

Split-Thickness Skin Grafting for Abdominal Wall Reconstruction after Necrotizing Fasciitis: A Case Report

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ABSTRACT

Necrotizing fasciitis is a rapidly progressive soft-tissue infection that requires immediate resuscitation, broad-spectrum antimicrobial therapy, and radical surgical source control. Survivors may be left with extensive defects that demand staged reconstruction. We report a 66-year-old woman with diabetes and active tobacco use who presented after three weeks of progressive left lumbar pain and swelling extending to the groin, thigh, and vulva. She arrived in profound shock (blood pressure, 60/45 mmHg) with purulent drainage and crepitus. Computed tomography demonstrated gas within the left psoas muscle and the lumbar, lumbosacral, and vulvar subcutaneous tissues, consistent with necrotizing fasciitis and a retroperitoneal abscess. She required intensive care, mechanical ventilation, multiple vasopressors, broad-spectrum antibiotics, serial radical debridement, drainage of the retroperitoneal collection, and repeated negative-pressure wound therapy. Because enteric effluent subsequently contaminated the wound system, a diverting rightsided colostomy was created. Once infection control and a healthy granulating bed had been achieved, abdominal cutaneous flap advancement and a meshed split-thickness skin graft harvested from the left leg provided definitive coverage. Late postoperative assessment showed durable wound closure. This case illustrates how staged source control, temporary negative-pressure wound management, selective fecal diversion, and timely autologous skin grafting can salvage a massive abdominal wall defect after necrotizing fasciitis.

KEYWORDS: necrotizing fasciitis; abdominal wall; split-thickness skin graft; negative-pressure wound therapy; case report

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INTRODUCTION

Necrotizing soft-tissue infections are uncommon but potentially fatal surgical emergencies characterized by rapidly advancing fascial necrosis, systemic toxicity, and a frequent need for repeated operations. Early manifestations may be deceptively nonspecific; pain out of proportion, edema extending beyond visible erythema, bullae, skin necrosis, crepitus, and shock should heighten clinical suspicion. Imaging can define the anatomical extent in a sufficiently stable patient, but it must not delay operative exploration when the diagnosis is strongly suspected [1-3]. Survival depends on prompt hemodynamic resuscitation, empiric broad-spectrum antimicrobial therapy, and complete excision of nonviable tissue. This lifesaving strategy often produces large, contaminated wounds. After source control,

negative-pressure wound therapy (NPWT) can control exudate and dead space and stimulate granulation; definitive closure may then require local or free flaps, dermal substitutes, or split-thickness skin grafts (STSGs), selected according to the depth of tissue loss and the vascularity of the recipient bed [3-6].

We present the staged management of extensive abdominal, lumbar, inguinal, thigh, and vulvar necrotizing fasciitis complicated by retroperitoneal abscess and refractory shock. The case is clinically instructive because a massive defect was successfully covered with cutaneous advancement and a meshed STSG after serial debridement, NPWT, and selective fecal diversion. [7,8].

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CASE PRESENTATION

Patient information

A 66-year-old woman from Mexico had uncontrolled diabetes. She had smoked 6-10 cigarettes per day since the age of 18 years. She reported an unintentional weight loss of approximately 20 kg over three years, accompanied by changes in eating habits and mood. With a history of open cholecystectomy 25 years ago and 3 cesarean sections, with no other significant history.

Clinical findings and diagnostic assessment

Approximately three weeks before admission, left lumbar pain developed after physical activity and progressed to swelling involving the left thigh and psoas region. Local measures were ineffective. After chiropractic manipulation

and the application of ice on April, swelling, warmth, and pruritus increased and inflammatory changes extended to the vulvar region. In late April, the patient developed presyncope, asthenia, adynamia, nocturnal diaphoresis, and impaired ambulation. At emergency assessment, blood pressure was 60/45 mmHg, heart rate 95 beats/min, respiratory rate 25 breaths/min, and Glasgow Coma Scale score 15. She was pale and clinically dehydrated with reduced responsiveness. Examination disclosed cellulitis, an indurated hematoma surrounded by erythema, purulent discharge, and crepitus across the left lumbar, inguinal, and thigh regions (**Figure 1**). Persistent hypoperfusion despite intravenous fluids prompted norepinephrine infusion, escalation to additional vasopressors, and admission to the intensive care unit.

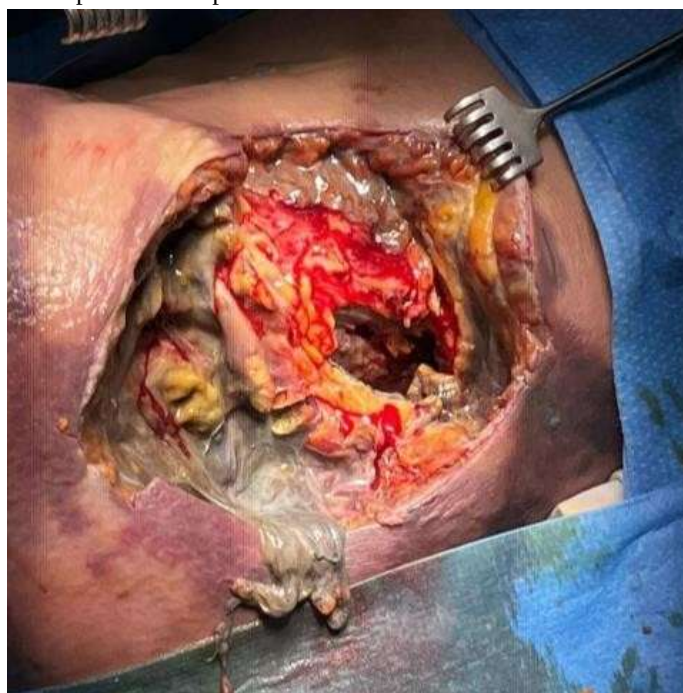


Figure 1. Extensive necrotizing soft-tissue infection involving the abdominal and adjacent soft tissues before definitive debridement. Purulent material and widespread nonviable tissue are visible.

