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Case Report

Fournier Gangrene and Retroperitoneal Abscess Secondary to Perforated Appendicitis: A Case Report

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Abstract: Fournier's gangrene and retroperitoneal abscess are rare complications of late presentation of perforated acute appendicitis. This case report discusses the case of a 46-year-old male patient who presented with 5 days history of progressive abdominal pain and was admitted to our department as a case of complicated perforated acute appendicitis followed by retroperitoneal abscess formation and Fournier's Gangrene few days later. The patient had a hospital stay of 53 days, during which he underwent diagnostic laparoscopy and appendectomy, computerized tomography guided percutaneous abscess incision and drainage for the retroperitoneal abscess and multiple scrotal debridement surgeries for the Fournier's gangrene, in addition to the drain care and intravenous antibiotic course he received. Diabetes mellitus is one of the most common risk factors of Fournier's gangrene, which was newly detected in our patient six months earlier. Fournier's gangrene is ten times more common in males than in females, especially in their third and sixth decade of life. It is life-threatening and has unfavorable prognosis that indicates early detection and aggressive surgical and medical intervention with a multidisciplinary approach, including fluid resuscitation, immediate initiation of broad-spectrum antibiotics and aggressive debridement of the necrotic tissue; in addition to the respiratory and hemodynamic support to improve the prognosis and overall outcome and to maximize the chances of survival.

Keywords: Fournier's Gangrene, Retroperitoneal Abscess, Acute Appendicitis

1. Introduction

Acute appendicitis is one of the most common abdominal emergencies worldwide that can achieve a good prognosis with early detection and management [1]. Fournier's gangrene is a rare but aggressive form of external genitalia or perineal extensive fulminant infection, which can occur as a complication of delayed presentation and subsequent delayed management of perforated appendicitis [2, 3]. It is a specific form of necrotizing fasciitis that is accompanied by thrombosis in the feeding arteries of the external genitalia or perianal region leading to necrosis of fascia layers and formation of gangrenous tissue [4, 5]. It harbours a fatal course that requires prompt recognition, diagnosis and appropriate timely treatment by surgical debridement combined with broad-spectrum antibiotic therapy along with extensive supportive therapy, including fluids, hemodynamic and nutritional support [6, 7]. The following case represents a male patient with late presentation of acute appendicitis; thus it was perforated and few days later he developed retroperitoneal abscess and Fournier's gangrene. This is a chronology report of the clinical and radiological findings of our patient, in addition to the management plan throughout his hospital stay.

2. Case Presentation

A 46-year-old male, non-smoker and non-alcohol consumer, recently diagnosed with diabetes mellitus, presented to the casualty with five days history of progressive severe right iliac fossa pain that was preceded by left iliac fossa pain associated with nausea and vomiting. The patient denied any

history of fever, urinary or gastrointestinal symptoms. He had no history of previous surgeries and was not taking any medication. No known drug or food allergy was reported as well.

On arrival to the hospital, the patient was hemodynamically stable, Temperature of 36.9°C, Heart Rate of 84 bpm, and Blood Pressure of 132/80 mmHg. Abdominal examination revealed right iliac fossa tenderness. His blood investigations were within normal range (Table 1). His random blood sugar was found to be 16.4 mmol/l and his urine test detected ketone level of 2.5. No significant pathology was found on his chest x-ray [Figure 1(a)] while his plain abdominal x-ray showed distended bowel full of gases [Figure 1(b)]. From the clinical findings and investigations, the patient was given a provisional diagnosis of acute abdomen. He was admitted to the hospital, kept nil per os (NPO), on intravenous fluids (IVF) and painkillers. The medical physician attended the patient regarding his hyperglycemia, and advised to keep the patient on insulin sliding scale and to assess his diabetic status by measuring his glycated hemoglobin (HbA1c). Computed tomography (CT) abdomen and pelvis revealed perforated complicated acute appendicitis with multiple free air bubbles in the right iliac fossa and right retroperitoneal region associated with smudging of the surrounding fat with multiple stranding as well as multiple small right iliac fossa and inguinal region lymph nodes [Figure 2(a)&(b)]. The patient was consented for diagnostic laparoscopy (DL) with a possibility of Laparotomy. DL revealed an acute inflamed appendix, perforation at the base with abscess cavity at the right paracolic gutter. The appendix was removed laparoscopically, abdominal washout was performed with normal saline and a pelvic drain was placed. The patient was kept NPO, on IVFs, painkillers and antibiotics. Care of drain was taken.

