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## **Scrotal strangulation of differential diagnosis of acute scrotum: a rare case report**

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### **Abstract**

#### **BACKGROUND**

Acute scrotal pain and swelling are common presentations in the emergency department (ED). Urgent surgical intervention is justified in up to one-third of cases, whereas two-thirds of them should be treated conservatively.

#### **CASE SUMMARY**

We report a case of scrotal only strangulation in a child and review the available literature.

#### **CONCLUSION**

Due to its rarity, scrotal strangulation can be a diagnostic challenge. Skin ulceration and edema may well indicate the presence of a strangulation object. High index of suspicion and proper physical examination, especially in patients with a mental disability or a behavioral disorder, are key to early diagnosis and treatment.

4

### **INTRODUCTION**

Acute scrotal pain and swelling are common presentations in the emergency department (ED). Urgent surgical intervention is justified in up to one-third of cases, whereas two-thirds of them should be treated conservatively. Common causes of acute

scrotal pain in children and adolescents include torsion of the appendix testis, epididymitis, and testicular torsion. Scrotal strangulation by external pressure is an extremely rare cause. We report a case of scrotal only strangulation in a child and review the available literature.

## **CASE PRESENTATION**

### ***Chief complaints***

Bilateral scrotal redness, pain, swelling, and tenderness

### ***History of present illness***

An 11-year-old child with intellectual disability<sup>3</sup> was brought to the ED by his parents because of a 5-day history of pain, bilateral scrotal redness, swelling, and tenderness. The child refused to cooperate, and a physical examination was impossible, beyond looking at the scrotum (Figure 1).

A scrotal Doppler ultrasound was performed, demonstrating normal size and symmetrical testicles with homogeneous echogenicity, bilateral hydrocele, and increased scrotal skin thickness (Figure 2). The child was discharged from the hospital with a diagnosis of idiopathic scrotal edema. His scrotal pain and swelling worsened under treatment with non-steroidal anti-inflammatory drugs, Mebendazole, and antihistamine. After 3 days he revisited the ED, where he refused to undergo a physical examination. The parents agreed to sedate him, and finally a physical examination was carried out using Midazolam. Scrotal strangulation by nylon zip-tie was found (Figure 3).

The zip-tie was removed using regular scissors, relieving the pain in a few minutes. The scrotal swelling reduced in the following 10 days, and the incision underwent secondary healing in the following month. Psychological evaluation and subsequent assistance by a psychologist and social worker were given to the patient and his parents.

### *History of past illness*

None

### *Personal and family history*

A child with intellectual disability

### *Physical examination*

Bilateral scrotal redness, swelling, and tenderness. Scrotal strangulation by nylon zip-tie was found.

### *Laboratory examinations*

None

### *Imaging examinations*

A scrotal Doppler ultrasound was performed, demonstrating normal size and symmetrical testicles with homogeneous echogenicity, bilateral hydrocele, and increased scrotal skin thickness (Figure 2)

### **FINAL DIAGNOSIS**

Scrotal strangulation

### **TREATMENT**

The zip-tie was removed using regular scissors, relieving the pain in a few minutes.

### **OUTCOME AND FOLLOW-UP**

The scrotal swelling reduced in the following 10 days, and the incision underwent secondary healing in the following month.

### **DISCUSSION**

A systematic literature search was performed in PubMed and the Cochrane Library databases up to December 2021. The search key terms included "scrotal entrapment", "scrotal strangulation", "penoscrotal strangulation", "genital incarceration", and "scrotal incarceration". Inclusion criteria was a diagnosis of scrotal or penoscrotal strangulation. The search yielded 232 articles. Excluded were "penile only strangulation" and "incarcerated scrotal hernias" cases. References in the included papers were checked for relevant cases, and any germane paper found was reviewed in the present study. All demographic and clinical data were recorded.

The key terms retrieved 17 relevant papers from 1994 to 2020 that reported on 19 cases: 16 cases of penoscrotal strangulation and three of scrotal strangulation, including the present case (Supplementary Table).

The median patient age was 46 years (IQR 55, 34), and the current case is the first report of pediatric scrotal strangulation in the literature. The median time to presentation was 2 days (IQR 1, 3), and 16 (84%) patients did not pose a diagnostic challenge and were diagnosed at the first clinical examination. The other three patients were diagnosed by repeated physical examinations, or by CT and open surgery. The most common constricting device was metallic ring (74%). Mental illness or drug addiction were present in 5/19 (26.5%) patients and of these, 4/5 (80%) presented with more severe clinical course or worse outcomes.

Scrotal strangulation is a surgical emergency and an extremely rare etiology of acute scrotum. The rarity is verified in the present study, since only 18 cases of penoscrotal or scrotal strangulation in adults were found in the literature. The current case is the first reported in children.

Patients often present with local pain, swelling, paresthesia, and urinary symptoms <sup>[1]</sup>. In most cases, medical history was the most useful element in making an accurate diagnosis. Depending on the duration of incarceration, there can also be ulceration and necrosis of the skin, more frequently associated with use of sharp plastic rather than smooth metal constricting devices. Severe complications such as sepsis or penile

amputation and bilateral orchiectomy were reported in three cases, and one of them was fatal [2].

In the present case of an 11-year old boy with limited medical history and poor cooperation, a scrotal entrapment by nylon zip-tie was diagnosed 8 days after the onset of symptoms. The normal appearance of the uninvolved penis and the scrotal swelling obscured the zip-tie, challenging the diagnosis. According to the literature, delay in diagnosis and treatment (including the need for various imaging tests, examination under anesthesia, or surgical exploration) are more frequent in patients with mental illness or drug addiction, causing severe long-term consequences [2-4].

In adults, a wide variety of strangulating objects have been described. In most reported cases, the constrictive devices were used intentionally by the patient, mainly for sexual pleasure. Penile strangulations in children are well reported, with accidental hair-tie strangulation as the most common mechanism [5], although some authors question the rate of accidental cases [6]. Scrotal entrapment is unlikely to occur by accident. Child abuse, violence by peers and siblings, and attention-seeking behavior are all optional causes. Therefore, any penoscrotal or scrotal strangulation in children requires an in-depth investigation.

## **CONCLUSION**

Due to its rarity, scrotal strangulation can be a diagnostic challenge. Skin ulceration and edema may well indicate the presence of a strangulation object. High index of suspicion and proper physical examination, especially in patients with a mental disability or a behavioral disorder, are key to early diagnosis and treatment.

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