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Case Report

Pre and retroperitoneal necrotizing fasciitis after COVID-19 infection: A case report [☆]

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ABSTRACT

Necrotizing fasciitis is a serious infection that originates in the subcutaneous tissues. We present a case of 52 years old male patient who developed preperitoneal and retroperitoneal necrotizing fasciitis 2 weeks after the start of Coronavirus-19 infection. Preoperative abdominal computed tomography with intravenous and oral contrast revealed pre and retroperitoneal spread of air loculi with turbid fluid patches within necrotic tissues. After surgical excision of the lesion, histopathological and microbiological examinations of the samples revealed necrotizing fasciitis. This is the first report of preperitoneal and retroperitoneal necrotizing fasciitis after Coronavirus-19 infection in 52 years old male with no history of trauma or immunocompromised condition. Coronavirus-19 infection may increase the liability of patients to develop overwhelming infection and it may also delay the patient presentation causing serious health-related emergencies. The findings of necrotizing fasciitis on clinical grounds or imaging studies can help in diagnosis as well as the surgical intervention and appropriate antibiotics can highly impact the prognosis and survival of the patient.

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Introduction

Necrotizing fasciitis is a rapidly progressing soft tissue necrosis associated with significant morbidity and mortality. The rapid identification of necrotizing fasciitis is essential in reducing the associated mortality [1]. Multiple microbial organisms were isolated from necrotizing fasciitis as streptococci, bacteroides, and gram-negative enterobacteriaceae [2]. The underlying coronavirus-19 (COVID-19) infection may

increase the liability of developing necrotizing fasciitis and has impacts on its management [3,4].

The clinical presentation of necrotizing fasciitis shows a wide range of signs and symptoms, hence early diagnosis and treatment is a major challenge [5]. Several triggering factors of necrotizing fasciitis were reported as minor trauma, burn, insect bite, and immunosuppression states as leukemia, diabetes, human immunodeficiency virus infection, alcohol abuse, liver cirrhosis, and Addison's disease [1].

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Fig. 1 – Abdominal x-ray shows bilateral subcutaneous air in the flanks (white arrows).

Management of necrotizing fasciitis with the concomitant COVID-19 infection may be challenging. Covid-19 is associated with lymphopenia which may increase the risk of infection [6].

We report a unique case of a patient who developed pre and retroperitoneal necrotizing fasciitis 2 weeks after COVID-19 infection. Given the pervasive nature of the current COVID-19 pandemic, understanding potential polymicrobial superinfection as a difficulty and how to manage it has never been more critical in the medical discourse.

Case description

A 52-year-old male patient presented to the emergency room of Mansoura University Hospital with a high fever, rigors, and chills. He had abdominal distension and severe diffuse abdominal pain for 1 week getting worse over the last 3 days. He was COVID-19 positive 2 weeks before the emergency visit confirmed by polymerase chain reaction (PCR) test. He was neither smoker nor alcoholic. He denied any history of trauma, diabetes mellitus, or hypertension.

On examination, the patient appeared ill and toxic with clammy skin. The patient had tachycardia with a heart rate of 117 beats/min and hypotension. He had a diffuse cutaneous erythematous patch on his abdomen more on the right flank. The abdomen was rigid and tender to touch.

His laboratory investigations showed lymphopenia with normal white blood cell count and high C-reactive protein. Electrolytes, liver function tests and renal parameters were normal. Abdominal ultrasound was performed and revealed minimal pelvic free fluid. Abdominal x-ray showed bilateral subcutaneous air in the flanks (Fig. 1).

Preoperative abdominal computed tomography (CT) with intravenous (I.V.) and oral contrast was done and revealed pre and retroperitoneal sheets of air loculi with fluid patches within necrotic tissues. (Fig. 2)

The patient was prepared for emergency surgery and underwent extensive debridement of the entire necrotic tissue including the pre and retroperitoneal spaces. Intraoperative 360 ml of pus was drained. Lavage was given followed by bilateral drain placement in the left pelvis and subhepatic region.

