

Case Report

Living in symbiosis with COVID: two delayed presentations of soft tissue infections in elderly patients with COVID-19 infection

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ABSTRACT

Retroperitoneal and extensive breast abscesses in elderly patients are associated with a significant burden of comorbidities, insidious symptoms, and signs resulting in delayed diagnosis. We present two elderly COVID-19-positive patients with retroperitoneal and breast abscesses. Both patients underwent multiple procedures and, despite a protracted course, survived each two potentially lethal infections. A 72-year-old man presented to the emergency department (ED) with back pain. Labs showed a polymerase chain reaction (PCR)-positive COVID-19 test and leukocytosis. A computed tomography scan of the abdomen and pelvis (CTAP) showed a perirectal abscess spreading into the pelvis and retroperitoneum. The patient underwent an incision and drainage (I and D). Additional imaging found multiple collections with extension into the retroperitoneum. These were drained, and the patient was discharged after repeat imaging showed resolution. A 78-year-old female was admitted with swelling of the right breast. Labs showed a positive PCR COVID-19 test, and chest computed tomography (CT) showed a rim-enhancing collection extending from the right breast into the right pectoralis muscle. The patient was started on antibiotics and underwent an I and D of the right breast. She was discharged on post-operative day (POD) four on antibiotics. She was readmitted 32 days later with a left sided abscess overlying the left pectoralis and was successfully treated conservatively with a course of antibiotics. There are few studies on the formation of abscesses in the breast and retroperitoneum in the setting of COVID-19 infection. Thus, information on the topic can aid physicians in maintaining clinical suspicion of severe abscesses illness in elderly patients presenting with vague clinical symptoms or symptoms concerning soft-tissue infections in the setting of COVID-19 infections

Keywords: Breast abscess, Retroperitoneal abscess, COVID-19 infection, Immune response, Immune dysfunction

INTRODUCTION

COVID-19 can present as an acute life-threatening illness with debilitating symptoms, respiratory distress, progression to multi-organ failure, long-term complications, and impaired quality of life, even in survivors.¹ Retroperitoneal and large breast abscesses are rare and associated in elderly patients with a significant burden of comorbidities, insidious symptoms, and signs,

resulting in delayed diagnosis with high morbidity and mortality rates.² The most common presenting symptoms of COVID-19 are headache, cough, fever, and myalgias. productive cough, hemoptysis, and diarrhea.³ Severe disease is associated with bilateral lung infiltrates on imaging, hypoxemic respiratory failure necessitating mechanical ventilation support, hypotension requiring vasopressor treatment, and exceptionally high mortality.⁴ However, many patients who test positive for the COVID-

19 virus are asymptomatic.⁵

Extensive soft tissue infections, such as retroperitoneal abscesses and large breast abscesses, can be complicated by sepsis, and necrotizing fasciitis associated with high morbidity and mortality, especially in the elderly. The immunological effects of COVID-19 on the human body, are well studied; however, there is little in the literature on abscess formation and progression in the setting of COVID-19 infection. We present two elderly COVID-19 PCR-positive patients who survived extensive soft tissue infections of the retroperitoneum and breast, respectively.

CASE REPORTS

Case 1

A 72-year-old man with a history of benign prostatic hypertrophy and pilonidal disease presented to the emergency department (ED) in April 2020, complaining of months of back pain. He was afebrile with a blood pressure (BP) of 126/61 mmHg, a pulse of 80 bpm, and an oxygen saturation of 96%. Physical examination revealed a perianal swelling with foul-smelling drainage. Laboratory studies included a positive PCR COVID-19 test, a white blood cell (WBC) count of 22.1 k/ul, and a 140 mmol/l sodium level.

A computed tomography scan of the abdomen and pelvis (CTAP) confirmed a perirectal abscess spreading into the pelvis and retroperitoneum (Figure 1) and subcutaneous emphysema. The patient underwent examination under anesthesia, for washout and debridement of the right perirectal abscess. Necrotic tissue was found to extend into the retroperitoneal area. Wound cultures grew mixed gram-negative and gram-positive flora with the prevalence of *Citrobacter*; blood cultures yielded *Bacteroides*.