Table 1. *Blood Results of the Patient on Day of Admission.*

Laboratory Test	Patient	Reference Range	Unit
Complete Blood Count			
WBC	9	3.7-11	10^9/L
RBC	5.29	4.3-6	10^{12}/L
Haemoglobin	13.5	13-17	g/dL
Coagulation Profile			
PT	17.4 H	11.5-16	seconds
APTT	30.2	23.1-38.7	seconds
INR	1.27		
Renal Function Test			
Urea	7.8 H	2.5-6.4	mmol/L
Uric Acid	212	150-450	umol/L
Creatinine	80	74-115	umol/L
Albumin	23 L	35-48	g/L
Bicarbonate	23.2	22-30	mmol/L
Liver Function Test			
T. Bilirubin	27	3-20	umol/L
D. Bilirubin	9.8	0-5	umol/L

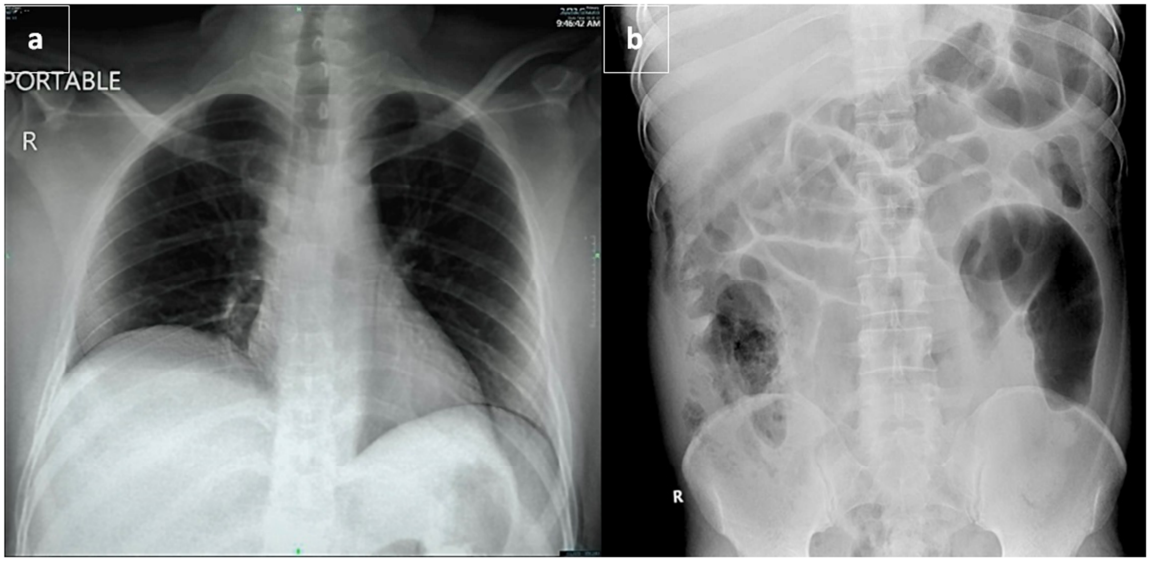

Figure 1. *Portable x-rays on day of admission: (a) Chest x-ray (CXR) with unremarkable findings. (b) Abdominal X-ray (AXR) showing distended bowel full of gases.*

