Original Article

Evaluation of demographic characteristics and paraclinical results of patients and differentiated thyroid cancers

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ABSTRACT

Introduction: Thyroid cancer is the most common malignant endocrine system. It accounts for less than 1% of malignant neoplasms in humans and accounts for the highest number of deaths caused by endocrine gland cancer. The objective of this research was to evaluate the demographic characteristics and paraclinical results of patients with differentiated thyroid cancer in several hospitals in Urmia. Methodology: In this cross-sectional descriptive study, all patients with differentiated thyroid cancers confirmed by pathological findings were included in a 13-year period of study (2000-2013). Demographic characteristics (age, gender, clinical complaints of patients, type of cancer and stage of disease were derived from medical records of patients) and analyzed by SPSS20 software. Results: Out of 112 patients studied, 87 cases (77.7%) were papillary, 20 (17.85%) were follicular, 3 cases (2.7%) were modular and 2 cases (78. 1%) were anaplastic in terms of tumor type. The pathological results indicated that 50 cases (44.65%) were Stage I, 28 cases (25%) were Stage II, 11 cases (9.82%) were Stage II, and 23 cases (20.5%) were Stage IV. In addition, negative autoantibody was reported in 91 cases (81.25%), and positive autoantibody was reported in 21 cases (18.75%). Conclusion: In our research, papillary thyroid cancer, as most of other similar studies, had the highest prevalence and it was more common in females. Given its lymphatic dissemination, its metastasis can be prevented with timely admission to physician and the survival rate of the patients can be increased by early treatment.

Keywords: Autoantibody, differentiated thyroid cancers, disease stage, survival.

Introduction

Thyroid cancer accounts for less than 1% of all malignancies and 5% of deaths out of total cancers. Moreover, differentiated thyroid cancer accounts for 95% of thyroid cancers, which are divided into two groups: papillary thyroid cancer (PTC) and follicular thyroid cancer (FTC). Other thyroid cancers originate from para-follicular cells [1]. The clinical manifestation of thyroid cancer varies from asymptomatic and negative cases to invasive ones. Among the thyroid cancers, papillary thyroid cancer accounts for more than 80% of cancers. Exposure to ionizing radiation (radiotherapy with radioactive radiation) is one of the most important factors involved in this regard.

The prevalence of PTC caused by ionizing radiation varies from 2.8% to 13% [2, 3]. In addition, about 20-15% of thyroid cancers are follicular. The prevalence of FTC in females is three times more than that in males and it is more common in people aged over 50 years and radiation is not a risk factor for it. PTC is more common in areas with adequate intake of PTC, but FTC is slightly higher in areas with iodine deficiency and endemic goiter [4]. Adequate iodine intake in different countries has increased the frequency of PTC and reduced the frequency of FTC and anaplastic [5]. Pathologically, PTC is often multi focal and encapsulation is unusual in PTC. It has lymphatic dissemination both in thyroid tissue and in the neck and paratracheal lymphoid glands. At the same time, it has blood metastasis to the lungs and bones. FTC is also often encapsulated and single and shows higher tendency to vascular invasion and blood metastasis.

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Unlike PTC, lymphatic dissemination is delayed in this type of cancer [6]. In recent years, the incidence of thyroid cancer has increased in world [7] and epidemiological studies have revealed that the incidence of thyroid cancer is more than other tumors in the past five years in the United States [8] and this increase is mainly due to small papillary cancers that are differentiated and treatable. For accurate measurement of the anatomical extent of the disease, TNM was used, which can be either clinical (Clinical TNM) or based on evidence of treatment (including biopsy) or pathologic (Pathologic TNM), which has a higher accuracy than the previous ones [9]. In addition, in the postoperative phase, the prescription of levothyroxine (T4) after thyroidectomy causes the suppression of TSH and the prevention of tumor relapse. Thyroglobulin measurement is used as a susceptible marker to test the possibility of tumor relapse or the survival of tumor remnants. It should be noted that in cases where one person has anti-thyroglobulin antibody, thyroglobulin loses its ability to act as a tumor marker and results in false negative results [8]. Given what was stated above and the prevalence of thyroid cancer and its serious consequences, we decided to conduct this research to examine the patients diagnosed thyroid cancer in terms of demographic characteristics and paraclinical results in order to recognize the high-risk groups and treat them early to reduce the mortality rate and metastases and take steps to increase the survival of these patients.

