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Case Report

SARS-COV-2 Positive Patient with Fournier's Gangrene and Multiorgan Complications

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Abstract

Fournier gangrene is a rare type of necrotizing fasciitis of the genital or anorectal region that rapidly progresses towards diffuse tissue necrosis and mortality if untreated. As seen in this case, the disease is difficult to diagnose in its early stages due to a lack of pathognomonic signs that differentiate it from a localized scrotal abscess, cellulitis, pyoderma gangrenosum, and orchitis. These initial findings of Fournier's gangrene make rapid diagnosis difficult, thus we recommend a low threshold for further workup based on exam findings and clinical suspicion. Emergent imaging modalities and cultures can aid in the diagnosis but should not delay surgical debridement and broad-spectrum antibiotics -the gold standard of treatment for Fournier's gangrene. This case also presents possible correlations between SARS-CoV-2 and Fournier's gangrene, but further research must be conducted to delineate clinical course management in patients with SARS-CoV-2 and Fournier's gangrene.

Keywords: COVID-19; SARS-CoV-2; Fournier's gangrene; Necrotizing fasciitis

Introduction

Fournier gangrene is a rare type of necrotizing fasciitis that initially appears similar to cellulitis in the genital or anorectal region, but rapidly progresses towards diffuse tissue necrosis. The disease is difficult to diagnose in its early stages due to a lack of pathognomonic signs that would differentiate it from a localized abscess or infection. The initial presentation may only show signs of erythema or tenderness, although it can progress to septicemia within one hour after spreading up the abdominal and thoracic wall. Pain that is out of proportion to the presenting lesion may be the only differentiating factors that may lead to a Fournier gangrene diagnosis.

The rate of fascial destruction has been recorded reaching as high as 2-3 cm/hr [1]. The causative agents are typically bacterial flora native to the perineal and anal regions. Infection can occur as a result of superficial breakage of the skin, but the progression to Fournier gangrene is highly correlated to comorbidities such as diabetes mellitus, immunosuppressive conditions, as well as obesity and chronic alcohol usage. The extent to which diabetic patients control their diabetes has been correlated to the progression of severity in a concurrent case of Fournier gangrene [2]. The incidence of Fournier gangrene in the U.S according to national studies is 1.6 cases per 100,000 adult males [3]. Although the disease can also affect females, it is currently difficult to establish a comparable cohort to analyze incidence compared to males. With the recent COVID- 19 pandemic, some immunocompromised patients infected with coronavirus-2 (SARS-CoV-2) have also developed Fournier gangrene while undergoing critical care [4,5]. However, current

recorded cases of patients with coincident Fournier gangrene and SARS-CoV-2 infection are exceedingly rare.

Case Report

A thirty-year-old obese male (BMI 60) with asthma presented to the Emergency Department (ED) with a two-day history of bilateral testicular swelling and an associated constant "painful pressure" that was rated 6/10 on the pain scale. The patient's vital signs were BP 135/75, pulse 92, temperature 97.7 ∞F (36.5 ∞C), respiratory rate 29, weight 172 kg (397 lb 3.1 oz), SpO2 98%. The patient stated that swelling had become so diffuse that it disrupted the flow of his urine such that urine "just dribbled out" of the scrotum. The day prior to his presentation in the ED the patient had a phone appointment with his primary care physician regarding these symptoms and was prescribed ciprofloxacin; however, it is important to note that due to the patient's panniculus, he could not directly visualize the extent of his scrotal swelling. He reported that his symptoms had progressed despite two initial doses. Past medical history is significant for a hospital stay one month ago for acute renal failure secondary to pyelonephritis. The patient's recovery was complicated by an infection secondary to his Foley catheter. The infection was treated, and the catheter was removed in the ED four days prior to this visit, where no scrotal swelling or erythema was noted at the time.

