



FREQUENCY AND MORPHOLOGICAL STUDY OF TESTICULAR GERM CELL TUMOR.

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ABSTRACT... Objective: To assess the frequency of various histopathological types of testicular germ cell tumor in our study population. The prime identification of testicular germ cell tumor is important to prevent the advance stage of cancers. The present study was designed to assess the frequency of different morphological types of testicular germ cell tumor which have a mirror effect on the treatment and prognosis of tumor. **Study Design:** Cross sectional study. **Setting:** Department of pathology, Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre Karachi. **Period:** 10 years period from 1st January 2006 to 31st December 2015. **Material and Methods:** Total no of 34 cases of testicular germ cell tumor were studied for morphological features using all properly formalin fixed, paraffin embedded surgical pathological testicular specimens received during the above period. All relevant clinical information was recorded on designed proformas. Section were taken and stained with hematoxylin and eosin. Data entered and analysed through computer software SPSS version 21. **Results:** The results of study showed that the frequency of testicular germ cell tumor was 0.80% among all malignancy in male. Out of 36 cases of testicular tumor, 34 (94.5%) were germ cell tumors and remaining 02 (5.5%) cases were sex cord stromal tumor. Among 34 cases of germ cell tumor 12 (35.2%) cases of mixed germ cell tumor found which was the most common between them, followed by seminoma 10 (29.4%) cases. However 05(14.7%) of yolk sac tumor, 04 (11.6%) of teratoma and 03(8.8%) of embryonal tumor were found. **Conclusion:** Results revealed that frequency of different types of testicular germ cell tumor in this study were in accordance to national and international studies. However the incidence of tumor varies noticeably in different geographical areas. Different pattern of seminomas and non – seminomas also may be emerging.

Key words: Frequency, Histopathology, Testicular Germ Cell Tumor.

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INTRODUCTION

Approximately 1% of all malignancies in male are Testicular cancers. Their incidence has been rising worldwide in the last fifty years and also varies across the globe. In United Kingdome the testicular cancers are the 16th commonest cancer in 15 - 44 years of male but it is rare in general population. In Europe mostly in Norway, France, Denmark, Germany, Hungary and Switzerland around 8-10 /1000 world general population are found the highest incidence of germ cell tumors.¹

In contrast the rate of this tumor is low (less than 0.7 per 100000) in most of Asian and African countries.² It is estimated that there are 2, 44,110 testicular cancer survivors in the United States.³

According to Agha Khan University Hospital (2004), out of 2393 malignant neoplasm in males, 42 cancers were testicular cancers.⁴ According to Shaukat Khanum Cancer Hospital and Research in 2014, testicular cancers were 12th most common malignancy in males. As per PMRC, JPMC, Karachi, the local population based data indicates an incidence of 0.7/100000.⁵

Germ cell tumor, Sex cord stromal tumor, mixed germ cell tumor and miscellaneous tumors are broad classification of testicular tumors.⁶ Approximately 95% of Testicular malignancies consist of testicular germ cell tumors.⁷ This tumor is located in various sites as both gonadal and extra gonadal including sacrococcygeal,

retroperitoneal, mediastinal, cervical and pineal region. WHO classified the testicular germ cell tumors into eight histological sub-types that are seminoma, spermatocytic seminoma, yolk sac tumor, embryonal carcinoma, polyembryoma, choriocarcinoma, teratoma, and mixed germ cell tumors.^{8,9}

METHODOLOGY

Study Design

Cross sectional study.

Study setting, Duration and Tissue sample

This study population consists of diagnosed cases of germ cell tumors obtained in the department of pathology in Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre, Karachi from 01-01-2006 to 31-12-2015. Total numbers of cases of Testicular germ cell Tumor were 34, analysed for morphological features. All properly formalin fixed, paraffin embedded surgical pathological testicular specimens received in the department of pathology, BMSI, JPMC during the above given period comprised in this study. Poorly fixed specimens, inadequate samples and recurrent tumor were excluded from the study.

STATISTICAL ANALYSIS

Data were feeded and analyzed through computer software SPSS (Statistical packages of Social Sciences) version 21. Frequency and percentage were calculated for gender, lesion type and morphology.

