ORIGINAL ARTICLE

Survival Analysis of Children with Yolk Sac Tumors: An Experience from a single intuition

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ABSTRACT

Background: Pediatric yolk sac tumors (YST) are rare tumors with malignant tumors extremely rare.
Methodology: All the pediatric patients who received treatment for histology proven yolk sac tumors at ShaukatKhanum Memorial Cancer Hospital (SKMCH) from January 2006 to December 2014 were retrospectively reviewed. Patients over the age of 18 years were excluded. A total of 90 patients were included in the study. A set of parameters were identified to record initial clinical presentation and examination, imaging and laboratory investigations including tumor marker levels. Decisions of multidisciplinary team meetings, surgical treatment, neo-adjuvantand adjuvant chemotherapy retrieved. Data analysis carried out using SPSS 20.
Results: In total 90patients presented to our hospital during the study period, most of them were above 1 year of age with male (64.4%) to female (35.6%) ratio of 2:1. Most of the patients received treatment outside our hospital (92.2%) and were referred here for chemotherapy. Gonads (78.9%) were more frequently involved and fertility preserving surgery (71.1%) was the most commonly performed surgical procedure. Metastasis was found in 11(12.2) patients at presentation. On long term follow up 60(66.7%) patients are alive and in good health, 7(7.8%) died and 23(25.6%) are lost to follow up with an overall 5 year survival of more than 80% with a mean 50 months followup.
Conclusion: YST are a rare tumors, survival can be improved with early diagnosis and multimodal treatment with surgery and chemotherapy.
Keywords: Yolk Sac Tumor, Endodermal Sinus Tumor, Germ Cell Tumors

INTRODUCTION

Germ Cell Tumors (GCT) are rare tumors based on population analysis. Generally 80% of the GCTs are benign compared to 20% malignant GCT (constituting 2-3% of heterogeneous rare malignant pediatric tumors)[1].Germ Cell Tumors has a bimodal age distribution with first peak in infant age group and the second peak starts in adolescence[2,3]. There is an increase in the rate of GCTs incidence in pediatric age group in Europe, Australia and the United States[4].During the teen years girls are slightly more frequently affected as compared to boys with a ratio of 1:0.8[5].

The YST also known as endodermal sinus tumors, may present clinically with a testicular and ovarian mass. Signs and symptoms of precocious puberty or virilization as a result of excessive hormone production may be present[6]. Commonest sites of YST in children are gonadal, presacral and retroperitoneal. Prognosis is mainly dependent on the site and age at diagnosis[6]. The ovarian GCT are mostly diagnosed in the fifth decade of life with 12% of patients below the age of 30 years[7]. There is bimodal age distribution in testicular tumors, with a first peak in children under 1 years of age and a second peak in older age group (30–60 years)[8,9].Testicular tumors in pediatric age group have a number of features that differentiate them from tumors in adults[9] accounting for 1-2% of neoplasms with testicular yolk sac tumors being the most common malignant tumor[10,11].Most of the tumors of pediatric age group are diagnosed at an early stage with no lymph node involvement or distant metastasis and are completely excised with a favorable course[9]. Where as in adults 10% shows malignant features with lymphatic spread and poor prognosis[12,13].

In the past limited focus was given to chemotherapy for pediatric YST, the role of which is now well clear. As there is gradual increase in the incidence of GCT, data from Pakistan regarding the profile of YST at presentation and management is scarce. We conducted this study to evaluate the presentation, management and role of chemotherapy in YST as our current knowledge regarding incidence of YST in Pakistan is incomplete. We have compiled data from our hospital which is a charity based cancer hospital and referral center. It is a retrospective study with design to gather demographic information, clinical presentation,

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management, and survival outcomeof pediatric YST from a tertiary care cancer hospital in Pakistan.

