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Case Report

Testicular rupture after blunt scrotal trauma in children: A case report and literature review

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ABSTRACT

Blunt testicular trauma with rupture of albuginea is one of the rarest emergencies in children. Medical history and Testicular Doppler Ultrasound lead to diagnosis. Appropriate management is necessary to preserve the testis. Follow-up to adulthood is recommended to assess the impact on fertility.

Introduction

Scrotal trauma in young males represents less than 1% of all trauma-related injuries [1], 1.5% of which complicated with testicular rupture [2]. Prevalence of testicular rupture in men then approximates 0.15‰. Rupture of the tunica albuginea exposes the seminiferous tubules which puts at stake prognosis for future fertility [3,4]. Background circumstances and Testicular Doppler Ultrasound (TDU) lead to diagnosis. Either conservative or surgical management can be done, depending on testicular lesions and hematocele. We present the case of a 13-year-old boy who was kicked in the genitals by a classmate and came for a consultation 24 h later due to pain and right scrotal swelling. The Testicular Doppler Ultrasound revealed right testicular rupture. Intraoperative findings confirmed the rupture of the tunica albuginea with partial testicular necrosis. We performed an extensive necrosectomy of devascularized extruded seminiferous tubules with suture of the tunica albuginea and right orchidopexy.

Medical observation

A 13-year-old boy with no prior history was brought to our pediatric emergency department for right acute scrotal pain, after being kicked in the genitals 24 h earlier by a classmate. He initially had paroxysmal scrotal pain, which decreased and then intensified again, leading him to the pediatric emergency room. The right hemiscrotum was swollen, purple, and hardly palpable due to the pain. However, cremasteric reflex was elicited on both testicles. Left testis examination was normal. A preoperative TDU revealed right testicular rupture with specific signs such as heterogeneous echo pattern of testicular parenchyma and contour loss. Doppler showed normal flow to both testicles (Fig. 1). The patient was immediately transferred to the operating room and underwent a right scrotal exploration. Time-length between diagnosis and surgery was 2 h. Intraoperative findings confirmed the rupture of the tunica albuginea with partial testicular necrosis (Fig. 2). Primary albuginea closure was impossible due to edema. We decided to perform an extensive necrosectomy of devascularized extruded seminiferous tubules. About 2/3 of the right testis was excised. The tunica albuginea was repaired with separated stiches of resorbable thread (PDS 4.0), the tunica vaginalis with a resorbable thread overlock (Vicryl 4.0).

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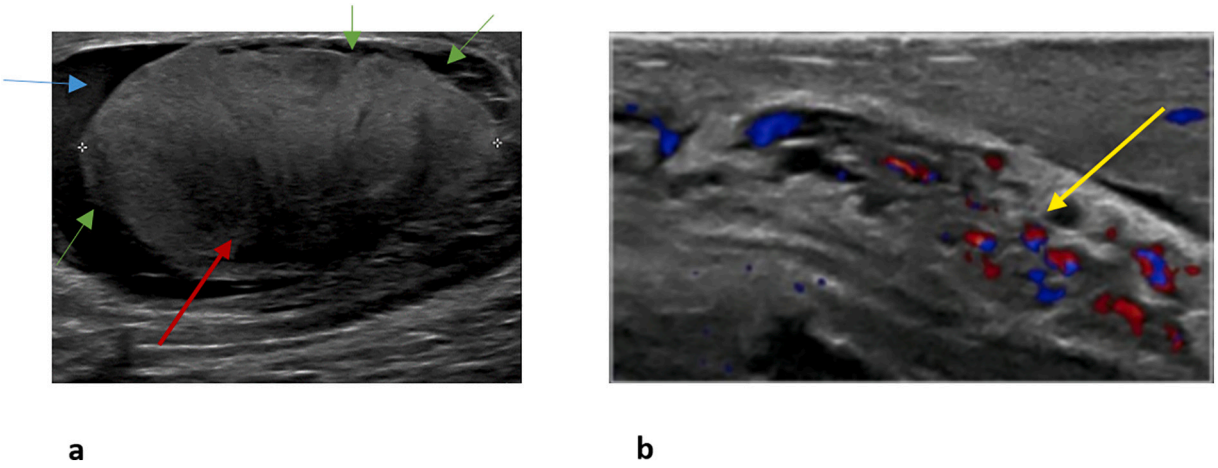

Fig. 1. Testicular Doppler ultrasound a) The right testis is heterogeneous (red arrow) with loss of its sphericity (green arrows) and hematocele (blue arrow). **b)** Persistent blood flow in the right spermatic cord (yellow arrow).

