

Case Report

Extratesticular Leydig cell tumor next to the left testis: a case report and literature review

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Abstract: *Background:* Extratesticular Leydig cell tumor is a relatively rare kind of tumor, especially involving the testis. *Case presentation:* We report a case of a 7-year-old boy with extratesticular Leydig cell tumor next to the testis. An intraoperative biopsy revealed that a painless mass was presented in the left scrotum. The ultrasonography identified the left varicocele and an enlarged left testis with uneven echoes. The patient underwent left radical orchiectomy. The mass, 2.5 × 2.5 × 2 cm in size, was located next to the left testis. Immunohistochemical analysis was carried out and indicated that the tumor cells were positive for vimentin, inhibin, syn and Ki-67, and were negative for S-100, cgA and CD99. The pathologic diagnosis was considered as a benign extratesticular Leydig cell tumor. *Conclusions:* We reported an extratesticular Leydig cell tumor next to the testis, and vimentin, inhibin, syn and Ki-67 might be regarded as positive medicines for the treatment.

Keywords: Leydig cell tumor, spermatic cord, case report

Introduction

Extratesticular Leydig cell tumor is a rare gonadal stromal tumor. Although Leydig cell tumor is the most frequent non-germ cell tumor of the testis [1], it has been reported only in four cases, one in the pelvis, two in the spermatic cord and another was in the epididymis [2-5], and rarely involved the left testis. In this case report, we reported a 7-year-old boy who underwent left radical orchiectomy of an extratesticular Leydig cell tumor next to the testis. In addition, clinical, histopathologic and immunohistochemical features of this case were described.

Materials and methods

Case report, surgical findings, and follow-up

A 7-year-old boy presented with sudden rapidly increasing in growth and development was admitted to the Department of Endocrinology in Nanjing Children's Hospital in September, 2014. An intraoperative biopsy revealed that a painless mass was presented in the left scro-

tum. Urologic examination showed an enlarged left scrotum distributed in the shape of worm-like with a certain degree of activity and no obvious tenderness. The laboratory examination found that total testosterone was > 52.05 nmol/L and the 17-hydroxy progesterone was 5.42 nmol/L. The ultrasonography identified the left varicocele and an enlarged left testis with uneven echoes (**Figure 1**).

Then left radical orchiectomy was performed. First, the transection of left scrotum (about 2 cm) was pulled out, and spermatic cord and testis were dissociated. The specimen revealed that the left testis and epididymis were normal. The tumor, located in the scrotum just next to the left testis, was 2.5 × 2.5 × 2 cm in size (**Figure 2A**). At the edge of the tumor, clear boundary was seen. After separation of the tumor, nutrient vessels were observed and parallel with the spermatic vessel. Then the nutrient vessels was dissociated to a high level and ligated followed by excision. After the tumor was sectioned, blown tissues were seen (**Figure 2B**). The patient had an uneventful recovery

Extratesticular Leydig cell tumor

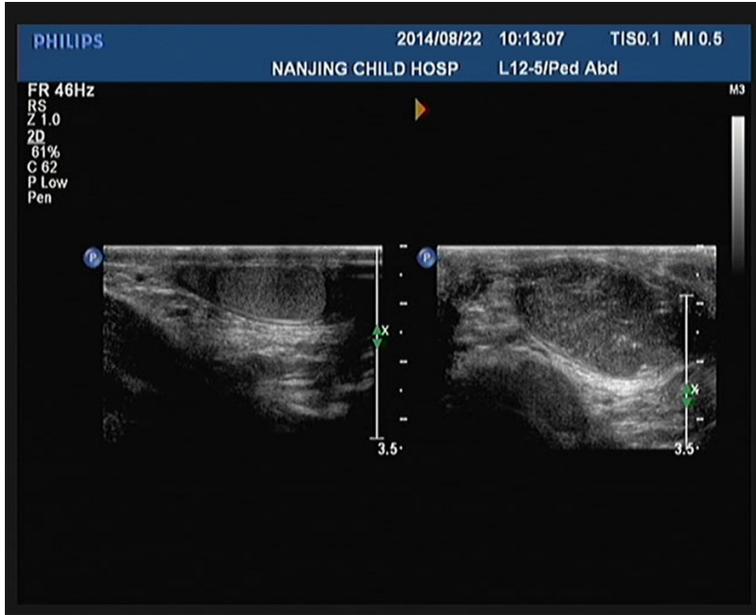


Figure 1. An enlarged left testis with uneven echoes identified by ultrasonography.



Figure 2. A. Left testis and spermatic cord clamped and dislocated out of the scrotal sac through an inguinal left incision. The mass was well dissociated from surrounding tissues. B. Blown tissues were seen after the tumor was sectioned.

after surgery and was clinically free of tumor at one year of follow-up.

