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RESISTANT VULVAL NECROTISING FASCIITIS IN A YOUNG WOMAN: MULTIDISCIPLINARY MANAGEMENT OF AN EXTENSIVE NECROTISING SOFT TISSUE INFECTION

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ABSTRACT

***Objective:** To report the presentation, critical care course, microbiological evolution, and reconstructive outcome of a young woman with resistant vulval necrotising fasciitis. **Methods:** This case report was prepared from inpatient clinical records, operative notes, imaging findings, microbiology reports, and multidisciplinary management details. **Results:** A 19-year-old nulligravida woman presented with lower abdominal pain, vomiting, urinary symptoms, and right labial swelling. Although admission vital signs were stable, the infection progressed rapidly from labial cellulitis to extensive necrotising soft tissue infection involving the vulva, medial thigh, inguinal region, and lower anterior abdominal wall. Magnetic resonance imaging showed a right labia majora collection with spread to the thigh and psoas edema. Emergency necrosectomy and repeat extensive debridement were required for severe sepsis with intermuscular and extraperitoneal pus tracking. The patient required Critical Care Medicine and Surgical Intensive Care Unit support, serial culture-guided antimicrobial escalation, vacuum-assisted closure dressings, transfusion support, nutritional rehabilitation, and split-thickness skin grafting, with 95% graft uptake. **Conclusions:** Timely recognition, repeated source control, intensive multidisciplinary care, and staged reconstruction were central to recovery.*

KEYWORDS: Sepsis, Debridement, Antimicrobial Escalation, Intermuscular Abscess, Extraperitoneal Xtension, Wound Reconstruction, Graft Uptake, Intensive Care.

1. INTRODUCTION

This research aims to describe the clinical features, microbiology, intensive care support, and staged wound reconstruction in a case of resistant vulval necrotising fasciitis in a young female patient.

Necrotising fasciitis is a severe medical condition that requires prompt treatment. The infection causes the destruction of fascia, systemic symptoms, and high morbidity. Early recognition is challenging due to the presence of cutaneous lesions, which do not necessarily indicate deeper damage. Earlier studies focused on the high microbiological load and mortality rate associated with necrotising fasciitis (Liu Yuag Meng *et al*., 2005). Later, researchers have also described the trends and prognosis related to the negative outcome of necrotising soft tissue infection (Chen *et al*., 2025) and the importance of the polymicrobial pathogenesis and different presentations of the disease for its prognosis (Naamany *et al*., 2021). Vulval necrotising fasciitis is rare but should be considered in patients who present with symptoms similar to those of cellulitis or abscess. The infection is known to progress quickly and extend to thighs, perineum, abdominal wall, and extraperitoneal spaces (Razvi *et al*., 1998). Recent reports have similarly described aggressive spread from vulvar origin and emphasize the need for early recognition and multidisciplinary management (Traoré *et al*., 2024; Rabbani *et al*., 2022).

The present report describes a patient whose disease progressed from apparently localized labial infection to extensive necrotising soft tissue destruction requiring repeated debridement, Critical Care Medicine support, Surgical Intensive Care Unit management, vacuum-assisted closure therapy, serial antimicrobial revision, and split-thickness skin grafting.

2. METHODS

This manuscript is a retrospective descriptive case report derived from inpatient case records, serial physical examination findings, laboratory investigations, magnetic resonance imaging, computed tomography, operative notes, microbiology reports, critical care records, and reconstructive surgery details. The clinical sequence was organized chronologically from emergency presentation to discharge. No experimental intervention was undertaken.

3. RESULTS

A 19-year-old nulligravida woman presented with lower abdominal pain for 3 days, four episodes of non-bilious non-bloody vomiting, burning micturition, increased urinary frequency, and right labial swelling for 1 day. An outside ultrasound reportedly suggested a thickened appendix with mesenteric and pelvic inflammatory changes. On admission, she was conscious and oriented, with Glasgow Coma Scale score 15/15, pulse rate 92 min-1, blood pressure 120/80 mmHg, respiratory rate 22 min-1, oxygen saturation 99% on room air, and no fever at examination. Local examination showed a 5 x 5 cm swelling over the right labia with erythema, warmth, and induration, without active discharge or bleeding.

Fig.1 clinical presentation

The patient was initially admitted under Obstetrics and Gynecology. High vaginal swab showed non-Candida albicans, while urine culture was sterile. Dermatology opinion favored vulval cellulitis with impending necrotising fasciitis. As the disease progressed, a new bleb with skin discoloration appeared on the right medial thigh, and edema extended to the mid-inguinal region with skin excoriation over the labia majora. Magnetic resonance imaging demonstrated a collection in the right labia majora with inflammatory spread to the right inguinal region and right mid-thigh, psoas edema, and minimal ascites. Baseline investigations showed leukocytosis with total count 11,900 mm-3, hemoglobin 8.4 g dL-1, serum albumin 2.4 g dL-1, and a Laboratory Risk Indicator for Necrotizing Fasciitis score of 8.