Methodology

This descriptive cross-sectional study was conducted to evaluate the demographic characteristics and paraclinical results of patients with differentiated thyroid cancers after approval in the Research Council of the Faculty and the Ethics Committee of the University. During this study, the clinical records of all patients diagnosed with thyroid cancer were included. The sample size included 112 patients with complete clinical records admitted to several hospitals of Urmia, who admitted to these centers for diagnosis and treatment at 13-year period (2000-2013).

Patients' demographic characteristics (age and gender), clinical complaints at admission time, type of cancer, and stage of disease were derived from the medical records and entered the checklist. Convenient and census sampling was used in this research. Patients with incomplete medical record were excluded from the study. Finally, after the completion of the project, the results were collected and analyzed and they were presented as frequency, mean, and percentage, and tables and charts were used to describe them. This was performed by using SPSS20 software.

Results

In this descriptive cross-sectional study, 112 patients were evaluated in a time period of 13 years (2000-2013), in which 91 patients (81.25%) were female and 21 patients (18.75%) were male with mean age of 16.65 ± 44.08 (maximum age of 103 and minimum age of 16 years).

Table 1: Frequency distribution and frequency percentage of tumor types in differentiated thyroid cancer patients

Tumor type	f	%
Papillary	87	77.7
Modular	3	2.7
Follicular	20	17.9
Anaplastic	2	1.8
Total	112	100

More investigations showed that the mean age was high in anaplastic type and low in modular type (Table 1). Table 2 also presents types of tumors separately in terms of gender.

Table 2: The mean age of differentiated thyroid cancer patients

Tumor type	n	Mean ±SD
Papillary	87	17.11 ± 45.24
Modular	20	12.45 ± 38
Follicular	3	14.74 ± 35.33
Anaplastic	2	2.21 ± 67.5

Pathological results of patients showed that 87 patients (77.7%) had papillary tumor, 20 patients (17.85%) had follicular tumor, 3 patients (2.7%) had modular tumor, and 2 patients (1.78%) had anaplastic tumor. In this study, we examined the staging of tumor of any type and its results are presented in Table 3.

Table 3: Distribution of absolute and relative frequency of patients with differentiated thyroid cancer in terms of Stage

Stage of tumor	f	%
Stage I	50	44.6
II Stage	28	25
III Stage	11	9.8
IV Stage	23	20.5

Table 4: Distribution of absolute and relative frequency of tumor type in Patients with differentiated thyroid cancer in terms of stage

Tumor type	Stage of Tumor				Total
	Stage I	Stage II	Stage III	Stage IV	
Papillary	(%43.7)38	(%26.4)23	(%10.3)9	(%19.5)17	(%100)87
Modular	(%55)11	(%25)5	(%0)0	(%20)4	(%100)20
Follicular	(%33.3)1	(%0)0	(%66.7)2	(%0)0	(%100)2
Anaplastic	(%0)0	(%0)0	(%0)0	(%100)2	(%100)2
total	(%44.6)50	(%25)28	(%9.8)11	(%20.5)23	(%100)112

According to Table 4 and Fisher statistical test, there is a significant relationship between tumor stage and tumor type during diagnosis (P = 0.01). This research also examined the auto-antibody status of patients. The results showed that in 91 patients (81.25%), autoantibody was negative and in 21 patients (18.75%), it was positive. More investigations in each group showed 19 cases of positive autoantibody (21.8%) were in sub-group of papillary tumor and 2 cases (10%) were in the sub-

group of follicular no case was reported in the modular and anaplastic sub-groups. Examining patients in terms of clinical symptoms showed that 81 patients (72.3%) had cervical mass, 21 patients (18.75%) had voice violence, and 10% (9%) had weight loss when admitted (Table 5 and 6).

Table 5: Distribution of absolute and relative frequency of patients with differentiated thyroid cancer in terms of presence or absence of anti-thyroglobulin antibody

Tumor type	anti-thyroglobulin antibody status		total
	positive	negative	
Papillary	(%21.8)19	(%78.2)68	(%100)87
Modular	(%10)2	(%90)18	(%100)20
Follicular	(%0)0	(%100)2	(%100)2
Anaplastic	(%0)0	(%100)2	(%100)2
total	(%18.8)21	(%81.2)91	(%100)112

Table 6: Distribution of absolute and relative frequency of patients with differentiated thyroid cancer in terms of clinical symptoms (patient complaint)

Tumor type	patient complaint			total
	cervical mass	Voice violence	Weight loss	
Papillary	(%75.9)66	(%16.1)14	(%8)7	(%100)87
Modular	(%0)0	(%66.7)2	(%33.3)1	(%100)2
Follicular	(%65)13	(%25)5	(%10)2	(%100)20
Anaplastic	(%100)2	(%0)0	(%0)0	(%100)2
total	(%72.3)81	(%18.8)21	(%8.9)10	(%100)112