The patient received intravenous (IV) antibiotics with daily dressing changes. Follow up a. On postoperative day (POD) eight, a new area of induration and erythema was noted overlying the right groin and thigh, but a repeat CTAP did not delineate a new process only showing marked improvement of the fluid collection and subcutaneous emphysema with associated mild soft tissue edema. The patient completed a 14-day course of antibiotics and there was clinical improvement of induration and erythema of the gluteal region. The patient improved and was discharged to a nursing facility on POD 15.

The patient was readmitted 16 days later with a right groin swelling with purulent drainage. Labs were significant for a positive a COVID-19 PCR and WBC 14.9 k/ul. The CTAP scan showed multiple collections in the right retro-rectal area, the right groin, and the right flank, extending into the right retroperitoneum (Figure 2). The patient was started on antibiotics and was taken to the OR for incision and drainage (I and D) of the groin. Wound culture were obtained and grew *Bacteroides uniformis*, and blood

cultures showed no growth. The patient returned to the OR for I and D of the abscesses in the right retroperitoneum, anterior abdominal wall, suprapubic and pelvic regions. On POD 12, the first negative covid-19 PCR was recorded negative COVID-19 PCR test and repeat CT of the abdomen/pelvis revealed near resolution of the abscesses and leukocytosis had resolved. The patient was found to be clinically stable and was discharged back to a nursing facility.



Figure 1: A CT scan of the abdomen and pelvis (CTAP) showing a 11×4 cm subcutaneous abscess with adjacent fat str and ing and overlying skin thickening (blue line).



Figure 2: A CT scan showing a right sided collection involving the right perirectal and pelvic space with a thin confluent collection (blue arrows) connecting to the right retroperitoneum.

Case 2

A 78-year-old female nursing home resident was admitted in June 2020 with weeks of right-sided breast swelling with draining sinuses. Her BP was 108/52 mmHg, pulse of 75 bpm, temperature of 97.6°F, respiratory rate of 18 breaths per minute, and SpO₂ of 94%. The patient was cachectic with a BMI of 15.62 kg/m² and disoriented with motor weakness and dry mucous membranes. Physical exam revealed a non-tender but erythematous right breast with induration of the inferior lateral quadrant and two 1.5×0.4 cm sinuses. Lab values included a positive PCR COVID-19 test, WBC of 6.5 K/ul, and a sodium level of 160 mmol/l. A chest CT showed bilateral pulmonary infiltrates, a rim enhancing 22.5×15×7 cm collection extending from the right breast into the right pectoralis

muscle (Figure 3). The patient was started on vancomycin and underwent an I and D of the right breast. Wound cultures taken in the ED grew MRSA. She was discharged on postoperative day four on Bactrim.

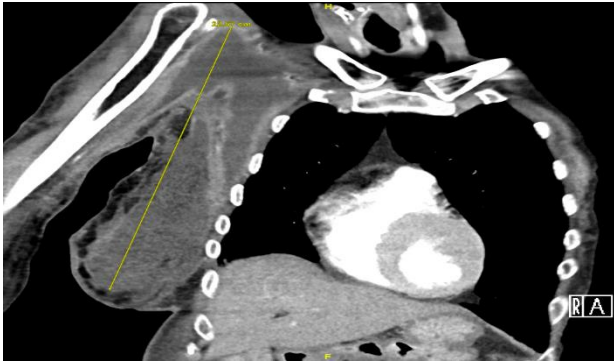


Figure 3: Chest CT showed a ring-enhancing collection extending from the right breast into the pectoralis muscle.

She was readmitted 32 days later, febrile to 100.8°F (38.2°C) with a BP of 140/90, a pulse of 102 bpm, a respiratory rate of 18, and SpO₂ of 96%. Lab values included a negative COVID-19 PCR and WBC of 6.3k. On contrast chest CT, a new 7×4.7×1.4 cm abscess was seen in the left pectoralis muscle with a resolution of previous breast abscess and lung parenchymal abnormalities (Figure 4). The patient received meropenem and vancomycin IV and had a negative needle aspiration of the new collection. She was discharged six days later on fourteen days of linezolid.

