PROGNOSTIC FACTORS OF THYROID CANCER AND FIVE-YEAR SURVIVAL RATE

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ABSTRACT

The objective of the study is to determine the prognostic factors of thyroid cancers and five years survival rate of thyroid cancers.

Material and methods: The study was descriptivestudy from 1st January 2007to 31st December 2009, followed for 5 years till 2014 (of 8 years duration) at ENT and Surgical departments Khyber Teaching Hospital and Hayatabad Medical Complex, Peshawar. Total number of 312 patients having thyroid cancers enrolled from admitted patients. The prognostic factors like age and sex of the patient, type of tumour and stage of tumour were studied. The patients included in the study were those diagnosed as thyroid cancers confirmed by tissue biopsy either FNAC or after lobectomy/ thyroidecomy. The cancers were staged using TNM staging system. All the patients were followed for five years after diagnosis irrespective of treatment.

Results: In our study the 5-year survival rate for less than 40 years of age was 90.1%, for 41-60 years 90.6% and more than 60 years 78%. The 5-year survival rate for femalesis better with (93.6%) as compare to males(73.1%). The 5-year survival rates for papillary carcinoma (90.5%) as compare to other thyroid carcinomas is good as well as early stage tumours (stage I and II which is 100%) do better than late stage tumours (stage III and IV).

Conclusion: Early age, female sex, early stage and well-differentiated thyroid cancers have better prognosis.

Key Words: Prognostic factors of thyroid cancer, 5 years survival rate of thyroid cancers.

INTRODUCTION

Thyroid cancer is a rare form of cancer, accounting for 1-1.5% of all cancer cases.[1] It's the most common cancer in people aged 35 to 39 years and in those aged 70 years or above. Women are two to three times more likely to develop thyroid cancer than men.[2] There are four main types of thyroid cancer. Papillary carcinoma –the most common type, accounts for about 60% cases, usually affects people under the age of 40 years, particularly women. Follicular carcinoma – accounting for around 15% and tends to affect older adults. Medullary thyroid carcinoma – accounts for around 5% cases (5-8%), can run in families. Anaplastic thyroid carcinoma – the rarest and most aggressive type of thyroid cancer, accounting for less than5%, usually affects older people above 60 years.[3]

The cause of thyroid cancer is unknown, but certain risk factors have been identified and include a family history of goitre (noncancerous or cancerous), exposure to high levels of radiation, genetic abnormalities andcertain hereditary syndromeslike familial adenomatous polyposis, Cowden syndrome and multiple endocrine neoplasia type II.[4,5] The clinical features of thyroid cancer include a goitre (solitary nodule, multinodular goitre), unexplained hoarseness that lasts for more than a few weeks, a sore throat or difficulty swallowing and cervical lymphadenopathy. Rare features like pain, stridor, vocal cord paralysis hemoptysis and rapid enlargement may be present.[6]

Thyroid cancer is diagnosed by tissue biopsy using FNAC or even thyroid lobectomy. Other tests like Ultrasound with Doppler, CT scan, total body scan and PET are used to stage the cancer. Thyroid function test is done to confirm thyroid hormone level.[7] The TNM method (introduced in 1987 by the International Union Against Cancer and adopted by the American Joint Commission on Cancer) is the most universally used staging method and applies to papillary, follicular and medullary thyroid cancers.[8]

The recommended treatment plan depends on the type and grade the cancer. Differentiated thyroid cancers are treated using a combination of surgery to remove the thyroid gland (thyroidectomy), removal of involved lymph nodes followed by radioactive iodineto destroy any remaining cancer cells and prevents the recurrence. Medullary thyroid carcinomas are treated with total thyroidectomy, neck dissection and external beam radiotherapy. Anaplastic carcinoma requires

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tracheostomy or even thyroidectomy for debulking or radiotherapy.[9]