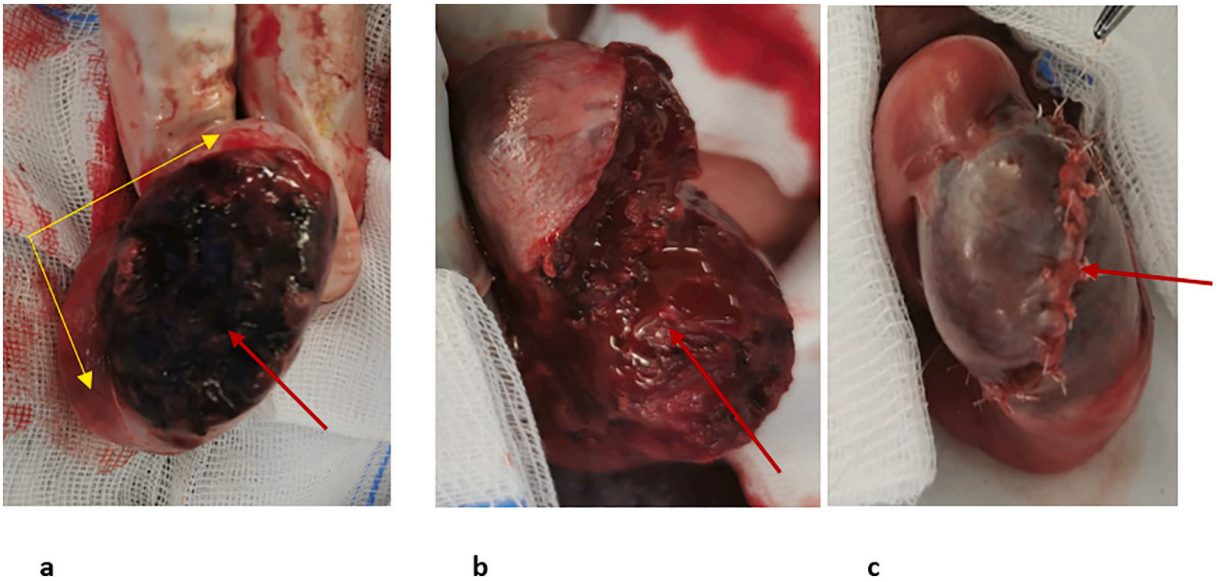

Fig. 2. Right exploratory scrototomy a) Partial testis necrosis (red arrow) with rupture and retraction of the albuginea (yellow arrows). Testis edema forbids any closure of the tunica albuginea. **b)** Vascularized testicular parenchyma after necrosectomy (red arrow). **c)** Tunica albuginea suture without tension (red arrow).

Then a right orchidopexy was performed using 3 stiches of non-resorbable thread (Prolene 5.0). Operative time was 45 min. There was no sign of infection so we decided not to administer antibiotics. The patient returned home 12 h later. Histology showed ischemic testicular necrosis and extensive hemorrhagic ranges. Postoperative follow-up consisted in clinical examination and TDU on Post-operative Day (POD) 21 then monthly for 3 months, then yearly. The clinical examination aimed at assessing the volume and consistency of the testis. On POD 21, the right testis was smaller than the left one but had the same consistency. TDU showed the fracture line and some fluid formation within the right testis upper pole which appeared bilobed (Fig. 3). Both testicles parenchyma was homogeneous and well vascularized. The right testis volume was about 10.6 cm^3 whereas the left one 32.2 cm^3. After a one year-follow-up, clinical examination and TDU didn't change except for the fluid within the right testis which had disappeared. Our patient is still undergoing clinical and ultrasound monitoring yearly to assess the viability of the testicle and its volume evolution over time. Endocrine tests and a sperm analysis are planned at the end of the growth, as well as advice on future fertility.

Discussion

Testicular trauma with rupture of albuginea in children is a rare clinical entity. Very few studies have been reported over the past

