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### Title

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### Journal

Dermatology Online Journal, 24(11)

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### Publication Date

2018

### DOI

10.5070/D32411042009

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# *Escherichia coli*-infected cephalohematoma in an infant

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## Abstract

We report a case of *Escherichia coli* infection of a cephalohematoma in an infant delivered by vacuum extraction. After excluding potential complications, the patient was treated with intravenous ceftriaxone while hospitalized followed by oral cephalexin after discharge. Infection is a rare but serious complication of cephalohematomas in the newborn period. *Escherichia coli* is the most common pathogen responsible for infected cephalohematomas. Clinicians should be aware that infected cephalohematomas may be complicated by sepsis, meningitis, or osteomyelitis.

**Keywords:** *Escherichia coli*, infected cephalohematoma, neonatal

## Introduction

Cephalohematomas are a common among neonates, but infected cephalohematomas are rare. Risk factors for infected cephalohematomas include instrument-assisted deliveries, bacteremia, and cellulitis. The most common pathogen is *Escherichia coli*, although *Staphylococcus aureus* and *Proteus* species are also common. Complications include sepsis, meningitis, and osteomyelitis. Standard therapy includes surgical drainage and antibiotics. We report an uncomplicated case of a vacuum extraction-associated infected cephalohematoma in a 5-week-old infant due to *E. coli* that was managed with antibiotics only.

## Case Synopsis

A 5-week-old full-term male infant, delivered by

vacuum extraction, was evaluated by the pediatric dermatology consultant in the emergency department for drainage from two nodules overlying a cephalohematoma. The mother initially noticed the cephalohematoma at two weeks of age. One week prior to presentation, nodules within the cephalohematoma appeared and subsequently began enlarging and draining. He was treated with mupirocin and warm compresses, with no improvement. Physical examination revealed an afebrile and well-appearing infant with a large, boggy, uniform swelling occupying much of the caudal half of the right parietal scalp, without crossing suture lines. There were two superimposed discrete, fluctuant, erythematous nodules, each



**Figure 1.** Cephalohematoma with two superimposed fluctuant nodules measuring 1.2×1.2cm and 1.5×1.5cm.

greater than 1cm in size, with overlying desquamation (**Figure 1**). Laboratory testing revealed a white blood cell count of 19,400 cells/ $\mu$ L with 49% neutrophils. C-reactive protein was within normal limits. Ultrasound suggested a cephalohematoma with two elevated cutaneous nodules, consistent with an inflammatory process with associated granulation tissue but without any drainable abscesses.

The patient was admitted to the hospital, intravenous ceftriaxone was initiated, and sterile wound culture performed upon initial dermatology evaluation. This later demonstrated *E. coli*. Blood cultures were negative. Magnetic resonance imaging of the brain with contrast ruled out underlying osteomyelitis and intracranial extension. Lumbar puncture was unsuccessfully attempted. The patient was diagnosed with *E. coli* infected cephalohematoma and discharged on a 7-day course of oral cephalixin after a 3-day hospitalization. The nodules continued to decrease in size and aspiration obtained 21 days after discharge showed no growth.

## Case Discussion

Cephalohematomas, which occur in 1-2% of all deliveries, are caused by the traumatic rupture of subperiosteal vessels and are more common when the delivery is assisted by forceps, vacuum, or scalp electrode [1, 2]. Most cephalohematomas resolve spontaneously within weeks and infection is a rare complication. In addition to instrumentation-assisted delivery, risk factors for infected cephalohematoma include neonatal bacteremia with secondary seeding and overlying cellulitis [2, 3]. Early infection within the first two weeks of life is often the result of hematogenous seeding, whereas infection of a cephalohematoma after three weeks is typically related to an overlying cellulitis [3]. *E. coli* is the most common pathogen isolated from infected cephalohematomas, responsible for 57% of cases in a retrospective study of 28 cases [4]. The second and third most common pathogens are *S. aureus* and

*Proteus spp.* However, a number of other bacteria have been reported, including Group E *Salmonella*, Group B *Streptococcus*, Coagulase-negative *Staphylococcus*, *Klebsiella pneumoniae*, *Streptococcus pneumoniae*, *Morganella morganii*, and *Escherichia hermannii* [2, 4-6]. Typical laboratory abnormalities include leukocytosis and elevated C-reactive protein [4].

In addition to infected cephalohematoma, the differential diagnosis of an infantile scalp nodule or mass includes liquefying cephalohematoma forming a seroma, and vascular tumors and malformations such as infantile hemangiomas and lymphatic malformations. Benign and malignant neoplasms, such as myofibromas, congenital juvenile xanthogranulomas, and rhabdomyosarcomas may be in the differential diagnosis. Furthermore, panniculitis, such as subcutaneous fat necrosis of the newborn, and embryologic cysts with an abscess, such as dermoid cysts may be considered.

Infected cephalohematomas vary in presentation, including purely local findings suggestive of infection, such as erythema, fluctuance, tenderness to palpation, and purulent drainage, along with systemic manifestations, such as poor oral intake, irritability, fever, and jaundice [1, 7, 8]. Infected cephalohematomas may also have serious complications, including sepsis, meningitis, osteomyelitis, and death [4]. Surgical drainage and antibiotic therapy guided by cultures is standard therapy. Magnetic resonance imaging is the preferred imaging modality for diagnosing underlying osteomyelitis, which may necessitate debridement of underlying necrotic bone [1, 2, 4]. When meningitis is suspected, a lumbar puncture is an important diagnostic tool and treatment should include antibiotics with penetration of the blood-brain barrier [4, 5, 8, 9].

## Conclusion

Infection of cephalohematomas are rare but should be considered when fluctuant nodules develop, and *E. coli* should be recognized as a common pathogen.

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