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A Case of Necrotizing Soft Tissue Infection Secondary to Perforated Colon Cancer

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Abstract

Necrotizing soft tissue infections are aggressive infections that cause necrosis of muscle, fascia, and tissue. They typically follow fascial planes that lack insufficient blood supply. Early drainage and debridement are essential for survival in these patients. This is a case of a patient who presented in diabetic ketoacidosis with a necrotizing soft tissue infection localized to the left flank and abdomen with underlying colon cancer pathology.

The patient was a 54-year-old female who initially presented with acute dyspnea and left flank pain for two weeks. On admission, she was afebrile, tachycardic, tachypneic, and hypertensive. After being transferred to the ICU for diabetic ketoacidosis management, she began complaining of left abdominal pain and the CT showed concerns for a possible necrotizing soft tissue infection in the left flank region. She was taken to the operating room immediately for debridement and started on broad-spectrum antibiotics. The next day, an exploratory laparotomy was performed with a hemicolectomy and creation of an end colostomy due to concern for a perforated colonic malignancy. A final debridement was completed and a wound vacuum-assisted closure (VAC) was placed. Final pathology demonstrated well-differentiated colonic adenocarcinoma invading into the muscularis propria.

Overall, necrotizing soft tissue infections can be related to a perforated viscus especially a colonic malignancy and this case demonstrates the importance of proper surgical management and high clinical suspicion for possible underlying pathology in a soft tissue infection.

Categories: General Surgery, Infectious Disease, Oncology

Keywords: necrotizing fasciitis, necrosis, colon cancer, malignancy, soft tissue infection, necrotizing soft tissue infection, nf, nsti, cellulitis, myositis

Introduction

Necrotizing fasciitis (NF) is a subset of aggressive necrotizing skin and soft tissue infections (NSTI) that cause necrosis of the muscle, fascia, and subcutaneous tissue [1]. NF affects about 0.4 in every 100,000 people per year in the United States [1]. The infections follow certain fascial planes, which lack sufficient blood supply and leave overlying tissues initially unaffected [1]. This can delay initial diagnoses as well as surgical intervention [1]. Predisposing risk factors for NSTI include diabetes mellitus, malignancy, alcohol abuse, and chronic liver, and kidney diseases [2]. However, in over 20% of cases, the etiology is idiopathic [3-5].

In order to quickly and accurately diagnose NSTI, the index of suspicion must be high. Signs and symptoms can include fever, tachycardia, hypotension, shock, swelling, erythema, pain disproportionate to appearance, skin discoloration, crepitus, and subcutaneous air gas [6]. Lab values including C-reactive protein, WBC count, hemoglobin, sodium, creatinine, glucose levels can all be helpful in establishing the diagnosis [6]. Imaging studies that are useful include plain radiography, ultrasound, CT, and MRI. Management of NF includes broad-spectrum antibiotics, and importantly, early and aggressive drainage and debridement, which are the mainstay of treatment [7]. Postoperative management of the surgical wound and proper nutrition are also critical for the patient's survival [7].

We present a case of a female patient that initially presented with diabetic ketoacidosis and concurrent flank pain. Upon stabilization of the diabetic ketoacidosis, she was promptly diagnosed and treated for an underlying necrotizing soft tissue infection of the left hemi abdomen and left flank which later led to the discovery of a colonic malignancy. The aim of this unique case report is to exemplify how the rapid diagnosis and treatment for a life-threatening condition can lead to optimal outcomes, as well as the benefit of remaining vigilant for possible causes of necrotizing soft tissue infection.

Case Presentation

Our patient was an obese 54-year-old female who presented to the emergency department with a chief

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complaint of shortness of breath. She presented with a blood pressure of 176/80 mmHg, a pulse of 115 bpm, and a respiratory rate of 40 bpm. Labs on initial presentation showed a blood glucose of 653 mg/dL, leukocytosis of 17.5 K/ μ L, and an elevated lactic acid of 2.5 mmol/L. She had no previous diagnosis of diabetes mellitus. She was transferred to the ICU for management of diabetic ketoacidosis. After the patient was stabilized in the ICU, she started complaining of left abdominal pain. Physical exam showed a poorly defined erythema with underlying crepitus and a central stellate-shaped violaceous patch on the left flank and abdomen that was concerning for impending necrosis as shown in Figure 1.



