

# A fatal case of necrotizing fasciitis caused by *Escherichia coli* after road traffic accident

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## ABSTRACT:

- **Objective:** Necrotizing fasciitis is a life-threatening skin infection that causes necrosis of subcutaneous tissue and fascia causing high mortality. Monomicrobial necrotizing fasciitis (type II) usually is caused by group A streptococcus.
- **Case presentation:** We report an exceptional case of *Escherichia coli* induced necrotizing fasciitis in a young male after a road traffic accident.
- **Conclusions:** Early diagnosis and prompt initiation of antibiotics along with aggressive debridement could lead to a better outcome.
- **Keywords:** Necrotizing fasciitis, Road traffic accident, Gram negative bacteria, *Escherichia coli*, Sepsis.

## INTRODUCTION

Necrotizing fasciitis is a severe disease leading to necrosis of subcutaneous tissue and fascia with high mortality, even with antibiotic therapy and surgical debridement. Monomicrobial necrotizing fasciitis (Type II) is typically caused by group A streptococcus, and among gram negatives, *Vibrio* and *Aeromonas* are well-known causative organisms of type II necrotizing fasciitis. *Escherichia coli* is a rare cause of necrotizing fasciitis. We report a fatal case of necrotizing fasciitis caused by *Escherichia coli* in a young male after a road traffic accident.

## CASE REPORT

A 24-year-old male presented to the Emergency Department of our Max Super Specialty Hospital, Ghaziabad, India with complaints of weakness and inability to move both lower limbs associated with a lacerated wound over the right knee following a road traffic accident. He had a history of falling off his two-wheeler two days back, resulting in the lacerated wound over his right knee

which was sutured at an outpatient setup from a local practitioner in Gwalior city (India). Later, he developed a low-grade fever the next morning associated with inability to move both legs from below the hip joint on the next day and was referred to the Max Super Specialty Hospital, Ghaziabad (India) with provisional diagnosis of Guillain Barre syndrome after receiving an injection of methylprednisolone.

He was conscious, oriented to time, place and person. His pulse rate was 140/minute, regular, low volume, respiratory rate 22/minutes, blood pressure (BP) 70/40 mmHg and oxygen saturation (SpO<sub>2</sub>) 94% on room air. Examination revealed no pallor, icterus, cyanosis, lymphadenopathy, edema. Examination of the affected knee showed an approximately 12 cm x 0.5 cm was present over the right knee associated with swelling and tenderness on palpation. Systemic examination showed decreased power in lower limb with power 2/5, rest of the systemic examination was normal. He was initiated with empirical broad-spectrum antibiotic, ceftriaxone along with fluid resuscitation and other supportive measures. However, he continued to be in shock, so inotropes were started after fluid resuscitation.



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Arterial blood gas revealed severe metabolic acidosis. Blood workup showed normal hemoglobin (Hb 12.5 g/dl), normal leucocyte count (TLC  $4.99 \times 10^9/L$ ) with thrombocytopenia (platelet count  $135 \times 10^9/L$ ). Liver function test revealed indirect hyperbilirubinemia with transaminitis (total bilirubin 3.5 mg/dl, indirect bilirubin 2.9 mg/dl, SGOT 29.7 U/L, SGPT 326 U/L). Renal function showed acute kidney injury (81.3 mg/dl, creatinine 4.4 mg/dl, sodium 140 mEq/L, potassium 5.6 mEq/L). Acute phase reactants were elevated (CRP 458.4 mg/dl, ESR 78 mm/hr, Ferritin 533.9 ng/dl, D-dimer 2891 ng/dl). Serum procalcitonin was 31.54 ng/dl. Urine routine and microscopy showed proteinuria 2 plus. Chest X ray PA view and USG whole abdomen revealed no abnormality.



**Figure 1.** X ray right Leg AP showed diffuse soft tissue swelling along the suprapatellar, infrapatellar regions with air lucencies within. Small, calcified densities were noted along the lateral aspect of upper leg.

His condition deteriorated further with oliguria, severe metabolic acidosis, hypotension, and decreased oxygen saturation. His antibiotic changed to meropenem and teicoplanin and inotropic support continued and as his respiratory failure worsened, he was put on ventilator support.

X ray right Leg AP/Lateral showed diffuse soft tissue swelling along the suprapatellar, infrapatellar regions with air lucencies within. Small, calcified densities were noted along the lateral aspect of upper leg (Figures 1 and 2). Debridement of the wound was done, and the pus revealed the presence of showed gram negative bacilli. Blood, pus, and tissue culture yielded growth of *Escherichia coli* resistant to meropenem, piperacillin/tazobactam, amoxicillin and sensitive to ceftriaxone, cefepime, tigecycline.

However, his condition further deteriorated, and he succumbed to this fulminant infection.

## DISCUSSION

Necrotizing fasciitis is a severe disease causing necrosis of subcutaneous tissues and fascia with mortality of 30%<sup>1</sup>. Two types of necrotising fasciitis that have been



**Figure 2.** X ray right Leg Lateral showed diffuse soft tissue swelling along the suprapatellar, infrapatellar regions with air lucencies within. Small, calcified densities were noted along the lateral aspect of upper leg.

described namely, Type I necrotizing fasciitis is polymicrobial infection of at least one anaerobe commonly *Bacteroides* or *Peptostreptococcus* combined with facultative anaerobic species. Type II necrotizing fasciitis is caused by infection with group A *Streptococci* alone or in combination with other species<sup>2</sup>. However, our patient had rapidly evolving necrotizing fasciitis caused by *Escherichia coli*, spread through soft tissue which resulted in patient death within 48 hours despite prompt debridement of wound and aggressive antibiotic treatment. Li et al<sup>3</sup> presented a case of necrotizing fasciitis with *Escherichia coli* in a patient of nephritic syndrome. Grimaldi et al<sup>4</sup> reported another case of monomicrobial infection *Escherichia coli* necrotizing fasciitis in a patient with aplastic anaemia. Shaked et al<sup>5</sup> reported a case series of 7 cases on flesh eating strains of *Escherichia coli* with CNF1 toxin gene, which resulted in the death of all cases and 3 died within 48 hours of admission. All the patients had history of one or more chronic disease including malignancy, chronic liver disease, chronic renal failure<sup>5</sup>. However, our patient was an immunocompetent individual and had contracted the infection in a road traffic accident.

Chen et al<sup>6</sup> showed incidence of 1.6% cases of *Escherichia coli* causing necrotizing fasciitis with 1.6% and 4.9% isolation of organism from fascia and blood respectively<sup>6</sup>. Bekal et al<sup>7</sup> also reported a patient with history of lipectomy and bowel obstruction who underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy following which she had necrotizing fasciitis due to *Escherichia coli*.

Recommended empirical antibiotic therapy for skin, soft tissue infection, and Necrotizing fasciitis covers gram positive bacteria and includes penicillin or ampicillin plus clindamycin. However, with emergence of gram negative bacteria causing this life threatening infection, empirical therapy should include antibiotic with gram negative activity.

## CONCLUSIONS

Physicians need to be aware that necrotizing fasciitis can occur due to infection with *Escherichia coli*. Apart from covering gram-positive organisms, empirical antibiotic therapy should also provide cover against gram-negative organisms. Further research and study are required to mitigate and prevent the further spread of this emerging life-threatening infection.

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