SPECTRUM OF THYROID CARCINOMAS IN COASTAL ANDHRA PRADESH: A RETROSPECTIVE STUDY

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ABSTRACT

BACKGROUND

Thyroid carcinoma accounts for less than 1% of cancer cases. In the Indian subcontinent, thyroid carcinoma exhibits a varied disease profile and geographic differences in the pattern of cancer, the knowledge of which impacts a more favourable clinical outcome. The present study aims to profile Thyroid carcinoma in areas of age, gender, geographic domicile, morphology & clinical features and referral paradigm of cases in King George Hospital, Visakhapatnam, the tertiary referral hospital for coastal Andhra Pradesh.

METHODS & MATERIALS

The Retrospective Study 1988-2004 includes 188 patients who attended Department of Nuclear Medicine for pre & post-operative nuclear scan, thyroid carcinoma treatment protocol, whose clinical features, relevant laboratory data, histopathological reports & prognosis were analysed.

RESULTS

Papillary thyroid carcinoma was present in 79% and Follicular thyroid carcinoma in 19%, Anaplastic & Medullary Thyroid Carcinoma in 2% of cases (n=188), male to female ratio 1:0.62. Coastal city of Visakhapatnam recorded highest 59% of cases who were in their 3rd and 4th decades. West Godavari District had lowest at 5%. Clinical presentation of cases of Thyroid carcinoma as a Nodule (61%) which was the most common form lead to maximum number of referrals (n=82) from the Department of Surgery, King George Hospital.

CONCLUSION

In coastal Andhra Pradesh, papillary thyroid carcinoma was the most dominant form. Women were more affected than men. Painless thyroid nodule was the most common clinical feature. Coastal city of Visakhapatnam recorded highest number of cases and maximum referrals were from Department of Surgery.

KEYWORDS

Thyroid Cancer, Papillary Thyroid Carcinoma, Follicular Thyroid Carcinoma.

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INTRODUCTION: Thyroid carcinoma, which accounts for less than 1% of cancer cases has a variable incidence around the world.[1] Thyroid cancer is also the most common endocrine malignancy.[2] India is a vast country, of which Andhra Pradesh is a state with varied customs, habits, culture, dietary practices and environmental influences. Indian National Cancer Registry Programme (NCRP 1982) cancer registries have provided an idea of the magnitude and pattern of cancer in selected urban centres and rural pockets.[3,4] This behavioural spectrum spans a considerable oncological width with respect to natural history and disease prognosis. Thyroid carcinoma appears to be a heterogeneous entity with a variable disease profile. About 10% cases are medullary thyroid carcinoma (MTC), 10% anaplastic thyroid carcinoma (ATC) which has a cause-specific mortality ratio of 100%.[5]

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80% papillary thyroid carcinoma (PTC) & follicular thyroid carcinoma (FTC) which are differentiated thyroid carcinoma (DTC) vary with geographic area. PTC is the more common form.[6] The present study aims to analyse the spectrum of thyroid cancer cases as presented at the Department of Nuclear Medicine, King George Hospital, Visakhapatnam. The study spans a period of 16 years (1988-2004) and evaluates various trends with regard to age, gender, tumour morphology, clinical features, cases by site and referral pattern. The patients/subjects belonged to urban and rural areas of coastal Andhra Pradesh (AP) comprising of Visakhapatnam (VSP), Vizianagaram (VZM), Srikakulam (SKLM), East and West Godavari Districts (EGD & WGD).

SUBJECTS & METHODS: King George Hospital is a 1000 bed referral hospital whose medical services are availed of by patients domiciled in Visakhapatnam (VSP), Vizianagaram (VZM), Srikakulam (SKLM), East & West Godavari districts (EGD & WGD) constituting coastal Andhra Pradesh. All patients diagnosed with thyroid carcinoma who attended the Department of Nuclear Medicine, King George Hospital, during a period of 16 years (1988-2004), were evaluated in

the present study. Relevant data such as age, sex, domicile and laboratory data was retrieved from case records of 188 patients, 82 were pre and post-operative cases of near total thyroidectomy from the Department of Surgery and 106 cases were from other specialties. Preoperative technetium nuclear scan.[7,8] identified cold nodules, followed by FNAC/biopsy where indicated. Histopathological study was done. Diagnosis of papillary thyroid carcinoma was based on the strict criteria for cytological features as defined by WHO,[9] Whole body nuclear scan with low dose I-131 assessed post-operative cases for remnant tissue metastasis to cervical lymph nodes, soft tissue invasion and distant sites to bone, and lungs. Ultrasonography & CT were used to evaluate soft tissue extension into neck, trachea and oesophagus. Variables were tested using chi-square test, qualitative data was expressed as percentage. Averages were presented as mean and ±SD. P values of ≤ 0.05 were considered statistically significant.