METHODOLOGY

Data of patients who received treatment for histology proven yolk sac tumors of either gender at ShaukatKhanum Cancer Hospital from January 2006 to December 2014 was retrospectively reviewed. Patients over the age of 18 years were excluded. Hospital records of all the patients with a diagnosis of YSTwere included. A set of parameters were identifies to record initial clinical presentation and examination, imaging and laboratory investigations including tumor marker levels. Decisions of multidisciplinary team meetings, surgical treatment, neoadjuvant adjuvant therapy data retrieved. Data analysis carried out using SPSS 20. Patients were stratified on basis of age, clinical stage and type of tumor. Each individual YST was categorized in terms of diagnosis, surgery, chemotherapy and outcome. For categorical variables chi square test was used. Overall survival was calculated by subtracting date of last follow up from date of first presentation to hospital. Kaplan Meier curves were used to determine estimated overall survival. All analysis was performed on SPSS version 20.

RESULTS

A total of 90 children presented to our hospital during the study period. Majority of the patients (55.5%) were of the age of 1 to 5 years followed by 35.6% above 5 years of age with a male to female ratio of 2:1.Most of the patients were from Punjab (72.2%) followed by Khyber PakhtoonKhuwa (15.5%). Gonads (79%) being the most frequently involved siteas shown in table-1. Most of the surgeries (92.2%) were performed outside hospital and were referred to our hospital for chemotherapy and completion surgery, out of them 64 (71%) patientsunderwentfertility preserving surgeries, 8 (8.9%) patientsunderwentexploratorylaparotomy and no surgery was done in 8 (8.9%) patients as shown in table 2. Completion surgery was performed in 8 (8.9%) patients and debulking was performed in 3 (3.3%) patients while 2 were found irresectable. Metastasis was present in 11 (12.2%) patients and recurrence was found in 12 (13.3%) patients on long term follow up as shown in table 2. On long term follow up 60(66.7%) patients are alive and in good health, 7(7.8%) died and 23(25.6%) are lost to follow up with an overall 5 year survival of more than 80% with a mean 50 months follow-up as shown in Fig. 1.