RESULTS

The Testicular germ cell tumor's frequency during ten years period (from 01-01-2006 to 31-12-2015) was found 0.08% among total number of 4243 malignancies of all types. During 10 years period total 36 cases of testicular tumors were received. Out of which 2 cases (5.5%) were sex cord stromal tumor while 34 (94.5%) cases were Germ cell tumors as depicted in Table-I. The distribution of testicular germ cell tumors of particular one histological type received over 10 years period in our department were 22 cases as shows in Table-II. The most frequently encountered tumor was seminoma contributing 10 cases with a

frequency of 29.4%. The second commonest malignancy was yolk sac tumor constituting 05 cases (14.7%), while 4 cases (11.8%) of teratoma and 03 cases (8.8%) of embryonal carcinoma were observed. The distribution of mixed germ cell testicular tumor according to combination of various histological components as depicted in Table-III.

Amongst a total of 12 cases of mixed germ cell tumor the most important pattern of tumor observed is embryonal carcinoma + yolk sac tumor contributing 5 (14.7%) cases of all germ cell tumors, followed by amalgamation of embryonal carcinoma + teratoma + yolk sac tumor consisting 3 (8.8%) cases. In addition the mixed pattern of immature teratoma + yolk sac tumor constituting 3 (8.8%) cases. While the least frequently observed combination was embryonal carcinoma + teratoma + yolk sac + choriocarcinoma constituting only 1 case (2.8%) of testicular germ cell tumors during the 10 years period.

Total no. of cases received in department	Total no. of malignancies	Total no. of testicular Germ cell tumor
52010	4243 (8.15%)	34 (0.80%)
Frequency of testicular germ cell tumor among all testicular tumors (n=36)		
Total no. of testicular tumors	Total no. of Germ cell tumors	Frequency
36	34	94.5%
Table-I. Frequency of testicular germ cell tumor among all malignancies (From 01.01.2006 To 31.12.2015) (n=34)		

	Tumor Type	No. of Cases (n=22)	Percentage 64.7%
a)	Seminoma	10	29.4%
b)	Yolk sac tumor	5	14.7%
c)	Teratoma	4	11.86%
d)	Embryonal carcinoma	3	8.8%
Table-II. Distribution of testicular germ cell tumor of single histological type according to morphological types (N=22)			

	Tumor Type	No. of Cases	Percentage
		(n=12)	35.2%
a)	Embryonal Ca+ Yolk sac tumor	5	14.7%
b)	Embryonal Ca + Teratoma	3	8.8%
c)	Embryonal Ca + Yolk sac tumor + teratoma + Choriocarcinomas	1	2.8%
d)	Teratoma + Yolk sac tumor	3	8.8%

Table-III. Distribution of mixed testicular germ cell tumor according to more than one histological component (n=12)

DISCUSSION

The most effective and functional years of male life is primarily influenced by testicular germ cell tumors. In Pakistan the published research studies on testicular cancers are rare. This study demonstrated that the frequency of testicular germ cell tumors is still remaining relatively rare in our country. Only 34 patients reported as a case of testicular germ cell tumor during ten years period. Another study revealed that there are variations in testicular cancers worldwide as western countries having a high rate compared to Africa and Asia.¹⁰

In this study the testicular germ cell tumor's frequency among all malignancies in male was found to be 0.80%. These statistics are in close accordance with two international studies where frequency of testicular tumors was found to be 0.7% and 0.9% respectively.^{11,12} Our results are also close to two local studies who reported 1.1% and 1% of testicular tumors in Karachi and Larkana respectively.^{13,14}

However two local studies were conducted, one at Armed Forces Institute of Pathology, Rawalpindi and the other at Agha Khan University Hospital, Karachi by where frequency of testicular germ cell tumor was found 1.2% and 1.7% respectively.^{15,4}

On the contrary Shaukat Khanum Cancer Hospital and research centre the collective cancer registry, (1994-2014) reported frequency of testicular

germ cell tumor that was 3.1%. These variations of figures may be due to variation in sample size. Moreover Shaukat Khanum and Aga Khan University Hospital received cases from all over the country.