FIGURE 1: Left flank and left lower quadrant on admission

As shown in Figure 2, the CT of the abdomen and pelvis showed a large amount of subcutaneous emphysema within the left flank soft tissues that wrapped anteriorly along the left lower lateral abdominal wall into the anterior subcutaneous soft tissues of the left lower quadrant. There was also a small tract of air extending from the left retroperitoneum posterior to the left kidney and extending along the left iliopsoas muscle inferiorly. Mild soft tissue stranding and thickening adjacent to the proximal sigmoid colon in the region of the subcutaneous air was present as well.

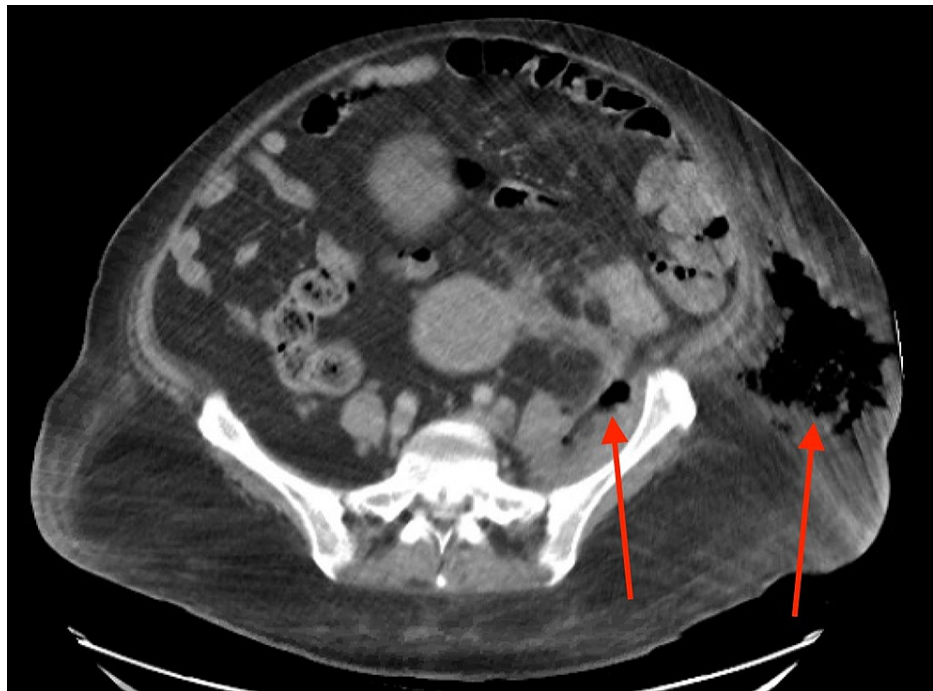


FIGURE 2: CT abdomen and pelvis showing subcutaneous air in the retroperitoneum extending into the left flank

As a result of these findings, the patient was immediately taken to the operating room for management of a necrotizing soft tissue infection of the left hemi abdomen and left flank. Debridement of skin, soft tissue, fascia, and muscle was performed as shown in Figure 3.



FIGURE 3: Post-operative day #1 after initial debridement

After further review of the initial CT on the following day, there was suspicion that there was a perforation secondary to a colonic malignancy as evidenced by soft tissue thickening along the wall of the sigmoid colon. Thus, a CT of the abdomen and pelvis with rectal contrast was ordered which showed intraabdominal abscesses and concerns for a tumor within the sigmoid to the descending colon, as seen in Figure 4. Further debridement was continued with the drainage of the intraabdominal abscesses along with a takedown of the splenic flexure, and an open left hemicolectomy with the creation of an end colostomy. During the operation, a perforation of the colon was identified.

