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# From Benign to Brutal: A Breast Infection Gone Rogue - A Case of Necrotizing Fasciitis of the Breast

**Dr. MD Mustafa[1], Dr. Manjunath H.R[1], Dr. Lakshminarayan[1], Dr. Kalavathi[1], Dr. Anil[1]**

[1]Department of General Surgery, Sapthagiri Institute of Medical Sciences and Research Centre, Bangalore, India

Correspondence: Dr. MD Mustafa

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## ABSTRACT

**Background:** Necrotizing fasciitis (NF) of the breast is an exceedingly rare, rapidly progressive, and potentially life-threatening soft tissue infection involving the subcutaneous tissue, superficial fascia, and overlying skin. It represents a true surgical emergency with high morbidity and mortality if not recognized and managed promptly.

**Case Summary:** We report a case of a 65-year-old female presenting with a one-month history of progressive pain and swelling of the right breast. Clinical examination revealed a 3×4 cm wound in the upper outer quadrant with foul-smelling discharge, slough, and surrounding fluid-filled blebs with crepitus. Laboratory investigations demonstrated leukocytosis (TLC 21,850 cells/µL) with neutrophilia (94%), elevated serum sodium (159 mmol/L), serum creatinine (3.3 mg/dL), decreased hemoglobin (9.8g/dl) and elevated CRP (201mg/L) with Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score of 11. Gram staining identified Gram-negative organisms. The patient underwent emergency surgical debridement followed by mastectomy and reconstruction using a split thickness skin grafting.

**Conclusion:** Early clinical suspicion, prompt microbiological evaluation, and aggressive surgical management are critical to favourable outcomes in NF of the breast. The LRINEC score serves as a valuable adjunct in diagnosis. Staged surgical management comprising emergency debridement, mastectomy, and split thickness skin grafting surgery resulted in a satisfactory outcome in our case.

***Keywords:*** Necrotizing fasciitis, breast, LRINEC score, surgical debridement, mastectomy, split thickness skin grafting, soft tissue infection

## 1. INTRODUCTION

Necrotizing fasciitis (NF) is a severe, rapidly spreading necrotizing infection of the soft tissues that primarily involves the subcutaneous tissue and superficial fascia, with characteristic sparing of the underlying muscle in early stages. It was first described by Wilson in 1952, who coined the term, though cases consistent with the clinical picture had been documented as far back as the American Civil War era by Joseph Jones. NF of the breast is exceptionally uncommon in routine surgical practice, with only a limited number of cases reported in the global literature. It's rarity, combined with a potentially insidious onset that may mimic other common breast conditions such as breast abscess or mastitis, poses a significant diagnostic challenge. Delay in diagnosis is directly associated with increased morbidity, mortality, and the extent of tissue loss.

The infection may arise idiopathically or secondary to breast surgery, trauma, or other predisposing conditions. The causative organisms may be monomicrobial or polymicrobial with Streptococcus pyogenes and Gram-negative enteric organisms being commonly implicated. The mainstay of treatment remains aggressive surgical debridement combined with broad-spectrum antibiotics, with mastectomy often required for adequate source control, and reconstructive procedures employed for restoration of form and function.

We present this case to highlight the diagnostic challenges and underscore the importance of prompt, aggressive, multi-disciplinary surgical management in achieving a favourable outcome. A review of the relevant literature is provided to contextualize our management approach within contemporary evidence.

## 2. CASE REPORT

### *2.1 Patient History and Presentation*

A 65-year-old female presented to the emergency department of the Department of General Surgery, Sapthagiri Institute of Medical Sciences and Research Centre, Bangalore, with a chief complaint of severe pain and progressive swelling over the right breast of one month duration. The onset was insidious, with gradual worsening over the preceding weeks. There was no history of preceding trauma, previous breast surgery, breast abscess, or nipple discharge. No significant past medical or surgical history was elicited. The patient denied any history of diabetes mellitus, immunosuppression, or prolonged steroid use.

### *2.2 Clinical Examination*

**General examination:** The patient was conscious, oriented, and in significant discomfort. Vital signs on presentation included elevated temperature, tachycardia, and borderline hypotension, consistent with systemic inflammatory response.

