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Case Report

Retroperitoneal Necrotizing Soft Tissue Infection due to Intra-Abdominal and Retroperitoneal Abscesses-A Case Report

Edoardo GP Frezza[1*], Madona Boulos[2], Robert Debek[3]

[1]Trinity School of Medicine, Warner Robins, GA, USA

[2]American University of the Caribbean School of Medicine, Miramar, FL, USA

[3]General Surgery, Ascension St. Agnes Hospital, Baltimore, MD, USA

***Corresponding author**: Edoardo G.P Frezza, Trinity School of Medicine Warner Robins, Georgia, USA

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Abstract

Necrotizing soft tissue infections, which can also be termed as necrotizing fasciitis; are a set of infections that result in rapid tissue necrosis, acute sepsis, and potential death. Cancer, chronic liver disease, diabetes, and renal failure are all risk factors for necrotizing fasciitis as these pathologies render a person immunocompromised [1]. In the following case report, a 66-year-old female patient status post total hip arthroplasty presented to the ED with right lower quadrant pain, fever, non-bloody emesis, and watery diarrhea. The patient was taken emergently to the OR after CT of the abdomen and pelvis identified a large retroperitoneal abscess with air tracking to the mediastinum. One week later, the patient improved with IV antibiotics and was able to be discharged home. Necrotizing fasciitis is a rapidly progressing pathology with high mortality ratings, yet there are only 2 other reports on intra-abdominal abscesses causing retroperitoneal necrotizing fasciitis. Here, we provide another case of this rare process. Correct and early recognition of NF is highly crucial in its management yet remains a challenge due to its wide range of symptom presentation.

Keywords: Retroperitoneal Necrotizing Fasciitis; Intra-Abdominal Abscess; Retroperitoneal Abscess; Soft Tissue Infection.

Introduction

Necrotizing Fasciitis (NF) is an uncommon and potentially life-threatening bacterial infection leading to rapid necrosis of fat, muscle connective, and subcutaneous tissues. Retroperitoneal necrotizing soft tissue infections are a highly rare subgroup of this pathology. Most NF infections present as infected incisions or wounds to the extremities, or more rarely - produced by abscesses [2,3]. Yet, there are limited cases describing how an intra-abdominal abscess leads to NF. At the time of writing this case report, there are only 2 known cases of retroperitoneal abscess leading to necrotizing fasciitis as a complication [4,5]. In both cases, the patient initially presented with mild symptoms but eventually developed a more serious hospital stay. Here we provide another case of an intra-abdominal abscess causing retroperitoneal NF. We will go into some details about the disease and stress the importance of early recognition.

NF can be categorized into four different types based on microbiological findings. Type I is classified as the polymicrobial type and accounts for 70-90% of all necrotizing fasciitis cases. This type is usually caused by obligate and facultative pathogens and is prevalent in individuals with co-morbidities such as diabetes mellitus or renal failure.

Type II is classified as the mono-microbial type and is mainly caused by Group A beta-hemolytic Streptococcus or Staphylococcus Aureus. Of these pathogens, S. Aureus infections are more difficult to manage because it is the responsible microbe of the

methicillin-resistant S. Aureus - which represents 10-30% of all necrotizing Fasciitis cases [6]. NF cases that are caused by S. Aureus typically occur after small incisions or wounds to the limbs, are typically observed in patients without comorbidities, and are highly correlated with heavy NSAID use. Our patient had a wound culture showing moderate growth of E. coli and E. faecalis.

Type III necrotizing fasciitis infections are all also classified as mono-microbial; as they are caused by Gram-negative bacteria and Clostridium species. Clostridium infections are typically produced by crush injuries or by surgical wounds during obstetric and intestinal procedures. Common symptoms of Clostridium caused NF infections include hemorrhagic blisters, gas gangrene, purpuric necrosis, and typically present as a more rapidly spreading infection.

The last category of necrotizing fasciitis infections is classified as type IV and is mainly caused by Candida spp. and Zygomycetes. These fungi result in aggressive and extensive infections, especially in immunocompromised individuals [6].

The uncommon nature of retroperitoneal necrotizing soft tissue infections adds to the already high incidence of their misdiagnosis, resulting in the delay of their management and an even poorer prognosis. An example of this is discussed in a case report, where a 50-year old male patient expired despite undergoing extensive debridement of bilateral necrotic retroperitoneum [7]. The patient reportedly experienced abdominal and bilateral flank pain, diarrhea, right-sided flank swelling, and other tell-tale signs of necrotizing fasciitis for six days before correctly getting diagnosed. Though the patient was immediately operated post diagnosis, he unfortunately passed away due to respiratory failure secondary to diaphragmatic paralysis secondary to extensive retroperitoneal necrotizing soft tissue infection.

This case signifies the importance of early diagnosis of necrotizing soft tissue infections in effort to decrease the mortality rate associated with these infections.

