Patterns and outcome of surgical management of goitres at Bugando Medical Centre in northwestern Tanzania

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Abstract: Despite the well established endemicity of goitres little work has been done on the management of goiters in Tanzania. A cross-sectional study was conducted at Bugando Medical Centre (BMC) in Mwanza, Tanzania to determine the pattern and outcome of surgical management of goitres. Data was collected using a pre-tested, coded questionnaire. A total of 152 patients were studied of which 140 (92.1%) were females and males were 12 (7.9%) (F: M = 11.7: 1). Their ages ranged from 18 to 72 years (mean =38.4± 12.5 years). The mean duration of illness was 9.2 years. The thyroid gland size at admission was grade III in 63.8% of patients. Multinodular goitres were reported in 51.3% of patients. The majority of patients (92.1%) presented with euthyroid goitres and the remaining (7.9%) patients had toxic goitres. Pressure symptoms and cosmetic disfigurement were the common indications for thyroidectomy in 47.4% and 23.7%, respectively. Near total thyroidectomy and total thyroidectomy were the surgical procedures performed for benign and malignant goitres in 47.3% and 8.1% of patients, respectively. Simple multinodular goitres were the most common histopathological pattern accounting for 67.2% of cases. Twelve (7.9%) patients had a histologically proven thyroid malignancy, of which follicular and papillary carcinoma were reported in 41.7% and 33.3% of cases, respectively. Post-operative complications rate was 7.9%. The mean length of hospital stay was 14.4 days (range 3 to 34 days). Five patients died giving a mortality rate of 3.4%. In conclusion, this study has shown that the pattern of surgical goitres seen at Bugando Medical Centre is similar to what is reported from other parts of the world. However, the majority of patients present for surgery very late with huge goitres predisposing them to increased risk of post-operative complications, prolonged length of hospital stay and cost of medical care. It is therefore recommended that health education should be given to the community about the cause, prevention and treatment options so that patients could seek early medical attention.

Key words: goiters, pattern, outcome, surgical management, Tanzania

Introduction

Goitre, defined as enlargement of the thyroid gland that normally weighs 25-30g, is a common endocrine disease that is reported to affect approximately 4-15% of a given population worldwide (Tumbridge *et al.*, 1977; Matesa *et al.*, 2002; Takayo *et al.*, 2002). Goitres are a common endocrine disease in Tanzania after diabetes mellitus and are a single commonest cause of surgical admissions to Bugando Medical Centre (Bugando Medical Centre- Medical Record Database 2008-2009). The etiological spectrum of thyroid diseases ranges from a variety of thyroid tumors, altered functional states and inflammatory conditions, to a rare form of disorders (Takayo *et al.*, 2002; Matesa *et al.*, 2002). Ultrasonographic results and autopsy findings indicate that goitre could be present in as much as 30% and 50% of the general population respectively without clinical manifestation (Takayo *et al.*, 2002). Apart from being cosmetically disfiguring, a huge thyroid swelling can

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compress adjacent structures such as oesophagus, recurrent laryngeal nerve, superior vena cava and trachea. Compression of the trachea may seriously compromise the patency of the airway and lead to threatening respiratory obstruction (Gardiner & Russell, 1995).

Thyroid surgery has been reported to be the mainstay of the treatment of surgical goitres and is considered as a safe procedure in well equipped settings with suitable experience to anticipate and avoid the occurrence of possible surgical complications (Mattioli *et al.,* 1996; Bakheit *et al.,* 2008; El Bushra *et al.*, 2009). Many treatment modalities have been described for the surgical management of various forms of goitres, including lobectomy, sub-total thyroidectomy, near-total thyroidectomy and total thyroidectomy. However, the choice of surgical approach and the extent of tissue resection for the benign thyroid diseases remain controversial (Bellantone *et al.*, 2002). In order to improve the outcome of these patients, most surgeons have been looking for a treatment that results in the lowest recurrence and complication rate (Acun *et al*., 2004). Subtotal thyroidectomy because of its low incidence of postoperative complications, has previously been advocated by some for the treatment of benign thyroid disease, but recurrence rates as high as 45% have been reported (Waldstrom *et al*., 1998; Acun *et al*., 2004; Salman & Omer, 2007).

