

Adult Acute Scrotal Edema - When Radiologists Can Help to Avoid Unnecessary Surgical Treatment

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ABSTRACT

Acute idiopathic scrotal edema is a commonly painless self-limiting condition causing scrotal swelling, and is usually seen in children. In some cases, this condition is difficult to differentiate it from other causes of acute scrotum. In the right clinical scenario, ultrasonography has been used to confirm the diagnosis. We describe the ultrasound and CT findings of acute idiopathic scrotal edema in a 72-year-old male with coexistent involvement of the inferior abdominal wall.

CASE REPORT

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A 72-year-old male presented to the emergency department with a 12-hour history of acute onset of painless swelling of the scrotum, penis and inguinal areas with associated erythema.

He denied any new lower urinary symptoms or previous trauma to his genitalia (because he was working in the farm during the sudden onset of the complaints, it could not be initially discarded the hypothesis of insect bites).

Pertinent past medical history comprised benign prostatic hypertrophy. The patient did not refer similar episodes in the past and was not aware of any allergies. The patient denied recent sexual activity and at the time of presentation was not receiving any medication relevant for the case. He also denied diabetes mellitus.

His family history was unremarkable, including for history of testicular tumours.

Physical examination showed a discomfort in the scrotum and penis shaft, which were diffusely erythematous, with apparent extension to the inguinal region. There was no urethral discharge and the perineal/anal examinations were

unremarkable. No rashes or skin lesions were noticed on physical examination. The vital signs were within normal limits.

The laboratory findings revealed normal white blood cell count and erythrocyte sedimentation rate. Renal function was also normal. Urine microscopy and urine cultures showed no abnormalities.

Ultrasonography was performed, which showed a thickened scrotal wall (maximum thickness anterior to the testicles of 2cm) with presence of high vascularity in the Doppler ultrasound (figure 1). The testes and epididymis demonstrated normal appearance both in grayscale and colour Doppler ultrasound imaging (figure 2). Ultrasound also showed small bilateral hydroceles.

Despite the clinical benign scenario, the surgical team was still concerned with a scenario of early Fournier gangrene. Due to the age of the patient, a Computed Tomography (CT) was performed. A pelvic CT with intravenous contrast confirmed a thickened scrotal wall and exuberant scrotal edema, with extension to the perineum and inferior abdominal wall (figure 3). It also showed the bilateral hydrocele and inguinal lymph nodes with avidity for contrast, with maximum long-axis diameter of 1.5 cm and hilar fat preserved in all lymph nodes.

There were no internal masses in the scrotum and no fascial thickening or air was detected or abnormalities seen in the pelvic cavity (figure 4).

The patient was managed conservatively with closed observation and restricted activity, and was treated empirically with non-steroidal anti-inflammatory drugs and anti-histamines. All symptoms completely resolved in 72 hours. Follow-up after 2 months in an outpatient consultation showed normal genitalia.

DISCUSSION

Etiology & Demographics:

Acute idiopathic scrotal edema (AISE) is a benign, self-limited condition first described in 1956, by Qvist [1].

Acute scrotal disorders are not a rare occurrence, and AISE is often a diagnosis of exclusion, but only correctly identified if clinicians are aware of this entity [2].

AISE is much more common in children than in adults, and may account for 20-30% of all cases of acute scrotum in prepubertal boys. Najmaldin and Burge [3] described AISE as being the commonest cause for acute scrotal swelling in boys younger than 10 years old. On the other hand, adult case reports in the literature are scarce, particularly in elder patients, as was the case described in our report [4–8].

The exact aetiology of AISE is not fully and well understood, but there is a tendency to consider it as an allergic phenomenon, a variant of angioneurotic edema, although a triggering allergen was not identified [2,7]. Supporting this theory, some studies describe concomitant presence of eosinophilia [9,10] and association with other allergic conditions, such as asthma and dermatitis [11].

An infective aetiology has been proposed by Nicholas [12], where 13% of patients in their small series was shown to be positive for β -hemolytic streptococci in their scrotal fluid culture. The microorganism presumably enters the host system via the anal canal, and the propagation is facilitated by preceding microtrauma in the scrotum. No other strong evidence supports this aetiology. Other postulated possible causes include trauma, insect bites and urinary extravasation [8].

A recent report suggests that acute Epstein–Barr virus infection can be the cause of AISE [13]. Further studies are needed in a larger scale, especially in adult patients.

Recurrence of AISE episodes up to three times have been reported in up to 21% of patients [6,8].

Clinical & Imaging Findings

AISE is characterized by sudden onset of edema and erythema in the scrotal wall, and pain is not characteristic [14].