RESULTS: Present study comprises 188 cases of Thyroid carcinoma from the coastal region of Andhra Pradesh (A. P.) who were referred to Department of Nuclear Medicine, King George Hospital for followup protocol (Study data Table- 1). These include 72 men (38%) and 116 women (62%) aged between 11-71 yrs. with mean age of 37±13.20 yrs. among the study subjects, and 41.68±14.54 yrs. for men and 33.37±12 yrs. for women respectively. In the present study, 110 cases were aged less than 40 yrs. which was statistically significant (P<0.05); 92 of them were papillary thyroid carcinoma, 17 were follicular and one of anaplastic type and others which constituted M.T.C-2, Poorly differentiated carcinoma-1 and Mixed Thyroid carcinoma-3 cases (Table - 2) were in the older age group of 55-71 yrs.

PTC was present in 151 patients of which 90 cases were women and 61 were men. FTC was present in 30 cases (Table - 3) histologically, PTC was more common and significant (P<0.05). Women were affected more than men (M: F), ratio being 1:0.62 which was not significant (P>0.05) in the present study. MTC, PDC, ATC were exclusively seen in women. Male female ratio in the study group for PTC which was 1:0.67, FTC 1:0.42 was not significant (P>0.05). Among men and women with metastasis, the ratio was 1:0.89 and without metastasis was 1:0.48 which was significant at P <0.05. The main clinical features were neck mass or thyroid nodule (n=116), dysphagia (n=10), hoarseness of voice (n=13), mass or nodule was present in 62.91% of PTC and 8.5% of FTC patients. Pressure symptoms like hoarseness, dysphagia, and stridor were present only in patients with PTC (Table - 4).

Out of 116 preoperative cases who presented with nodule/neck mass, 83 had only nodule while 24 cases had only cervical neck mass. 9 cases combined thyroid nodule with cervical, bone, and lung metastasis. Recurrence (Serum thyroglobulin levels were significantly elevated) was observed in 35 cases of postoperative patients (n=72) who had cervical metastasis and 4 cases had bone and lung metastasis.

Out of 188 cases overall, 72 cases had recurrence following thyroidectomy i.e. 37.7% with metastasis to cervical lymph nodes 81% (n=59). 116 cases (61.2%) had disease-free survival during 10 yrs. followup. PTC was associated more with cervical metastasis and FTC with cervical, lung and bone metastasis in this study. Distribution of cases by site revealed maximum number of cases from coastal city of VSP (n=113) and minimum from WGD (n=15) (Table - 5). VZM had the 2nd largest number of cases (n=30). Referral pattern from various departments of King George Hospital (Table - 6) showed surgery 44% >NM 31% >ENT 12% > others 4%. Nuclear medicine constituted a tertiary referral base for EGD & WGD districts where initial diagnosis was general practitioner (GP) driven with possible treatment in the form of Thyroidectomy by the GP/local surgical specialists and followed by referral to Surgery & ENT Departments Of King George Hospital which were a secondary referral base for patients from VSP, SKLM & VZM.

Parameters	**N**	**%**
Cases/Study	188	
Subjects		
Mean Age		
Men	41.68 Yrs±14.54	
Women	33.37±12	
Study Group	37±13.2	
Gender		
Men	72	29
Women	116	61.70
Morphology		
PTC	151	80.32
FTC	30	15.40
Others	7	3.15
Main Clinical Feature		
Neck mass/Nodule	116	
Most Common Mets Cervical	59	81.18
Recurrence	72	37.7
5 yr. Prognosis Followup	116	61.2

Table 1: Demography of Study Data

Age	**Total**	**Papillary**	**Follicular**	**Anaplastic**	**Medullary**	**Mixed**	***PDC**
Below 40	110	92	17	-	-	1	-
Above 40	78	59	13	1	2	2	1
Total	**188**	**151**	**30**	**1**	**2**	**3**	**1**

Table 2: Age Group Distribution of Thyroid Carcinoma

* Poorly Differentiated Carcinoma

Type	Male	Female	Total
Papillary	61	90	151
Follicular	9	21	30
Anaplastic	-	1	1
Medullary	-	2	2
Mixed	1	2	3
*PDC	1	-	1
Total	**72**	**116**	**188**

Table 3: Histological Types of Thyroid Carcinoma

* Poorly Differentiated Carcinoma

Features	Papillary CA (%)	Follicular CA (%)
Mass/Nodule	95(62.91)	16(8.51)
Dysphagia	9(5.96)	1(3.33)
Hoarseness	12(7.28)	1(3.33)
Weight Loss	14(9.27)	1(3.33)

Table 4: Clinical Features of Thyroid Carcinoma

Domicile	VZM	VSP	SKLM	EGD	WGD	Other States
Cases	30	113	15	14	10	6
%	16	59	8	7	5.31	3.19

Table 5: Distribution of Cases (%) of Thyroid Carcinoma by Site

Department	Endocrinology	ENT	MED	Nuclear Medicine	Surgery	Others
Cases	4	23	7	58	82	14
%	2%	12	4	31	44	7