Patient Presentation

A 66-year-old female with a past medical history of hyperlipidemia, status post left total hip arthroplasty a month prior presented to the local ED with right lower quadrant pain for seven days. She was having episodes of fever, non-bloody and nonbilious emesis, and watery-brown diarrhea. She was not able to ingest anything either. She was sent to the emergency department from her primary care office after being instructed by her physician to go to the hospital for electrolyte imbalances. Computed tomography of the abdomen and pelvis was obtained because of generalized weakness and abdominal pain.

Surgery was consulted for intra- and retroperitoneal abscesses near the right kidney and pelvis, extending from retroperitoneum to mediastinum with pockets of gas (Figures 1-4).

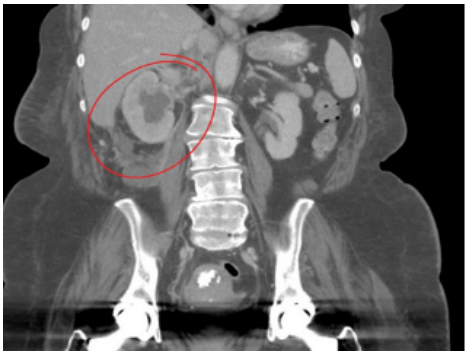

Figure 1: Coronal CT of the abdomen and pelvis identifying an abscess with surrounding gas around the right kidney.

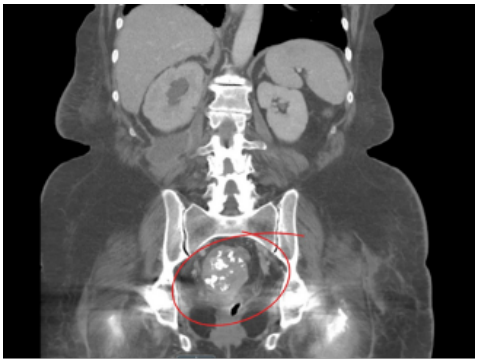

Figure 2: Coronal CT of the abdomen and pelvis identifying a 4.8 x 5.3 x 6.0 cm abscess within the pelvis with pockets of gas

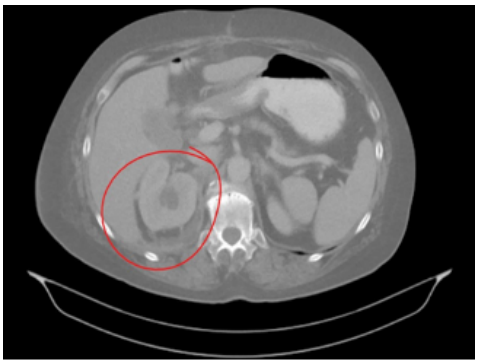

Figure 3: A transverse CT of the abdomen identifying the abscess of the right kidney. Note the pockets of gas separating the structure of the kidney from the retroperitoneal muscle wall.

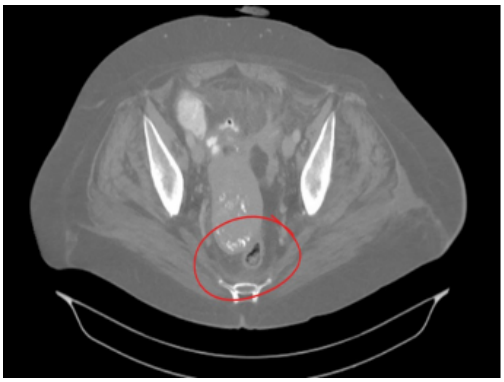

Figure 4: A transverse CT of the pelvis with an abscess with pockets of gas.

Hospital Course

The operation performed was an exploratory laparotomy, drainage of the right perinephric and retroperitoneal abscess, and Hartman's procedure.

After informed written consent was obtained, the patient was brought to the operating room and assumed the supine position on the operating table. After the successful induction of general endotracheal anesthesia, the abdomen was widely prepped and draped in a standard sterile fashion. A perioperative safety checklist was reviewed, and a timeout was performed. Preoperative antibiotics and DVT prophylaxis were provided.

Access to the abdomen was obtained via a vertical midline incision approximately one handbreadth above and one handbreadth below the umbilicus. The abdomen was explored, and a Thompson retractor was placed with the above findings.

The first abscess we entered was one of the interloop intraabdominal abscesses and the pus was deeply malodorous. This was sent for culture. Next, we entered a more superior and posterior abscess, which was retroperitoneal, and this was also cultured. This abscess cavity tracked posteriorly into the retroperitoneum behind the kidney consistent with a necrotizing soft tissue infection. The abscess rind as well as debrided tissue was sent for analysis.

In order to expose the right kidney, the right colon was mobilized, and the duodenum was kocherized. The preoperative CT scan had shown gas around the kidney as well as around the IVC and the porta hepatis and therefore all of these areas were exposed, debrided, and irrigated.