**Local examination — Inspection:** A wound measuring 3×4 cm was identified in the upper outer quadrant of the right breast. The wound was circular in shape, with sloping, ill-defined margins. The floor was covered with foul-smelling purulent discharge and necrotic slough. Multiple fluid-filled blebs (bullae) were present in the surrounding skin. Generalised fullness of the right breast was noted. The nipple-areolar complex appeared grossly normal. No skin dimpling or retraction was observed.

**Local examination — Palpation:** All inspection findings were confirmed on palpation. There was localised rise of temperature and exquisite tenderness over the affected area. Pitting oedema of the right breast was present. Multiple discharging blebs were identified on palpation. Crepitus was elicited in the perilesional tissue, strongly suggesting subcutaneous gas production by anaerobic organisms — a pathognomonic finding of necrotizing soft tissue infection. The left breast was clinically normal.

### *2.3 Investigations*

Haematological investigations revealed a markedly elevated total leucocyte count (TLC) of 21,850 cells/µL with neutrophilia of 94%, with elevated CRP levels(201mg/L) consistent with a severe bacterial infection with decreased hemoglobin (9.8 g/dl). Renal function tests demonstrated significantly elevated serum creatinine (3.3 mg/dL), with elevated serum sodium levels (159 mmol/L) indicating acute kidney injury, likely secondary to systemic sepsis and haemodynamic compromise.

The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score, which incorporates C-reactive protein, total white cell count, haemoglobin, serum sodium, serum creatinine, and blood glucose, was calculated at 11 points. A score ≥8 is considered strongly predictive of necrotizing fasciitis, and a score of ≥10 is considered diagnostic in the appropriate clinical setting. Our patient's score of 11 thus provided strong laboratory corroboration of the clinical diagnosis.

Gram staining of a tissue biopsy specimen from the affected breast tissue revealed Gram-negative bacilli exclusively. No Gram-positive organisms were identified. Cultures

were sent for further microbiological characterisation and sensitivity testing to guide targeted antibiotic therapy.

Imaging investigations including ultrasound and computed tomography (CT) of the chest and breast were performed to delineate the extent of fascial involvement, identify subcutaneous gas, and rule out deeper tissue involvement prior to operative planning.

### *2.4 Operative Management*

Following haemodynamic stabilisation, fluid resuscitation, and initiation of empirical broad-spectrum intravenous antibiotics (covering Gram-negative, Gram-positive, and anaerobic organisms), the patient was taken for emergency surgical intervention.

At the first operative stage, aggressive surgical debridement was performed. Intraoperative findings revealed extensive necrosis of the subcutaneous tissue and superficial fascia of the right breast, with characteristic "dishwater" fluid in the tissue planes, loss of tissue integrity, and absence of bleeding at the wound margins - all consistent with the intraoperative diagnosis of necrotizing fasciitis. All devitalised and necrotic tissue was excised until healthy; bleeding tissue margins were achieved. Wound swabs and tissue samples were collected for culture and histopathological examination (HPE).

Given the extensive tissue involvement and the inability to achieve adequate source control with debridement alone, the patient subsequently underwent mastectomy of the right breast. The decision to proceed to mastectomy was made in accordance with current surgical evidence, which supports total or radical mastectomy in cases where debridement alone is insufficient for source control.

Following confirmation of wound clearance and resolution of systemic sepsis, breast reconstruction was undertaken using a split thickness skin grafting. The reconstruction provided durable soft tissue coverage and an aesthetically acceptable result.

### *2.5 Postoperative Course*

The postoperative period was carefully monitored with serial wound reviews, regular dressing changes, and continued intravenous antibiotic therapy guided by culture and sensitivity reports. Renal parameters were closely monitored, and appropriate nephrology input was obtained. Histopathological examination of the excised breast tissue confirmed necrotizing fasciitis with extensive fascial necrosis and inflammatory infiltrate, with no evidence of underlying malignancy.

The patient showed progressive clinical improvement, with resolution of systemic inflammatory markers, healing of the flap, and satisfactory functional and aesthetic outcome. She was discharged after an adequate inpatient stay with instructions for regular outpatient follow-up for wound review and surveillance.