The five-year absolute survival rate for differentiated thyroid cancers (papillary and follicular) is very good as compared to medullary and anaplastic carcinoma. The early stage tumours have better prognosis than late stage tumours. Almost 100% for both stage I and II, 90% for stage III papillary carcinoma, about 70% for stage III follicular carcinoma, and about 50% for stage IV. The five-year absolute survival rate for medullary carcinoma is 100% for stage I, near 98% for stage II, near 8% for stage III and near 30% for stage IV. The five-year absolute survival rate for anaplastic carcinoma is 0%, as all are in stage IV. The overall prognosis is better in younger people and female.[10]

The purpose of this study was to find out the pattern of thyroid cancer in this part of the world along with the different stages in which they present. The different prognostic factors (age of the patient, sex of the patient, type of tumour and stage of tumour) affecting the development of thyroid cancer and the five-year survival rate were calculated. This study gives us local statistics and the 5-year survival rates for different age groups, gender, different type and stages of thyroid cancers.

METHODOLOGY

It was a descriptive study of 3 years duration from 1st Jan 2007 to 31st Dec 2009 and followed for next five years till December 2014, conducted in the ENT department of Khyber Teaching Hospital and surgical department of Hayatabad Medical Complex, Peshawar. Sample size was 312 patients of thyroid cancer.

Patients of all ages and either gender presenting with primary thyroid cancer in the ENT and surgical OPD diagnosed as thyroid cancers after confirmed by tissue biopsy either by FNAC or thyroidectomy (lobectomy/total thyroidectomy) were included. All those patients who were diagnosed as thyroid lymphoma and metastatic thyroid carcinomas were excluded from the study. The above mentioned conditions act as confounders and were excluded to reduce bias in the study results.

DATA COLLECTION PROCEDURE

The study was conducted after getting approval from hospital ethical and research committee. The patients meeting the inclusion criteria were included in the study through OPD/ER department. The diagnosis of thyroid cancer was based on tissue examination either FNAC or thyroidectomy (lobectomy/total thyroidectomy). The purpose, risks and benefits of the study were explained to all included patients, they were assured that the study is purely conducted for research and data publication and a written informed consent was obtained from all included patients.

Postoperatively all patients were followed at regular intervals and finally at the end of 5-years to determine the survival rate for different prognostic factors including age and sex of the patients with different type and stage of the cancer.

All the above mentioned information including name, age, gender, address and telephone numbers were recorded on a pre-designed proforma. A strict exclusion criterion was followed to control confounders and bias in the study results.

STATISTICAL ANALYSIS

All the data was entered and analysed in SPSS 16 (version 16). Frequencies and percentages were calculated for categorical variables like gender of the patient, sex of the patient, type of the cancer and stage of the cancer. All the results were presented as tables and charts.

RESULTS

In our study, out of 312 patients, majority were diagnosed as papillary carcinoma(64.4%) with rest of the carcinomas as shown in table. Most of the patients, 128 out of 312 (41%) were of the age range of 41 – 60 years, followed by 113 patients (36.2%) in more than 60 years age group and 71 (22.8%) patients in less than 40years age group. Out of these 312 patients 204 (65.4%) were females and 108 (34.6%) were males.

In our study, the overall 5-years survival rate in different age groups came out 90.6% in 41- 60years age group, followed by 90.1% in less than 40years and 78% in above 60years age group with split percentages for different carcinomas in different age groups shown in Table 2. The overall 5-year survival rate in different genders showed differentiated thyroid carcinomas are more common in female gender with good prognosis (93.6%) as compare to males (73.1%) with different prognosis for various thyroid carcinomas as shown in table-3.

The 5 year survival rate for different thyroid carcinomas showed that the prognosis of papillary carcinoma as compare to other differentiated and undifferentiated thyroid carcinomas is good as well as early stage (stage I and II) tumours do better than late stage tumours (stage III and IV), while anaplastic carcinoma is the worst tumour with 0% 5 year survival as shown in table-4.

