

Ultrasound Imaging of Fournier's Gangrene with Encased Scrotal Pyocele: A Case Report

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ABSTRACT

Fournier's Gangrene (FG), also known as necrotising fasciitis, is a rapidly progressive and potentially fatal disease affecting the perineum, as well as the genital and perianal body surfaces. An encased scrotal pyocele, an uncommon type of purulent collection in the scrotum, can be a risk-facilitating factor for FG, particularly in high-risk patients. We present a patient with a 10-year history of diabetes who presented with progressive scrotal swelling and pain for five days, during which he developed an encased scrotal pyocele that subsequently became complicated by FG. Timely surgical intervention was performed in the form of complete excision of the pyocele sac, accompanied by bilateral orchidectomy, followed by serial debridement until the formation of healthy granulation tissue. This case illustrates the rare progression of an encased scrotal pyocele to FG, supported by clinical findings, ultrasound, intraoperative observations, and post-operative imaging, highlighting the importance of timely multidisciplinary management.

Keywords: Encapsulated scrotal abscess, Necrotising fasciitis, Radiology

CASE REPORT

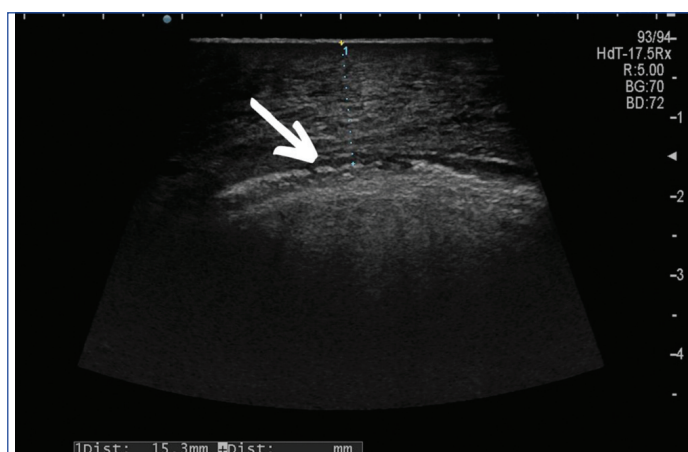
A 52-year-old male presented to the emergency department with complaints of progressive scrotal swelling and pain associated with fever for five days. The patient also had a 10-year history of diabetes, managed with an oral hypoglycaemic agent—metformin 500 mg once a day before a meal. He had experienced scrotal swelling for 3-4 years; however, it had not been evaluated due to the absence of discomfort or any increase in size. Over the past week, the swelling had gradually increased in size, accompanied by a new onset of erythema. He denied any recent trauma or urinary symptoms.

On physical examination, the scrotum was tense, erythematous, and tender, with evidence of fluctuance. Crepitus was noted on palpation of the perineum, raising suspicion of a necrotising infection. The patient was febrile (39.2°C) and tachycardic, with signs of systemic toxicity.

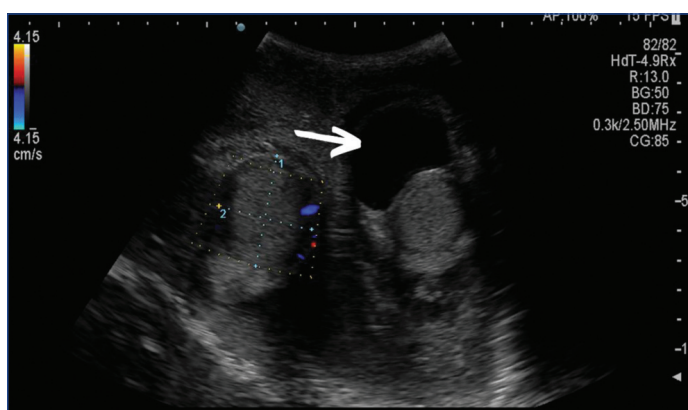
Initial laboratory investigations revealed leukocytosis (WBC: 18,500/mm³), an elevated Erythrocyte Sedimentation Rate (ESR: 70 mm/hr), C-Reactive Protein (CRP: 52 mg/L), and hyperglycaemia (random blood glucose: 320 mg/dL), suggesting an infection and poorly controlled diabetes.

The patient was advised to undergo a scrotal ultrasound. Only air foci were observed inside the scrotal sac when using the conventional superficial ultrasonography probe [Table/Fig-1]. Upon using the abdominal probe, the bilateral testes were found to be normal in size [Table/Fig-2]. A large, well-defined collection with internal debris was seen in the right scrotal sac, with echogenic air foci present [Table/Fig-3,4]. Anechoic fluid was also noted in the left scrotal sac [Table/Fig-2]. A provisional diagnosis of a right-encased pyocele with a left hydrocele and developing FG was made.