Recent studies have reported total thyroidectomy to be the gold standard treatment for thyroid cancer, multinodular goitre and graves. However, due to its associated risk of postoperative complications, most surgeons avoid the procedure for the treatment of benign thyroid diseases (Acun *et al*., 2004; Efremidou *et al.,* 2009). Near-total thyroidectomy has been reported to achieve both low recurrence and complication rates when compared with the rates reported in the literature for total thyroidectomy and has shown to be an effective and safe surgical treatment option for various benign thyroid diseases. However, its long-term follow up has not been documented in literature (Acun *et al.,* 2004; El Bushra *et al*., 2009). There is paucity of information in our setting regarding thyroid diseases including goitres. In this study, we report our experiences with goitres and their surgical management outcome in our local setting. The study will provide basis for improvement of treatment outcome of these patients.

Materials and Methods

Study design and setting

This was a cross sectional study which was conducted at Bugando Medical Centre (BMC), in Mwanza, Tanzania over a two-year period from February 2008 to January 2010. Bugando Medical Centre is a 1000 bed, consultant and teaching hospital for the Weill-Bugando University College of Health Sciences (WBUCHS) and other paramedics. It is one of the four consultant and tertiary referral hospitals in the Tanzania. BMC provides services to all patients from neighboring towns and those referred from peripheral hospitals in the Lake Victoria Zone.

Study subjects

The study included all patients who were admitted to the hospital for surgical treatment of goitres. Patients who refused to consent for the study were excluded from the study. All patients included in the study were pre-operatively evaluated by means of history taking and physical examination. The size of the goitres was graded from 0-III according to WHO classification system (WHO/UNICEF/ICCIDD, 1994). Wayne's clinical index (Lester, 1980) was used for clinical diagnosis of thyrotoxic goitres. Blood was taken (in patients who were

found to have thyrotoxic symptoms) for determination of thyroid function tests (TSH, T4 and T3) by using Enzyme linked iso-sorbent assay (ELISA) method. Plain neck and chest radiographs were performed in patients suspected to have retrosternal goitres. Ultrasound and radioactive imaging of the thyroid gland were not performed routinely. Computed tomography scan of the neck and chest in patients with massive, retrosternal or clinically malignant goiter, or in a suspected posterior extension of the nodules was not performed due to its unavailability. Fine needle aspiration biopsy was performed only in selected cases. Antithyroid medications were used for patients who were found to have thyrotoxic symptoms before surgery to attain euthyroid state. Lugol's iodine was prescribed in some patients to reduce the vascularity of the gland. A preoperative laryngoscopic examination of the vocal cords was not done routinely.

All recruited patients were operated under general anesthesia with endotracheal intubations and muscle relaxation. Intra-operatively, recurrent laryngeal nerves (RLN) were routinely identified on both sides and every attempt was made to identify and preserve the parathyroid glands. Those glands with compromised blood supply were excised, diced and re-implanted in the sternocleidomastoid muscle. All wounds were closed with rubber drains left *in situ*. Intra-operative findings were documented by the operating surgeons. The weights of the thyroid specimens removed at operation were recorded. All postoperative thyroid tissues specimens removed surgically were subjected to histopathological examination for diagnostic confirmation. Surgeon's assessment of the patients' voice was a reliable method to suspect vocal cord palsy during the postoperative period. Laryngoscopic examination was advised postoperatively in patients with hoarseness or loss of voice quality. Postoperative serum calcium levels were selectively checked in all patients undergoing total thyroidectomy. In the absence of any complication all patients were discharged on the third day. All patients were followed until discharge or death.

Data collection and analysis

Data were collected using a pre-tested, coded questionnaire. Included in the questionnaire were socio-demographic data, clinical presentation, clinical diagnosis, indications for surgery, histopathological results, type of operation performed, post-operative complications and treatment outcome. Data collected was analyzed using SPSS computer software version 11.5.

Ethical consideration

All patients admitted to the hospital for surgical treatment of goitres were, after informed written consent, included in the study. Approval to conduct the study was sought from the WBUCHS/BMC Joint Ethic Review Committee before the commencement of the study.

Results

Between February 2008 and January 2010, a total of 152 patients who were admitted to BMC for surgical management of goitres were studied. 140 (92.1%) were females and males were 12 (7.9%) with a female to male ratio of 11.7: 1. Their ages ranged from 18 to 72 years with a mean and median of 38.4 years and 36.8 years, respectively. The peak age incidence was 31-40 years age group. The majority of patients, 96 (63.2%) were younger than 40 years. The majority of patients, 99 (65.1%) came from the rural areas located a considerable distance

from Mwanza City and most of them, 82 (53.9%) had either primary or no formal education. The majority of patients (86.8%) presented with a long standing goitres (Table 1).

