlargement is more common in endemic areas where the commonest cause is iodine deficiency. Cosmesis, dyspnea, dysphagia or voice changes are the main presenting complaints in these patients due to involvement of trachea, esophagus, and recurrent laryngeal nerve². These symptoms are commonly associated with malignant goiters and some time with giant goiters but benign nodular goiters of medium or small size do not normally cause these symptoms. Giant goiter sometimes needs emergency thyroidectomy due to pressure symptoms or intra follicle bleed. ³

Morbidity and mortality of giant goiter surgery is higher than routine elective thyroidectomy. The surgery is problematic due to distorted anatomy, soft trachea, increased operating time, prolong anaesthesia and high postoperative respiratory complications. Postoperative asphyxia is the most dangerous complication requiring immediate or prophylactic tracheostomy. The patients at high risk for respiratory complications are with giant goiter, preoperative or postoperative recurrent laryngeal nerve palsy, tracheal

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deviation and narrowing, retrosternal extension, progressive stridor and difficult intubation.^{4,5}

METHODOLOGY

This prospective, observational study was carried out in the Department of Surgery, Fauji Foundation Hospital, Rawalpindi from May 1999 to April 2008. The purpose of the present study was to determine the prevalence of giant goiter and morbidity after surgery and to compare the data with the national and international literature. The Fauji Foundation Hospital is a tertiary care teaching hospital, which provides health care to the ex-servicemen, their families and private patients. Most of the patients belong to the areas of Rawalpindi Division, Jhelum, Chakwal, Abbottabad District, Murree Hills, Northern and Central Punjab, Azad Kashmir and NWFP. Inclusion criteria comprise of all patients with giant multinodular goiter (Grade IV) irrespective of age and sex. Patients with malignant goiters or those who have not completed the six month follow up period post operatively were excluded from the study. All patients with goiter were evaluated meticulously at the first time of reporting in OPD by senior registrar, Junior and senior consultant regarding size of goiter and inclusion in study. To declare a patient with giant goiter we follow the criteria used by Perez⁶ of goiter classification. All patients were admitted and thorough clinical, biochemical and histopathological and preoperative evaluations including clinical and biochemical were done. Patients were prepared for operation and all necessary routine investigations for thyroid surgery were carried out. All surgeries were done by consultant or senior surgeon of our team. All preoperative, operative and post-operative findings were recorded in detail. Patients were followed regularly weekly for one month and monthly for next five months to see any complication in post operative period. The results were evaluated and analyzed statistically by using Epi 6 software.

RESULTS

A total of 744 patients operated during study period and among them 94.89% (n=706) were female and only 5.11% (n=38) were male. Desent match with inclusion criteria regarding size of goiter 26.08% (n=194), were of grade-IV

i.e. giant multi nodular goiter and 43.27% (n=322) were having Grade -III size goiter. None of the patient with Grade 0a size was operated (Table - I). Among Grade – IV (Giant Multinodular goiter), 96.90% (n=188) were euthyroid and only 3.10% (n=6) were diagnosed as hyperthyroid (Table - I). Details of operative procedure were given in Table - II. Near total thyroidectomy was the commonest procedure done in 59.79% (n=116) patients, total thyroidectomy in 28.86% (n=56) and subtotal thyroidectomy was performed only in 11.35% (n=22) patients. Transient hypocalcaemia is the commonest complication observed in post operative period in 8.24% (n=16) patients and permanent hypoparathyroidism observed in only 2.66% (n=4) patients. Seroma formation was the 2nd commonest complication

Table – I: Size and status of Goiter of all patients reporting in OPD during study period (n=744)

Grades	Patients	SEX		STATUS		
		Male	Female	Euthyroid	Hypothyroid	Hyperthyroid
G0a						
G0b	12 (01.62%)	0	12 (100%)	4 (33.34%)	0	8 (66.66%)
GI	90 (12.09%)	1 (1.11%)	89 (98.89%)	64 (71.12%)	2 (02.22%)	24 (26.67%)
GII	126 (16.94%)	5 (3.96%)	121 (96.04%)	102 (80.96%)	8 (06.35%)	16 (12.69%)
GIII	322 (43.27%)	17 (5.27%)	305 (94.73%)	312 (98.89%)	2 (0.63%)	8 (02.48%)
GIV	194 (26.08%)	15 (7.73%)	179 (92.27%)	188 (28.69%)	0	6 (03.10%)
TOTAL	744	38 (5.11%)	706 (94.89%)	338 (90.05%)	12 (01.62%)	56 (08.33%)

observed in 7.21% (n=14) patients. Permanent recurrent laryngeal nerve injury, noticed in 1.03% (n=2) and transient Recurrent laryngeal nerve palsy in 4.63% (n=9) patients. Only two patients (1.03%) have bleeding in post operative period. Other complications observed in our patients were wound infection in 2.57% (n=5) and stitch granuloma in 1.54% (n=3) Table - III.