The patient was immediately started on empirical broad-spectrum intravenous antibiotics, which included meropenem (1 gm three times a day) and metronidazole (500 mg three times a day) to cover a wide range of gram-positive, gram-negative, and anaerobic organisms. The patient was also placed on a sliding insulin scale. The ultrasound findings suggested FG, necessitating urgent surgical intervention. The patient underwent surgical debridement, which revealed an enlarged, inflamed scrotum. Upon opening, the bilateral scrotal sacs were found to be pus-filled structures. After the drainage of pus, the infected sac was visualised, which was

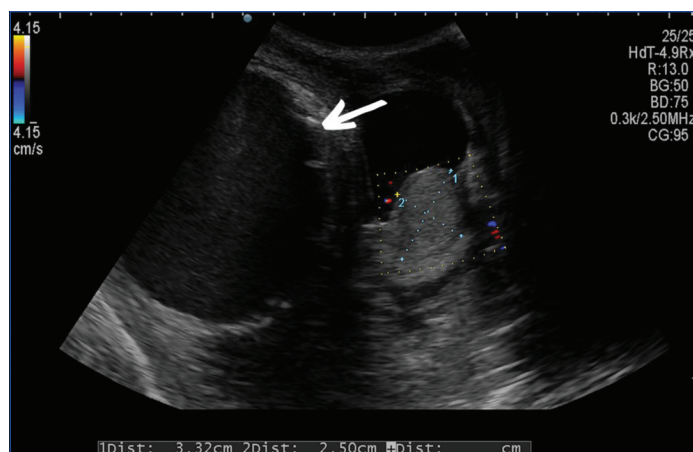


[Table/Fig-1]: Grey scale Brightness mode (B mode) USG image using superficial probe shows the presence of air foci (arrow) in the scrotal sac causing compromised evaluation of underlying structures.

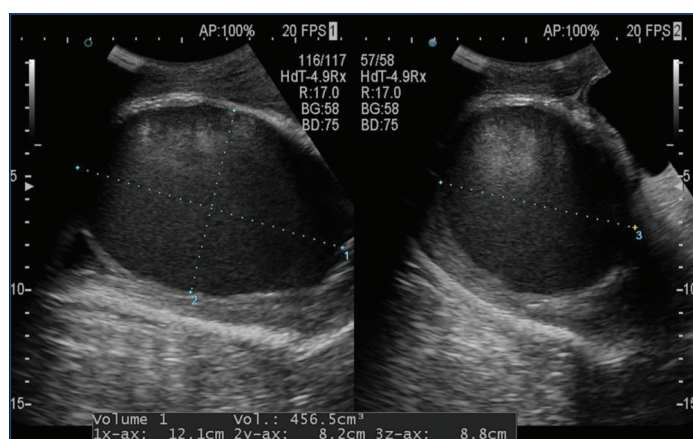


[Table/Fig-2]: Grey scale B mode USG image using abdominal probe visualising bilateral scrotal sacs with thickened wall, bilateral testes, and anechoic fluid (arrow) in the left scrotal sac suggesting hydrocele.

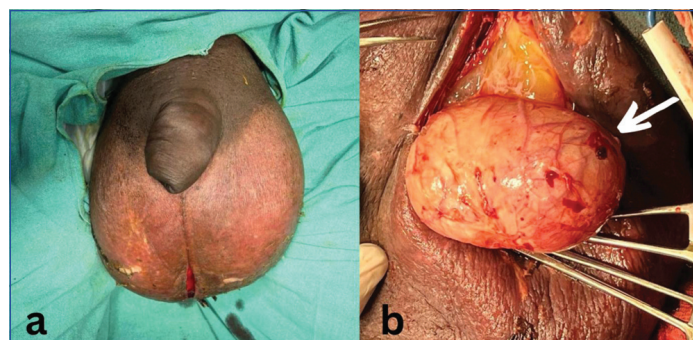
excised entirely along with bilateral orchidectomy [Table/Fig-5]. Postoperatively, the scrotal wall remained viable. Serial debridement was performed until only healthy granulation tissue was left through secondary healing. The scrotal wall was closed, encasing this tissue. The patient remained in the Intensive Care Unit (ICU) for aggressive glucose control and monitoring.



[Table/Fig-3]: B mode USG Doppler image demonstrating a well-defined collection with echogenic debris within and air foci along its walls (arrow), suggesting the possibility of encased pyocele with Fournier's Gangrene (FG). The doppler window in the left scrotal sac shows a lack of vascularity.



[Table/Fig-4]: Grey scale B mode USG image demonstrating the size and volume of the encased collection.



[Table/Fig-5]: a) Intraoperative image of the scrotum showing an enlarged, inflamed scrotum; b) Intraoperative image showing the encased pyocele.