## 3. DISCUSSION

Necrotizing fasciitis of the breast represents one of the rarest presentations of this fulminant soft tissue infection, with only sporadic cases and small case series reported in the surgical literature. The majority of published cases have been described in English-language journals, and systematic reviews provide the most comprehensive epidemiological data currently available.

Two recent systematic reviews of primary NF of the breast have collectively identified that approximately 52.5% of reported cases were idiopathic in nature, while 37.5% were secondary to prior breast surgery, trauma, or other predisposing procedures. Our case was idiopathic, with no identifiable precipitating event, trauma, or prior breast surgery — consistent with the most frequently reported aetiological category. This finding underscores the unpredictable nature of this condition and highlights that absence of a predisposing factor should not preclude clinical suspicion.

Microbiologically, mixed polymicrobial infections were most commonly identified in 42.5% of reviewed cases, while monomicrobial infection with Streptococcus pyogenes accounted for approximately 37.5%. In our case, Gram staining identified Gram-negative organisms exclusively, a

finding that directs empirical antibiotic selection toward agents with broad Gram-negative and anaerobic coverage. The relative absence of Gram-positive organisms is an important consideration in antibiotic stewardship for such cases.

The LRINEC scoring system, originally developed and validated by Wong et al., remains a clinically useful adjunct in the risk stratification of patients with suspected necrotizing soft tissue infections. Scores of ≥6 suggest an elevated risk, scores of ≥8 carry high predictive value, and scores ≥10, as observed in our patient (score: 11), are considered highly diagnostic in the correct clinical context. While not a substitute for clinical judgment, the LRINEC score enables clinicians to escalate surgical decision-making with greater confidence and reduces diagnostic delays.

With respect to surgical management, the systematic review data indicate that total or radical mastectomy was performed in 52% of reported NF of the breast cases to achieve adequate source control. Excisional debridement without mastectomy accounted for 32%, while partial mastectomy was performed in 12% of cases. The surgical approach in our case — staged emergency debridement followed by mastectomy — is thus consistent with the predominant management strategy reported in the literature and reflects the principles of optimising source control while stabilising the patient between operative stages.

Breast reconstruction following mastectomy for NF presents a unique challenge, given the risk of wound contamination, compromised wound bed, and systemic debilitation at the time of primary surgery. We employed a split thickness skin grafting for reconstruction, which provided reliable vascularised tissue coverage and an aesthetically acceptable outcome.

Advanced age, as in our patient, has been identified as a risk factor for adverse outcomes in NF due to associated comorbidities and physiological reserve limitations. The concurrent acute kidney injury observed in our patient required close renal monitoring and interdisciplinary management, emphasising the importance of a multi-disciplinary approach involving surgery, nephrology, infectious disease, and critical care specialists.

## 4. CONCLUSION

Necrotizing fasciitis of the breast is a rare but life-threatening surgical emergency that demands a high index of clinical suspicion, particularly in elderly patients presenting with rapidly progressive breast infection and systemic signs of sepsis. The LRINEC scoring system is a valuable diagnostic adjunct that can facilitate timely surgical intervention. The mainstay of treatment remains prompt, aggressive surgical debridement with broad-spectrum antibiotic therapy. Mastectomy may be necessary for adequate source control, and staged reconstructive surgery using split thickness skin grafting is a reliable option.

In our case, early surgical decision- making, appropriate intraoperative debridement, definitive mastectomy, and subsequent skin grafting resulted in a satisfactory clinical outcome. This case adds to the limited body of published literature on NF of the breast and reaffirms the principles of aggressive, timely, and staged surgical management as the cornerstone of treatment.

**Authors' Contributions:** All authors contributed to the clinical management of the patient, manuscript preparation, and revision. All authors have read and approved the final manuscript.

### *Declaration by Authors*

**Patient's consent:** Written informed consent was obtained from the patient for publication of this case report and any accompanying images. Patient confidentiality has been maintained throughout.

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**Conflict of Interest:** The authors declare no conflict of interest.

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