DISCUSSION

Endemic goiter is still a public health problem in Northern region of Pakistan including Azad Jammu and Kashmir and

Table – II: Detail of Operative procedures done in Grade- IV Goiter patient (n=194)

Procedure	No. of patient	%
Subtotal thyroidectomy	22	11.35
Near total thyroidectomy	116	59.79
Total thyroidectomy	56	28.86
TOTAL	194	

Himalayan region. All sizes of goiter are common in endemic goitrous region and majority of the patients in these areas present with large (grade III or IV) goiters.^{7, 8} So it is not uncommon to encounter with giant goiter protruding beyond chin or jaw. The term endemic goiter refers to the occurrence of goiter in a significant proportion of individuals in a particular geographic region⁸. In fact, it has been estimated that goiters affect as many as 200 million of the 800 million people who have a diet deficient in iodine². Currently, iodine deficiency disorder is associated with the presence of endemic goiter in India, China,

Table – III: Complications after Surgery (n = 194)

COMPLICATION	No of pts	%
Transient RLN palsy	9	04.63%
Permanent RLN palsy	2	01.03%
Transient Hypocalcaemia	16	08.24%
Permanent hypocalcaemia	4	02.06%
Hemorrhage	2	01.03%
Seroma formation	14	07.21%
Wound infection	5	02.57%
Stitch granuloma	3	01.54%

Central Asia and Central Africa. Endemic goiter is thought to be caused by TSH stimulation resulting from inadequate thyroid hormone and other paracrine growth factor synthesis. Thus, the thyroid gland enlarges in an attempt to maintain a euthyroid state⁹.

Thomas in 1959 published the first report from Ibadan on "The large Goiters". He reported that over 60% of his 100 cases had "massive goiters"¹⁰. Many years later, Olurin from same institution in Ibadan published a prospective study in which he identified that the clinico-pathophysiological problems of surgically managing patients with simple goiter not less than 10gm per kilogram body weight which he labelled as the Simple Giant Goiter Syndrome (SGGS). These patients have simple goiters weighing not less than 10gm/kilo body weight, with a history usually of not less than 10 years duration and predominantly in peasant woman of about 41 to 50 years of age who live in rural goiter endemic area.^{11,12}

The classification commonly used to grade goiter according to different sizes suggested by Perez^{6, 13} is as follows :

Grade 0a: Thyroid not palpable, or if palpable not larger than normal.

Grade 0b: Thyroid distinctly palpable but not visible with

the head in a normal or raised position considered to be definitely larger than normal, i.e. at least as large as the distal phalanx of the subject's thumb.

Grade I: Thyroid easily palpable and visible with the head in either a normal or a raised position. The presence of a discrete nodule qualifies a patient for inclusion in this grade.

Grade II: Thyroid easily visible with the head in a normal position.

Grade III: Goiter visible at a distance.

Grade IV: Monstrous goiters.

Giant goiter (Grade IV) observed in 26.08% patients in our study. This proportion is significantly high which is due to lack of awareness among the people regarding medical treatment, lack of medical facilities, poverty, social reasons and no use of supplement iodine in diet. Some of the commonest compressive symptoms commonly associated with giant goiter are dyspnea, stridor, orthopnea, dysphagia and hoarseness. These symptoms are particularly more common with the substernal extension of goiter.^{7,8}

In simple multinodular goiter, total thyroidectomy by an experienced surgeon with capsular dissection seems to be a better option to avoid risk of recurrence and the five fold increased risk of complications of re-do surgery. Near total thyroidectomy (subcapsular dissection) and total thyroidectomy are the commonest procedures performed by us for these giant multinodular goiters. Although the surgical technique used was routine but the operative challenge was the magnificent size of the gland and its adherence to vital structures. The complications associated with thyroid surgery must be kept in mind so the surgeon can carefully evaluate the surgical options, have more precise surgical indications and be able to give the patient adequate information. Importantly, based on the unfortunate outcome for our patient, one should avoid unnecessary and risky surgeries in giant multinodular goiter when there is a lack of facilities for proper postoperative care.^{14,16}

Surgical excision can immediately resolve local symptoms and is often recommended when substernal extension is evident. Although goiters have been reported to decrease by up to 40% after RAI treatment, such therapy may not sufficiently diminish the size of the gland and could even cause temporary gland enlargement due to subsequent edema. These enlarged thyroid glands can also be of cosmetic concern for some patients, who opt for surgical excision of the lobe or gland for this reason.^{9,17,18}