On physical exam the patient was found to have a temperature of 97.7°F, bilateral diffusely edematous scrotum encompassing the penis and mild scrotal tenderness with purulent discharge draining from the urethral meatus, and a well demarcated erythematous rash on the inner thighs and lower abdomen. There were no bullae, pustules, ecchymosis, or ulcers noted. There was also no crepitus and no tenderness out of proportion to the exam, which would suggest scrotal cellulitis. His laboratory test results revealed elevated WBC count (25.2 x 109/L) with bandemia, hyponatremia (117 mEq/L), and elevated creatine levels (3.4 mg/dL). An ultrasound of the bladder demonstrated an increased post void residual volume. An urgent CT of the abdomen and pelvis without contrast was ordered and revealed a right testicular abscess, soft tissue swelling, subcutaneous gas, bilateral hydronephrosis, and gas in the bladder. The gas within the soft tissue tracking towards the perineum suggested Fournier's gangrene.

Hyponatremia was corrected with IV 0.9% saline (corrected by 6-12 mEq/L over 24 hours). Blood cultures were obtained, and the patient was started on broad spectrum antibiotics (Imipenem 1g IV q6h and Vancomycin 15 mg/kg IV q6h and Clindamycin 600 mg IV q8h). Insertion of a foley catheter took several attempts but was eventually successful and relieved 3.9L of urine. Prior to admission and as preoperative precautions, the patient underwent SARS-CoV-2 testing and was found to be positive. A follow up chest X-ray revealed a right sided pleural effusion.

The patient was transferred via ambulance to a facility equipped for urologic surgery where he underwent emergent surgical incision and debridement of the abscesses in the right scrotal/suprapubic/perineal regions. Post-surgical debridement cultures revealed heavy growth of Peptostreptococcus magnus and Enterococcus faecalis. The patient was treated with 3 weeks of antibiotics with Unasyn (Ampicillin and Sulbactam). The patient had complications with intubation and extubation, likely secondary to the underlying lung pathology-his SARS-CoV-2 infection and the pleural effusion causing problems during intubation and extubation. The patient became septic during his hospital stay but was stabilized and discharged with a vacuum-assisted wound closure after four days.

Discussion

With an overall mortality rate between 20-40%, as high as 70-80% if the patient presents with sepsis or lower than 10% if treated promptly [6], it is imperative to be able to recognize Fournier's gangrene and start surgical debridement and broad-spectrum antibiotics as quickly as possible - the gold standard treatment for Fournier's gangrene [7]. Any delay increases the likelihood of mortality as seen in one study where they found that a delay in surgical debridement by 24 hours was found to have a nine-fold increase in mortality [8]. Despite being relatively rare, it is crucial to consider and evaluate for Fournier's gangrene in any patient presenting with perineal cutaneous infection, due to its ability to progress to septicemia within hours.

The most common clinical manifestations of Fournier's gangrene are erythema (without sharp margins); edema; severe pain (out of proportion to exam findings); fever; skin bullae, necrosis, or ecchymosis; and crepitus [9]. These symptoms are nonspecific as cellulitis, localized scrotal abscesses, pyoderma gangrenosum, and orchitis present similarly, but one key distinguishing symptom is usually pain that is out of proportion to exam findings and its rapid progression of clinical manifestations [9]. It is interesting that in this case, the patient was not in any excruciating pain; he rated the pain as 6/10 and described the pain as a constant "pressure". This patient also did not have fever, crepitus, skin bullae or ecchymosis, which are common symptoms of Fournier's gangrene and a way to differentiate between other diagnoses. The patient only had diffuse edema, well-demarcated erythema (of the scrotum and penis extending to the inguinal folds bilaterally and up onto the abdomen), and purulent discharge draining from the urethral meatus. The diagnosis of Fournier's gangrene usually relies on physical exam findings and clinical manifestations; however, this patient's presenting symptoms and physical examination actually steered away from Fournier's gangrene and made cellulitis a high likelihood, particularly because of cellulitis's association with well-demarcated erythema.

The misdiagnosis of Fournier's Gangrene as scrotal cellulitis has been reported in the past [10], and this case accentuates the difficulty of correctly diagnosing Fournier's Gangrene purely from clinical manifestations. Therefore, the use of imaging can aid in correctly evaluating the differential diagnoses. With this particular

patient, a CT abdomen and pelvic scan showed subcutaneous gas in the scrotal region, and gas in the soft tissues surrounding the testicles, which suggested Fournier's gangrene (Figures 1,2). Scrotal contents and testicular involvement can be seen with ultrasound; however, as seen with in this case, its findings and benefits may be limited due to its ability to only superficially visualize contents. We recommend the use of emergent imaging studies if Fournier's Gangrene is suspected; however, such imaging studies should not delay surgical treatment.

