



## Original Article

# Evaluation of testis sparing surgery in paediatric testicular tumor

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### Abstract

**Aim:** To evaluate the outcome of testis sparing surgery (TSS) and to investigate under which circumstances TSS can be considered a safe treatment option in paediatric patient with testicular tumor.

**Methods & Materials:** This prospective interventional study was conducted in Dhaka Medical College Hospital (DMCH) during January 2019 to June 2021 (total 30 months) and 0-14 years child with testicular tumor was included & child with advanced disease was excluded. Total 30 patients were selected with consecutive sampling. Postoperatively patients were followed up for 6 months.

**Results:** Germ cell tumor (GCT) was the most common (93.3%) paediatric testicular tumor and teratoma was the commonest among the GCT (76.7%). Benign tumor was predominant (83.3%) in paediatric testicular tumor and TSS was done in this group. No tumor recurrence or testicular atrophy occurred in 6 months follow-up.

**Conclusion:** TSS to preserve testis is preferable for paediatric testicular tumor.

### Introduction

Testicular tumors are rare in children, representing 1-2% of all solid tumors in children<sup>1</sup> and the incidence of testicular tumor is approximately 0.5-2 per 100,000 children and adolescents<sup>2</sup>. Testicular tumors are divided into two main categories: germ cell tumors (GCTs) and non-germ cell tumors derived from the stroma, sex cord stromal tumors (SCSTs)<sup>3</sup>. Among the testicular tumors a greater percentage of benign lesions occur in pre-pubertal patients, with teratoma being the most commonly reported histology<sup>4</sup>. Unlike in adult patients, teratoma behaves in a universally benign fashion in pre-pubertal boys and is not associated with germ cell neoplasia in situ (GCNIS)<sup>5</sup>. Pure yolk tumor is the most commonly encountered malignant tumor among pre-pubertal patients<sup>6</sup>. Given the higher likelihood of benign lesions in this population, a clear shift towards a testis sparing approach has been observed for pre-pubertal patients<sup>7</sup>. For benign testis tumors, partial orchiectomy offers a durable cure and may allow preservation of long-term hormonal function, fertility and quality of life<sup>8</sup>.

Indeed, none of the preoperative tests can clarify the exact diagnosis. For this reason, all testicular masses should be assumed to be malignant, until proven otherwise and this is particularly true in paediatric cases<sup>9</sup>. However, frozen section examination (FSE) has a sensitivity of 95-100% and a specificity of 100% to differentiate a benign and malignant tumor for adult pathology<sup>10</sup>. Scrotal USG is highly reliable for differentiation of testicular mass. USG findings suggestive of a benign lesion includes a homogeneous or mainly cystic morphology, good demarcation, echogenic rime, normal to increased echogenicity and reduced or normal perfusion when compared to

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healthy testicular parenchyma. A malignant histology is suspected when USG shows an inhomogeneous, hypoechoic, not well-circumscribed lesion, often with increased perfusion and with diffuse infiltration of the testis<sup>11</sup>.

The surgical approach of testicular tumors is based on imaging and quantification of tumor markers, to differentiate between benign and malignant. If the tumor is restricted to one testicle the standard of care has been a radical inguinal orchiectomy (RIO)<sup>12</sup>. Trans-scrotal intervention of any type, including FNAC, open testicular biopsy, and scrotal orchiectomy, is often referred to as scrotal violation, which causes increased rates of local recurrence compared to RIO<sup>13</sup>. Traditionally, paediatric testicular tumors have been managed according to adult protocols, with radical inguinal orchiectomy<sup>14</sup>. As the true incidence of malignant testicular pathology in childhood is much lower than previously thought<sup>15</sup>, Testis Sparing Surgery (TSS) has become a desirable and viable option<sup>16</sup>. TSS is generally performed through an inguinal approach, in which the tumor is enucleated with a surrounding margin of normal testicular parenchyma<sup>17</sup>. TSS may reduce psychological and cosmetic consequences associated with RIO<sup>17</sup>. Moreover, it might reduce the risk of impaired fertility<sup>18</sup>. Furthermore, in both pre and post pubertal patients with a solitary testis preoperatively, TSS is recommended to preserve Leydig cell function and thereby testosterone production and any fertility potential<sup>19</sup>. Even in bilateral synchronous or metachronous malignant testicular GCTs, TSS could be an option<sup>20</sup>. As among patients with GCT, there is a lifetime 2% risk of a contralateral GCT<sup>21</sup>, TSS should be the choice in every possible case. Though there is some guidance on TSS in adult, still there is no consensus for paediatric population<sup>22</sup>. This study was done to evaluate the outcome of testis sparing surgery (TSS) and to investigate under which circumstances TSS can be considered a safe treatment option in paediatric patients with testicular tumors.

## Materials & Methods

It was a prospective, interventional study carried out in department of Paediatric Surgery, DMCH from January 2019 to June 2021 (total 30 month). Children with testicular tumor aged 0-14 years were included.