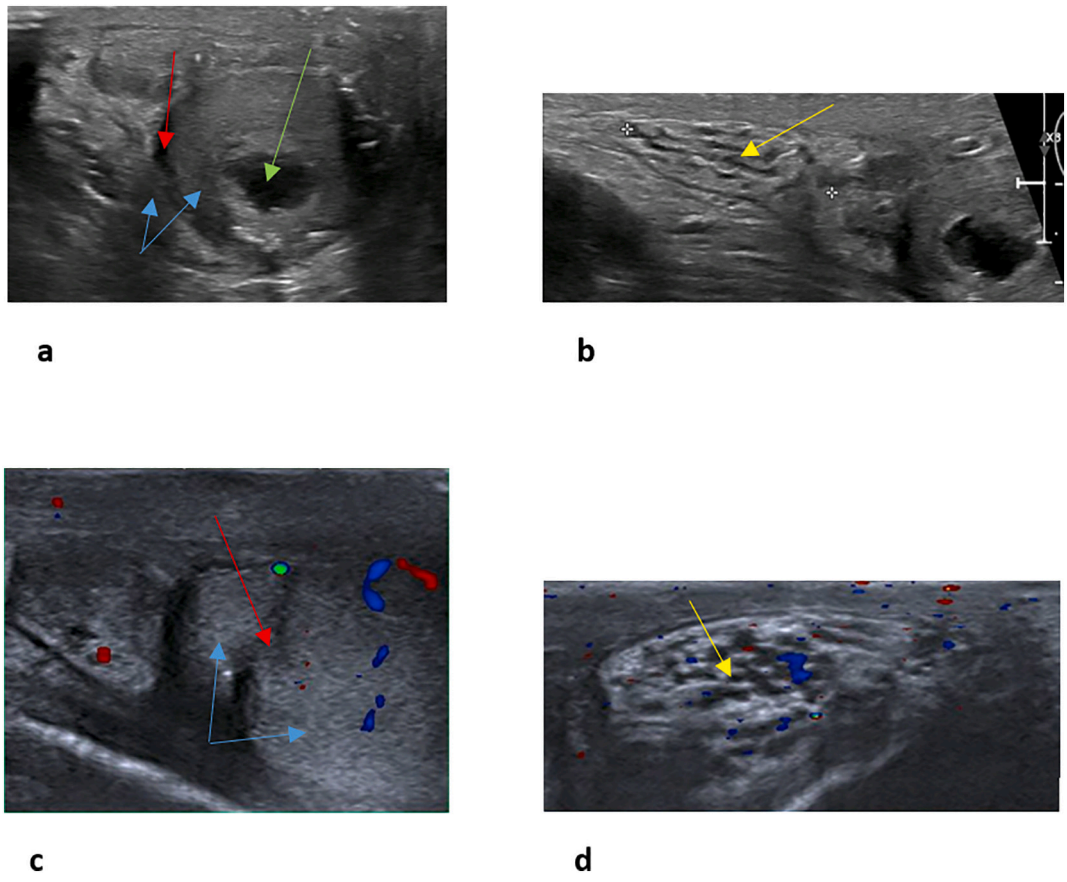

Fig. 3. Testicular Doppler Ultrasound Follow-upPOD 21: a) The fracture line can be seen (red arrow). Presence of hypoechoic fluid within the testis (green arrow). The testicle appears bilobed (blue arrows). **b)** Normal blood flow in the right spermatic cord (yellow arrow). After a year: **c)** Persistent fracture line (red arrow) and bilobed aspect of the right testicular parenchyma (red arrow). **d)** Normal blood flow in the right spermatic cord (yellow).

Table 1
Studies on testicular rupture in children published over the past 10 years.

Authors	Year	Number of cases	Country
Lardellier et al.	2010	45	France
Zenon et al.	2011	7	Croatia
Indra et al.	2017	1	USA
Matthiew et al.	2019	1	USA
Our study	2020	1	France

10 years (Table 1). Lardellier et al. conducted a study in 15 French pediatric surgery centers: 45 patients were identified but 2 centers said they had never operated one. [4]. Testicular trauma in children, especially young men, mostly happens during physical activities (games, sports). Sport was involved in 85.7% (6 out of 7 cases) and 51.1% of the cases (23 out of 45 cases) respectively [4,5]. Direct impact on the genitals is the main mechanism causing hyperpressure within the albuginea leading to rupture. Right testis injury is more common [3]. The average age of patients is 12.3 years old (2 days to 18 years old) [4]. Ours was 13 years old and Indra et al. also reported a case of testicular trauma with rupture of the albuginea in a 13-year-old boy following a bicycle accident [6]. Three cardinal signs are found in testicular rupture: traumatic context, paroxysmal unilateral scrotal pain and scrotal swelling. Presence of cremasteric reflex eliminates concomitant testicular torsion. Children sometimes forget or neglect this type of trauma, as in our case, resulting in both diagnosis and management delay. TDU is highly sensitive and specific (100% and 93.5%, respectively) [7]. Heterogeneous appearance and loss of testicular contour associated with hematocele are among the findings [8]. Moreover, testicular fracture and scrotal thickening can be seen. Likewise, persistent blood flow favors good outcome [3]. Time length between trauma and surgery was 36 h, as for Zenon et al., who recorded 35 h in their study [5]. Most authors agree that surgical exploration within 24 to 72 h improves testicular rescue rate [4,8,9]. Surgical delay may decrease the salvage rate from 80 to 90% to 45–55% [3]. Based on this opinion, many authors hold the viewpoint that patients benefit a lot from early surgical intervention, such as increasing testis salvage