Histopathologic findings and immunohistochemistry

Blown tissues were then performed with pathological examination and stained by hematoxylin and eosin (HE). As shown in **Figure 3**, the tumor cells were of medium sized and polygonal, with abundant acidophil endochylema. They had round or oval cell nuclei, in which some plasmosomes were obvious. The tumor cells were in diffuse growth and had plenty of vascular network structures with focal lymphocyte infiltration.

Immunohistochemical analysis was carried out and indicated that the tumor cells were positive for tumor markers of vimentin, inhibin, syn and Ki-67 (10% positive cells), and were negative for S-100, cgA and CD99 (**Figure 4**).

Based on the conclusive findings of histopathological and immunohistochemical analysis, the diagnosis of a benign extratesticular Leydig cell tumor was established.

Discussion

Leydig cell tumors are rare sex cord stromal tumors, causing from Leydig cells which produce testosterone [6]. Although as the most common hormone-secreting testicular tumors, Leydig cell tumors account for only 3-6% of testicular masses in prepubertal males [7, 8]. Extratesticular Leydig cell tumor is also an extremely rare condition. In the present study, we described a 7-year-old boy who underwent left radical orchiectomy of an extratesticular Leydig cell tumor next to the testis. After one-year follow-up, we found that the boy was asymptomatic and in good health.

Leydig cell tumor can occur at any age, mostly in male patients between 20 and 60 years, and less than 25% having been reported in boys from 5 to 10 years old. According to our review of the literature (**Table 1**), among 4 patients

Extratesticular Leydig cell tumor

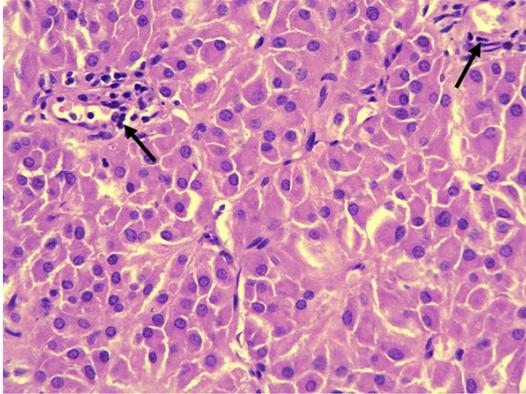


Figure 3. Histology of blown tissue of the tumor staining by hematoxylin and eosin. Magnification \times 400. The tumor cells were medium sized polygonal cells with abundant acidophil endochylema. They had round or oval cell nuclei, in which some plasmosomes were obvious. The tumor cells were in diffuse growth and had plenty of vascular network structures with focal lymphocyte infiltration (arrows).

with extratesticular Leydig cell tumor, two were from 39 to 40 years old and one was 18 years old [2-5], which showed no distinct difference with Leydig cell tumor. Unlike Leydig cell tumors which are mostly bilateral in 3-10% of cases and about 10% of the reported cases evolved into malignant neoplasms [7, 9], all of the 4 patients with extratesticular Leydig cell tumor were unilateral. Among these 4 patients, there were two lesions on the right spermatic cord and one in the left pelvis. Also in our case, the lesion was in the left scrotum next to the testis.

The clinical presentation of Leydig cell tumors and the extratesticular Leydig cell tumor may be based on the clinical manifestations and accessory examination including laboratory examination and imaging examination. As low gonadotropin levels and increased production of testosterone, most patients of Leydig cell tumors may develop secondary sexual characteristics when the lack of hypothalamic-pituitary activation [6, 8, 10]. Conservative surgery as a first-line treatment has been used for early diagnosis of Leydig cell tumors [11]. In addition, ultrasonography is a main imaging method and magnetic resonance imaging is an additional choice when nonpalpable Leydig cell tumor could not be identified using ultrasound [12]. However, the final diagnose should depend on histopathological findings. The major morphologic features of Leydig cell tumor include rich

of acidophil endochylema, abundant of lipofuscin, crystalloids of Reinke in 25-40 cases, oval cell nuclei with evident plasmosome and medium size and polygonal shape [13]. Additionally, the tumor cells are immunoreactivity positive for inhibin, vimentin and calretinin and negative for S-100, chromogranin or keratins when detected using immunohistochemical analysis [4, 14]. In our study, we also found that the tumor cells were positive for vimentin, inhibin, syn and Ki-67, and were negative for S-100, cgA and CD99, which was considered as extratesticular Leydig cell tumor.

