CASE REPORT

Fournier's gangrene: diagnosis and management aided by repeated clinical examination and ultrasound

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SUMMARY

We describe a case of a man aged 57 years admitted to our tertiary centre via his general practitioner, presenting with a 1-week history of scrotal pain, testicular swelling and fluctuance. He was initially managed in the community with flucloxacillin for 1 week, but failed to respond to treatment. Clinical history was suggestive of Fournier's gangrene, but initial examination was not conclusive. Repeated examination over the next hour aided diagnosis and helped to track the progression of the condition. The patient was treated with intravenous antibiotics and prepared for theatre. Since there was a delay in getting the patient to theatre, an ultrasound scan was performed to help ascertain the extent of the disease to aid surgical planning. Following successful debridement and skeletalisation of the testicles and ward recovery, he was transferred for plastic reconstruction.

BACKGROUND

Fournier's gangrene is an infection by the mixture of aerobic and anaerobic microorganism that results in necrosis of fascia layers around the perineal skin and genital areas. It is a progressive process and can be fatal if not treated promptly.¹ Early clinical identification and surgical intervention are essential in managing these patients. Fournier's gangrene has a high mortality rate, up to 45% in some case series.^{2,3}

We describe a case of Fournier's gangrene which demonstrates the difficulty in diagnosis when it is not clear and how re-examining the patient is pivotal in gaining a diagnosis. This case also highlights delays in clinical systems where this patient needed theatre but was delayed. We also demonstrate that ultrasound scan cannot only aid diagnosis but can help in demonstrating the urgent need for theatre.

CASE PRESENTATION

We report a man aged 57 years who presented via his general practitioner to our surgical assessment unit with a 1-week history of worsening testicular pain. This started as an abscess located posteriorly in the midline of the scrotum and had gotten larger. His medical history includes metabolic syndrome: obesity, non-insulin-dependent diabetes, hypertension and hypercholesterolaemia, gastro-oesophageal reflux disease and diabetic neuropathy. His general practitioner had started him on a week's course of flucloxacillin.

On examination at 16:35, his vitals were, respiratory rate: 22, oxygen saturations: 96% on air, temperature: 37.1°C, heart rate: 100 and blood pressure: 121/92. His left testicle was grossly swollen but unable to be palpated and crepitus was suspected. The right testicle was non-tender.

INVESTIGATIONS

- ▶ 16:33 Urine dip:
 - Glucose +, Blood ++ and Ketones +++
- ▶ 16:55: Bloods:
 - Haemoglobin: 147 g/L (130–180 g/L)
 - Mean corpuscular volume: 94 fL (80–100 fL)
 - White cell count: $19.4 \times 10^9/L$ ($4\text{--}11 \times 10^9/L$)
 - Neutrophil: $16.5 \times 10^9/L$ ($1.7\text{--}7.5 \times 10^9/L$)
 - Platelets: $228 \times 10^9/L$ ($150\text{--}400 \times 10^9/L$)
 - Sodium: 136 mmol/L (133–146 mmol/L)
 - Potassium: 3.5 mmol/L (3.5–5.3 mmol/L)
 - Urea: 4.6 mmol/L (2.5–7.8 mmol/L)
 - Creatinine: 67 mmol/L (58–110 mmol/L)
 - Albumin 27
 - Alkaline phosphatase: 250 U/L (30–150 U/L)
 - C reactive protein: 304 mg/L (<5 mg/L)
- ▶ 18:25 Arterial blood gas:
 - pH: 7.43 (7.35–7.45)
 - pO₂: 12.2 kPa on air (11.1–14.4 kPa)
 - pCO₂ is 3.0 mmol/L (4.3–6.4 mmol/L)
 - Bicarbonate: 15 mmol/L (21–28 mmol/L)
 - BE: –8.9 mmol/L (–2.0–3.0 mmol/L)
 - Lactate: 1.8 mmol/L (0.5–1.6 mmol/L)
- ▶ 19:30 Ultrasound scan: There is a large volume of gas within the subcutaneous tissues of the right side of the scrotum which extends to the midline. There is also generalised thickening and hyperaemia of the scrotal subcutaneous tissues. Within the base of the scrotum, there is complex and mixed echogenicity material, which appears hyperaemic and contains some locules of gas, this most likely represents infected/necrosed tissue. Good blood flow near the perineum.

DIFFERENTIAL DIAGNOSIS

Fournier's gangrene
 Scrotal abscess
 Epididymo-orchitis
 Testicular torsion

TREATMENT

The patient was re-examined at 16:55. He seemed to be in even greater discomfort, the testicular pain had increased and scrotal crepitus was felt with certainty. The patient was booked for an emergency

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operation to be carried out immediately (National Confidential Enquiry into Patient Outcome and Death Classification of Intervention category one), but due to capacity issues in emergency theatres, there was a delay.⁴ He was administered intravenous clindamycin and meropenem after discussion with microbiology and started on a sliding scale of insulin to stabilise his blood sugar levels.

The patient was re-examined again at 18:25. The pain was still present and crepitus was felt throughout the scrotum. He was catheterised and an ultrasound scan was performed to assess the extent of progression while the emergency theatres were being prepared (figures 1 and 2).

