

# An Ecthyma Gangrenosum Case Due to Staphylococcus in Early Neonatal Period

## Erken Neonatal Dönemde Stafilokoka Bağlı Ektima Gangrenozum Olgusu

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**ABSTRACT** Ecthyma gangrenosum (EG) is an invasive cutaneous infection commonly caused by *Pseudomonas aeruginosa*, but other microorganisms including bacterial, fungal and viral agents are also reported among the causes. It typically affects immunocompromised neutropenic patients and leads to septicemic infections and high mortality rate. It has been rarely reported in immunocompetent patients. And rarely the clinical presentation is only cutaneous lesion without bacteremia. Here, we report a 13 day-old newborn infant who was diagnosed as nonsepticemic form of EG, associated with a single, large necrotic ulcer on his jaw. The lesion dramatically improved with anti-pseudomonal antibiotics in three weeks. Early diagnosis and administration of appropriate antibiotics are essential and emergent especially for septic patients with EG. We would like to emphasize that it is crucial to clinically suspect EG even in newborn period to decrease the morbidity and mortality.

**Key Words:** Ecthyma; infant, newborn; *Staphylococcus aureus*

**ÖZET** Ektima gangrenozum (EG) genellikle etkeni *Pseudomonas aeruginosa* olan bakteriyel invaziv bir cilt enfeksiyonudur ancak birçok bakteriyel, fungal, viral etken de aynı klinik tabloya sebep olabilir. EG, özellikle bağışıklık sistemi baskılanmış, nötroopenik hastalarda septisemiye ve yüksek oranda mortaliteye yol açmaktadır. Nadiren bakteriyemi olmaksızın sadece cilt enfeksiyonu şeklinde ortaya çıkabilir. Ayrıca immünolojik olarak tamamen sağlıklı bireylerde de görülebilir. Burada 13 günlükken alt çenesinde gangrenöz ülsere lezyon ile başvuran, bakteriyemik olmayan EG tanısı konulan bir yenidoğan olgusu sunulmuştur. Lezyonda uygun antibiyotik tedavisi ile üç hafta içinde belirgin gerileme kaydedilmiştir. Tedavide erken tanı ve uygun antibiyotiklerin kullanımı özellikle septik olgularda acil ve önemlidir. Morbidite ve mortalitenin azalabilmesi için EG'nin yenidoğan döneminde de akılda tutulması gereken bir ayırıcı tanı olduğunu bu olgu ile vurgulamak istedik.

**Anahtar Kelimeler:** Ektima; bebek, yenidoğan; *Staphylococcus aureus*

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**E**cthyma gangrenosum (EG) is an invasive cutaneous infection commonly caused by *Pseudomonas aeruginosa*, but other microorganisms including bacterial, fungal and viral agents are also reported among the causes.<sup>1</sup> EG is well-determined in critically ill and immunocompromised patients with *P. aeruginosa* septicaemia.<sup>2-4</sup> The classic clinical presentation of EG was described as an erythematous macule that develops into a hemorrhagic vesicle and finally necrotic deep ulcers with ecchymotic, gangrenous centres, bright red areolae and typical raised, purplish, in-

durated, rolled-out edges.<sup>5,6</sup> It typically affects immunocompromised neutropenic patients and leads to septicemic infections and high mortality. EG can be diagnosed in any age, but reported cases mostly consist of infants and elderly patients but rarely newborns. In this report, we describe a 13 day-old newborn infant who was diagnosed with a non-septicemic form of EG, associated with a single, large necrotic ulcer on his jaw.

## CASE REPORT

A 13 day-old, 3,400 g full-term male baby admitted to our hospital with a necrotic, crater shaped lesion on his jaw. He was born to consanguineous parents following an uncomplicated pregnancy by vaginal delivery at 38<sup>th</sup> weeks of gestation. On the third day of life, an erythematous papule was noticed on his jaw. According to his history, a local anti-bacterial cream was recommended from a doctor but the lesion progressively enlarged and became a suppurative abscess within 10 days. On physical examination, a single, punched out, crater shaped, black coloured gangreneous ulcer measuring 2x2.5 cm was seen on his jaw. The margins were irregular, indurated with central black eschar and yellowish exudate (Figure 1). On admission, the infant was tachypneic with an oxygen saturation of 92% in room air. He had a respiratory rate of 65/min, heart rate of 168 beats/min, and blood pressure of 65/35 mmHg. Although auscultation of the chest was normal, the chest X-ray revealed right parac-



FIGURE 1: Ecthyma gangrenosum lesion in admission.

ardiac infiltration. X-ray of mandibula was normal, there was no bone destruction.