Figure 1: Computed tomography scan without intravenous contrast of the abdomen and pelvis. Coronal view.

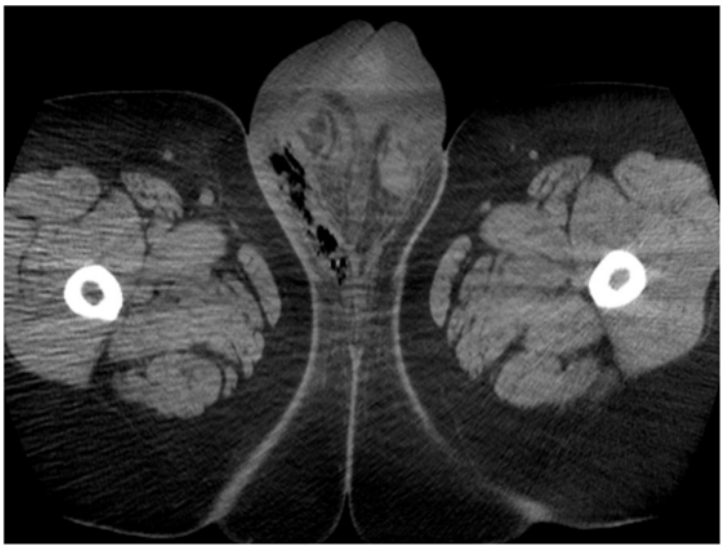

Figure 2: Computed tomography scan without intravenous contrast of the abdomen and pelvis. Axial view.

The diagnosis for Fournier's gangrene can be confirmed with routine and anaerobic culturing. Since Fournier's gangrene is a polymicrobial type I necrotizing infection, it is typically caused by anaerobic - most commonly Bacteroides, Clostridium, or Peptostreptococcus - isolated in combination with Enterobacteriaceae - i,e., Escherichia coli, Enterobacter, and Klebsiella - and one or more facultative anaerobic streptococci. Obligate aerobes (such as Pseudomonas aeruginosa) and fungi (such as Candida) can also be involved, but it is rare [9]. In this patient, it was confirmed through cultures that Peptosretpococcus magnus, and Enterococcus faecalis were the causative agents of this patient's Fournier's gangrene. Although cultures can be definitive for diagnosing Fournier's gangrene, the treatment and surgical operation should not be delayed while waiting for the cultures as it may take days for culture results, which can increase the chances of mortality.

The management of this patient was further complicated by the concurrent underlying lung pathology. The patient was found to be SARS-CoV-2 positive and had bibasilar patchy opacities and perioperative mild right apical pneumothorax that required thoravent placement. Lung complications may have been induced by the body's reaction to Fournier's gangrene or this patient's underlying lung pathology along with may have increased his susceptibility to Fournier's gangrene. There have been reported correlations between a history of past upper respiratory tract infection and Fournier's gangrene [11]. Secondary bacterial infections and cutaneous manifestations of SARS-CoV-2, though not initially well documented, have become an increasing area of concern as both the infection and treatment of SARS-CoV-2 may compromise immune function and increase risk of infections [12,13]. This case is unique as Fournier's gangrene has not yet been routinely noted as a complication of SARS-CoV-2, though as these necrotizing skin infections are rare and the correlation warrants further investigation and meta-analysis [14].

Conclusion

With Fournier's gangrene's high mortality rate, it is imperative to quickly diagnose and start treatment as soon as possible. However, as seen with this case, the diagnosis can be complicated by the lack of the common clinical manifestations of Fournier's gangrene or even showing symptoms that may mimic another condition [10]. With this case report, the goal is to present an unusual case of Fournier's gangrene to emphasize the importance of having Fournier's Gangrene as a differential diagnosis and to further aid with future identification, management, and treatment of patients with Fournier's gangrene. This case report also brought to light the future areas of research, such as clinical course management in patients with Fournier gangrene with simultaneous SARS-CoV-2 infection and multi-organ complications [15-16].

Acknowledgement

None.

Conflict of Interest

No conflict of interest.

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