Table 6: Percentage of Cases from Referral Departments King George Hospital

DISCUSSION: Differentiated thyroid carcinoma is the most common malignancy of the thyroid gland. Thyroid carcinoma arises from 2 cell types present in the gland. The endodermally derived follicular cell gives rise to papillary, follicular and anaplastic variants. The neuroendocrine derived calcitonin producing C cell gives rise to medullary carcinoma. Radiation exposure[10,11] and increased iodine supplementation increases risk for thyroid malignancy, particularly papillary thyroid carcinoma.[12] Thyroid carcinoma most commonly manifests as a painless, palpable solitary thyroid nodule. Thyroid nodules account for 8% of palpable nodules in adult population.[13] Thyroid scintigraphy is absolutely non-invasive and distinguishes hot nodule from cold nodule, the former rules out malignancy while the later warrants fine needle aspiration biopsy. About 10% cold nodules are found to be malignant.[14] PTC causes more pressure effects like stridor, hoarseness, dysphagia and weight loss. PTC spreads by lymphatic system to regional neck lymph nodes, sometimes to mediastinal lymph nodes before spreading to lungs. FTC is less often multifocal than PTC, tends to cause early haematogenic metastasis in the lungs, bones and liver and less frequently to regional lymph nodes. Prognosis is good if identified early. It is worse in young and old. ATC has poor prognosis as it is aggressive and responds poorly to treatment.[15] Poor prognostic factors include childhood radiation to head and neck, large nodule, evidence of tumour fixation or invasion into lymph nodes, distant metastasis and vocal cord paralysis.[16]

Incidence of thyroid carcinoma increases with age. In USA peak age for PTC was 30-39 yrs. for FTC 30-49 yrs. and above 70 yrs. for ATC; In Europe 44-58 yrs. were observed.[17,18] In the present study, peak age observed for PTC was 30-49 yrs. Number of cases of FTC increased with age and one case of ATC occurred at 71 yrs. age. In the review of Ambika et al,[19,20] histological types of cancer were studied in hospital cancer registry for 1185 new cases of thyroid cancer. Papillary carcinoma was the commonest followed by follicular carcinoma, similar results were reported by Al Zahrani & Ravichandran.[21] and other studies.[22] Present study results are similar to these studies. In another study.,[23] mean age for men 41.35$\pm$15.52 and women 36.59$\pm$13.28 yrs. noted were similar to 41.68$\pm$14 yrs. for men and 33.37 yrs. $\pm$12 yrs. for women in the present study. Recurrence rate in the present study of 37.9% was only slightly higher compared to 31.5% cited in above study. It is possible that environmental conditions and dietary habits (Diet rich in fish) may be of benefit to the coastal population. In India, thyroid carcinoma has a wide spread distribution with PTC occurring in coastal areas of Tamilnadu, A.P. & Kerala which are iodine rich. The iodine content of soil is thought to modify the development of these cancers.[24] The existence of a relationship between occurrence of thyroid cancer and iodine status continues to be debated. The overall incidence of thyroid carcinoma in a population is not thought to be influenced by iodine intake.[25]

Data on this aspect is scanty from India with one study reporting that cause and outcome of DTC in children from Iodine deficient areas is no different from those in iodine sufficient areas.[26]

However, there is a distinct change in the type of carcinoma of thyroid gland following iodisation in deficient population. The ratio of PTC to FTC.[27,28] rose in Argentina, Switzerland and Poland. The long term stimulation of thyroid tissue proliferation is one of the causes for increased incidence.[29] Switzerland data has shown a decline of FTC from 42% to 28% while PTC shows an increase to 23% from 8%. These studies and others denote changes in epidemiological pattern of thyroid carcinoma subsequent to iodine prophylaxis with probable improvement in prognosis due to shift towards more differentiated forms of thyroid carcinoma that are diagnosed at an earlier stage. Since 1982, the cancer registries under the National Cancer Registry Programme have provided an idea of the magnitude and pattern of cancer in selected urban centres and in a couple of rural pockets. However, large areas of the population, particularly the rural area and several urban centres are largely uncovered and therefore remain unknown.[30] Incidence of thyroid carcinoma varies marginally from state to state. A survey done by ICMR between 1984-1993 recorded a frequency of 1.99% for men and 5.71% for women, and nationwide relative frequency of 0.1%-0.2% among all other cancers.[31] Another population survey done at the Indian Cancer Registry from Mumbai for the years 1910-1996 showed that incidence in men and women as 0.73% & 1.93% vs. 0.61% &1.16% in the present study respectively.[32] The spread ranged from ages 15-75 with a peak occurrence in the 4th - 6th decades. Detailed analysis of incidence of thyroid carcinoma in female cases per 1, 00,000 was 1.2 for Visakhapatnam and 1.2 for EGD among other states.

Currently, majority of available data on thyroid carcinoma derive from retrospective studies or cancer registry databases. Trends observed increased incidence in both sexes, increased PTC especially in areas of pre-existing iodine deficient population supplemented with iodine. ATC has become rare. Present study is limited by the small sample size and loss of patients for followup due to migrant population between urban and rural areas in the coastal region. There is a lack of longterm prospective randomised clinical trials with large cohorts which could be necessary to demonstrate changes in epidemiology and effect of environmental factors or improved medical methods.

CONCLUSION: Present study reflects retrospective pattern in the coastal region of Andhra Pradesh where PTC was the more dominant histological pattern. Women were more affected in various types of DTC. Painless nodule is the most common trend in clinical presentation observed.

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