Fig.2 intra operative picture of abscess drainage

Empirical intravenous piperacillin-tazobactam and clindamycin were started. Emergency necrosectomy under spinal anesthesia was performed on 21/09/2024. Devitalized tissue extending from the right inguinal region to the base of the perineum was excised and sent for culture. Tissue and pus cultures later showed multidrug-resistant Escherichia coli, and tissue culture also isolated Pseudomonas aeruginosa. On postoperative day 2, the patient developed severe sepsis with spread of infection to the lower anterior abdominal wall, right medial thigh, and right labial fold. Repeat extensive debridement under general anesthesia was therefore undertaken on 23/09/2024. Approximately 300 mL of pus was drained from the intermuscular plane between the internal oblique and transversus abdominis muscles and from the extraperitoneal space. No intraperitoneal collection was identified.

Fig.3 intra operative picture post second debridement

During the second operation, ionotropic support became necessary, extubation was deferred, and the patient was transferred intubated to Critical Care Medicine. Antimicrobial therapy was escalated to meropenem, clindamycin, vancomycin, fluconazole, amikacin, and linezolid. A Ryle's tube was inserted and high-protein enteral feeding was started. The patient was extubated on postoperative day 3. Contrast-enhanced computed tomography dated 27/09/2024 showed an ill-defined pelvic collection tracking along the medial thigh into the extraperitoneal region, bulky anterior abdominal musculature and psoas, and bilateral moderate pleural effusions.

The patient was transferred to the Surgical Intensive Care Unit on 01/10/2024. Wound debridement with vacuum-assisted closure dressing under intravenous sedation was performed on 04/10/2024 and repeated on 14/10/2024. Because of persistent sepsis, repeat wound and blood cultures were obtained. These later showed Klebsiella pneumoniae, followed by Acinetobacter baumannii and Burkholderia cepacia during the ward phase. Antimicrobial therapy was revised serially according to culture and sensitivity findings. During this prolonged inpatient period, the patient also required management of hypotension, tachycardia, chest pain, hyponatremia, hypomagnesemia, hypocalcemia, hypokalemia, anemia, and poor nutritional intake. Echocardiography showed preserved systolic function with ejection fraction 63%. Packed red blood cell transfusions were given on 23/10/2024, 29/10/2024, and 12/11/2024.

Fig.4 raw area post debridements

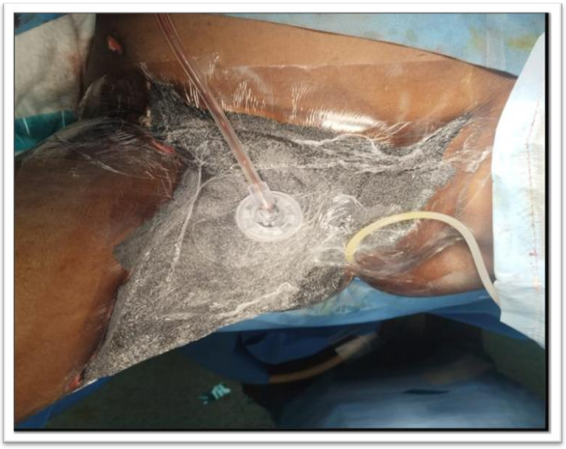

Fig.5 VAC dressing

After adequate control of sepsis and improvement in the wound bed, split-thickness skin grafting over the lower abdominal wall, right thigh, and vulval raw areas was performed under general anesthesia on 04/11/2024. Vacuum-assisted closure support was continued postoperatively. Graft uptake was 95% on postoperative day 5. At discharge, the patient was hemodynamically stable, afebrile, tolerating oral diet, and had a healthy wound without active discharge.

Fig.6 intra operative picture for split skin grafting

Fig.7 first look after split skin grafting

Table I. Chronological timeline of clinical course

Date / Period	Event	Main findings / intervention
Initial presentation	Emergency admission	Lower abdominal pain, vomiting, urinary symptoms, and right labial swelling
Admission	Initial assessment	Stable vital signs; right labial erythematous indurated swelling measuring 5 x 5 cm
Early inpatient phase	Disease progression	Bleb formation with extension to the inguinal region and medial thigh
21/09/2024	First necrosectomy	Debridement of devitalized tissue from the inguinal region to the perineal base
23/09/2024	Repeat debridement	Severe sepsis; 300 mL pus drained from intermuscular and extraperitoneal planes
Postoperative period	Critical Care Medicine	Ventilatory support, ionotropes, antibiotic escalation, and enteral nutrition
27/09/2024	Review imaging	Persistent pelvic and thigh tracking collection with bilateral pleural effusions
01/10/2024	Shift to SICU	Continued sepsis monitoring and advanced wound care
04/10/2024	First VAC procedure	Debridement and vacuum-assisted closure dressing under intravenous sedation
14/10/2024	Second VAC procedure	Repeat debridement and vacuum-assisted closure dressing
24/10/2024 onward	Ward phase	Infectious Disease-guided revisions, transfusion support, and rehabilitation
04/11/2024	Reconstruction	Split-thickness skin grafting over the lower abdominal wall, right thigh, and vulva
Postoperative day 5	Early graft outcome	Graft uptake of 95%
Discharge	Final outcome	Hemodynamically stable, tolerating diet, and wound healthy