An important aspect of this disease concerns the similar manifestations to other acute scrotal conditions that need surgically correction, but unlike these tends to resolve in 3-6 days without surgery. So, correct diagnosis is essential to avoid unnecessary invasive approaches.

The initial clinical assessment is crucial, in order to obtain precise information regarding the initial symptoms, especially concerning the presence or absence or sudden pain and duration of symptoms.

The scrotum display features typical of an acute inflammatory process. Patients typically complain of discomfort in the scrotal wall and show acute swelling and erythema that is often bilateral, with unilaterality usually representing an intermediate stage [2,12].

The edema usually extends to the anterior abdominal wall, perineal and inguinal regions, a phenomenon that can occur in around half of the cases [8,14–16]. Edema in the inguinal region is the most common location for coexisting edema [3].

The edema in the scrotum is restricted to the skin and dartos fascia, whereas the deep layers and the internal structures of the testicles are normal.

Ultrasonography (US) is essential and decisive to confirm the diagnosis and also to exclude other causes of acute scrotum [17]. Characteristic findings include marked thickening of the scrotal wall, with a heterogeneous striated appearance [18,19].

The mean wall thickness in the scrotal wall have been described as 11.2mm [20]. In this 2009 study, the authors also report that the scrotal wall was easily compressible, although this can be a subjective outcome. They also showed inguinal lymph nodes enlarged and hypervascular, with a mean long-axis diameter of 10.4mm (all adenopathy demonstrated preserved hilar fat). US also depicts the normal parenchymal structure of the testicles and epididymis, without increased vascularity in Doppler imaging. Geiger has described the “Fountain Sign” as a highly suggestive sign of the diagnosis, which represents the increased vascularity to the scrotal wall from branches of the deep external and internal pudendal arteries, seen in a transverse ultrasound view [21]. Another US feature include mild reactive hydrocele [14,20].

Computed tomography (CT) may also help to exclude pelvic causes of scrotal edema in uncertain cases. There is no available literature on CT features due to radiation concerns in the habitual patients of young age. However, in adult cases, like our patient, this issue is not so critical. Because Fournier’s gangrene should always be excluded in adult patients with acute scrotal disorder, early diagnosis is vital [22].

Magnetic resonance imaging appearance has already been described, with similar findings of marked edema without evidence of deeper extension to the pelvis [5].

Treatment & Prognosis

Usually, with conservative therapy, the edema resolves within 24 to 72 hours after the onset of the symptoms. Although no randomized control studies exist in adults, there is no evidence in the literature that explicitly supports the use of antibiotics, steroids or antihistamines as a treatment option [6,10].

Differential Diagnoses

Differential diagnosis involves other causes of acute scrotal edema including Fournier gangrene, epididymo-orchitis, testicular torsion, torsion of the testicular appendages, incarcerated hernia, trauma, cellulitis and systemic causes of scrotal edema [7]. Generally, these conditions can be ruled out through clinical, physical examination, laboratory data and radiological findings. Concerning radiologic findings, diagnosis is especially facilitated by US, that allows direct visualization of anatomical features and can be used to exclude other causes of acute scrotum. The most distinct characteristic of AISE is marked scrotal wall edema, that is confined to the skin and dartos fascia, whereas the deeper layers and all internal structures are completely normal. Also, there is increased vascularity and easy compressibility of the scrotal wall. Additional US and Doppler findings include mildly reactive hydrocele and increased peritesticular blood flow.

Unlike epididymo-orchitis the testis and epididymis are normal in appearance and do not show increased vascularity.

The normal vascularity of testis can distinguish it from testicular torsion, that show twisting of the spermatic cord, increased in size of the testis and epididymis and altered blood flow.

Although hydrocele and scrotal wall thickening frequently accompany torsion of a testicular appendage, an extratesticular mass with spherical shape with mixed echogenicity and an enlarged epididymal head corresponding to twisted appendage are not seen in AISE, differentiating this condition from appendage torsion.

Scrotal wall cellulitis is much more common in diabetic, obese or immunocompromised patients [23]. Patients commonly have a fever and elevated white count. Scrotal cellulitis may result in rapid accumulation of fluid between Colle's and Buck's fascia which may compromise blood flow to the scrotal contents and penis [24,25]. It is clinically significant as it can progress to necrotising fasciitis especially in the immunosuppressed or diabetic patients [26,27].

The presence of edema at sites in addition to the scrotum deserves consideration of systemic causes of edema. These causes are the result of either low plasma oncotic pressures or

high vascular hydrostatic pressure from venous congestion. They include liver failure, congestive cardiac failure, renal failure and nephrotic syndrome.