Children with retroperitoneal LN enlargement or lung metastasis, children with paratesticular mass, child with lympho-proliferative disorder (lymphoma and leukemia) were excluded. Total 30 (thirty) children were included with consecutive sampling. The approval was obtained from the ethical committee of DMCH and informed consent for orchiectomy was obtained from parents/ legal guardian of each subject. Chi-square test was done at significant level.

## Operative Procedure

After proper patient selection and once the decision had been made for testis sparing surgery (TSS), adequate counseling regarding the possibility of orchiectomy was done.

The initial steps for TSS were the same as RIO, beginning with an inguinal incision, incision of the external oblique fascia and delivery of the testis into wound. A noncrushing clamp was applied at the internal ring. Intraoperatively, the location of tumor was determined by palpation and the tunica vaginalis was then opened at the closest point to the tumor. The tumor was sharply excised without violating tumor capsule and sent for intra-operative FSE. To prevent irreversible damage, a warm ischaemia time not exceeding 30 minute was recommended during TSS<sup>23</sup>. If frozen section examination (FSE) confirmed benign histology, the tunica albuginea was repaired with fine, absorbable suture and the testis was returned to the scrotum. If malignancy was detected, RIO was completed by high ligation of the spermatic cord at the internal ring.

## Results

**Table I**  
*Characteristics of the study subjects (n=30)*

Characteristics	Frequency	Percentage (%)
Age in years		
0-5	18	60.0
6-10	8	26.7
11-14	4	13.3
Mean±SD		5.20±3.99
Laterality		
Rt testis	21	70.0
Lt testis	9	30.0

<b>Table II</b> <i>Clinical presentation (n=30)</i>		
Clinical presentation	Frequency	Percentage (%)
Scrotal mass	30	100.0
Scrotal pain	2	6.7
Mild hydrocele	4	13.3
Precious puberty	1	3.3

<b>Table III</b> <i>Histological type (n=30)</i>			
Histological type	Frequency	Percentage	P value
GCT	28	93.3	
Teratoma	23	76.7	
Yolk sac tumor	4	13.3	
Mixed germ cell tumor	1	3.3	
SCST	2	6.7	0.001
Epidermoid cyst	1	3.3	
Leydig cell tumor	1	3.3	
Type			
Benign	25	83.3	0.001
TSS done	25	83.3	
Malignant	5	16.7	
RIO done	5	16.7	

<b>Table IV</b> <i>Serum AFP in GCT (n=28)</i>		
AFP	Frequency	Percentage (%)
High	4	14.3
Yolk sac tumor	3	75.0
Mixed germ cell tumor	1	25.0
Normal	24	85.7
Teratoma	23	95.8
Yolk sac tumor	1	4.2

<b>Table V</b> <i>Serum <math>\beta</math>-HCG in GCT (n=28)</i>		
$\beta$ -HCG	Frequency	Percentage (%)
<b>High</b>	1	3.5
Mixed germ cell tumor	1	100
Normal	27	96.5
Yolk sac tumor	3	11.1
Teratoma	24	88.9

<b>Table VI</b> <i>Correlation of frozen section and histopathological examination (n=30)</i> FSE histopathology				
	Frequency	Percentage	Frequency	Percentage
Benign	25	83.3	25	83.3
Malignant	5	16.7	5	16.7

<b>Table VII</b> <i>Outcome of testis sparing surgery (n=25)</i>		
	Frequency	Percentage (%)
Tumor recurrence	0	00
Testicular atrophy	0	00
No recurrence/atrophy	25	100

### Discussion

The presence of mass in the scrotum was the most frequent manifestation of testicular tumor and occurred in all (100%) patients, which is consistent with the literature<sup>24</sup>. Hydrocele was present in 13.33% and literature reports that hydrocele may be associated with testicular tumor in 15 to 50% of cases<sup>25</sup>.

In the patients with testis tumor analyzed, the most frequent histological type was the GCT (93.33%) that is in accordance with findings in literature<sup>26</sup>. Among the GCTs, the most common histological subtype in childhood is teratoma<sup>27</sup>.

AFP level is elevated in 75 % cases of yolk sac tumor which is similar with the literature<sup>28</sup>, making it a sensitive and useful marker for diagnosis and surveillance. AFP level is normal in teratoma and in other benign tumor which is similar with literature<sup>29</sup>.

Benign tumor occurs in 83.33% of testicular mass and literature shows that benign testicular tumor predominates in paediatric age group and it occurs in 74-89% of testicular mass<sup>30</sup>.

FSE result was similar with final histopathology report in all cases (100%) and this finding is similar with Connor et al<sup>16</sup>. There were no contradictions between the definitive histopathological examination and frozen section<sup>31</sup>.

### Limitation

Sample size was small and follow up time was short.

## Conclusion

TSS to preserve testis is preferable for paediatric testicular tumor as benign tumor predominates in this age group coupled with high reliability of serum tumor marker (STM) and intraoperative FSE.

## Take-home points

- Benign testicular tumor predominates in paediatric age group which in reverse in adult.
- TSS is favorable in paediatric age group.
- Negative STM and favorable USG are the most important preoperative investigation.
- Intraoperative FSE to confirm benign histology is a key component of TSS.
- RIO is the gold standard for malignant testicular tumor.

**Conflict of interest:** None

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