

CASE REPORT

Aggressive surgery for incisional hernia with necrotizing soft tissue infection highlighting unique abdominal findings

Teppei Tokumaru^{1,2}  | Hideaki Kurata² | Rei Nakaebisu² | Joji Tomioka²

¹Emergency and Critical Care Center, Yamaguchi Prefectural Grand Medical Center, Hofu, Japan

²Department of Acute Medicine and Surgery, Yonemori Hospital, Kagoshima, Japan

Correspondence

Teppei Tokumaru, Emergency and Critical Care Center, Yamaguchi Prefectural Grand Medical Center, 10077 Osaki, Hofu City, Yamaguchi 747-8511, Japan.
Email: teppei.1090@gmail.com

Abstract

Background: Surgery for incisional hernias with obesity can be more challenging because obesity is associated with perioperative complications. Necrotizing soft tissue infection (NSTI) is a life-threatening condition that requires aggressive surgical management. Few incisional hernias with NSTI have been reported, and the optimal strategy is undetermined.

Case Presentation: A 66-year-old obese woman had been diagnosed with incisional hernia 4 years previously but was not treated. She presented with abdominal pain that had worsened 2 weeks previously. Emergency radical surgery was carried out for an incisional hernia with NSTI. The abdominal fascia was sutured directly without mesh. Negative pressure wound therapy was performed after surgery. The postoperative course was uneventful, without recurrence.

Conclusions: Aggressive surgery is a valid strategy for life-threatening incisional hernias with NSTI. Strategies should be developed based on physiological and anatomical findings.

KEYWORDS

aggressive surgery, incisional hernia, necrotizing soft tissue infection, negative-pressure wound therapy

INTRODUCTION

Incisional hernia is a common condition that requires surgery. Obesity is the most significant risk factor. Surgical treatment in obese patients can be more challenging due to an increased risk of perioperative complications.^{1,2} Mesh repair is reportedly useful for incisional hernia, with a short-term reduction in the risk of recurrence.³ However, the benefit can be offset by long-term complications, and no-mesh repair should be considered for some patients.⁴

Necrotizing soft tissue infection (NSTI) is a potentially life-threatening condition that predominantly affects the extremities and rarely the abdomen.⁵ Because NSTI can present with peculiar skin findings, aggressive surgical management should be performed when suspected.^{5,6} In cases of incisional hernia complicated by NSTI, inflammation can involve the abdominal organs, making it challenging

to decide on strategies. Negative pressure wound therapy (NPWT) after surgery for complex incisional hernias could potentially reduce complications.⁷

We report a case of life-threatening incisional hernia with NSTI that was successfully treated by aggressive surgery and postoperative NPWT, which highlights the abdominal findings and strategy for incisional hernia with NSTI.

CASE PRESENTATION

A 66-year-old obese woman was diagnosed with incisional hernia approximately 4 years previously, but was not treated. She had received Cesarean section with a median lower abdominal incision 40 years previously. For 2 weeks, she had experienced worsening abdominal pain and exudate from her abdominal skin. Consequently, she was admitted to our hospital.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2023 The Authors. *Acute Medicine & Surgery* published by John Wiley & Sons Australia, Ltd on behalf of Japanese Association for Acute Medicine.

Her general appearance was sick. A physical examination revealed the following: respiratory rate, 28 breaths/min; oxygen saturation, 100%; blood pressure, 97/72 mmHg; heart rate, 112 b.p.m.; and body temperature, 38.9°C. She presented with severe pain in the localized lower abdomen. She had a body mass index of 40.1 kg/m². Her abdomen showed severe distention, erythema with sharp margins, swelling, bullae, and necrotic skin and dishwasher-gray exudate around the operative scar. Palpation of the lesion revealed heat, tenderness, and an unusual crackling sensation, such as crepitus.

A blood test showed the following: white blood cell count, 29,500/μL; hemoglobin, 13.6 g/dL; and platelet count, 20,200/μL. Laboratory tests revealed the following: total bilirubin, 1.8 mg/dL; creatinine, 1.05 mg/dL; prothrombin time, 59.7%; activated partial thromboplastin time, 30.3 s; fibrinogen, 636 mg/dL; and fibrin degradation product, 37.1 μg/mL. A blood gas analysis revealed pH of 7.531 and lactate level of 2.4 mmol/mL. Abdominal computed tomography showed incisional hernia of the small bowel content with subcutaneous fluid and gas collection. Small bowel necrosis of the hernia content was suspected, but no small bowel obstruction was observed. The hernia defect measured 6 cm (length) × 3.8 cm (width) (Figure 1).