TEACHING POINT

Acute idiopathic scrotal edema is a benign, self-limited condition of unknown aetiology, characterized by ultrasound findings of edematous thickening and increased vascularity of the scrotal wall, with normal testicles and epididymis. Correct diagnosis in cases of acute scrotal swellings is imperative since it will prevent unnecessary surgery and its associated morbidity.

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FIGURES

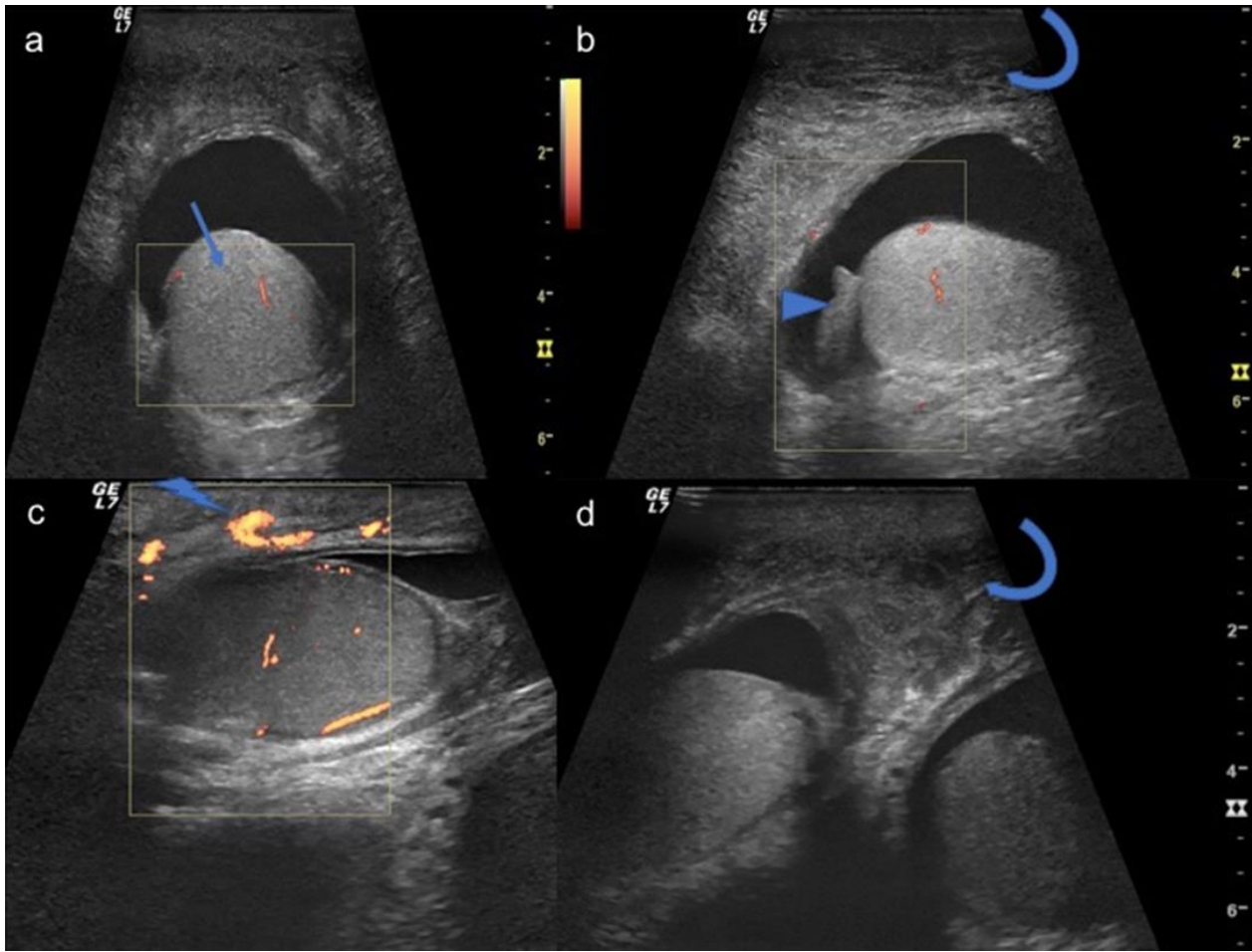


Figure 1: 72-year-old male with diagnosis of Acute idiopathic scrotal edema.

Findings: No increased vascularity in the testicles (arrow in a) and epididymis (arrowhead in b), compared with higher vascularity in the scrotal wall (lightning bolt in c). Note the heterogeneous striated appearance of then scrotal wall (curved arrows in b and d). The author did not depict the ‘fountain sign’ simply because he did not turn on the Doppler button on, in the right image, due to the fact that he was not aware of this condition before this case diagnosis (d).