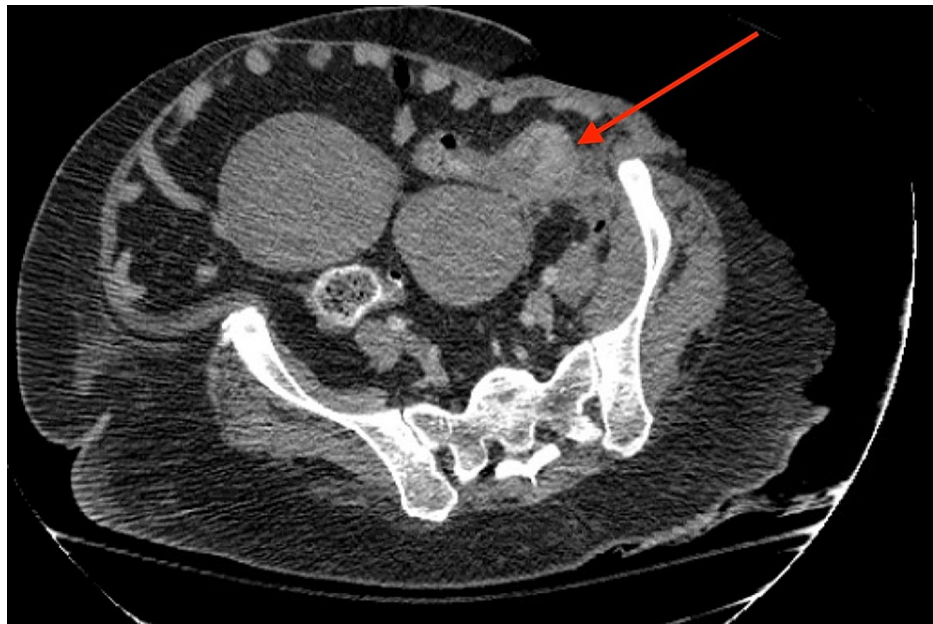


FIGURE 4: CT abdomen and pelvis showing thickening of sigmoid colon

Two days later, a final debridement was completed with the placement of a wound VAC.

Blood and specimen cultures grew *Streptococcus anginosus* (*S. anginosus*) and final pathology of the specimen demonstrated well-differentiated colonic adenocarcinoma measuring 6.5 cm in length and 1.1 cm in thickness, invading into the muscularis propria but not into the pericolonic fat or serosa. All fourteen lymph nodes were negative for malignancy, stage pT2N0M0 with all resection margins free of tumor. The surgical specimen is shown in Figure 5.



FIGURE 5: Sigmoid colon cancer specimen

Post-operatively, the patient was managed with broad-spectrum antibiotics and diabetes management with subcutaneous insulin. She was also followed up for surgical wound care and continuous antibiotics at a long-term acute care facility for two months. Follow-up wound healing at 2.5 months can be seen below in Figure 6.



FIGURE 6: Wound healing at 2.5 months

Discussion

During the work-up of necrotizing soft tissue infections, differential diagnoses should be considered and ruled out before making a diagnosis of a necrotizing soft tissue infection associated with *S. anginosus* bacteremia, as they have different treatment methods.

One common differential is gas gangrene or NF caused by *Clostridium* species [8]. This type of NF involves both anaerobes and aerobes, an important distinction because this will almost always result in amputation, in contrast to solely debriding, where salvaging the tissue may be possible [8].

Our case report is part of a unique subset of cases demonstrating the relationship between the *S. anginosus* species, colon cancer, and NF [9]. There was suspicion that a cancerous lesion disrupted the colonic mucosa, therefore, allowing pathogens to invade the tissue, leading to the conclusion that the infection was a consequence of cancer [9]. In one study, a patient was found to have *S. anginosus* bacteremia with liver abscesses and was incidentally found to have rectal adenocarcinoma, suggesting a similar association [10]. A literature review by Lin et al. revealed only a few case reports showing this relationship [9,10]. In addition, systemic *S. anginosus* infections have also been reported in patients with esophageal and gastric cancer [9,11].

When considering treatment options for a necrotizing soft tissue infection, it is important to note that administering antibiotic treatment without debridement is associated with a mortality rate approaching 100% [9]. A major challenge and consequence of lack of prompt diagnosis is delaying the surgical treatment, which correlates with worse outcomes and higher mortality rates [12]. Therefore, surgical source control should be achieved promptly [12]. The mainstay treatment of NSTI is early and aggressive surgery and debridement of necrotic tissue, along with broad-spectrum empiric antibiotic therapy and hemodynamic support [13]. In one review, the only variables that correlated with increased mortality were age and debridement that occurred 24 hours after admission [12,13].