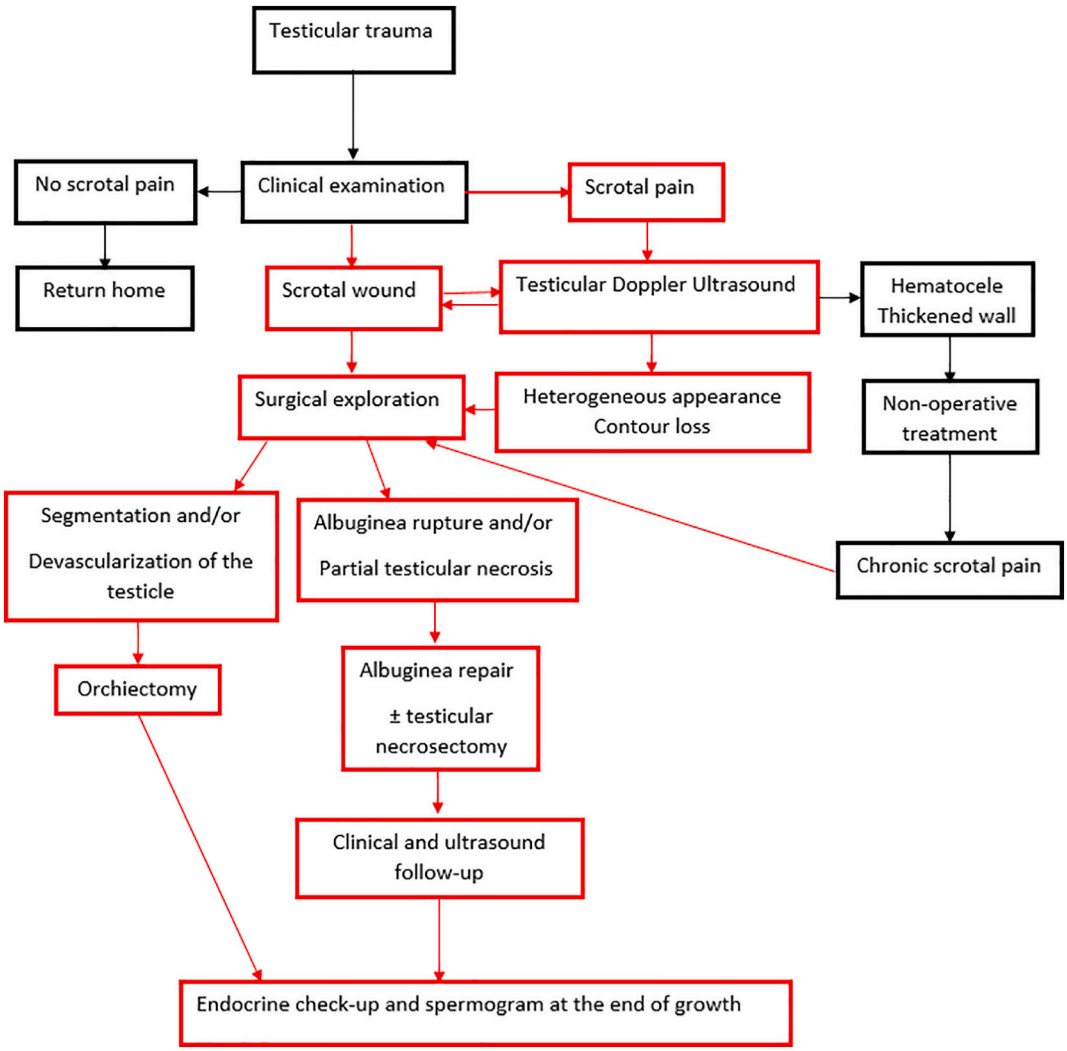

Fig. 4. Management of testicular trauma in children.

rate, promoting testicular function storage, quicker symptoms control, shorter hospital stay and earlier back to sport. When albuginea suture is not possible due to edema, Block et al. suggest the use of a tunica vaginalis flap to close the section slice [3]. We found no specific reference about minimum testicular volume necessary to maintain testis endocrine function. So, unilateral orchiectomy might be the last choice when not even a quarter of the testis can be saved or if it is segmented and devascularized. Linh et al. showed normal spermogram and FSH-LH levels in three patients having undergone albuginea suture after unilateral testicular rupture. Only one patient had an elevation of antispermatozoid antibodies, but without any impact on the gonads [10]. Although we chose an aggressive surgical treatment, Redmond et al. systematically advocate a non-operative approach in all testicular trauma. According to them, necrosectomy carries away viable testicular tissue and early closure of the albuginea could result in compartment syndrome causing atrophy [11]. Fortunately, it did not happen in our case. Besides, urology guidelines usually support albuginea suture. We then propose a useful diagnostic and therapeutic management in case of testicular trauma in children [12] (Fig. 4).

Conclusion

Testicular rupture is a serious complication of testicular trauma. Specific clinical signs must lead to TDU. Surgical exploration is often needed and, suture of the ruptured tunica albuginea remains the gold standard procedure. Follow-up to adulthood is necessary to assess prognosis on fertility.

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