Technique: Gray scale and colour Doppler ultrasonography of the scrotum (linear transducer, 12MHz).

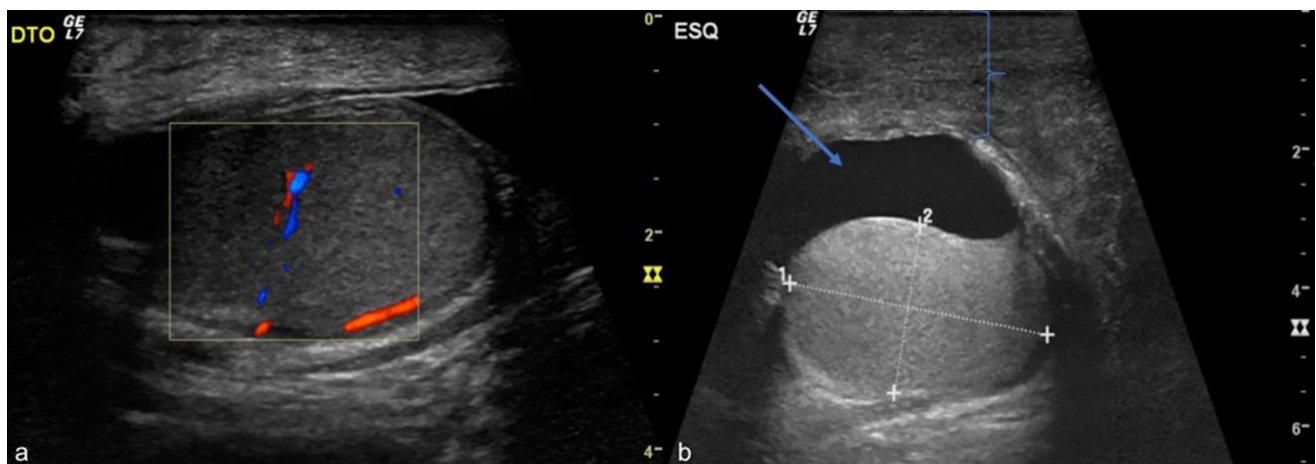


Figure 2: 72-year-old male with diagnosis of Acute idiopathic scrotal edema.

Findings: normal testicular parenchyma on both sides, mild anechoic hydrocele (arrow) and the exuberant edema in the scrotal wall, around 2cm in thickness (bracket).

Technique: Ultrasonography of the right hemiscrotum (a) and left hemiscrotum (b) (linear transducer, 12MHz on gray scale imaging). Colour Doppler imaging (a) and gray scale imaging (b).