Table II. Microbiology and major antimicrobial escalation during hospital course

Stage	Microbiology / trigger	Main organisms / findings	Treatment revision
Initial admission	Vaginal swab and urine culture	Non-Candida albicans; urine sterile	Amoxicillin-clavulanate, metronidazole, and fluconazole
Early progression	Bleb swab	Escherichia coli	Referral for surgical management after local worsening
Post first surgery	Tissue and pus cultures	Multidrug-resistant Escherichia coli and Pseudomonas aeruginosa	Piperacillin-tazobactam and clindamycin
Critical Care Medicine	Severe sepsis after repeat debridement	Ongoing clinical deterioration	Meropenem, clindamycin, vancomycin, fluconazole, amikacin, and linezolid
SICU phase	Repeat wound and blood cultures	Klebsiella pneumoniae	Polymyxin and gentamicin according to sensitivity
Ward phase	Persistent fever and tachycardia with repeat cultures	Acinetobacter baumannii and Burkholderia cepacia	Teicoplanin, cotrimoxazole, cefoperazone-sulbactam, and continued polymyxin B

One important takeaway from this case is the significance of multiple source controls. The failure of septic physiology post the initial procedure was not attributable to surface signs, but rather an active sub-surface infection that could be seen through repeat surgery. Early repeat surgery facilitated the drainage of pus in between muscle planes and outside the peritoneum and possibly changed the course of systemic decline. Recent consensus recommendations advocate for early and multiple surgical procedures as key components in the treatment of necrotizing soft tissue infections (Zhou *et al*., 2025), with multiple surgical strategies being more successful in vulvar necrotizing fasciitis cases (Rabbani *et al*., 2022).

The emerging changes in the microbiology were also significant. For the patient, there were several pathogens that included multidrug-resistant *Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Acinetobacter baumannii,* and *Burkholderia cepacia.* The change in the microbiology necessitated that antimicrobials be adjusted based on serial cultures and not based on one empirical approach. There are also other previous cases reported in medical literature that emphasize the importance of aggressive management and constant evaluation (Razvi *et al*., 1998). Other studies have reported the growing importance of multidrug-resistant pathogens in cases of vulvar necrotizing fasciitis (Bento *et al*., 2022), along with the possibility that non-traditional pathogens such as fungi could play an important role (Chantzi *et al*., 2025). Furthermore, polymicrobial infections remain a defining feature influencing disease progression and prognosis (Naamany *et al*., 2021).

Recovery was not dependent on surgery alone. The Critical Care Medicine approach allowed for ventilation, hemodynamic stability, and nutrition to commence. The Surgical Intensive Care Unit allowed for repeated debridement using negative pressure wound therapy as well as monitoring. Correction of dyselectrolytemia, anemia, and hypoalbuminemia had to occur before any reconstructive surgery could take place. Gender-based outcome research has shown that timely critical care and multidisciplinary approach contribute to patient survival in Fournier's gangrene (Belinchón-Romer *et al*., 2024), while the same has been reported for obstetric and gynecological necrotizing infections (Belokrinitskaya *et al*., 2024). The final graft take of 95% highlights the significance of staged wound preparation, which was followed by deferred definitive cover. There is ample evidence in the literature regarding the role of reconstruction modalities, such as split thickness grafts, in the post-debridement phase (Michael *et al*., 2022; Susini *et al*., 2024). The application of structured algorithms in reconstructive procedures following infection control further stresses the role of staged reconstruction (Gabriel *et al*., 2025). Principles of general critical care, including hemodynamic stability and metabolic correction, must still be considered General critical care principles, including hemodynamic stabilization and metabolic correction, also remain essential components of management (Blair and Piccicacco, 2020).

5. CONCLUSIONS

Resistant vulval necrotising fasciitis is a rare but highly destructive infection that may progress rapidly despite modest early findings. Early suspicion, repeated debridement, multidisciplinary critical care, serial microbiological reassessment,

nutritional and metabolic optimization, and delayed reconstruction are essential for survival and wound healing. The present case shows that even severe disease with prolonged sepsis can be managed successfully through coordinated staged treatment.

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