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COMPARATIVE STUDY OF CONSERVATIVE RESECTION AND RADICAL OPERATION FOR THYROID CARCINOMAS

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ABSTRACT

Objective: **To compare mortality and morbidity in management of thyroid cancers by total lobectomy (C-R) and near-total thyroidectomy (R-O) and to relate pathological subtype to prognosis.**
Design: **A retrospective study of patients with thyroid cancers that were managed during an eleven-year period.**
Setting: **Jos University Teaching Hospital, Nigeria.**
Subjects: **A total of 44 patients who underwent C-R (n = 26) and R-O (n = 18) were studied.**
Intervention: **A total of 509 goitrous specimens including the excised thyroid cancers were histopathologically studied.**
Main outcome measurers: **Cases were analysed for mortality and morbidity data in the two groups during a partial follow-up period of two years.**
Results: **Mortality figures for C-R was 4% versus 11 for R - O. Postoperative haemorrhage occurred in 14% for C-R versus six for R-O. Similarly, bilateral vocal cord paralysis occurred in 11% versus 22; voice changes in 11% versus 33, transitory hypoparathyroidism 8% versus 50, local recurrence in 18% versus eleven. Hypothyroidism occurred in all patients undergoing R-O and stitch granuloma in 11% of patients in C-R group versus six for R-O. Follicular carcinoma constituted 59% of the total number thyroid cancers with papillary cancer constituting 35%.**
Conclusion: **C-R is recommended as the operation of choice for thyroid cancers.**

INTRODUCTION

Thyroid cancer is uncommon and ranks about twenty fifth among the anatomic sites of malignant tumours(1) . The surgical management of thyroid cancer like that of all other malignancies has as its hallmark, an adequate resection of the diseased gland with a wide safety margin followed by excision of cervical lymph nodes when there is any gross evidence of metastatic involvement. This logical basis for either cure or palliation of a patient with thyroid cancer depends on the histopathologic sub-type, stage, fixity of the tumour and on the experience of the surgeon. By and large, there are two widely divergent views concerning the extent of resection to be carried out in thyroid cancer; radical operation or conservative resection. Proponents of the radical operation (R-O) for thyroid carcinomas believe that complete resection of the involved gland is the rational operation for cancer because of the multicentric nature of papillary and medullary carcinomas(2). They maintain that clinical recurrence has been reported in the opposite lobe when conservative resection has been performed(3). Furthermore, anaplastic change has been reported in the thyroid remnant in long standing cases(4). They also maintain that in competent hands, total thyroidectomy carries an acceptable risk of injury to the recurrent laryngeal nerves and parathyroids(5). Advocates of conservative resection (C-R) for thyroid carcinomas on the other hand, affirm that management of these cancers should be based not only on histopathological type but also on the known biological behaviour of these tumours since the long-term survival rate after conservative resection is the same as for that following radical operation(5,6). While admitting the multicentricity of these tumours in 30-50% of cases, they argue that cancer recurrence can be controlled with suppressive doses of L-thyroxine. They emphasise that radical operation carries a significant risk of injury to the parathyroids and recurrent laryngeal nerves(7,8). Despite the plethora of literature on both conservative and radical operations in the management of thyroid cancers, there are few reports which have compared the results of these two divergent views of management in a single communication from the same institution. Studies of this type are important so that variables in patient

selection, diagnostic evaluation and the surgical techniques employed in the treatment of such thyroid cancers could be kept to a minimum. The objective of this study is to compare the mortality and morbidity characteristics of surgical management of thyroid cancers by conservative resection or radical operation in a selected group of patients that have been managed in our institution over a given period. We hope to put into perspective some of the assertions that have been made by different surgeons on the best way to manage thyroid cancers. We have also tried to relate histological sub-type of thyroid cancer to overall mortality and prognosis in this study.

MATERIALS AND METHODS

The hospital records of 44 consecutive patients with primary thyroid cancers managed at the Jos University Teaching Hospital (JUTH) were analysed. The study covered the period between January 1988 and March 1998. Twenty six patients who underwent conservative resection (C-R) and 18 who underwent near-total thyroidectomy (R-O) were available for study. The patient characteristics of the two groups are indicated in Table 1 with regard to age, sex, clinical type of goitre and duration of thyroid enlargement.