Emergency radical surgery was performed for a life-threatening incisional hernia with NSTI, which was considered difficult to treat with damage control surgery (e.g., drainage alone). A skin incision was made along the demarcation line. The injured areas of skin, soft tissue, and hernia contents of the small bowel were resected en bloc. No intra-abdominal contamination or peritonitis was observed. The small bowel was reconstructed using end-to-end and layer-to-layer hand-sewn anastomosis. The abdominal fascia was directly

sutured by interrupted 0-coated Vicryl (ETHICON, polyglactin 910) suture without mesh repair or component separation, because the fascia could be closed with less tension than expected. The injured wound defect of the skin and subcutaneous tissue was treated with NPWT (Figure 2). The total operation time was 178 min, the bleeding volume was 285 mL, and the transfusion volume was 0 mL.

A surgical specimen culture showed *Klebsiella pneumonia* and *Enterococcus faecalis*. Negative pressure wound therapy was performed for 4 weeks postoperatively, and conservative wound management was successful (Figure 3). The postoperative course was uneventful. The patient was discharged on hospital day 53. At 1 year postoperatively, she was in good health without recurrence.

The patient provided her informed consent to participate in the study, which was approved by the Institutional Ethics Committee.

DISCUSSION

We described the abdominal findings and treatment strategy for a case of life-threatening incisional hernia with NSTI. The abdominal examination showed peculiar findings of NSTI: the erythema had a sharp margin,⁶ and no peritoneal contamination was observed. En bloc resection, including the injured area and intestinal reconstruction, can be performed in life-threatening conditions. Although the fascia was defective, direct suturing without mesh was possible, and postoperative NPWT management was successful.

The abdominal findings suggested NSTI (e.g., bullae, necrotic skin and dishwasher-gray exudate, tenderness, and

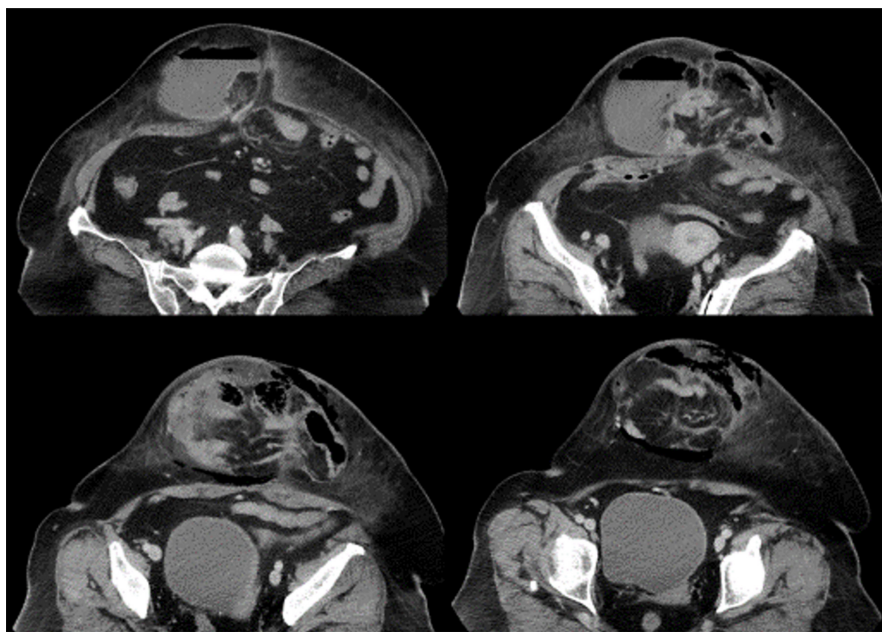


FIGURE 1 Abdominal computed tomography scans of a 66-year-old woman who had been diagnosed with incisional hernia 4 years previously but was not treated. The scans showed an incisional hernia of the small bowel contents with subcutaneous fluid and gas collection. While a prolapsed small bowel due to an incisional hernia can become necrotic, small bowel obstruction was not observed in this case.