The results of initial hematologic tests were as follows: hemoglobin, 14.5 g/dL; hematocrit, 43.7%; white blood cell count,  $16.7 \times 10^9/L$ ; platelet count,  $448 \times 10^9/L$ ; mean corpuscular volume, 77.3 fL; and absolute neutrophil count,  $4.75 \times 10^9/L$ . A peripheral smear showed 54% lymphocytes, 35% neutrophils, and 11% monocytes, but no atypical cells. The results of blood biochemistry analyses including C-reactive protein were within the reference ranges. Age-related levels of serum IgA, IgG, and IgM were within normal limits. Echocardiography revealed atrial and ventricular septal defect with first degree tricuspid insufficiency. Based on the suspicion of EG, vancomycin intravenous (iv) (10 mg/kg/dose, every 12 hours), ceftazidime i.v (30 mg/kg/dose, every 8 hours) and ampicillin i.v (15 mg/kg/day every 24 hours) were administered empirically consisting of anti-pseudomonal antibiotics. Also local antibacterial treatment was initiated with rifampin and nitrofurazone. The treatment continued three weeks. Blood cultures for pyogenic bacteria and fungus were sterile. However, culture of exudate taken from the ulcer was positive for *methiciline sensitive Staphylococcus aureus*. On the following days, the lesion dramatically improved, with stable vital signs and scar on his jaw he was discharged on the 21<sup>st</sup> day of hospitalisation (Figure 2). Informed consent was obtained from parents of the infant.

## DISCUSSION

EG is a serious cutaneous infection which is caused by *Pseudomonas aeruginosa*, *S. aureus*, *Aeromonas hydrophilia*, *Enterobacter* species, *Proteus* species, *Burkholderia cepacia*, *Serratia marcescens*, *Aspergillus* species, *Mucor* species, *Escherichia coli* and *Candida* species.<sup>7,8</sup> An investigator from Japan reported that *Staphylococcus* species were responsible for 60% of EG cases, *Streptococcus* species and *Pseudomonas* species were detected in 40% of EG cases.<sup>9</sup> Similarly, culture of exudate taken from the lesion of our case was positive for *methiciline sensitive S. aureus*.



**FIGURE 2:** Ecthyma gangrenosum lesion at discharge.

Two types of EG (septicemic, nonsepticemic) have been described based on the pathogenesis. Classical EG is associated with sepsis (often with *P. aeruginosa*), and skin involvement (often in plicae region) occurs via the hematogenous route.<sup>3,8</sup> The mortality rate of this type of EG in immunocompromised patients reaches to 38-77%.<sup>7,10</sup> The nonsepticemic type is more benign, and skin involvement occurs by the inoculation of the pathogenic agent through the skin. This type of EG can develop in immunocompetent patients or in patients who have transient tendency for infections.<sup>11</sup> The mortality of nonsepticemic EG is (15%) which is lower than the septicemic type of EG.<sup>7,11</sup> However, the lesions of both forms appear as multiple lesions.<sup>3</sup> And, 57% of the lesions were observed in gluteal and perianal regions, 30% in extremities, 6% in trunk and 6% in face.<sup>7,12</sup> The presentation of our case was compatible with the nonsepticemic type in terms of clinical severity, and immunologic normality. The infant was suffering from a single lesion of EG on his jaw and pneumonia. Neonatal pneumonia can be acquired transplacentally, by aspiration of infected amniotic fluid or hematogenously. Respiratory distress, tachypnea, retractions, grunting, fever, cyanosis, apnea, tachycardia are the possible clinical findings in neonatal pneumonia.<sup>13</sup> Clinically, our patient was tachypneic due to pneumonia but he was breastfeeding without desaturation. There was no temperature instability, apnea or feeding difficulties. Although pneumonia

might be a clinical manifestation of early onset sepsis, neither septic markers nor his blood cultures supported sepsis. Neonatal pneumonia is caused by many of the same pathogens associated with neonatal sepsis. However, in a population based surveillance study *Staphylococcus* species was reported as an agent in 14% of the early onset sepsis.<sup>14</sup> In summary, the interesting points of our case were as follows; the infant was nonsepticemic, immunocompetent and he had a single lesion in a rare localization which was caused by a relatively rare agent.

To date, there have been limited data on EG in newborn infants. In 1978, Ghosal et al.<sup>15</sup> reported a series of 35 preterm infants (6 to 23 days of age) with a gangrenous lesion of the nose, eyelids, oral cavity, anal region and genitalia that they named these lesions as noma neonatorum. *P. aeruginosa* was isolated in most of the skin lesions (96%), and 86% of them also had *Pseudomonas* sepsis with positive blood cultures. The outcome was generally mortal. Similarly, another author reported a preterm infant with noma neonatorum and declared that noma neonatorum represented a neonatal form of EG. Both of the clinical pictures are similar, and the terminological difference is unclear. Recently reported newborn cases with EG were again preterms.<sup>6</sup> Another newborn infant with EG was a harlequin baby and the agent was *P. aeruginosa*.<sup>16</sup> However, *Candida albicans* was detected in a 12 day old newborn infant with EG.<sup>17</sup> The predominance of prematurity among newborn cases with EG make us think about immunodeficiency of preterm infants.

A detailed immunological evaluation is intensely recommended for patients suffering from EG. Basically, a complete blood count will help the diagnosis of cyclic neutropenia, transient neutropenia or chronic neutropenia. However, not only quantitative but also qualitative disorders of neutrophils are important risk factors for EG.<sup>7,15,18</sup> Also, it should not be forgotten that viral infections, usage of wide-spectrum antibiotics and *Pseudomonas* infections by itself may cause transient neutropenia. The basic immunological evaluation of our patient was normal. Follow-up

examinations performed afterwards were also completely normal.

In conclusion, based on this case, we would like to emphasize that it is crucial to clinically suspect

EG even in newborn period and immediately initiate empiric antibiotic therapy covering *Pseudomonas* species and *Staphylococ* species to decrease the morbidity and mortality.

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