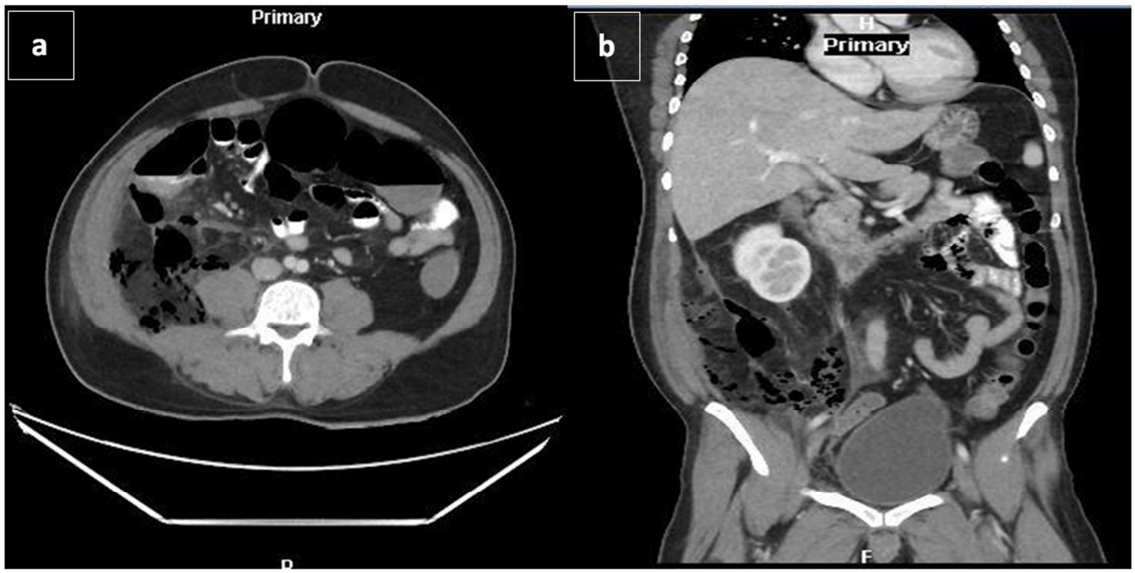

Figure 2. *Abdominopelvic Computed Tomography (CT) with contrast on day of admission, (a) axial and (b) transverse plane, showing perforated complicated acute appendicitis with multiple free air bubbles in the right iliac fossa and right retroperitoneal region associated with smudging of the surrounding fat with multiple stranding as well as multiple small right iliac fossa and inguinal region lymph nodes.*

Post operatively day 1 (POD#1), the patient was vitally stable and only complaining of mild abdominal pain. Abdominal examination revealed a distended abdomen with mild tenderness at incisional sites. The drain output and content were recorded in a chart (table 2[a]). The patient was kept under close observation and a nasogastric tube was inserted, due to a paralytic ileus. A drain fluid culture was sent, showing E. coli moderate growth, antibiotics were modulated accordingly.