Abdominopelvic computed tomography demonstrated gas within the psoas muscle and the subcutaneous tissues of the lumbar, lumbosacral, and left vulvar regions, together with a retroperitoneal abscess. These findings supported the diagnosis of extensive necrotizing fasciitis. Thoracic computed tomography showed massive right-sided atelectasis and bilateral pleural effusions. Echocardiography showed preserved systolic function (left ventricular ejection fraction, 68%) and no evidence of pulmonary embolism. Bedside ultrasonography demonstrated more than 50% inspiratory collapse of the inferior vena cava and basal pulmonary B-lines.

Therapeutic interventions

Broad-spectrum antibiotics and aggressive organ support were initiated for septic and hypovolemic shock. On the day of initial source control, radical debridement removed approximately 3 kg of necrotic tissue, and an NPWT system was placed (**Figures 2 and 3**). The patient returned to the intensive care unit under mechanical ventilation. On the following day, a second exploration drained the retroperitoneal abscess, removed further nonviable tissue, and replaced the NPWT dressing. Further NPWT exchanges and wound assessments were performed serially.



Figure 2. Abdominal wall defect after extensive surgical debridement. Viable bleeding tissue delineates the wound bed after removal of necrotic tissue.



Figure 3. Negative-pressure wound therapy applied after surgical source control.

On May 5, enteric effluent was detected through the NPWT system; therefore, a right-sided diverting colostomy was performed to reduce ongoing fecal contamination. On May 9, an STSG was harvested from the left leg. The reconstructive procedure combined advancement of an abdominal cutaneous

flap, excision of residual nonviable tissue, placement of the meshed graft, and reapplication of NPWT. On May 16, the final operation included wound cleansing, additional flap advancement, dressing exchange, and removal of the NPWT system (**Figure 4**).



Figure 4. Meshed split-thickness skin graft applied to the prepared abdominal wall recipient bed. Follow-up and outcomes

After a few months, once the graft had fully settled, it stayed in place and the reconstructed area received a continuous layer of new skin, as can be seen in Figure 5.



Figure 5. Late postoperative appearance after graft integration and wound healing.

DISCUSSION

This case demonstrates the transition from emergency source control to definitive reconstruction in a patient with unusually extensive necrotizing infection spanning the retroperitoneal, abdominal, lumbar, inguinal, thigh, and vulvar regions. The profound hypotension, crepitus, purulent drainage, and deep soft-tissue gas were consistent with advanced disease.

Contemporary reviews emphasize that operative treatment should proceed as soon as the diagnosis is suspected, because delayed or incomplete debridement is associated with poorer survival [1-3]. The large volume of tissue removed and the need for a second-look operation reflect the biological behavior of these infections rather than failure of the reconstructive strategy.

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NPWT served as a bridge between serial debridement and closure. It assists with exudate removal, dead-space management, granulation, and wound-bed preparation. A 2024 cohort study of 371 patients with necrotizing soft-tissue infection found that NPWT with instillation was associated with higher closure rates than conventional NPWT or moist dressings, although the nonrandomized design limits causal interpretation [4]. The 2025 adult necrotizing fasciitis consensus supports NPWT only after thorough debridement and infection control, with caution in confirmed anaerobic infection and in patients at high bleeding risk [3]. In the present case, repeated NPWT exchanges allowed ongoing inspection and further excision before grafting.

A meshed STSG was appropriate once a vascularized granulating bed was present. Compared with unmeshed grafts, meshing expands the available surface area and permits egress of blood and exudate, features that are valuable in a large, irregular wound. Its limitations include a reticulated appearance, secondary contraction, pigment change, and lack of fascial strength [5,6]. Accordingly, STSG provides durable soft-tissue coverage but does not reconstruct a missing musculofascial layer. Long-term surveillance for bulging or incisional hernia and assessment of abdominal wall function remain important.

The creation of a diverting colostomy was triggered by documented enteric effluent through the wound system rather than performed routinely. Evidence on fecal diversion in perineal necrotizing infections remains mixed; diversion can protect a wound from contamination but introduces operative and stoma-related morbidity. Recent observational data do not establish a consistent survival benefit, supporting individualized use when sphincter injury, rectal involvement, uncontrollable contamination, or inability to maintain wound hygiene is present [9-11]. In this patient, direct contamination of the extensive reconstructive field provided a pragmatic indication.

CONCLUSION

Extensive abdominal wall necrotizing fasciitis requires immediate physiologic resuscitation and repeated, uncompromising surgical source control. Once infection is controlled, NPWT can prepare a large defect for reconstruction. In a well-vascularized wound bed, cutaneous advancement combined with a meshed STSG offers broad autologous coverage with limited donor-site burden. Fecal diversion should be selective and driven by demonstrable contamination or anorectal involvement. Careful long-term follow-up is needed because skin coverage alone does not restore musculofascial strength.

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