Table 1: Clinical presentation of patients with goitres

Clinical presentation	Frequency	Percentage
Duration of goitre (in years)		
< 1	20	13.2
1-5	97	63.8
>5	35	23.0
Reasons for medical consultation		
Large neck swelling	92	60.5
Pressure symptoms	32	21.1
Thyrotoxic symptoms	12	7.9
Rapid growing swelling	10	6.6
Neck pain	4	2.6
Abscess formation	2	1.3
Thyroid gland size / grade		
I	8	5.3
II	42	27.6
III	102	67.1
Lobe involved		
All lobes	86	56.6
Right lobe	23	15.1
Left lobe	21	13.8
Solitary nodule	22	14.5

The duration of illness ranged from 1 month to 15 years with a mean of 9.2 years. The majority of patients (63.8%) presented between one and five years of onset of illness. The reasons for seeking medical treatment are shown in table 2. The thyroid gland size at admission was grade III in 67.1% of patients. All lobes were enlarged in 56.6% of the cases (Table 2). The majority of patients, 140 (92.1%) presented with euthyroid goitres and the remaining 12 (7.9%) patients presented with toxic goitres which were all treated with antithyroid drugs before surgery with good response. No patient presented with hypothyroid goitres. Multinodular goitres were the most common pre-operative clinical diagnosis made (Table 2).

Table 2: Clinical diagnosis

Clinical diagnosis	Frequency	Percentage
Multinodular goitres	78	51.3
Solitary thyroid nodules	20	13.2
Simple diffuse goitres	20	13.2
Neoplastic goitre	18	11.8
Toxic goitres	12	7.9
Thyroid abscess	2	1.3
Retrosternal goitre	2	1.3

Pressure symptoms (47.4%) and cosmetic disfigurement (23.7%) were the most common indications for surgery. Other indications included suspicious malignancy (11.8%), toxic goiter (7.9%), recurrent goiter (7.9%) and thyroid abscess (1.3%). Thyroid surgery was

performed in 148 (97.4%) patients. Four patients had advanced inoperable thyroid cancer (confirmed by histopathological examination of Incisional thyroid biopsy) for which only supportive therapy was provided. Near-total thyroidectomy was the most common type of thyroid surgery performed in (47.3%) patients (Table 3). Tracheostomy was performed in two patients, one due to tracheomalacia in a huge longstanding multinodular goitre and another after total thyroidectomy for thyroid cancer. Twelve (7.9%) patients underwent secondary thyroidectomy for recurrence goitres; some of them had their initial surgery (primary thyroidectomy) decades ago. The duration of surgery ranged from 20 minutes to 160 minutes with a mean of 68.5 minutes and the mean weight of thyroid tissue removed was 452 grams (Range=30-1600 grams).

Table 3: Surgical procedure performed (N= 148)

Surgical procedure performed	Frequency	Percentages
Near-total thyroidectomy	70	47.3
Sub-total thyroidectomy	24	16.2
Nodulectomy	20	13.5
Lobectomy + isthmusectomy	18	12.2
Total thyroidectomy ± lymph node dissection	12	8.1
Incision & drainage (thyroid abscess)	2	1.4

Simple goiters accounted for over three quarters of the types of goiters. Twelve patients (7.9%) had a histopathologically proven thyroid malignancy, of which follicular carcinoma was the most common type in 41.7% of cases (Table 4).

Table 4: Histopathological (results) diagnosis (N=152)

Histopathological results	Frequency	Percentage
Simple goitres	**(116)**	**(76.3)**
Multinodular goitres	78	67.2
Simple colloid goitres	14	12.1
Diffuse hyperplastic goitres	13	11.2
Solitary nodular goitres	11	9.5
Toxic goitres	**(12)**	**(7.9)**
Diffuse toxic goitres	7	58.3
Toxic nodular goitre	5	41.7
Thyroid adenomas	**(10)**	**(6.6)**
Papillary adenoma	5	50.0
Follicular adenoma	5	50.0
Thyroid carcinomas	**(12)**	**(7.9)**
Follicular carcinoma	5	41.7
Papillary carcinoma	4	33.3
Mixed papillary-follicular carcinoma	2	16.7
Hurthle cell carcinoma	1	8.3
Thyroiditis	**(2)**	**(1.3)**
Pyogenic	1	50.0
Tuberculous	1	50.0

Twelve (7.9%) patients developed post-operative complications. Significant intra-operative hemorrhage requiring post-operative blood transfusion (33.3%) was the most common complication following thyroidectomy. Other post-operative complications included

hoarseness of voice (3), wound sepsis (1), aspiration pneumonia (1), transient tetany (1) and abscess formation requiring incision and drainage (1).