Conclusions

This study demonstrates proper surgical management for a unique case of NF, cellulitis, and myositis complicated by undiagnosed diabetes mellitus and with an underlying colonic malignancy. While prompt debridement is essential for NSTI, it is important to keep in mind any potential underlying pathologies. Thoroughly reviewing all imaging and searching for other possible etiologies is also necessary for providing the most optimal outcome. Previous studies have shown similar management of NF cases but not with the complications of diabetes mellitus or malignancy. Further studies should explore surgical debridement and long-term follow-up in these specific patient populations with larger sample sizes to help develop best practices for approaching these types of cases.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

- Wallace HA, Perera TB: Necrotizing Fasciitis. StatPearls Publishing, Treasure Island, FL; 2021.
- Shimizu T, Tokuda Y: Necrotizing fasciitis. Intern Med. 2010, 49:1051-7. [10.2169/internalmedicine.49.2964](https://doi.org/10.2169/internalmedicine.49.2964)
- Childers BJ, Potyondy LD, Nachreiner R, et al.: Necrotizing fasciitis: a fourteen-year retrospective study of 163 consecutive patients. Am Surg. 2002, 68:109-16.
- Singh G, Ray P, Sinha SK, Adhikary S, Khanna SK: Bacteriology of necrotizing infections of soft tissues. Aust N Z J Surg. 1996, 66:747-50. [10.1111/j.1445-2197.1996.tb00735.x](https://doi.org/10.1111/j.1445-2197.1996.tb00735.x)
- Anaya DA, McMahon K, Nathens AB, Sullivan SR, Foy H, Bulger E: Predictors of mortality and limb loss in necrotizing soft tissue infections. Arch Surg. 2005, 140:151-7; discussion 158. [10.1001/archsurg.140.2.151](https://doi.org/10.1001/archsurg.140.2.151)
- Goldstein EJ, Anaya DA, Dellinger EP: Necrotizing soft-tissue infection: diagnosis and management. Clin Infect Dis. 2007, 44:705-710. [10.1086/511638](https://doi.org/10.1086/511638)
- Misiakos EP, Bagias G, Patapis P, Sotiropoulos D, Kanavidis P, Machairas A: Current concepts in the management of necrotizing fasciitis. Front Surg. 2014, 1:36. [10.3389/fsurg.2014.00036](https://doi.org/10.3389/fsurg.2014.00036)
- UpToDate: necrotizing soft tissue infections. (2020). Accessed: July 18, 2021: <https://www.uptodate.com/contents/necrotizing-soft-tissue-infections?search=necrotizing%20fasciitis%20differentials&s...>
- Masood U, Sharma A, Lowe D, Khan R, Manocha D: Colorectal cancer associated with Streptococcus anginosus bacteremia and liver abscesses. Case Rep Gastroenterol. 2016, 10:769-74. [10.1159/000452757](https://doi.org/10.1159/000452757)
- Lin CY, Chao PC, Hong GJ, Tsai YT, Lee CY, Tsai CS: Infective endocarditis from Streptococcus viridans associated with colonic carcinoma: a case report. J Card Surg. 2008, 23:263-5. [10.1111/j.1540-8191.2007.00528.x](https://doi.org/10.1111/j.1540-8191.2007.00528.x)
- Sasaki H, Ishizuka T, Muto M, et al.: Presence of Streptococcus anginosus DNA in esophageal cancer, dysplasia of esophagus, and gastric cancer. Cancer Res. 1998, 58:2991-2995.
- UpToDate: surgical management of necrotizing soft tissue infections. (2019). Accessed: July 18, 2021: <https://www.uptodate.com/contents/surgical-management-of-necrotizing-soft-tissue-infections?search=necrotizing%20fasc...>
- Kalaivani V, Hiremath BV, Indumathi VA: Necrotising soft tissue infection-risk factors for mortality. J Clin Diagn Res. 2013, 7:1662-5. [10.7860/JCDR/2013/5535.3240](https://doi.org/10.7860/JCDR/2013/5535.3240)