Table 1

Patient characteristics in thyroid carcinomas managed by C-R and R-O; JUTH: 1988-98

Characteristic	C-R (n = 26)	R-O (n=18)	Total (n=44)
Age in years (mean)	37	39	38
Male: Female ratio	1:40	1:44	1:4.2
Type of goitre:			
Multinodular	21 (80)	16 (88)	37 (84)
Solitary nodule	5 (20)	2 (12)	7 (16)
Duration (years):			
5-10	2 (8)	1 (6)	3 (7)
11-15	3 (11)	2 (12)	5 (11)
16-20	18 (69)	10 (58)	28 (64)
21-25	2 (8)	3 (18)	5 (11)
26-30	1 (4)	2 (6)	3 (7)

All of the operations were performed with the patients under general anaesthesia. In patients who underwent near-total thyroidectomy, resection of all thyroid tissue was achieved leaving a small remnant to protect the superior parathyroid gland and its end artery. Total lobectomy involved resection of the cancerous lobe, followed by en-block resection of the isthmus, pyramidal lobe and the antero-medial portion of the lobe that appeared normal at operation. All resected thyroid tissue were submitted for specific histopathological diagnosis. The cervical lymph nodes at operation were excised only if they were grossly involved with tumour metastasis. All patients who underwent C-R were placed on thyroxine, 0.1mg daily for six months while for those who underwent R-O, thyroxine in a dose of 2-3mg/kg/day for life was administered. Patients were partially followed up for an average period of two years.

RESULTS

During the eleven-year period covered by this study, 509 goitrous specimens were submitted to the pathology department of JUTH for histological confirmation (Table 2). Four hundred and forty three of these (87%) were cases of parenchymatous goitres, Five (one per cent) were lymphoid thyroiditis (Hashimoto thyroiditis), 15 (3%) represented cases of foetal adenoma while 46 specimens (nine per cent) were thyroid cancers. There were no cases of thyroid lymphomas or sarcomas encountered in this study. Table 2 also indicates the stage of thyroid cancers in patients that were submitted to operation of either C-R and R-O. There was a total of 38 of 44 patients (85%) in both groups with T_4, N_o, M_o thyroid cancers, four patients (ten per cent) in T_4, N_1, M_o stage and two patients (five per cent) in T_4, N_3 M_1.

Table 2

Histological types and stage of thyroid cancer in 509 goitrous specimens; JUTH: 1988-98

Type	No. (n = 509)	%
Parenchymatous	443	87
Thyroditis	5	1
Adenoma	15	3
Carcinoma	46	9

Stage	C-R (n = 26)	R-O (n = 18)	Total (n = 44)
T_4 N_o M_o	22 (84)	16 (89)	38 (85)
T_4 N_1 M_o	2 (8)	2 (11)	4 (10)
T_4 N_3 M_1	2 (8)	0 (0)	2 (5)

Twenty four out of 44 patients (54%) underwent conservative resection; two patients with papillary carcinoma of the thyroid and 22 patients with follicular carcinomas. Two operations (5%) involving C-R with lymph node dissection were performed for two patients with papillary carcinomas. Similarly, 16 out of patients (36%) underwent near-total thyroidectomies for papillary carcinoma in eleven cases and follicular in five. Two R-O operations with lymph node resection (five per cent) were performed for one patient each of papillary and medullary carcinomas. Out of a total 46 goitrous specimens results obtained from the Pathology Department, 59% were follicular carcinomas of the thyroid, 35% were papillary and four per cent anaplastic carcinoma which were excluded from the series (Table 3), because it was only possible

to perform the operation of central resection for palliative purposes. A mixed papillary - follicular pattern with predominantly papillary pattern was regarded as papillary carcinoma.

Table 3

Operative treatment for histological types of thyroid carcinomas; JUTH 1988 - 98

Operation	Histological type			
	Papillary (n = 16)	Follicular (n = 27)	Medullary (n = 1)	No of Operations (n = 44)
C-R only	2	22	0	24 (54)
C-R with node resection	2	0	0	2 (5)
R-O only	11	5	0	16 (36)
R-O with node resection	1	0	1	2 (5)

Table 4

Operative mortality and morbidity associated with C-R and R-O for 44 thyroid cancers; JUTH: 1988 - 98