In papillary tumor, 66 patients (75.85%) admitted due to cervical mass, 14 patients (16.1%) admitted due to voice violence and 7 patients (8%) admitted due to weight loss. In follicular tumor, 13 patients (65%) admitted due to cervical mass, 5 patients (25%) admitted due to voice violence and 2 patients (10%) admitted due to weight loss. In follicular modular tumor, 2 patients (66.7%) admitted due to voice violence and 1 patient (33%) admitted due to weight loss and in the anaplastic sub-group, both patients (100%) admitted due to cervical mass.

Discussion

This cross-sectional research was conducted to evaluate the demographic characteristics and paraclinical results of patients with differentiated thyroid cancer in Urmia hospitals. Our research included the admitted patients with confirmatory pathologic results during a 13-year period of 2000-2013. This research revealed that 77.7% of patients had papillary tumor, 17.85% had follicular tumor, and rest of them (4.5%) had anaplastic and modular tumors. In addition, 81.25% of the patients were female and the rest of them were male with a mean age of 44.08 ± 16.65 years. In a 15-year retrospective in Italia, Davis et al. [3] examined a model of clinical symptoms and prognostic and therapeutic results with regard to therapeutic indices. In their research, 95.6% of patients were introduced for iodine treatment immediately after thyroid removal. Our research was somewhat similar to their research, while sample size of our research was very lower than that of their research and in terms of research content, we evaluated the demographic and paraclinical characteristics of thyroid cancer in patients. The research subjects were almost similar in terms of age and the type of thyroid cancer. Hodgsan et al. [9] examined the clinical symptoms and pathological characteristics of differentiated thyroid cancer in a 35-year study. They analyzed 4187 patients in their research and finally indicated that in the second half of the study, small papillary carcinoma increased and follicular carcinoma increased. Due to this increase, the tumor's invasiveness decreased and the survival rate of patients increased. Our research confirmed their research in terms of the prevalence of papillary tumor, but the sample size is much lower and, as their study, with the increasing age and stage of the disease, survival rate of the patients decreased.

Seiut et al. [10] published the results of their 15-year study on 1503 patients in 2008, which 66 patients (4.6%) underwent surgery and were treated, but 1437 patients were new cases of cancer, which they underwent radioactive treatment after thyroidectomy. In the mentioned research, 78.6% of the subjects were female and the rest were male and half of the patients aged below 50 years and the rest of them had mean age of 46 years at the time of tumor diagnosis. In terms of histology, 84% of them had papillary and 16% had follicular, and 49% of them had type I and 16% had type III and 13% had type II and 2% had type IV. In the scan performed on the whole body, there were 75% thyroid residuals were found. There were metastasis to lymph nodes in almost all cases and distant metastasis was seen in about 2% cases. The mean age of subjects of our research was almost similar to that of their research, with slight variation.

In terms of the prevalence of tumor type, our study, as their study, also showed that the papillary was the most prevalent tumor, followed by follicular, modular and anaplastic tumors, respectively. In terms of tumor metastasis to the lymph nodes, its frequency was greater in our study compared to that of their study (44.6% versus approximately 20%). In addition, we examined anti-thyroglobulin antibody in the studied population and results showed that approximately 20% of patients had this type of antibody, which it was found more in patients with papillary tumor. This result is in line with that of the study conducted by in Clin et al in 2011 in USA [11]. The examining the patients in terms of clinical manifestations, when they admitted, showed that about 72% of patients had cervical mass and about 19% had voice violence and about 9% had a weight loss, indicating that in patients admitted with cervical mass, thyroid problems along with other causes of cervical mass should be considered and screening is necessary in these patients. In addition, previous studies have shown that iodine intake and its adequacy have increased the frequency of papillary thyroid tumor and decreased follicular and anaplastic tumors. We did not find such result in our research, so future studies are recommended to examine this issue.

Conclusion

Based on the results of our study and previous studies [9-11], papillary thyroid tumor accounts for approximately 80% of the cases of differentiated cancers, and given its lymphatic dissemination, and then, its blood dissemination to other parts in late stages as well as late lymphatic dissemination of follicular type of thyroid and its blood dissemination in early stages, the survival rate of the patients can be increased by providing trainings and early admission of patients (especially female gender and older people) to physician and early diagnosis of the disease.

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