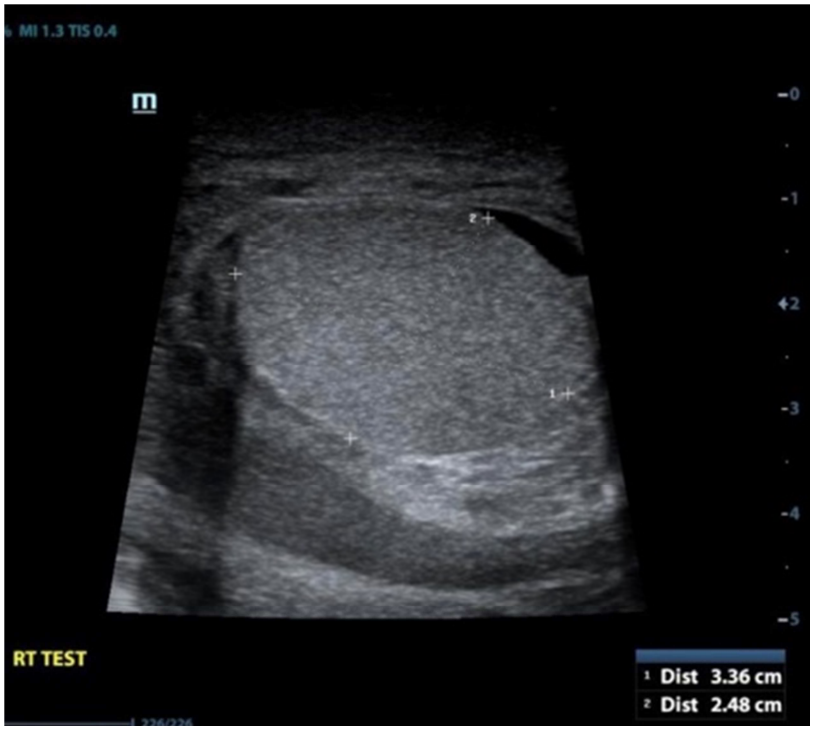

Figure 3. *Scrotal ultrasound showing right peri-testicular and scrotal collection with hyperechoic foci of air, marked subcutaneous and interstitial edema of the scrotal sac, increased echogenicity of the soft tissues around the right-side spermatic cord extension of the inflammatory process, and bilateral minimal hydrocele.*

Two days later, (POD#3), the patient complained of scrotal pain, exhibited persistent tachycardia, 110 bpm, his temperature spiked to 38°C. Scrotal swelling was identified with darker skin discoloration, giving an impression of

Fournier's Gangrene. Urgent scrotal ultrasound demonstrated right peri-testicular and scrotal collection with hyperechoic foci of air, marked subcutaneous and interstitial edema of the scrotal sac, and increased echogenicity of the soft tissues around the right-side spermatic cord extension of the inflammatory process [Figure 3], in addition to bilateral minimal hydrocele were noted A surgical local extensive debridement of Fournier's gangrene was performed under general anesthesia and suprapubic catheter (SPC) was fixed. The patient was kept on intravenous antibiotics with daily dressing. Wound swab culture showed no growth but positive to pus cells.

Post laparoscopy and post debridement the patient was hemodynamically stable. Abdominopelvic CT with contrast was repeated on post laparoscopy day #6 and post debridement day#3, revealing a progressive coarse regarding the complicated inflammatory process as well as of the multiple variable sizes ill-defined fluid collections [Figure 4(a)&(b)]. Subsequently, next day, he developed leukocytosis (WBC=17×10^9/l), and his procalcitonin (PCT) was 2.47, high as well. Antibiotics were changed based on the culture sensitivities.