Mortality and morbidity	C-R (n=26)	R-O (n=18)	Total (n = 44)
Mortality	1 (4)	2 (11)	3 (7)
Postoperative haemorrhage	4 (14)	1 (6)	5 (11)
Vocal cord paralysis	3 (11)	4 (22)	7 (16)
Voice changes	4 (11)	6 (33)	10 (22)
Hypoparathyroidism	2 (8)	9 (50)	11 (25)
Local recurrence	5 (18)	2 (11)	7 (16)
Hypothyroidism	0 (0)	18 (100)	18 (40)
Stitch granuloma	3 (11)	1 (6)	4 (9)
Total	22	43	65

Comparative hospital mortality and morbidity data associated with C-R and R-O are shown in Table 4. Operative mortality for total lobectomy was four per cent versus eleven per cent for near-total thyroidectomy. One of the patients with papillary carcinoma (T_4, N_3, M_1) died following operation in the C-R group. Two other patients in the R-O group with follicular carcinomas (T_4, N_o, M_o) accounted for the total number of deaths (three patients) in this series. Reactive haemorrhage occurred in the C-R group in fourteen per cent versus six in R-O group. Morbidity for bilateral vocal cord paralysis was eleven per cent for C-R versus 22 for R-O. Voice changes occurred in eleven per cent in the C-R group versus 22 for R-O. Transitory hypoparathyroidism was recorded in the C-R group in eight per cent versus 50 R-O. Local recurrence in the thyroid remnant was observed in 18% of the C-R group; two cases recurred within six months and three other cases between one to two years following operation. Four recurrences were histologically similar to the primary thyroid cancer excised at the initial operation; two cases each of papillary and follicular carcinomas. The remaining one was a case of papillary carcinoma that recurred after one year as anaplastic carcinoma. Similarly, two cases (eleven per cent) presented with recurrence in the R-O group; one occurred within six months, the other at 15 months following operation; all recurrence were histologically the primary thyroid cancers resected at the initial operation and were all follicular in type. Hypothyroidism presenting within 12-18 months following operation occurred exclusively in all patients undergoing R-O. Stitch granuloma was recorded in the C-R group in eleven per cent versus six for patients undergoing R-O. There was a total of 21 complications recorded in the (C-R group versus 43 for R-O. At the end of the follow up period of two years, 35 patients (80%) were lost to follow-up excluding the two patients with anaplastic carcinomas that died within one year.

DISCUSSION

Carcinoma of the thyroid is an uncommon disease with a low mortality rate in the African(8,9,10). The hospital incidence in JUTH is about four new cases a year. The mean age of presentation and sex ratio of patients closely conforms to figures obtained in other studies(4,6). Many malignant thyroid tumours present as hard, irregular solitary nodules and are at once suspect(5). The commonest mode of presentation in our series was however, a multinodular goitrous enlargement or a clinically solitary nodule in an euthyroid patient. This diagnostic problem was largely resolved by the routine use of fine needle aspiration cytology (FNA) on all patients who presented with what might seem to be simple multinodular goitre on admission. We have not determined the efficacy and advantages of FNA but recent reports claim a sensitivity of 95%, a specificity of 85%, a positive predictive value of 40% and a negative predictive value of 95%(11). It cannot however differentiate follicular carcinoma cells from those obtained from follicular adenoma but is deemed to be a safe procedure. Associated clinical features of thyroid carcinoma depend on the histological type and include features of local inflitrative spread and distant metastasis. Pulmonary metastasis are usually of the classical diffuse snow flake type in papillary carcinoma(6) and of the cannon-ball type in follicular and anaplastic carcinomas.

In this study, patients with thyroid carcinomas could be divided essentially into two groups depending on the duration of thyroid gland enlargement before presentation. On the one hand were those patients with a short duration of five to ten years. In this later group, thyroid carcinomas could have arisen de-novo; in the remaining group, malignant transformation occurring in long standing benign goitres could account for the

occurrence of thyroid carcinomas(9) in the absence of a history of known carcinogenic influences like local irradiation(6) and radioactive fall-outs from nuclear weapons(10). The appearance of pain, rapid increase in size of the goitre, recent voice changes and change in consistency form firm to hard should alert the surgeon about the possibility of malignant change. Confirmation of changes in consistency of the gland on physical examination, presence of enlarged, hard cervical lymph nodes and clinical evidence of bloodborne metastasis should confirm the occurrence of malignant change. More prospective studies are required in this field to elucidate the pathogenesis of carcinomas in long-standing begin goitres in Africans. Follicular carcinomas however, continue to be the commonest histological type of all thyroid cancers in the African(6,12), as corroborated by our results in this study.