DISCUSSION

Papillary thyroid carcinoma is the most common thyroid cancer followed by follicular, medullary and rarely anaplastic carcinoma. The first two are known as differentiated thyroid carcinomas (DTC)while the last one is also called undifferentiated carcinoma. The differentiated thyroid cancers are more common in female gender with good prognosis as compared to male patients. The prognosis of thyroid cancers is excellent in early age groups, female gender, early stages of cancer

Table 1: Percentage of Different Thyroid Cancers

Type of thyroid cancer	Percentage
Papillary	**64.42% (201/312)**
Follicular	22.76% (71/312)
Medullary	10.26% (32/312)
Anaplastic	2.56% (8/312)

Table 2: 5-Year Survival Rate for Different Age Groups

Age of the patient	Five-year survival rate				
	Papillary (182/201)	**Follicular (61/71)**	**Medullary (27/32)**	**Anaplastic (0/8)**	**Over all percentage(267/312)**
Less than 40 years (71)	99.3%(36/37)	94.4%(17/18)	93.7%(15/16)	--	90.1% (64/71)
41-60 years	90.7% (79/86)	93.9% (28/31)	90.3% (8/9)	0% (0/2)	90.6% (116/128)
More than 60 years	83.6% (67/78)	80.6% (16/22)	66.7% (4/7)	00% (0/6)	78% (87/113)

Table 3: 5Year Survival Rate for two Gender

Sex of the patient	Five-year survival rate				
	Papillary 182/201	**Follicular (61/71)**	**Medullary (27/32)**	**Anaplastic (0/8)**	**Over all percentage (270/312)**
Male	79.7% (51/64)	70.8% (17/24)	85.7% (12/14)	0% (0/6)	73.1% (79/108)
Female	95.6% (131/137)	93.6% (44/47)	83.3% (15/18)	0% (0/2)	93.6% (191/204)

Table 4: 5 Year Survival Rate for Different Types of Thyroid Cancer

Type of Thyroid cancer	Five-year survival rate				
	Stage I (104/104)	**Sage II (101/101)**	**Stage III (50/64)**	**Stage IV (15/43)**	**Over all percentage (270/312)**
Papillary	100% (62/62)	100%(71/71)	84.4%(38/45)	47.8%(11/23)	90.5% (182/201)
Follicular	100%(31/31)	100%(21/21)	58.3%(7/12)	28.5%%(2/7)	85.9% (61/71)
Medullary	100%(11/11)	100%(9/9)	71.4%(5/7)	40% (2/5)	84.3% (27/32)
Anaplastic	--	--	--	0% (0/8)	0% (0/8)

and well-differentiated thyroid cancers as compared toolder age, male gender, late stage of the disease and anaplastic carcinoma.

In our study the most common thyroid cancers were well-differentiated carcinomas 88.1% (papillary 65.4% and follicular 22.7%) followed by medullary carcinoma9.3% and rare anaplastic carcinoma 2.6%. The majority of thyroid carcinomas were found in female.

In China a study conducted in 2014, a total of 1756 patients with DTC were enrolled in the study and a marked female preponderance was found with the female/male ratio of 2.3:1.[11] In our study the five-year survival rate for female was 93.6% and for male 73.1% with 1.3:1 ratio. One of the studies in Japan it was concluded that the significance of prognostic factors of differentiated thyroid cancers varied according to patient sex and age.[12]

A study conducted by Konturek A in 2012 the mortality was found to increase with age. In the oldest age group, the death risk increased more than sevenfold as compared to patients below 50 years of age.[13] In our study the five-year survival rate for less than 40 years of age was 90.1%, for 41-60 years 90.6% and more than 60 years 78%.

In a study conducted by Diaconescu MR1, the medullary and anaplastic thyroid cancers were the most aggressive lesions and even extended surgery and complementary therapy failed to improve the prognosis of these patients.[14] The five-year survival rate for papillary carcinoma was almost 90.5%, follicular carcinoma 85.9%, medullary carcinoma 84.3.and anaplastic carcinoma 0%.