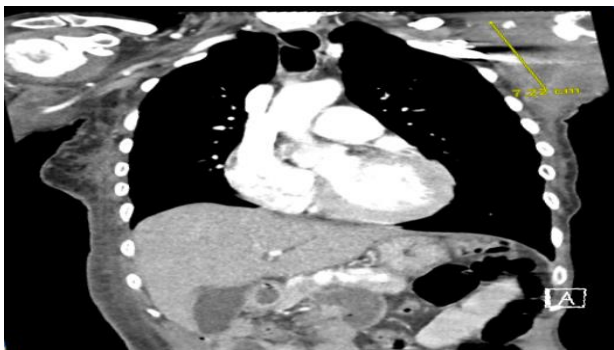


Figure 4: Contrast CT showing an abscess in the left pectoralis muscle with a resolution of previous breast abscess and lung parenchymal abnormalities.

DISCUSSION

In the spring of 2020, the fear of contracting the COVID-19 virus and not receiving proper hospital care influenced many patients to stay home instead of seeking medical care when early symptoms of infection appeared. The global COVID-19 pandemic led to a surge in demand for healthcare services, prompting a shift in the delivery of care to accommodate the influx of COVID-19 patients, causing deleterious medical and social consequences

known as “covidlateral” damages of the pandemic and epidemic.⁶ Patients refrained from seeking care for non-COVID-19 conditions, including skin and soft tissue infections (SSTIs), with emergency department visits and hospitalizations decreasing dramatically.⁷

Delayed presentation causes disease progression and, consequently, worse hospital outcomes. Kamagate et al reported on an extensive necrotizing breast infection requiring a mastectomy, attributed mainly to anxiety about contracting the virus in a hospital setting.⁸ Our patients are also examples of delayed presentations, as New York was the epicenter of the COVID-19 pandemic and epidemic, with lockdown measures in place.

Both patients exhibited extensive soft-tissue infections in the setting of COVID-19 infection; viral infection could be a critical factor in the progression of their extensive soft-tissue infections. Understanding the host immune response to SARS-CoV-2 infection is crucial, as it determines susceptibility to the progression of infection and the recovery coordinated by B and T cell responses.⁹ COVID-19 is notorious for disrupting the host’s immune response and is believed to affect both innate and adaptive immunity.¹⁰ In innate immunity, damage-associated molecular patterns (DAMPs) are secondary to proteins released from damaged lung tissue, picked up by antigen-presenting cells (APC), and presented to T-cells.¹¹ The result is a massive release of proinflammatory cytokines that mediates multiorgan injury via direct cytotoxicity.¹² Subsequently, due to the persistent activation by antigens, T-cell exhaustion occurs, where T-cells lose the ability to respond appropriately to virus-infected cells, causing an abnormal adaptive immune response.¹¹ SARS-CoV-2-positive patients have significantly reduced CD4+ and CD8+ T lymphocytes, with a significant decrease in T cells observed, and in severe cases with an elevation of the concentration of serum cytokines such as IL-2, IL-6, IL-10, and TNFα.^{11,13}

Aging causes a decrease in the innate immune response and a shift in T-cell subpopulations; this reduces naïve T-cells and increases memory T-cells. These waning immune-senescence and aging-related pro-inflammatory responses result in a susceptible host. Furthermore, the underlying pathophysiology is poorly understood; it is hypothesized that waning immune-senescence and aging-related low-level pro-inflammatory reactions lead to a gradual decline in the immune response, resulting in a susceptible host.⁹ Dysregulated immune response has been identified as a crucial pathological component of tissue-specific effects of COVID-19 in the short and long term.¹⁴ Our patients were both elderly with extensive soft tissue infections, in the setting of COVID-19 infections with expected high morbidity and mortality.