In our study out of 36 cases of testicular tumors, 34 (94.5%) were germ cell tumors and remaining 02 (5.5%) cases were sex cord stromal tumors. These results in accordance with an international study in India that showing germ cell tumor 91% and sex cord stromal tumors 4%.¹⁶ Our findings were also in close accordance to a study conducted in BMSI, JPMC by Jamal et al. (1990) showing 97% of testicular germ cell tumors.¹⁷ A study conducted in Lebanon reported frequency of germ cell tumor as 82%. Among germ cell tumors 10 cases (29.9%) were seminoma and 22 (70.5%) were non-seminoma. In this study mixed germ cell tumor followed by yolk sac tumor, teratoma and embryonal carcinoma were observed in non-seminoma type of tumor.¹⁸

Present study results showed that mixed germ cell tumors are the commonest accounting for 12 cases (35%) of testicular germ cell tumors. In different parts of the world there are marked variation in frequency of mixed germ cell tumors of figures as high as 62% and as low as 07% are reported.^{19,16} A study conducted in Shaukat Khanum Cancer Hospital and research centre showed 48%.²⁰

Seminoma was the second most common tumor in this study accounting for 10 cases (29.5%). Our findings were in close accordance to a study SIUT Karachi by Tunio et al. (2011) reported a frequency of 34% and 36% respectively.²¹ On the contrary two international studies one conducted in USA and other in Tanzania reported as the seminoma is the most common testicular germ cell tumor accounted for 56% and 61% respectively.^{2,11}

In this study we found 5 cases (14.7%) of yolk sac tumor. Two local studies observed that frequency of yolk sac tumor was 9% and 6% respectively.^{17,15}

In addition, in this study we found 4 cases (11.7%) of teratoma. Our findings were parallel to other

study who reported teratoma as 12%. However a study of Shaukat Khanum Cancer Hospital and Research Centre showing frequency as 5.7%.^{16,20}

Finally we found 3 cases (8.8%) of embryonal carcinoma. Similar findings were observed in an international study showed frequency of embryonal carcinoma as 8.9%. On the contrary a study reported 16% of embryonal carcinoma in their result.^{16,18}

According to others study there is a marked difference and conflicting results in the germ cell tumor's frequency in various part of the world, probably because of ethnic and geographic differences and racial disparities and also due to difference in sample sizes.^{22,23}

In this study more than one histological type of germ cell testicular tumor were observed in 12 cases (35%). Among these embryonal carcinoma and yolk sac tumor were the commonest combination constituting 5 cases (35%) and forming 14.7% of all germ cell tumors followed by combination of embryonal carcinoma with teratoma with yolk sac tumors including 3 cases (21%). The combination of teratoma with yolk sac tumor was seen in 3 cases (21%), while embryonal carcinoma, yolk sac tumor, teratoma and choriocarcinoma found as 1 case (7%).

A local study conducted in SIUT, Karachi reported the combination of embryonal carcinoma, yolk sac tumor with teratoma as the mainly frequent combination accounting 45% followed by embryonal with yolk sac tumor 38.4%.²¹ In a study conducted in India reported the frequency of mixed germ cell tumor in combination most commonly seen as embryonal carcinoma, yolk sac tumor and teratoma constituting 27% accompanied by combination of embryonal carcinoma, yolk sac tumor, teratoma and choriocarcinoma constituting 18%. While combination of embryonal carcinoma with yolk sac tumor was 15% and yolk sac tumor with teratoma was 11% of all testicular germ cell tumors.¹⁶

Surprisingly we did not find any seminomatous element in mixed germ cell tumor. In some

studies seminoma has been reported as a rare constituent of mixed germ cell tumor. Jamal et al. (1990) reported 1.5% seminoma with teratoma among all testicular germ cell tumors in their study.¹⁷

In our study we identified that yolk sac tumor was the commonest component that constituents 11 (92%) in 12 mixed germ cell tumor, followed by embryonal 9 (75%) while teratoma accounts 8 (66%), however 1 case of mixed germ cell tumor showed element of choriocarcinoma.

CONCLUSION

This study showed that germ cell tumor frequency varies in relation to geographic area, ethnicity and race. However most of the pattern and frequency of germ cell tumor in Pakistan are same as other countries.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author's Signature
1	Jawed Iqbal	Wrote the paper, Data collection and data analyzed, Substantial contributions to the conception or design of the work and interpretation of Data for the work.	
2	Shahnaz Imdad Kehar	Drafting the work or revising it critically for important intellectual content.	
3	Nazish Jaffer	Review the literature.	
4	Farah Asad	Statistically analyzed and fianl approval of the version to be published.	