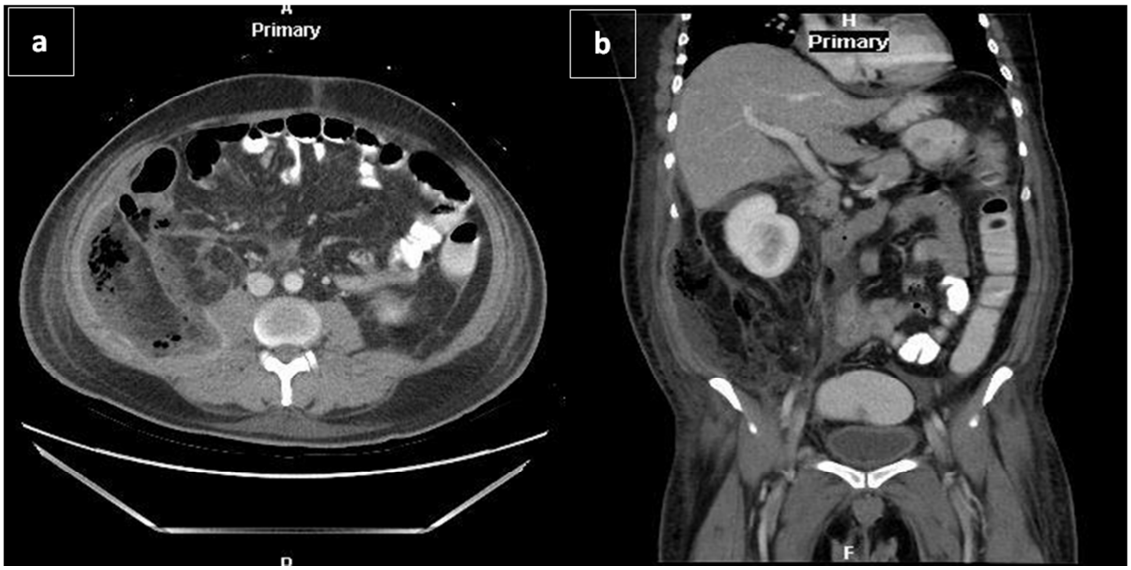

Figure 4. *Abdominopelvic Computed Tomography (CT) with contrast of post-laparoscopy day#6, (a) axial and (b) transverse plane, revealing a progressive coarse of the complicated inflammatory process as well as of the multiple variable sizes ill-defined fluid collections.*

Table 2. *Drain Charts (a=Postoperative Drain, b=Percutaneous Drain #I, c=Percutaneous Drain #II).*

POD	Amount	Content
Postoperative Drain [a] [post laproscopy-POD3]		
1	Nil	_____
2	10 ml	Serous
3	Nil	_____
Percutaneous Drain #I[b] [POD8-POD24]		
1	70 ml	Serous
2	5 ml	Pus
3	150 ml	Pus
4	30 ml	Pus
5	35 ml	Pus
6	10 ml	Pus
Percutaneous Drain #II[c] [POD26-POD41]		
1	20 ml	Pus
2	35 ml	Pus
3	130 ml	Pus
4	Nil	_____
5	85 ml	Pus
6	105 ml	Pus
7	100 ml	Pus
8	75 ml	Pus
9	55 ml	Pus
10	105 ml	Pus
11	Nil	_____
12	55 ml	Pus
13	15 ml	Pus
14	70 ml	Pus
15	50 ml	Pus
16	Nil	_____
17	Nil	_____
18	100 ml	Yellowish
19	40 ml	Yellow pus
20	20 ml	Pus
21	Nil	_____
22	15 ml	Pus
23	Nil	_____
24	30 ml	Pus
25	70 ml	Yellowish
26	5 ml	Yellowish
27	10 ml	Pus
28	Nil	_____

A day later (Post laparoscopy day#8 and post debridement day#5), CT guided percutaneous abscess incision and drainage was performed by intervention radiologist for the retroperitoneal and lumbar collections and a precautious drain (PCD) was inserted. Daily PCD output and color were recorded (table 2[b]). The drain culture showed a growth of pus

cells. Next day, his WBC were slightly improving around 15.7×109/l. Scrotal debridement was repeated and performed twice.

Three days later, antibiotics were changed according to the culture sensitivity. The patient was kept on high fiber high protein diet and diabetic diet, with dressing changed frequently, and continued receiving antibiotics. The following day, a second PCD (Pigtail) in the right lumber region was successfully inserted as the previous PCD was accidentally pulled by the patient (table 2[c]). CT abdomen and pelvis was repeated on post laparoscopy day#14, showing a mild regressive course regarding the previously mentioned walled off collections, with decrease in air content [Figure 5(a)&(b)]. Tissue culture eventually grew Escherichia coli and Fusobacterium proliferation. A wound swab culture was sent and the patient was isolated as his wound swab culture result came back showing a high growth of Pseudomonas Aeruginosa.