In a study conducted by de Melo TG, the common factor that influenced mortality for FTC and PTC patients was distant metastasis at diagnosis, increasing mortality rate by 41 times in FTC and 30 times in PTC patients.[15] In our study the five-year survival rates for stage I and stage II thyroid cancer was almost 100%, stage III 78.1% and stage IV 34.9%.

CONCLUSION

Early diagnosis of thyroid cancer gives better prognosis as well differentiated thyroid cancers and early stage cancersgreatly increase the five-year survival rate.

REFERENCES

1. R. Siegel, J. Xu, and E. Ward, "Cancer statistics, 2010," CA: A Cancer Journal for Clinicians, vol. 60, no. 5, pp. 277–300.
2. B. Aschebrook-Kilfoy, E. L. Kaplan, B. C. Chiu, P. Angelos, and R. H. Grogan, "The acceleration in papillary thyroid cancer incidence rates is similar among racial and ethnic groups in the United States," Annals of Surgical Oncology, 2013.
3. Mitchell, Sheppard R; Kumar, Vinay; Abbas, Abul K. Robbins Basic Pathology. Philadelphia: Saunders, 8th edition, Chapter 20 in ISBN 1-4160-2973-7.
4. Pacini, F. "Thyroid cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up". Annals of Oncology. (2012). 21: 214–219.
5. S. R. Baker and W. A. Bhatti, "The thyroid cancer epidemic: is it the dark side of the CT revolution?" European Journal of Radiology, 2006. vol. 60, no. 1, pp. 67–69.
6. Enomoto Y1, Enomoto K, Uchino S, Shibuya H, Watanabe S, Noguchi S..Clinical features, treatment, and long-term outcome of papillary thyroid cancer in children and adolescents without radiation exposure World J Surg. 2012 Jun;36(6):1241-6.
7. Lacout A1, Chevenet C, Marcy PY. Thyroid nodules diagnosed as follicular neoplasm: do not forget Doppler US and correlation to previous imaging findings.ClinEndocrinol (Oxf). 2015 Jan 19. doi: 10.1111/cen.12723.
8. Cooper DS, Doherty GM, Haugen BR, et al. (2009). "Revised American Thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer." Thyroid19 (11): 1167–214. doi:10.1089/thy.2009.0110.
9. Schlumberger M, Carlomagno F, Baudin E, Bidart JM, Santoro M (2008). "New therapeutic approaches to treat medullary thyroid carcinoma". Nat ClinPractEndocrinolMetab4 (1): 22–32.
10. Gr◡unwald, F, Biersack, H. J. (2005). Thyroid cancer. Berlin: Springer. ISBN 3-540-22309-6.
11. Yan H, Gu W, Lyu Z, Yang G, Ba J et al. [Gender-related clinical characteristics in patients with differentiated thyroid cancers].ZhonghuaNeiKeZaZhi. 2014 Apr;53(4):286-9.
12. Ito Y1, Kudo T, Takamura Y, Kobayashi K, Miya A, Miyauchi A. Prognostic factors of papillary thyroid carcinoma vary according to sex and patient age. World J Surg. 2011 Dec;35(12):2684-90.
13. Konturek A, Barczyński M, Nowak W, and Richter P. Prognostic factors in differentiated thyroid cancer—a 20-year surgical outcome study.Langenbecks Arch Surg. 2012 Jun; 397(5): 809–815.
14. Diaconescu MR1, Costea I, Glod M, Grigorovici M, Diaconescu S. Unusual malignant tumors of the thyroid gland. Chirurgia (Bucur). 2013 Jul-Aug;108(4):482-9.
15. de Melo TG, Zantut-Wittmann DE, Ficher E, da Assumpção LV. Factors related to mortality in patients with papillary and follicular thyroid cancer in long-term follow-up. J Endocrinol Invest. 2014 Jul 19.