Regarding complications in giant goiter the exact incidence

of postoperative hypocalcaemia and recurrent laryngeal nerve injury is not known. The risk of hypocalcaemia increases with increase in amount of thyroid tissue removed. One must make every effort to save the parathyroid glands by identifying, preserving and reimplanting if necessary especially in total thyroidectomy. Ligation of inferior thyroid artery in continuity away from thyroid during bilateral subtotal thyroidectomy associated with significantly low incidence of hypoparathyroidism or hypocalcaemia^{16,19}. Transient hypocalcaemia was observed in 8.24% of patients which recovers within six months of surgery and only 2.06% patients developed permanent Hypoparathyroidism in our study. Rosato and colleagues reported permanent hypocalcaemia in 1.7% and temporary hypocalcaemia among 8.3% patients⁴. Incidence of permanent hypocalcaemia reported between 0.3% to 1.4%^{4, 15, 16, 20, 21} and transient hypocalcaemia up to 10.7% in different national and international studies^{4,5,16,21,22}. Lee and his colleagues reported 28.4% incidence of transient hypocalcaemia in their study¹⁵ which is unusually very high. No exact statistics of postoperative hypocalcaemia in giant multinodular goiter was given in literature. Hypoparathyroidism after total thyroidectomy is an important complication that can be successfully treated by therapy, although it is not always easy to be managed in special circumstances such as in young persons or pregnant women.

The second gravest complication is injury to recurrent laryngeal nerve (RLN) which results in severe morbidity. Failure to recognize the RLN increases the risk of permanent damage to RLN. But in our experience only 2.06% patients have developed permanent and 4.63% have transient recurrent laryngeal nerve injury. The incidence of transient recurrent laryngeal nerve injury reported between 4% to 7% and permanent from 0% to 1.4% in different studies^{4,15,16,20-23}. Some surgeon advocate the identification of recurrent laryngeal nerve in every case and it is reported in literature that the incidence decreased from 5% to 1.6%²⁴. Bilateral recurrent laryngeal nerve injury is very rare especially in expert hands.

Only 1.03% patients developed post operative haemorrhage which needs re-exploration. Haemorrhage or Hematoma formation is a known complication of thyroidectomy and incidence varies between 0.2% to 9.9% which is reported in literature.^{15,20-22} Seroma formation

is commonly observed especially in giant multinodular goiter due to size of the goiter removed and raw area left. 7.2% patients developed Seroma formation in our study which was successfully managed by repeated aspiration. High incidence of Seroma formation is also reported in literature^{15,20,22}. Post operative wound infection and stitch granuloma was observed in 2.57% and 1.54% patients respectively. Almost same incidence is also reported in literature.^{4,16,20,21} Dysphagia and laryngeal edema are rare complications reported in literature^{4,20,21,25}. Tracheomalacia is a rare complication that may occur in patients undergoing thyroidectomy for a long-standing goiter. Following total thyroidectomy the tracheal ring was fixed bilaterally to periosteum of sternal end of the clavicle which is effective in preventing tracheomalacia^{25,26}. None of patient had tracheomalacia in our study.

Diffusely enlarged thyroid glands (goiters) are becoming increasingly infrequent. However, in some geographical areas they are still relatively common and can cause compressive symptoms involving the trachea, esophagus, and recurrent laryngeal nerve. Surgical treatment of giant thyroid glands requires a high level of expertise and may lead to severe complications. So a literature review showed that up to weight of 4.7kg (10.4lbs) thyroid gland has been reported. Only experienced surgeons should treat large thyroid goiters. Ideally, large thyroid goiters should be treated before they reach a substernal component, otherwise any sudden growth in gland size could seriously compromise respiration^{9,26}.

Literature review and our study reveal that the giant goiter is a living example of some historical pathology which is predominantly found in areas suffering from a lack of primary health care services, as a result of social, economic and political problems. In our study, the patient's pathology was entirely preventive in origin and can be minimized if National Health Authorities and International Health Organizations should focus on these areas of the world to eliminate ignorance and lack of resources, at least with respect to health issues. To improve the outcome of treatment the goiters surgery must be taken seriously, in particular, the establishment of safety measures and proper facilities (both equipment and personnel) should be considered beforehand.

CONCLUSION

Prevalence of giant goiter is significantly high in our country. Literature review reveals expected high postoperative complications so surgery should be done by experienced surgeons in the centers where all facilities are available. Public awareness should be created by health authorities and organizations regarding prevention and early treatment.

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