The overall length of hospital stay ranged from 3 to 34 days with a mean of 14.4 days. Five patients died giving a mortality rate of 3.4%. Two patients who had thyroid abscess were also HIV positive, died of HIV related complications. One patient who had tracheostomy due to tracheomalacia died of sudden tracheostomy tube obstruction six hours after operation. The other two patients died of advanced thyroid cancer

Discussion

The pattern of surgical goitres seen at Bugando Medical Centre in Tanzania appears to be similar to what is reported from other parts of the world (Mellese & Taddese, 2001; Hill *et al*., 2004; Bekele *et al*., 2004; Abede & Osman, 2006; El-Bushra *et al*., 2009). The age distribution of goitres in our study is comparable with other studies (Bekele *et al*., 2004; Abede & Osman, 2006) but the female to male ratio of 11.7:1 in this study is higher than that reported elsewhere (Abede & Osman, 2006; El-Bushra *et al*., 2009). These differences in sex ratios can be explained by an increased occurrence of goitre in both sexes due to high goitre prevalence in a given population. The sex differences in the tendency to visit health facilities when sick may also hide the true sex predominance. Therefore, this might not reflect true sex preponderance in the community. The actual sex ratio should be obtained in a broader community based study.

Most of the patients in our study came from the rural areas located a considerable distance from Mwanza City. Similar observation was also reported in other African studies (Hill *et al*., 2004; Bekele *et al*., 2004; Abede & Osman, 2006). This observation may explain the reason for late presentation to hospital in the majority of cases. Delayed presentation for treatment is still a common feature in most patients in Africa, as reported by other studies (Hill *et al*., 2004; Bekele *et al*., 2004; Abede & Osman, 2006; El-Bushra *et al*., 2009). In the present study, the majority of patients presented with a long standing goitres. The absence of symptoms besides the bulky mass might be the most probable reason for this. The considerable distance of the hospital from the goitre endemic areas, the slow growth of the mass and its presence in most of the inhabitants in the region might also contribute to the delay in presentation. Hospital visits are also found to be determined by cosmetic interest, educational status, recent onset of new symptoms, and psychosocial trauma and stigmatization the patients suffered because of their illness (Bekele *et al*., 2004).

The results of this study show that simple multinodular goitres was the most common type of goitres seen at Bugando Medical Centre. A similar pattern has also been reported by other studies (Mellese & Taddese, 2001; Hill *et al*., 2004; Bekele *et al*., 2004; Abede & Osman, 2006; El-Bushra *et al*., 2009). Simple multinodular goiter is the most common type of goitre in endemic iodine-deficiency regions where there is very low iodine content in the water and food. This leads to formation of reduced levels of thyroid hormones and hence the goitre. The high prevalence of simple multinodular goitres in these areas reflects low level of iodine in food and in water in these regions.

The rate of thyroid carcinoma in our study is higher than those reported elsewhere in Africa (Soyannwo *et al*., 1995; Makuria, 1977; Mellese & Taddese, 2001). However, other studies have reported even high rates (Bekele *et al*., 2004; Abede & Osman, 2006). The age of occurrence and histological pattern of these malignancies in this study is similar to other reports in Africa (Bekele *et al*., 2004; Abede & Osman, 2006). In this study, follicular

carcinoma was the commonest type of thyroid cancer and tended to affect the young age group. This finding is in agreement with other studies done in Africa (Bekele *et al*., 2004; Abede & Osman, 2006). Chow *et al*. (2001) in China and Franssila *et al*. (1981) in Switzerland have reported high rates of papillary carcinoma. The relatively younger age of occurrence of follicular malignancy may be related to endemicity of goitres in the country. Follicular carcinoma is said to follow long-standing iodine deficiency goitres and its prevalence is more common in areas of endemic goiters (William *et al*, 1977, Bekele *et al*., 2004). Further studies are needed to explain the high rate of thyroid cancer in this region.