Although malignant Leydig cell tumor cases account for only 10%, it can frequently metastasize in livers, bone, lungs and lymph nodes [15, 16]. Compared with benign Leydig cell tumors, malignant tumors are usually larger ($>$ 5 cm) and present as nuclear atypia, increased infiltrative margin, angiolymphatic invasion, mitotic figures, necrosis and DNA aneuploidy [17]. In addition, immunohistochemical analysis of Ki-67, p53 and bcl-2 may contribute to differentiate malignant and borderline cases [18]. In our study, after immunohistochemical analysis, the pathologic diagnosis was considered the tumor in the case was a benign extratesticular Leydig cell tumor.

For treatment of both Leydig cell tumor and extratesticular Leydig cell tumor, surgical excision is the major method because they are not sensitive for radiotherapy and chemotherapy. Orchiectomy is the best choice of common Leydig cell tumor, and orchiectomy with lymphadenectomy is used when regional lymph nodes were involved [9]. For Leydig cell tumor, the clinical and hormonal manifestations remit in 90% of the cases after surgery [19]. For malignant tumors, the average survival time is approximately two to three years after surgery [16, 20]. In the four extratesticular Leydig cell tumor cases, three of them survived well after surgery based on postoperative follow-up ranging from 8 months to 2 years and the rest one was not mentioned. In our study, left radical orchiectomy was performed and the boy was asymptomatic and in good health after one-year follow-up.

Conclusion

Extratesticular Leydig cell tumor is rare and characterized by positive for vimentin, inhibin,

Extratesticular Leydig cell tumor

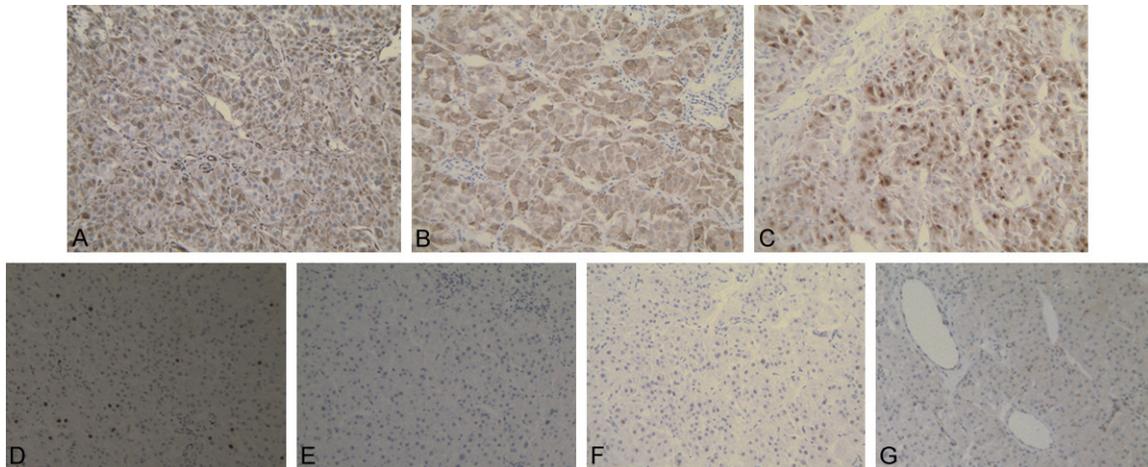


Figure 4. Immunohistochemical staining of tumor markers of vimentin (A), inhibin (B), syn (C) and Ki-67 (D), S-100 (E), cgA (F) and CD99 (G). (A-C) with high positive staining rates were assessed at a magnification of $\times 400$, and (D-G) with low positive staining rates (approximately 10% of the tumor cells, (D) or negative staining (E-G) were assessed at a magnification of $\times 200$ in broad stained areas).

Table 1. Literature review of previous cases of extratesticular Leydig cell tumor

NO.	Source	Publication year	Country	Patient number	Symptoms	Age of patients	Tumor location	Tumor size (cm)	Treatment	Outcome
1	Maurer et al.	1980	Switzerland	1	Increasing pollaki-suria, nocturia and reduction of urine stream in two years	40	Left pelvis	10 \times 9 \times 6	Laparotomy for tumor and Retroperitoneal lymphadenectomy	No recurrence within 12 months follow up
2	Srigley et al.	1990	Canada	1	NA	NA	On the tail of the epididymis	NA	NA	NA
3	Lanzafame et al.	2004	Italy	1	Right supratesticular painless palpable nodule	39	Right spermatic cord	1.0 \times 0.8 \times 0.7	Right inguinal incision for firm nodular mass	No recurrence within 8 months follow up
4	Ferrari et al.	2012	Italy	1	Presented with a palpable and asymptomatic right extratesticular mass	18	Right spermatic cord	1.5 \times 1.2 \times 1.0	Right inguinal incision for a solid mass	NA

syn and Ki-67, and negative for S-100, cgA and CD99 when detected using immunohistochemical analysis. Orchiectomy treatment of extratesticular Leydig cell tumor is safe and effective.

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Disclosure of conflict of interest

None.

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