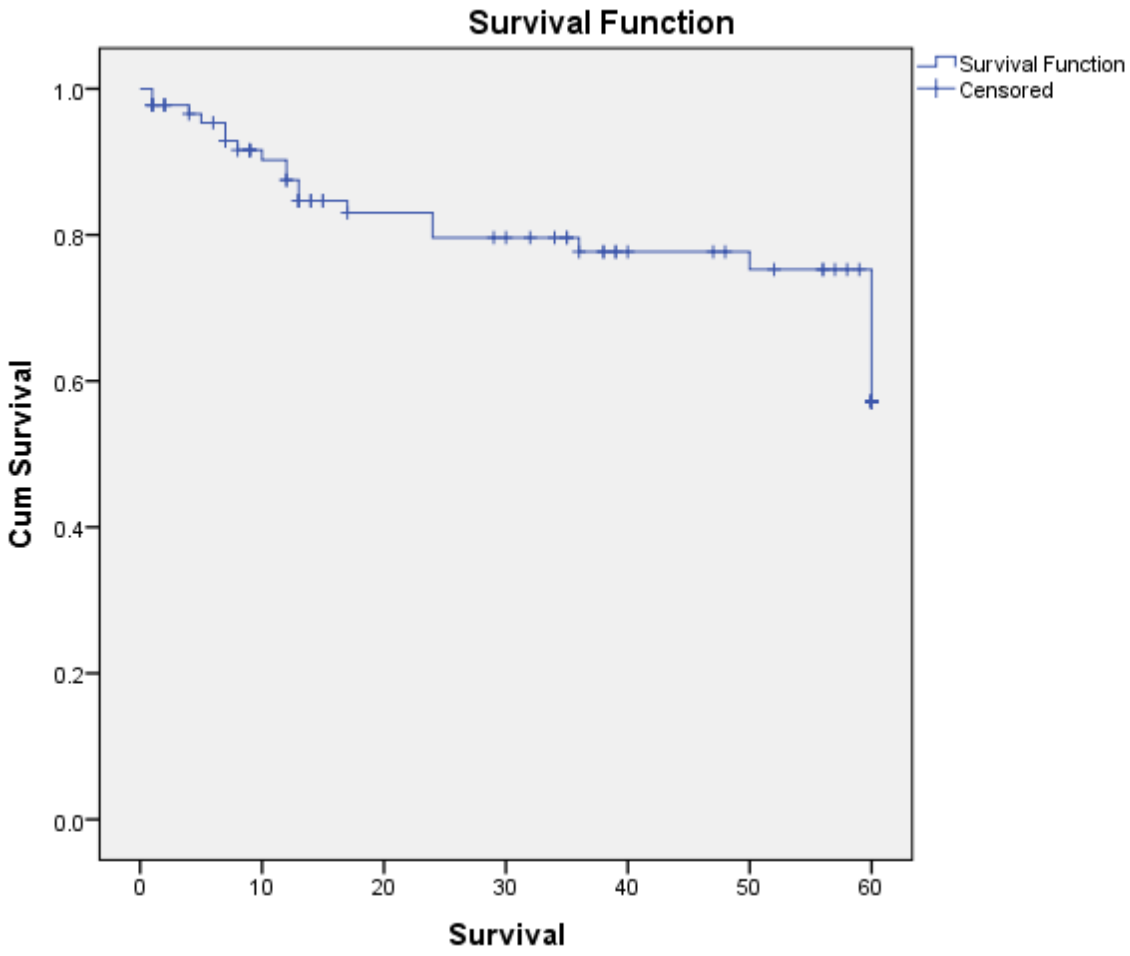
Table 1: Demographics

Demographics		**+**
Gender	Male	58(64.4%)
	Female	32(35.6%)
Area	Punjab	65(72.2%)
	Khyber Pakhtunkhwa	15(16.6%)
	Sindh	1(1.1%)
	Kashmir	5(5.5%)
	Afghanistan	4(4.4%)
Tumor Location	Gonadal	71(78.9%)
	Extra-Gonadal	19(21.1%)
Age	< 1 Year	7(7.8%)
	1-5 Years	50(50.5%)
	> 5 Years	33(36.7%)

Table 2: Management

Management	**n**
Primary surgery	
Fertility Preserving Surgery	64(71.1%)
Exploratory Laparotomy	4(4.4%)
TAH + BSO	2(2.2%)
Cystectomy	2(2.2%)
Excision of mass	4(4.4%)
Unresectable	6)6.6%)
No surgery	8(8.8%)
Total	90(100%)
Primary surgery our hospital	
Yes	7(7.7%)
No	83(92.2%)
Chemotherapy	
Yes	74(82.2%)
No	16(17.8%)
Mets at presentation	
Yes	11(12.2%)
No	79(87.8%)
Recurrence	
Yes	12(13.3%)
No	78(86.7%)
Completion of surgery	
Debulking Surgery	3(3.3%)
Laparotomy	8(8.9%)
Unresectable	2(2.2%)

Fig. 1: Overall 5 Year Survival



DISCUSSION

The main findings of our study were that pediatric YST are rare tumors, leading to high mortality in absence of any treatment and despite being neglected in the past, survival can be improved by multimodal treatment modalities. Pediatric YST are rare heterogeneous diverse tumors, a retrospective analysis was conducted to evaluate the outcomes of pediatric YST presented to our hospital during the study period. We conducted this retrospective study to gather all available information regarding the YST in our population which is a rare tumor.

In our study YST are more common above 1 years of age (92.2%) with fertility preserving surgery performed in 71%, well in accordance with published literature which shows testicular YST mostly present above 1 years of age with localized disease (80%)[14,15].Most of the pediatric YST are gonadal (79%) in our study as compare to extra-gonadal which was present in 21% patients which is similar to a study conducted by Marina et al, showing more gonadal involvement than extra gonadal[16].

The prognosis and treatment of the yolk sac tumors depends on the stage and age at presentation, with pediatric tumors and early stage tumors more than 80% survival is claimed,[14,15] similar results are found in our study as well, as our patients shows more than 80 % survival with a mean follow up of 50 months.

There are few limitations to our study, as being retrospective nature of the study, most of the patients were operated outside our hospital and were referred here for further treatment with scarce pre-operative information including clinical and tumor marker levels posing diagnostic and management challenges. Despite all these shortcomings, we gathered data from all these patients who presented during the study period and were studied to give our local data,

which is quite scarce. Base on this data, further assessment tools will be included to analyze prospectively in future to have more knowledge and manage these patients well.

CONCLUSION

Paediatric YSTis mostly chemosensitive and curable tumours with good prognosis, survival can be improved by early diagnosis, proper treatment and follow-up. Mass awareness regarding management principals of GCT in Pakistan need to be much improved.

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