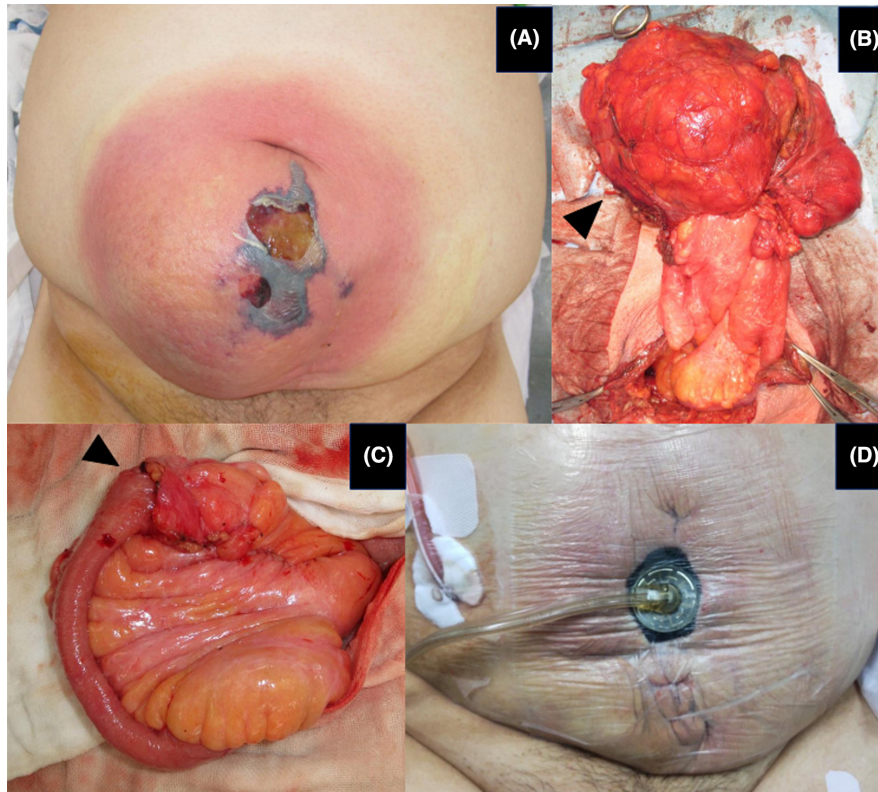


FIGURE 2 Emergency radical surgery was performed on a 66-year-old woman for life-threatening incisional hernia. (A) Her abdomen showed severe distention, erythema with sharp margins, swelling, bullae, and necrotic skin and dishwasher-gray exudate around the operative scar. (B) The injured areas of the skin, soft tissue, and hernia contents of the small bowel were resected en bloc. An intact small bowel was thus clearly revealed (black arrowhead). (C) Hand sewn anastomosis of the small bowel was performed (black arrowhead). (D) The wound defect of the skin and subcutaneous tissue was treated with negative pressure wound therapy.

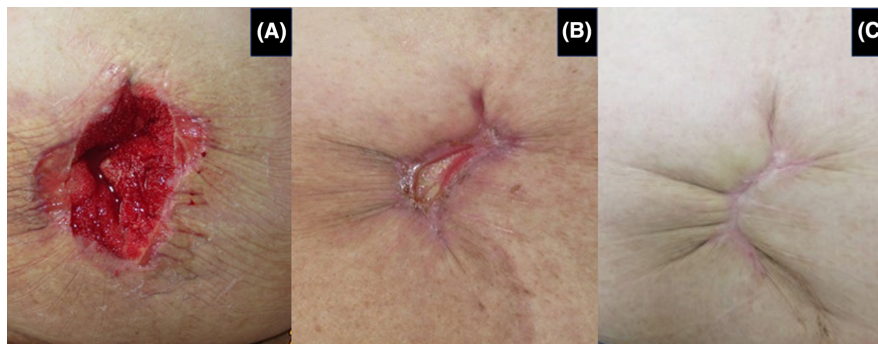


FIGURE 3 Negative pressure wound therapy was carried out for 4 weeks after emergency radical surgery on a 66-year-old woman for life-threatening incisional hernia. Conservative management of the wound was successful without skin grafting or any other surgical management. (A) One month after surgery. (B) Two months after surgery. (C) Five months after surgery.

crepitus). Erythema with sharp margins is atypical of NSTI.⁶ Despite the life-threatening condition, the infected lesions were relatively localized and there was no peritonitis. As the localized lesion did not extend into the abdominal cavity, it was presumed that the contents wrapped in the hernia had gradually caused ischemia and infection, resulting in NSTI of the abdominal wall. This was supported by the absence of small bowel obstruction and peritonitis, and the absence of a tumor lesion or perforation of the small bowel in the resected specimen, although the patient's abdominal symptoms had persisted for 2 weeks.