Thyroid abscess is infrequently mentioned in literatures and there are few clinical reports. Bekele *et al*. (2004) in Ethiopia reported seven cases with frank thyroid abscess that were managed with simple abscess drainage; of these, one patient was seropositive for HIV. In our study, thyroid abscess was found in two patients who were also HIV positive (data not shown). An underlying immunosuppression and super infection of cystic goitre and introduction of organisms during tattooing might be responsible for its development in our patients.

In our study, pressure symptoms and cosmetic disfigurement were the most common indications for surgery. This finding is similar to studies done elsewhere (Abede & Osman, 2006; Salman & Omer, 2007; El-Bushra *et al*, 2009). Acun *et al* (2004) in Greece reported toxic symptoms as the most common indication for thyroidectomy. The indication for surgery is determined by the prevalence of goitre in a certain locality.

Although thyroidectomy has been reported to be a well established surgical procedure and the main stay of treatment of goitres (Giddings, 1998), the approach and the extent of tissue resection for benign goitres remain controversial (Bellantone *et al*., 2002). Many surgeons advocate a surgical procedure that results into low complications and recurrence rates (Acun *et al*., 2004). In our study, a near-total thyroidectomy was the most common type of operation performed particularly in patients with toxic and large multinodular goitres and was found to be effective and relatively safe within the current hospital setup. The type of thyroid surgery done in our institution was found to be similar with reports from other centers (Acun *et al*., 2004; El-Bushra *et al*., 2009). However, a long term follow up study is required to assess the long term outcome of this type of surgery. Some studies advocate total thyroidectomy for the treatment of benign thyroid diseases due to its low rates of recurrence (Perzik & Katz, 1967; Jacob *et al*., 1983; Karlan *et al*., 1984). However, such radical surgery needs meticulous surgical procedure to preserve the parathyroid glands, recurrent laryngeal nerves and to avoid bleeding. Total thyroidectomy also requires meticulous post-operative care with intensive care facilities which are not always available in developing countries and hence near-total thyroidectomy is often a justifiable procedure for benign goitres. The provision of more surgical training and intensive post thyroidectomy care facilities must precede the adoption of more radical surgery for benign lesions, as has been recommended worldwide (El-Bushra *et al*., 2009).

The post-operative complication rate in the present study is in agreement with other studies reported elsewhere (Bekele *et al*., 2004; Abede & Osman, 2006; El-Bushra *et al*., 2009). In our study, hemorrhage sometimes requiring blood transfusion was the most common immediate complication which is comparable with other studies (Abede & Osman, 2006; El-Bushra *et al*., 2009). This is due to the presence of huge goitres with highly vascularized thyroid tissue in most of our patients and the presence of advanced thyroid malignancies. We also noted that the duration of surgery, post operative stay and postoperative complications was higher in patients operated for huge goitres and for thyroid carcinoma.

The mean duration of hospital stay in our study was about two weeks, which is higher than that reported in other studies ((Abede & Osman, 2006; El-Bushra *et al*., 2009). The reason for prolonged mean hospital stay in our study is attributable to long preoperative stay due to long operation waiting list and time required for patient preparation. The occurrences of post operative complications are also responsible for post operative longer stay. Social reasons such as long distance and lack of money to pay for the hospital bills and for transport back home also contribute to prolonged post operative hospital stay. The overall mortality rate in our study was found to be higher than that reported in studies done elsewhere (Bekele *et al*., 2004, El-Bushra *et al*., 2009). Higher mortality rate in our study may be attributable to the presence of post-operative complications, HIV infections presenting with thyroid abscess and advanced thyroid malignancies.

Despite lack of diagnostic facilities such as thyroid ultrasound, radioactive imaging and CT scan, the study has highlighted our experiences with goitres and their outcome of surgical management in our limited-resource environment. In conclusion, this study has shown that the pattern of surgical goitres seen at Bugando Medical Centre appears to be similar to what is reported from other parts of the world. The majority of patients present for surgery very late with huge goitres predisposing them to increased risk of post-operative complications, prolonged length of hospital stay and cost of medical care. Thyroidectomy is one of the most common surgical procedures done at BMC and has been performed with low post-operative complication and mortality rates. It is therefore recommended that health education should be given to the community not only about the cause and prevention but also about the treatment options so that patients could seek medical attention earlier than shown in the study. The importance of follow up clinics should also be emphasized.

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