At 21:30 (5 hours and 5 min after initial presentation), the patient had a debridement of scrotal skin and soft tissues. The scrotum was skeletalised and the urethra was preserved. Intraoperative pus and necrotic skin were found in both testicles and the soft tissues around these were sent for microbiological analysis. The testicles were skeletalised and soft tissue debrided to bleeding tissue. The patient was admitted to the intensive care unit directly following the theatre procedure for observation.

OUTCOME AND FOLLOW-UP

The patient was discharged from the intensive care unit two later days to the main urology ward. He did not require a secondary procedure and had an uneventful postoperative course. He was reviewed by the plastic surgical team 10 days later and was transferred to their care for plastic reconstruction.

DISCUSSION

This patient gave a good history for Fournier's gangrene and our report shows the natural progression of this dangerous disease. Initially, the case was not clear-cut and the diagnosis uncertain. However, repeated clinical examinations demonstrated deterioration and which led to the development of crepitus in the scrotum. The presence of crepitus is seen in 54.3% of patients with Fournier's gangrene.⁵ Its absence cannot be used to reassure a clinician and this particular case highlights the need for repeated examinations.

Risk factors associated with Fournier's gangrene include immunosuppressive disorders, increasing age, obesity and diabetes.⁶⁻⁷ Our patient suffered with obesity, non-insulin-

Figure 1 Ultrasound image showing a panoramic view of both testicles with the presence of gas in between them.

Figure 2 Ultrasound image showing the Doppler blood flow present and presence of gas in the soft tissues of the scrotum.

dependent diabetes, hypertension, hypercholesterolaemia and with the history of an infective source in the scrotum, hence the possibility of the development of a Fournier's gangrene could not be ignored.

The diagnosis of Fournier's gangrene is clinical and it is not normal practise to procure any imaging before treatment. In our case, we knew that there would be a delay before operative treatment and took the opportunity to assess the extent of tissue infiltration with an ultrasound system. Published articles report the use of ultrasonography and CT to aid diagnosis and assess the extent of the spread if this is readily accessible.⁸⁻⁹ CT is a highly sensitive and specific in detecting abnormal gas collections which can aid in evaluating the extent of disease.¹⁰ This form of imaging can help determine the depth of surgical debridement. CT in this regard is superior to ultrasonography.

More trainees from critical care specialties are being trained with basic ultrasound skills and these trainees will be covering medical specialties where patients with Fournier's gangrene risk factors tend to reside as inpatients.¹¹ A bedside ultrasound scan can help to aid diagnosis and is minimally invasive.¹² Ultrasound machine use in the emergency department is increasing and can be used for scrotal pain.¹³ This can help fast track patients in trusts where patients need to go urgently for specialty treatment at another hospital.

Some authors feel that positive ultrasonography should be followed by CT for the reasons outlined.¹⁴ This practise is an issue in smaller hospitals which do not have access to urgent CT scanning. This is where the role of ultrasonography becomes more beneficial. Our hospital is a large tertiary centre but our access to CT after 17:00 such as in this case is reduced and would have delayed definitive surgical treatment. This highlights the issue of access to imaging and how the developing trend of trainees having the skill of bedside ultrasonography can aid in the management of a patient such as ours. Figures 1 and 2 demonstrate the presence of gas in the soft tissues. This is not an image regularly seen and demonstrates how quickly gas can form.

Fournier's gangrene requires urgent debridement in the operating theatre. There are multitude of opportunistic organisms that are found to be causative agents of this condition and in most cases, it is more than one.¹⁵ We did not find any data in the literature on how long it would take for the condition to progress requiring a surgical debridement but evidence supports early recognition and debridement.¹⁶

Treatment of our patient was delayed because of capacity issues in our emergency theatre at the time of presentation. A recent systematic review examined the impact of dedicated emergency services including emergency operating theatres and how this can improve clinical outcomes. However, no consensus has been reached on what the ideal model of acute care surgery should be like.¹⁷ In tertiary centres, there is a greater volume of cases and this can lead to delays.¹⁸ In our specific case, we were competing with other specialties such as neurosurgery, general surgery and gynaecology.

Patient's perspective

The whole experience was very difficult. It happened so quickly. I knew something was not right. I was reassured when the doctor kept coming back to examine me. Although I was in pain from my testicle, the jelly scan was tender but not as painful as when I was examined. I felt a lot more positive knowing what the diagnosis was for sure when going to theatre. I am just grateful to the team for being able to treat me before it got a lot worse.

Learning points

- ▶ The absence of crepitus in the scrotum does not rule out a Fournier's gangrene as this is a late sign.
- ▶ In cases, which are not clear, repeated examinations and evaluation can aid diagnosis.
- ▶ Bedside ultrasonography can be used to aid in the diagnosis if it does not delay treatment.
- ▶ CT scanning is superior to ultrasound scanning and can aid preoperative planning but should only be sought if access does not delay treatment.
- ▶ Urgent surgical debridement is required and liaising immediately with theatre regarding this possibility is advised.

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