Postoperatively, the patient was moved to the intensive care unit and set on the ventilator for seven days. Abdominal CT with I.V. and oral contrast was done on the 9th postoperative day and revealed a minimal residual necrotic tissue seen at bilateral preperitoneal space (between the anterior abdominal wall and parietal peritoneum) at lumbar region in comparison to the preoperative study. (Fig. 3).

Histopathological examination of the excised tissue showed extensive acute suppurative inflammation, areas of hemorrhage, and tissue necrosis. Samples sent for microbiology showed heavy growths of *Klebsiella*, *Escherichia coli*, and some anaerobic species. The patient was started on appropriate antibiotics according to the result of the microbiological analysis.

On the 10th postoperative day, the patient respiratory condition and oxygen level were stable, so he was transferred to a normal inpatient room. The patient continued I.V. antibiotics for about 2 weeks then shifted to the oral form for another 10 days. He turned negative for the Covid-19 PCR test after 26 days since he came to our hospital. He was managed to restore his nutrition in a short time. Then, he was discharged from our hospital and was able to come back to his life.

Discussion

Necrotizing fasciitis is a massive infection of the soft tissue associated with edema and necrosis that may progress to cutaneous gangrene [1]. We are presenting a case which developed pre and retroperitoneal necrotizing fasciitis after COVID-19 infection in which there is no clear history of trauma or identifiable source of infection.

The diagnosis of necrotizing fasciitis in our case was confirmed during the operation with subsequent necrotic tissue debridement and their histopathological analysis. The patient was treated successfully showing marked improvement without complications.

While most of the reported cases of retroperitoneal and prepotential necrotizing fasciitis in the literature had an identifiable source of infection, our case did not show any source of infection [5,7,8]. Sugimoto et al reported a case of a 58-year old hypertensive man who developed extensive retroperitoneal necrotizing fasciitis resembling Fournier's gangrene from which *Streptococcus anginosus* was isolated [8]. Ikram et al presented a case of necrotizing fasciitis in the retroperitoneal space secondary to a perineal infection, which showed heavy growths of *Corynebacterium* and mixed anaerobic species [9]. The main organisms detected in our case were *Klebsiella*, *Escherichia coli*, and mixed anaerobic species making it a polymicrobial type of necrotizing fasciitis. Various

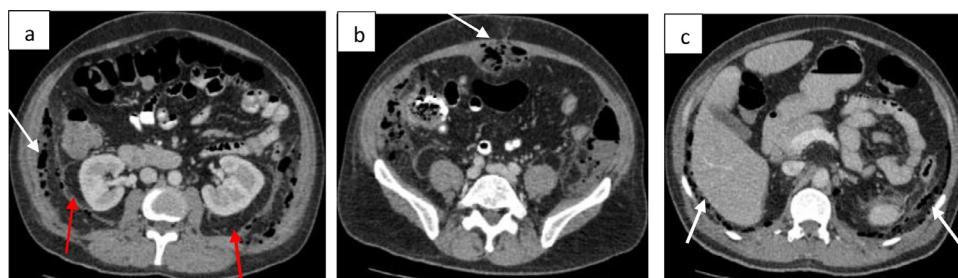


Fig. 2 – Axial cuts of preoperative abdominal CT with I.V. and oral contrast.

They reveal areas of air loculi with fluid patches impressive of necrotic areas with smudging of surrounding fat plane seen at preperitoneal space between the lateral abdominal wall and parietal peritoneum at right lumbar region (white arrow) (Fig. 2A). In addition, retroperitoneal bilateral smudging of perirenal fat is noted (red arrows) (Fig. 2A). Preperitoneal area of necrosis is also noted between the rectus sheath and the anterior parietal peritoneum below the umbilical region (white arrow) (Fig. 2b). Preperitoneal longitudinal area of necrosis is noted at subhepatic and subsplenic regions (white arrows) (Fig. 2C).



Fig. 3 – Postoperative Abdominal CT with I.V. and oral contrast showed minimal residue of necrotic tissue seen at preperitoneal space bilaterally in the lumbar region (white arrows).

clinical findings of the pre and retroperitoneal necrotizing fasciitis were reported as abdominal pain, fever, features of peritonitis, skin erythema and crepitus [7].