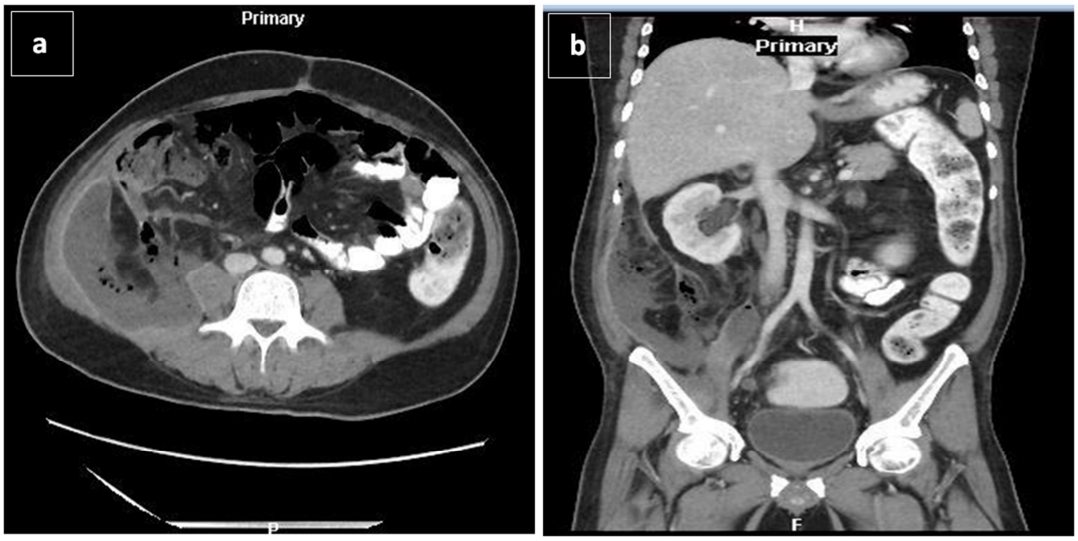

Figure 5. *Abdominopelvic Computed Tomography (CT) with contrast of post; laparoscopy day#14, (a) axial and (b) transverse plane, showing a mild regressive course regarding the previously mentioned walled off collections, with decrease in air content.*

Post laparoscopy day#30 and post debridement day#20, the patient was vitally stable and a primary skin closure was done by plastic surgeons. Post laparoscopy day#41, CT abdomen and pelvis showed regressive course with few residual changes [Figure 6(a)&(b)]. Post laparoscopy day#51 (53 days of hospital stay), the patient clinically and biochemically improved. His PCD and SPC were removed. Both urology and plastic surgery have cleared the patient from their sides and will be following his scrotal wound in OPD. The medical physician placed a discharge plan regarding his diabetes mellitus, after which the patient was discharged.