Perianal abscesses usually present with severe pain, fever, and purulent discharge. Abscesses below the puborectalis muscle prevent superior extension of the abscess upward to the supra-levator space unless untreated.¹⁵ Perirectal

abscess, especially in the elderly, is not uncommon; however, retroperitoneal spread occurs much less frequently, often with an insidious onset and vague symptoms.¹⁶ As seen in our first case presentation, the perirectal infection has the potential to spread via an intersphincteric plane and the levator ani muscle's diaphragmatic fascia, anteriorly superior perirectal space, or posteriorly to the retro-rectal space.¹⁶ The retroperitoneal compartments have three potential spaces: the anterior and posterior. Pararenal and perinephric spaces. Abscesses can breach these spaces via the perineal and retroperitoneal space and expand to other spaces due to direct extension or breakdown of fascial planes.¹⁷

Diagnosis can be further complicated because patients may present with extra-abdominal manifestations. The psoas muscle is enveloped by a muscular end fascia opened inferiorly, allowing the extension of abscesses to the pelvis and thigh.^{18,19} In the first case, the patient's chief complaint was diffuse back pain without any radiation to the abdomen.

The imaging modality of choice is computed tomography (CT), with a sensitivity of 77%. The CT usually demonstrates a collection with rim enhancement and surrounding fat str and ing; gas can also be present; this was present in both the patients' imaging.²⁰ Retroperitoneal infections and their complications are associated with mortality rates as high as 20% due to the vague signs and symptoms that result in delayed diagnosis.²¹ Rapid onset of septic shock can occur with the release of bacterial contents into the peritoneum, thorax, meninges, or thigh.²² Fortunately, our patient's hospital courses were not complicated by sepsis or septic shock.

Management of perianal and retroperitoneal abscesses ultimately requires surgical drainage and antibiotics, especially for those with severe systemic illness, immunosuppression, and diabetes.¹⁹ The surgical approach to a retroperitoneal abscess is usually performed via an extra-peritoneal flank incision with the patient in the lateral decubitus position.⁴ Our elderly male COVID-19-positive patient had a perianal abscess spreading first to the gluteal region and retroperitoneum, then later recurred, and extended in the thigh, flank, and thorax without sepsis or septic shock, responding to surgical drainage and antibiotic regimen.

The typical presentation of breast abscesses is a palpable erythematous breast mass, fever, and breast pain in patients in the fifth decade of life.²³ The patient presented at an older age than typically, with a breast swelling and a draining sinus, and which was managed with I and D and antibiotics. Literature reports a case of a 39-year-old obese female with a delayed presentation of right breast swelling, redness, drainage, skin sloughing, crepitus, and pain; due to anxiety surrounding contracting the virus, there was a delay in seeking medical care. CT showed gas in subcutaneous tissues of the posterior breast. Thus, the progression of the soft-tissue infection necessitated a more

radical intervention: a complete mastectomy.⁸ As the patient's initial infection did not respond to I and D, and antibiotics.

Management of atypical breast conditions associated with COVID-19 varies from conservative management with antibiotics to I and D, debridement, mass excision, and completion mastectomy.^{8,24} The elderly, frail, malnourished female patient with COVID-19 infection, with extensive breast collection and recurrent abscesses, was managed with I and D and antibiotics for both admissions; fortunately, despite her age and extensive soft tissue infection, her condition did not progress to necrotizing infection and survived

Further research is required on breast pathology as a systemic manifestation of COVID-19 infection. A proposed mechanism for breast pathology in the setting of COVID-19 is prothrombotic and vasculitis-like events leading to the development of abscesses.²⁴

However, the literature reports no definitive explanation for the development of abscesses in the setting of infection from the virus. Nevertheless, physicians need to maintain a high clinical suspicion of breast involvement in the setting of COVID-19 infection. This can prevent complications, reduce the need for more radical surgical procedures, and improve patient outcomes.

CONCLUSION

Soft-tissue infections can be seen in COVID-19-positive patients in the context of altered innate and adaptive immunity. However, the reason for the preference for infection in the breast and perianal area remains unknown. Elderly patients with significant comorbidities can have delayed presentation of soft tissue infection, and with the vague presentation potentially delaying diagnosis and immune dysregulation, causing progression to severe disease. There are few studies on the formation of abscesses in the breast and retroperitoneum in the setting of COVID-19 infection. Thus, information on the topic can aid physicians in maintaining clinical suspicion of severe infection in patients presenting with vague clinical symptoms or symptoms concerning soft-tissue infections and COVID-19. These infections could have been fatal in these elderly patients; however, both survived, despite a protracted course, readmissions, and recurrent infections, without sepsis or septic shock.

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