While most of the reported cases of necrotizing fasciitis were detected in immunocompromised patients as human immunodeficiency virus, diabetes mellitus, and chronic renal failure or other immunocompromised states, our patient

doesn't have a history of immunosuppression condition [5,7,8].

Searching the literature showed no previously published similar cases of preperitoneal or retroperitoneal necrotizing fasciitis after COVID-19 infection. The association between necrotizing fasciitis and COVID-19 infection has not been well clarified in the literature however some authors assumed that the lymphopenia associated with COVID-19 infection may predispose the patient to develop necrotizing fasciitis and enhance the secondary bacterial superinfection [3,4,10].

Abdominal necrotizing fasciitis is one of the critical causes of acute abdomen that should be considered especially if the patient has signs of peritonitis, skin color changes, or systemic manifestations of infection [1]. The presence of subcutaneous gas on the plain radiograph combined with the patient clinical data are suggestive of necrotizing fasciitis. Abdominal CT scan is the best modality of radiographic investigations to diagnose the development, progress, and spread of early necrotizing fasciitis that is highly fatal if not surgically managed [11].

The health care problems associated with COVID-19 infection may result in delay in patient's presentation causing serious health related emergencies that may require more radical surgical as well as medical intervention.

In the fact that the management of necrotizing fasciitis is a quiet challenge, targeted surgical intervention, and nonsurgical treatment can improve the outcomes of patients with such infection. As shown in our case the timely diagnosis, operative procedures, and the postoperative management, can lead to a surprising recovery of a patient brought in with a lethal spread of infection. Therefore, healthcare systems must communicate with the public to handle all medical emergencies promptly.

Patient consent

Written informed consent for publication was obtained from the patient.

REFERENCES

- [1] Hakkarainen TW, Kopari NM, Pham TN, Evans HL. Necrotizing soft tissue infections: review and current concepts in treatment, systems of care, and outcomes. *Curr Probl Surg* 2014;51:344–62.
- [2] Elliott D, Kufera JA, Myers RA. The microbiology of necrotizing soft tissue infections. *Am J Surg* 2000;179:361–6.
- [3] Gheisari M, Baghani M, Ganji R, Forouzanfar MM. Huge carbuncle leading to necrotizing fasciitis in the COVID-19 pandemic era. *Clin Case Rep*. 2021;9:1583–6 © 2021 The Authors. *Clinical Case Reports* published by John Wiley & Sons Ltd..
- [4] Kamagate N, DeVito R. Necrotizing soft tissue infection of the breast during COVID-19 pandemic. *Case Rep Surg* 2020;2020:8876475.
- [5] Woodburn KR, Ramsay G, Gillespie G, Miller DF. Retroperitoneal necrotizing fasciitis. *Br J Surg* 1992;79:342–4.
- [6] Rawson TM, Moore LSP, Zhu N, Ranganathan N, Skolimowska K, Gilchrist M, et al. Bacterial and fungal coinfection in individuals with coronavirus: a rapid review to support COVID-19 antimicrobial prescribing. *Clin Infect Dis* 2020;71:2459–68.
- [7] Giri S, Kandel BP, Kansakar PB, Vaidya P. Retroperitoneal necrotizing fasciitis presenting with peritonism in a 33-year-old Nepalese man: a case report. *J Med Case Rep* 2012;6:53.
- [8] Sugimoto M, Matsuura K, Takayama H, Kayo M, Ie T. Extended retroperitoneal necrotizing fasciitis with genital involvement, resembling fournier gangrene. *Surg Infect (Larchmt)* 2010;11:463–7.
- [9] Ikram S, Satyapal D, Kaur G, Dabra A. Case of retroperitoneal necrotising fasciitis: a rare and deadly spread. *BMJ Case Rep* 2019;12.
- [10] Chen X, Liao B, Cheng L, Peng X, Xu X, Li Y, et al. The microbial coinfection in COVID-19. *Appl Microbiol Biotechnol* 2020;104:7777–85.
- [11] Amaranathan A, Sahoo AK, Barathi D, Shankar G, Sistla SC. Retroperitoneal necrotizing fasciitis masquerading as perianal abscess - rare and perilous. *Cureus* 2017;9:e982.