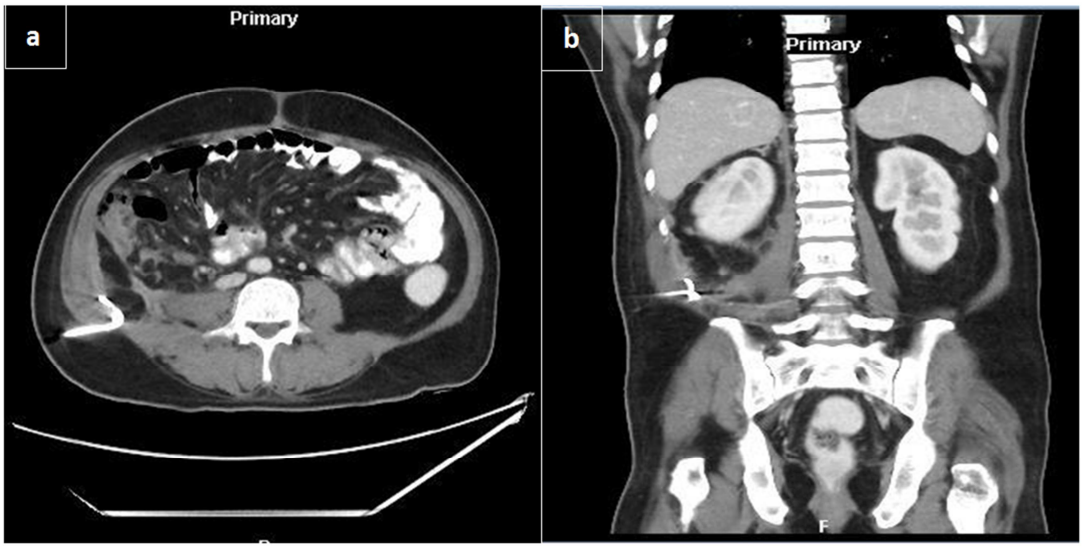

Figure 6. *Abdominopelvic Computed Tomography (CT) with oral, rectal and IV contrast, (a) axial and (b) transverse plane, showing regressive course with few residual changes of post laparoscopy day#41.*

3. Discussion

Acute appendicitis is a common surgical emergency that with early diagnosis and management can achieve a low morbidity and mortality rate [8]. Delayed management of perforated appendicitis can lead to serious complications including localized retroperitoneal abscess or pelvic cavity abscess or can lead to Fournier's gangrene [4, 6]. Retroperitoneal abscess with its clinical manifestations and diagnostic difficulty is considered a life-threatening complication due to its rapid spread to the perinephric space, the psoas muscle, the lateral abdominal pain and the lower extremities [1]. Fournier's gangrene is a necrotizing infection that is mainly caused by anaerobes such as Group A Streptococcus, Staphylococcus aureus and Clostridium perfringens. Diabetes mellitus is one of the most common risk factors of Fournier's gangrene [9]. In addition, hypertension, low immunity, smoking and alcoholism, which are other predisposing factors associated with it. Fournier's gangrene can affect both genders, but ten times higher in males than females, especially in their third and sixth decade of life [4, 10]. Although it is a clinical diagnosis, laboratory and imaging studies are supportive diagnostic adjunct to the clinical picture, the latter is useful to evaluate the extent of the disease [9, 11] Fournier's gangrene has an unfavorable prognosis and potentially fatal consequences with a high mortality rate of up to 67%, which was reported to be lower with improved outcome in patients with early recognition intervention [10, 12]. Hence, fluid resuscitation, urgent surgical debridement and immediate broad-spectrum antibiotic administration are the core principles of the management of Fournier's gangrene [13, 14]. Rapid intervention is indicated to prevent the consequences of this disease including extensive necrotizing fasciitis, sepsis, disseminated intravascular coagulation, respiratory failure, kidney failure and multi-organ failure, which are the most causes of death in Fournier's gangrene [15].

Our patient is a diabetic male in his fifth decade who had clinical presentation of acute appendicitis. He presented to casualty five days after the initiation of his symptoms. The delayed presentation lead to the progression of his condition. CT findings indicated a diagnosis of complicated perforated appendicitis, associated with retroperitoneal abscess. The patient was admitted to the hospital immediately, and after full optimization of his general condition he underwent diagnostic laparoscopy and appendectomy with drain insertion, and kept NPO on IVF, painkillers and antibiotics. Postoperatively, the patient was doing well and vitally stable, but three days later, he developed scrotal pain and swelling and a diagnosis of Fournier's gangrene was reached. Intravenous antibiotics were administered and he underwent three extensive surgical debridement. The patient made a full functional recovery and was discharged 53 days after admission.

4. Conclusion

Fournier's gangrene and retroperitoneal abscess are rare life-threatening complications that could occur in patients with delayed presentation of complicated perforated acute appendicitis, especially those with immunocompromised factors (diabetes mellitus, smokers and alcohol consumers). This case highlights the crucial importance of clinical suspicion, early detection with a high index of suspicion and prompt management with a multidisciplinary approach, including fluid resuscitation, immediate initiation of broad-spectrum antibiotics and aggressive debridement of the necrotic tissue as well as the respiratory and hemodynamic support to maximize the chances of good outcome and survival.

Patient Consent

A written consent for reporting this case and using the lab results and radiological figures was obtained and signed by the patient. Case report publication was approved by the ethical committee of researches, Kuwait Ministry of Health.

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