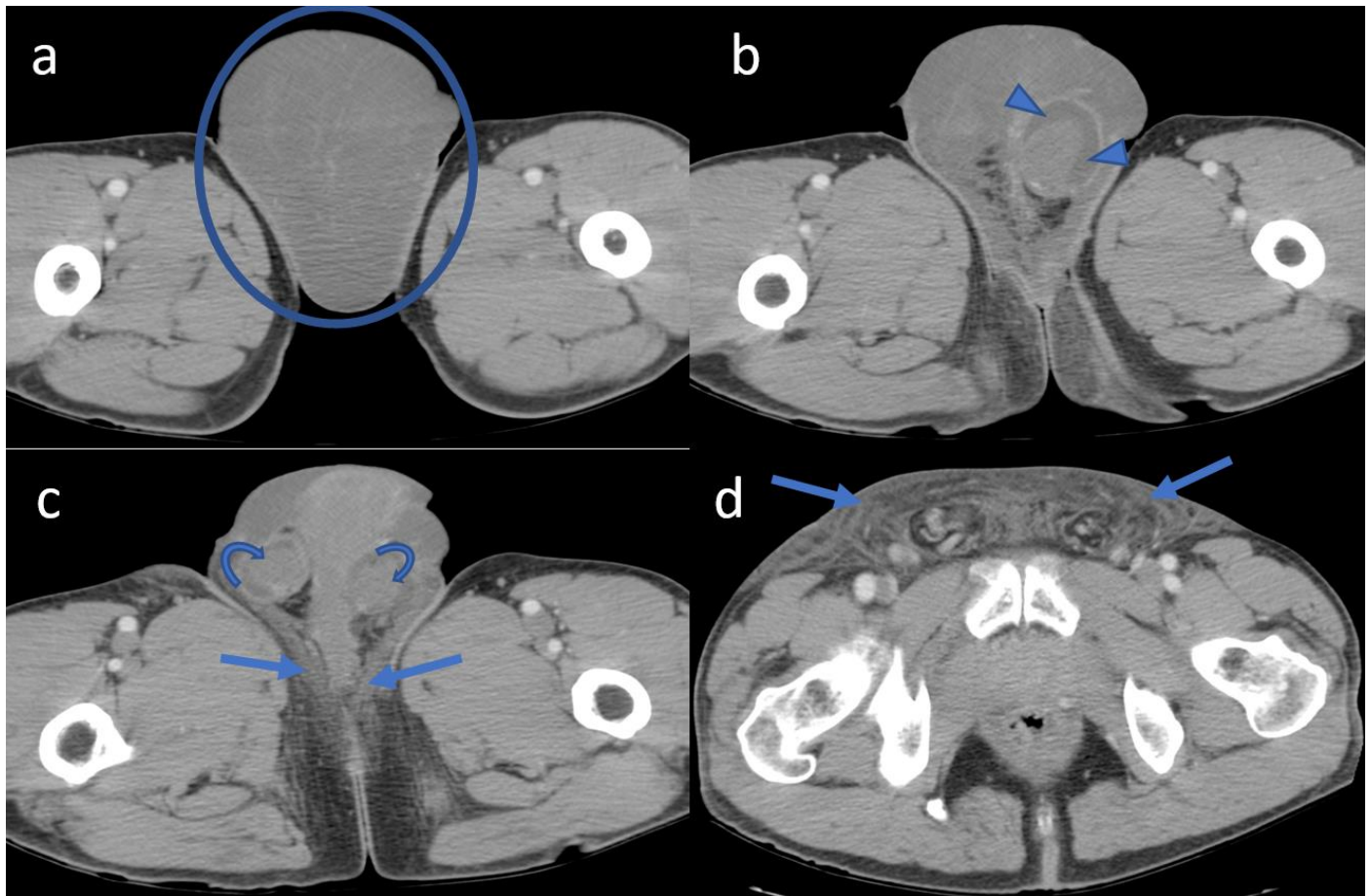


Figure 3: 72-year-old male with diagnosis of Acute idiopathic scrotal edema.

Findings: From caudal to cranial levels (a to d), CT axial images confirmed the edema in the scrotum (a), the mild hydrocele (arrowheads in b). It also showed the normal testicles (curved arrows) and edema extending to the perineum (arrows) (d). An enhanced delimitation of the extension of the edema to the inferior abdominal wall was obtained (d).

Technique: Multislice contrast-enhanced Computed Tomography (CT) scan (220mAs, 120kVp, 5mm slice thickness, 90 mL of 370 mg Iodine/mL contrast medium).



Figure 4 (left): 72-year-old male with diagnosis of Acute idiopathic scrotal edema.

Findings: CT axial image did not show any abnormality in the pelvic cavity, apart from the upper limit of the edema in the abdominal wall (arrow).

Technique: Contrast-enhanced pelvic CT scan (220mAs, 120kVp, 5mm slice thickness, 90 mL of 370 mg Iodine/mL contrast medium).

Etiology	Not fully understood, probably a form of angioneurotic edema
Incidence	Few cases reported in adults
Gender ratio	Only in males
Age predilection	Much more common in children; 20-30% of all cases of acute scrotum in prepubertal boys
Treatment	Conservative
Prognosis	Optimal, symptoms usually resolve in 48-72h
Imaging Findings	Bilateral thickening of the scrotal wall, with a heterogeneous striated appearance. Normal parenchymal structure of the testicles and epididymis, without increased vascularity in Doppler US. Edema usually extends to the anterior abdominal wall, perineal or inguinal regions.

Table 1: Summary table of Acute Idiopathic Scrotal Edema.

	US / Doppler	CT
Acute Idiopathic Scrotal Edema	Echogenic thickening of scrotal wall; increased blood flow to scrotal wall; normal blood flow to the testis	Edema can involve the perineum, abdominal wall and occasionally the penis
Early Fournier gangrene	US may detect fluid and gas within soft tissue	Soft tissue gas; a cause of infection may be apparent (perianal abscess, fistula)
Epididymo-orchitis	Hyperemia of epididymis or testis	Not performed
Testicular torsion	Decreased arterial blood flow	Not performed
Systemic causes of scrotal edema	Normal	Anasarca with dependent edema in sacrum and lower limbs

Table 2: Differential diagnosis table for Acute Idiopathic Scrotal Edema.

ABBREVIATIONS

AISE = Acute idiopathic scrotal edema
CT = Computed Tomography
US = Ultrasonography

KEYWORDS

Acute idiopathic scrotal edema; Scrotal swelling; Acute scrotum; Ultrasonography; Computed Tomography

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