The left colon was also mobilized and then the diseased portion of the sigmoid was resected with Covidien purple tri staple load above and below the diseased segment using a Liga Sure for the mesentery. The rectal stump seemed adequately long for reversal of ostomy in the future. The staple line was tagged on each end of the staple line with 3-0 Prolene sutures. The descending colon was mobilized enough to easily reach the anterior abdominal wall for ostomy. Once this was done, the entire abdomen was copiously irrigated with 1% povidone-iodine irrigation solution, all of which was removed. This was done serially for several litters, taking particular care to irrigate the debrided retroperitoneum including the perinephric retroperitoneum. This area extended into the IVC under the head of the pancreas and drains were placed in this area. Two drains total were placed, one into the left lower abdomen following the course of the abscess cavities all of which connected like a chain of lakes and terminating posterior and superior to the right kidney where debridement occurred for the necrotizing soft tissue infection there. The second drain was placed in the right lower abdomen terminating near the rectal stump, but not touching the rectal stump, which itself was covered with a harvested tongue of omentum as an omental flap. After thorough irrigation, placement of drains, returning of the bowel to anatomical position, harvesting of the omental flap, and covering the abdominal contents with the rest of the omentum, the abdomen was prepared for closure.

This was done in a running fashion with #1 looped Maxon suture. The subcutaneous tissue was irrigated with dilute Betadine with 1% povidone-iodine solution and the skin was closed very loosely with staples and the spaces between the staples were packed with gauze for a vacuum-assisted closure. This wound was dressed, and the ostomy matured.

Before closing the abdomen, a defect was made in the mid left abdominal wall using cautery, and an approximately 3-4 cm circle of skin with underlying fat was excised with cautery. An ostomy defect was then created in the standard fashion and the descending colon was easily mobilized and exteriorized through this defect before closing the abdomen.

The descending end colostomy was matured in a standard fashion with 3-0 Vicryl sutures and an ostomy appliance was applied. The patient was awoken from general anesthesia and transferred to recovery in improved, stable, but still guarded condition. She was transferred to the intensive care unit to have close monitoring.

Over the course of a week, she steadily improved with Zosyn (piperacillin/tazobactam), vancomycin, fluids replacement, and pain medications. She was discharged with a 3-week follow-up appointment in the clinic.

Discussion

Necrotizing soft-tissue infections are life-threatening infections. It is characterized by subcutaneous tissue, fascia, or muscle necrosis and typically comes with a high morbidity and mortality. In the case of our patient, we use the term necrotizing fasciitis as the infection has permeated through the peritoneal fascia to the subcu-

taneous tissue. This infection is typically caused by group A streptococcus with an incidence of 3-4 per 100,000 person-years [8].

The pathogenesis of the disease involves a combination of inflammatory processes, bacterial virulence factors, and certain risk factors that either impede the immune system or allow the seeding of bacteria to the subcutaneous fascia or muscles. Risk factors include underlying medical illnesses such as obesity, cardiac disease, chronic renal failure, cirrhosis, cancer, alcoholism, injecting drug use, and diabetes [9]. These diseases, in some manner, impair the immune system response, impair the vitality of tissue and its inherent defensive properties, or lead to higher exposure to pathogens. Regardless, the pathogenesis remains roughly the same. Ultimately, there is a replication of bacteria that causes inflammation along with impaired neutrophil involvement to destroy the bacteria. The bacterial enzymes and neutrophils decay the surrounding tissue. As an additional part of the inflammation cascade, activation of coagulation factors causes microthrombi, leading to tissue infarction. The accumulating edema further impairs perfusion as pressure increases, leading to compartment syndrome. All of this results in necrosis. Left untreated, the inflammatory cascade could mediate a more severe reaction such as septic shock [10].

The clinical diagnosis of this disease is challenging as the spectrum in which it presents is wide. The inflammatory process may not have enough effect to overtly notice in a patient, and, therefore, could present as an insidious infection. One article indicates that about 50% of patients are initially misdiagnosed [11]. The main symptoms are pain, swelling, and erythema. All of which are by-products of an inflammatory process. However, key symptoms that indicate a more dangerous infection include pain out of proportion to the physical exam findings, persistent fevers, and weight loss [10]. Unfortunately, these symptoms may be absent if the infection infects deep tissues like muscle or within the body cavity like in the case of our patient.

The use of a CT scan is extremely helpful in aiding or confirming the diagnosis. Typical findings on CT involve the presence of gas, fluid collections, involvement of fascia with asymmetric fascial thickening and lack of enhancement after contrast injection, which is the most specific finding [12].

Several laboratory investigations aid in the diagnosis as well. There is a score made specifically to aid the diagnosis called the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score. It derives its score from serum C-reactive protein, leukocyte count, hemoglobin, sodium, creatinine, and glucose values, but its efficacy is still in question [13].

Treatment of necrotizing soft-tissue disease involves immediate care with broad-spectrum antimicrobials and surgical debridement. The emphasis is to remove the necrosed tissue as well as prevent the infection from spreading further into the body [14-16].

Conclusion

Necrotizing soft-tissue infections are life-threatening emergencies that should get surgical debridement as soon as possible. To our knowledge, there are not many reported cases of intra-abdominal abscesses causing necrotizing fasciitis. We list 2 other reports and add our own. We highlight this case in the importance of active surveillance of our patients and ensuring good medical care.

Conflicts of Interest: The authors declare no conflict of interest.

Informed consent: The patient gave verbal consent for authorization of this article.

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