Necrotizing Fasciitis Complicated by Duodenal Stump Leakage After Distal Gastrectomy

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Presentation
A 67-year-old man who did not have any other combined medical illnesses underwent a distal gastrectomy with Bilroth II anastomosis for gastric cancer. One closed drain was positioned at the duodenal stump area through the right upper abdominal wall. The color of the drained fluid changed to bile color 2 days after the operation, but the patient was stable and showed no signs of abdominal irritation. Although a duodenal stump leak was suspected, the patient was observed and treated conservatively, including bowel rest and systemic antibiotics. On postoperative day (POD) 4, peritubular oozing and skin redness occurred around the drain insertion site. The patient had a fever of 38°C with leukocytosis, but had no abdominal irritation. The patient was treated for cellulitis, and the empirical intravenous antibiotics were changed from a second-generation cephalosporin to a third-generation. Shortly thereafter, the patient was advanced to a soft diet on POD 6, and the skin redness seemed to improve. However, the patient developed a 39°C fever in addition to mental status changes with drowsiness, tachycardia, and crepitus, and was palpated in the involved area on POD 11. Subcutaneous infiltration with emphysema around the drain site and mesenteric fat haziness with air densities around the duodenal stump site were observed (Figures 1A, B) on computed tomography (CT). Emergency exploration was performed for suspected necrotizing fasciitis (NF) of the abdominal wall with or without peritonitis. In the operative field, some fluid collection was observed, but only around the duodenal stump area. Additionally, there was also a foul-smelling watery discharge with wide necrotic tissue observed from the right lower rib to the right inguinal area during abdominal wall exploration with a longitudinal incision.

Diagnosis
Peritubular cellulitis was the initial diagnosis. However, the diagnosis was ultimately NF, which manifested with crepitus and symptoms of sepsis.

Discussion
While uncommon, necrotizing fasciitis (NF) is a severe and life-threatening soft tissue infection that involves the superficial fascial layers of the limbs, abdomen, and perineum. Necrotizing fasciitis is typically a complication of a minor soft tissue infection, or it can occur after trauma or a surgi-
cal procedure. Intra-abdominal pathology such as enteritis, appendicitis, or abscesses may spread to the abdominal wall and result in abdominal NF. This article presents on a case of NF of the abdominal wall following gastrectomy with a leak.

Meleney was the first to describe the clinical findings of a necrotizing soft tissue infection that spreads along fascial planes with characteristic sparing of the underlying muscle, with or without overlying skin involvement. Wilson was the first to characterize the condition as “necrotizing fasciitis.” For the pathophysiology of NF, it is known that the initial horizontal phase often spares the skin from any damage, and as the process evolves, bacterial invasion of the perforating cutaneous blood vessels leads to thrombosis and skin ischemia.

The importance of early diagnosis of NF is strongly emphasized, though it is difficult because its initial symptoms and signs are similar to cellulitis. Several signs and symptoms are known including high fever, localized swelling, erythema, tense edema outside the area of compromised skin, skin discolorization, blisters or bullae, necrosis, and crepitus with or without subcutaneous gas appearance. However, these symptoms are not specific to the diagnosis of NF. In this case, we considered peritubular cellulitis as the initial diagnosis, and symptoms seemed to improve after the antibiotics were changed. However, the diagnosis was ultimately NF, which manifested with crepitus and sepsis symptoms.

Although imaging studies are less helpful, magnetic resonance imaging and laboratory findings such as aci-

Figure 1. Computed tomography of the abdomen and postoperative appearance of the patient’s abdomen. A) Subcutaneous emphysema extends from the right lower rib to the pelvic wing. B) Mesenteric infiltration with air densities is observed on the duodenal stump. C) Extensive loss of abdominal wall tissue. D) Defects were closed with local flaps. E) Ten days after local flaps were applied.
dosis, anemia, electrolyte abnormalities, coagulopathy, and leukocytosis may help in the diagnosis. Sometimes subcutaneous emphysema can be seen on X-ray, and the CT scan may reveal signs of NF such as gas bubbles, air fluid level, and fascial swelling.

Cofactors such as old age, diabetes, alcoholism, immunosuppression, severe illnesses (e.g., cardio-pulmonary and liver disease), and obesity increase the risk of NF.

When NF is suspected, exploration of the necrotic area is always necessary. Surgical debridement must be performed step by step until vital tissue is found, and intravenous fluids and broad-spectrum antibiotics should be continued once the patient is stabilized.

Various cases of NF in the abdominal wall have been reported after laparoscopic vaginal hysterectomy, colon perforation, and even after elective herniorrhaphy. In the present case, the infection might have originated from the bile leak and spread through the closed drain to the abdominal wall.

For closure of the defects, various techniques have been introduced: split-skin grafts, negative pressure wound therapy ([NPWT], V.A.C.®, Kinetic Concepts Inc., San Antonio, TX), flap procedures, and myocutaneous flaps. The large defect in the present case was closed successfully using NPWT techniques and skin grafts.

Treatment

All non-viable abdominal wall fascia with overlying skin were resected and the drain was exchanged through another site for bile leakage (Figure 1C). Negative pressure wound therapy was used to treat the skin defect. Postoperatively, the patient recovered well and a skin graft was performed on POD 21 (Figures 1D, E). The patient was discharged 56 days following his second operation with the new drain.

Conclusion

This case report should remind surgeons that abdominal wall NF is possible around intra-abdominal drain sites. Aggressive surgical debridement and systemic antibiotics are effective treatments, and the defects can be closed by NPWT and skin grafting.

References