Necrotizing soft tissue infection is a potentially life-threatening rapidly progressive soft tissue infection that is difficult to rule out by physical examinations, imaging, or blood tests. Therefore, aggressive surgical management should be considered in suspected cases.^{5,6} Our patient's diagnosis was compatible with NSTI based on the surgical findings, and the abdominal findings were useful for determining the strategy. Direct fascia suture is generally performed without mesh for infected cases. Although mesh repair for infected cases has been reported, we considered that the benefits would be offset by long-term complications (e.g., mesh infection or migration).^{4,8}

However, recurrence is often not an immediate problem in cases managed with no-mesh repair, so it is selected as our first choice when possible.^{4,9} For difficult abdominal wall repair, we consider elective surgery with a skin flap.¹⁰ We performed NPWT after surgery because it can reduce complications of soft tissue infection and high-risk incisional hernia.⁸ In the present case, this approach was considered effective because the postoperative course was uneventful without recurrence.

We performed aggressive surgery for incisional hernia with NSTI, which presented unusual findings. In certain cases, emergency radical surgery can be the only lifesaving procedure. Potential pathologies must be considered when selecting the strategy. The integration and analysis of similar clinicopathologic cases are desired.

CONCLUSION

Aggressive surgery can be effective for life-threatening incisional hernia with NSTI. Necrotizing soft tissue infection can present with unusual findings, and the possible pathophysiology should be considered when determining the strategy.

ACKNOWLEDGMENTS

This work was supported by Yonemori Hospital and Yamaguchi Prefectural Grand Medical Center.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ETHICS STATEMENT

Approval of the research protocol: The study was approved by the Institutional Ethics Committee.

Informed consent: Written informed consent was obtained from the patient for publication of this case report and accompanying data.

Registry and the registration no. of the study/trial: N/A.

Animal studies: N/A.

ORCID

Tepei Tokumaru  <https://orcid.org/0000-0003-4423-2359>

REFERENCES

1. Dietz UA, Kudsi OY, Gokcal F, Bou-Ayash N, Pfefferkorn U, Rudofsky G, et al. Excess body weight and abdominal hernia. *Visc Med.* 2021;37(4):246–53.
2. Holihan JL, Alawadi Z, Martindale RG, Roth JS, Wray CJ, Ko TC, et al. Adverse events after ventral hernia repair: the vicious cycle of complications. *J Am Coll Surg.* 2015;221(2):478–85.
3. Holihan JL, Hannon C, Goodenough C, Flores-Gonzalez JR, Itani KM, Olavarria O, et al. Ventral hernia repair: a meta-analysis of randomized controlled trials. *Surg Infect (Larchmt).* 2017;18(6):647–58.
4. Kokotovic D, Bisgaard T, Helgstrand F. Long-term recurrence and complications associated with elective incisional hernia repair. *JAMA.* 2016;316(15):1575–82.
5. Fernando SM, Tran A, Cheng W, Rochweg B, Kyeremanteng K, Seely AJE, et al. Necrotizing soft tissue infection: diagnostic accuracy of physical examination, imaging, and LRINEC score: a systematic review and meta-analysis. *Ann Surg.* 2019;269(1):58–65.
6. Stevens DL, Bryant AE. Necrotizing soft-tissue infections. *N Engl J Med.* 2017;377(23):2253–65.
7. Swanson EW, Cheng HT, Susarla SM, Lough DM, Kumar AR. Does negative pressure wound therapy applied to closed incisions following ventral hernia repair prevent wound complications and hernia recurrence? A systematic review and meta-analysis. *Plast Surg (Oakv).* 2016;24(2):113–8.
8. Bessa S, Abdel-Razek A. Results of prosthetic mesh repair in the emergency management of the acutely incarcerated and/or strangulated ventral hernias: a seven years study. *Hernia.* 2013;17(1):59–65.
9. Sanchez VM, Abi-Haidar YE, Itani KM. Mesh infection in ventral incisional hernia repair: incidence, contributing factors, and treatment. *Surg Infect (Larchmt).* 2011;12(3):205–10.
10. Uppal SK, Garg R, Gupta A. Pre-expanded epigastric flap cover for ventral hernia following fungal necrotizing fasciitis of caesarian section wound: an unusual complication. *Indian J Surg.* 2010;72(Suppl 1):309–11.

How to cite this article: Tokumaru T, Kurata H, Nakaebisu R, Tomioka J. Aggressive surgery for incisional hernia with necrotizing soft tissue infection highlighting unique abdominal findings. *Acute Med Surg.* 2023;10:e907. <https://doi.org/10.1002/ams2.907>