The primary objective of this study was to evaluate the mortality and morbidity data associated with treatment of thyroid cancers by conservative resection and radical surgery on operable thyroid carcinomas. Near-total thyroidectomy was associated with a much higher mortality when it was compared to total lobectomy due to injury to the recurrent laryngeal nerves (RLN) and injury to the common carotid arteries with massive haemorrhage when this structure was encased by tumour. Both causes of mortality could be related in the final analysis to the fact that near-total thyroidectomy is a more difficult operation to perform than total lobectomy because R-O involves a longer operation time, tasking the skills of even the most experienced surgeon. Other causes of mortality following R-O not recorded in this study include kinking of the trachea and tracheomalacia following resection of huge, long standing goitres with pressure effects on nearby strictures. Safety in elective R-O has been made possible by improvements in anaesthesia and blood replacement but kinking and tracheo-malacia so common with R-O because of the absence of any remaining thyroid tissue to obviate dead space, can be prevented by preoperative tracheostomy or intraoperative plication of the thinned out pre-tracheal muscles(13).

Postoperative complications were most common with R-O than C-R but each must be viewed against its own merit in order to obtain an overall picture of the importance of each complication. Postoperative haemorrhage from the thyroid remnant was however common with total lobectomies. Meticulous attention to operative details and perioperative induction of the Valsalva maneouvre before closure of the wound should decrease the incidence of this complication(14). Voice changes due to damage to the external branch of the superior laryngeal nerve apart from unilateral damage to RLN were most common in near-total thyroidectomies. The incidence of these complications can be decreased by early identification of the nerves during dissection(15). Where this is not possible, intracapsular dissection and unilateral sub-total lobectomies leaving the uninvolved lobe to protect the ipsilateral RLN is recommended. The incidence of RLN injury for all types of thyroidectomies is less than one per cent but is more related to the type of thyroidectomy performed and the nerves at risk(16). Transitory hypoparathyroidism was common with near-total thyroidectomy due to vascular insult to the end artery supplying the parathyroids. Permanent hypocalcaemia due to four gland excision of the parathyroids or extensive injury was not recorded in this series probably due to our routine policy of auto-transplantation of excised parathyroid glands when not involved by tumour. Local recurrence in the thyroid was common in total lobectomies due to the multifocal nature of differentiated and medullary carcinomas. Hypothyroidism is said to increase in frequency after near total procedures and the incidence has a direct relationship to the size of the remnant. Ninety per cent of cases occur within eighteen months(14). Stitch granuloma in the collar incision scar of thyroidectomies was common with total lobectomies(17). We have employed L-thyroxine in this study to suppress thyroid stimulating hormone production in differentiated thyroid cancers and also to prevent hypothyroidism in all patients undergoing near-total thyroidectomy.

In the final appraisal we subscribe to the evidence presented here that conservative resection is advised for operable differentiated cancers reserving near - total thyroidectomy for selected cases of thyroid carcinoma where the gland as a whole is grossly involved at operation. Such a radical resection should be performed by an experienced surgeon in order to minimise the morbidity and mortality figures associated with near-total thyroidectomies. Follicular carcinomas of the thyroid still constitute the commonest histopathological sub-type of thyroid cancer but the anaplastic type carries the worst prognosis with death within two years of diagnosis. Medullary adenocarcinoma was not a common histopathological subtype in this series but constituted seven per cent of all the cases of thyroid cancers reviewed by Beahrs(1). The tumours are somewhat more aggressive and spread to the regional lymphatics. Multicentric tumours are present in most cases. They are associated with phaeochromocytomas and mucosal neuromas to form an interesting syndrome in about twenty per cent of cases (multiple endocrine neoplasia Type II; Sipple's syndrome). It arises from the parafollicular C cells of the thyroid and secretes calcitonin or 5-hydroxy-tryptamine or prostaglandin's which are important tumour-markers. It occurs commonly in men at an older age than does the papillary type of thyroid cancer. The prognosis of this form of carcinoma of the thyroid is affected significantly by the grade of malignancy and the stage of cancer at the time of operation. Ten-year survival for patients with negative nodes is 80% versus 40 for those with positive nodes. For differentiated carcinomas of the

thyroid, the prognosis is somewhat better. Intrathyroid papillary and occult carcinomas carry a 90% survival at 10 years, while extra thyroid carcinomas carry a 50% survival for the same period. Similarly non-invasive follicular carcinoma carry a 90% survival at 10 years while survival figures for the invasive type stand at 30% for the same period.

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