Culture sensitivity results from the debrided tissue and pus collected revealed polymicrobial flora dominated by *Escherichia coli*, leading to a modification of the antibiotic regimen. The culture sensitivity results indicated sensitivity to meropenem, which was continued, while metronidazole was discontinued after completing the five-day course. An endocrinology referral was made for better management of diabetic symptoms and medications.

The patient underwent a series of wound debridements, and the antibiotic regimen was continued for a total of four weeks. Secondary closure was carried out once the patient's condition improved progressively and the wound began to display new, healed granulation tissue [Table/Fig-6]. Four weeks after being admitted, the patient was discharged from the hospital with instructions to follow up regularly in an outpatient setting for wound care and glucose management.

DISCUSSION

FG is described as necrotising fasciitis of the perineal, perianal, and genital areas. The disease evolves rapidly; nonetheless, despite the



[Table/Fig-6]: Postoperative clinical imaging visualising the healthy red-pink granulation tissue surrounded by the scrotal wall.

most vigorous intensive care, its lethality has ranged from 20% to 40% [1]. FG generally occurs in patients with underlying systemic illnesses or immunosuppressed states, particularly diabetes mellitus and alcoholism [2]. Pyoceles are a less common cause of scrotal swelling and often present as secondary infections arising from epididymo-orchitis or testicular trauma. An encapsulated scrotal pyocele may progress to bacterial proliferation and necrosis if left untreated, thereby setting the stage for FG, especially in diabetic or immunocompromised patients [3].

Oral hypoglycaemic agents, particularly SGLT2 inhibitors such as canagliflozin and dapagliflozin, are effective in managing blood glucose levels; however, they may increase the risk of genital infections such as balanoposthitis. If these infections are not promptly treated, they can lead to ascending infections, such as urethritis or prostatitis, and descending infections such as orchitis, epididymitis, or even FG [4,5]. However, in this case, the patient was on metformin, so the above cause of FG was ruled out.

In order to achieve the best possible outcome, FG is considered a surgical emergency, with a prognosis that necessitates immediate medical intervention alongside timely and precise diagnosis. Furthermore, the likelihood of serious complications and even death in those affected is significantly increased when predisposing factors such as diabetes and immunosuppression are present [6].

Encased pyoceles are rare, with limited cases reported. Ultrasound in the case series has shown complex fluid collections, amorphous calcifications, and absent vascularity, indicating pyocele and necrosis [7]. In our case, air foci in the scrotal wall and a well-capsulated collection noted on ultrasound similarly pointed to an encased pyocele with FG. Another case report on idiopathic infant pyocele highlights its rarity in the paediatric population [8]. In that case, the left testicle and epididymis appeared hyperaemic, accompanied by a multi-septated collection that was post-operatively diagnosed as a pyocele. While these reports focus on children, they underscore the overall scarcity of pyoceles, including encased variants, across all ages. Data on adult incidence remain limited, warranting further research.

While uncommon, an encysted scrotal pyocele can potentially lead to significant problems, such as FG, if not treated appropriately and

successfully [9]. To improve overall patient outcomes and survival rates, especially for patients with serious medical conditions, broad-spectrum antibiotics must be administered promptly and appropriately. This is particularly true when combined with a meticulous and accurate surgical debridement procedure [9,10].

Diabetic patients are more susceptible to FG due to immunosuppression, impaired wound healing, defective phagocytosis, and underlying small vessel disease. These factors collectively undermine the body's ability to fight infections, delay tissue repair, and create a hypoxic environment conducive to bacterial proliferation, thereby increasing the risk of severe necrotising infections [2,11,12]. In this instance, it appears that the patient's poorly controlled diabetes played a significant role in the progression of the scrotal pyocoe into a more serious necrotising infection.

The process of identifying microorganisms that produce gas, as depicted clearly through ultrasound, is one of the most prominent defining characteristics of FG. This identification frequently indicates the existence of a polymicrobial illness, which usually comprises a variety of aerobic bacteria that thrive in oxygen-rich environments and anaerobic bacteria that flourish in the absence of oxygen [13].

This case emphasises how crucial it is to identify and treat scrotal infections as soon as possible, particularly in individuals who are at high risk. Thus, a multidisciplinary care strategy involving surgeons, intensivists, radiologists, and urologists becomes imperative in order to achieve the best possible outcomes in these types of cases.

CONCLUSION(S)

A closed scrotal pyocoe can sometimes result in FG, a serious medical condition that requires timely diagnosis and treatment. In a patient with a history of risk factors such as diabetes mellitus, the infection can rapidly progress to fatal outcomes. Consequently, urgent surgical debridement, along with appropriate antimicrobial

therapy, is essential to treat this disease and successfully reduce both morbidity and mortality.

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