Escherichia coli Bacteremia, Epididymo-Orchitis, and Scrotal Abscess in a Neonate

Julie E. Stark,1 Lilly A. Bellman,1 Sarah H. Kamel,1,2 Benjamin M. Whittam,1,3 John C. Christenson,1,2,4,6 and Emily C. Webber1,2,5,6

1Indiana University School of Medicine, 2Department of Pediatrics, 3Department of Urology, 4Section of Pediatric Infectious Disease, 5Pediatric Hospital Medicine Program, and 6Riley Hospital for Children, Indianapolis, Indiana

Received December 13, 2011; accepted March 6, 2012; electronically published June 29, 2012.

Epididymo-orchitis (EO) is a rare but important cause of scrotal swelling in pediatric patients. EO is caused by bacteremia leading to hematogenous seeding or ascending infection of the urinary tract. EO can be associated with abscess, bacteremia, and other serious infections, and must be distinguished from other causes of scrotal swelling such as testicular torsion. We present a case of a 16-day-old male with EO, scrotal abscess, and bacteremia from Escherichia coli.

Key words. Epididymo-Orchitis; Scrotal Abscess; Neonatal Bacteremia

CASE REPORT

A 16-day-old previously healthy male infant presented with 11 hours of increasing right-sided scrotal swelling. The patient was born at 37 weeks’ gestation by spontaneous vaginal delivery. Prior to admission, he was breast-feeding well with appropriate weight gain. Upon arrival to the emergency department, he was irritable but afebrile and in no apparent distress. His scrotum was swollen and tender. The left testicle was palpable, but the right side was too swollen to palpate a testicle. Cremasteric reflex was not present on either side, but examination was limited by swelling.

The urology service was consulted due to concern for possible testicular torsion, and recommended testicular ultrasound as well as empiric antibiotics due to the patient’s age and concern for rapidly progressing infection. Blood and urine cultures were drawn, and a lumbar puncture attempted, but did not yield cerebrospinal fluid. Laboratory evaluation revealed a white blood cell count of 13.0 x 10^9 cells/L with 58% neutrophils and 12% bands. The complete metabolic panel and urinalysis were within normal limits. Scrotal Doppler ultrasound demonstrated findings compatible with right-side epididymo-orchitis (EO) as well as a small-to-moderately sized right hydrocele. The left testicle was normal. The patient was started on vancomycin and piperacillin-tazobactam and was admitted for further treatment and evaluation.

A renal Doppler ultrasound showed grade 2 left hydrenephrosis but no other abnormalities. At 24 hours, blood cultures grew Escherichia coli in aerobic and anaerobic bottles; however, his urine culture was negative. His therapy was changed to cefepime for central nervous system penetrance after E coli was identified, given the lack of cerebrospinal fluid for culture and the patient’s continued irritability. Over the next 24 hours, the infant’s scrotum continued to increase in size. A repeat scrotal ultrasound revealed increased testicular and epididymal vascular flow. The right-sided hydrocele appeared to be increasing in size, and new echogenic debris was seen within the scrotal fluid collection, which was consistent with EO.

On hospital day three, a fluctuant, erythematous fluid mass arose on the anterolateral portion of the right hemiscrotum, consistent with scrotal abscess (Fig. 1). The urology service performed an incision and drainage and placed a drain. The procedure yielded frank pus confirming the diagnosis of a scrotal abscess, as well as a wound culture that grew E. coli. In the days following drainage, the right scrotal swelling and erythema resolved. The patient was less irritable and feeding improved. The E. coli isolate from blood and the scrotal abscess was susceptible to all cephalosporins, and antimicrobial therapy was narrowed to cefotaxime as the patient improved. The drain was removed on the third postoperative day. The infant remained afebrile throughout his hospital course.

A follow-up testicular ultrasound scan performed on the ninth day of admission demonstrated improvement in
inflammatory changes involving the right hemiscrotum, right epididymis, and right testis. He completed 14 days of intravenous antibiotics, after which he was discharged home with prophylactic oral amoxicillin 20 mg/kg/d. This prophylaxis was continued until he completed a voiding cystourethrogram as an outpatient that was negative.

**DISCUSSION**

Acute scrotal swelling in pediatric patients can be a surgical emergency. Differentiating causes that require aggressive medical or surgical interventions (testicular torsion, scrotal abscess, EO, or other infections) from more benign causes such as a noninfected hydrocele is crucial to optimal outcomes. Distinguishing between testicular torsion (a surgical emergency) and EO (which is usually treated with antibiotics only) requires thorough evaluation.

This becomes difficult among young infants, as there is little literature on acute scrotum presentation in this population. One of the largest studies on the topic by Chiang et al. [1] is a retrospective study of infants with EO or testicular torsion over a 10-year period at their institution, and found only 16 infants under 3 months of age. In this series, the authors describe several clinical differences in presentation of neonates with testicular torsion versus EO that may aid in diagnosis. The majority of cases of EO presented with fever and pain as well as elevated white blood cell count and/or C-reactive protein. Patients with testicular torsion presented with painless swelling or mass and fewer systemic symptoms, and 4 of 7 patients with EO had positive urine cultures. When EO is associated with positive urine cultures, it is assumed to be a result of ascending primary infection of the urinary tract [1]; however, it is also possible for EO to occur through hematogenous spread with a negative urine culture. The latter occurred in our case, suggesting *E. coli* bacteremia that seeded the epididymis and testis.

Physical examination may or may not aid in diagnosis in this population. The presence of a cremasteric reflex excludes testicular torsion [2]; however, only 48% of healthy newborns will demonstrate the reflex, suggesting it is a less useful finding in boys under 2.5 years [3].

Doppler ultrasound remains the diagnostic study of choice to distinguish between testicular torsion and EO. Ultrasound findings for EO include increased blood flow and heterogeneous echogenicity of the inflamed epididymis and/or testicle. Testicular torsion demonstrates decreased or absent testicular blood flow. When there is equivocal blood flow on the color Doppler, scintigraphy may help finalize a radiographic diagnosis [4] and allow appropriate medical intervention to proceed.

One element of our case that is unusual is the patient’s age, as acute scrotum in the neonate is fairly rare. Testicular torsion has a distinct bimodal age distribution, with peaks in infancy and puberty. EO is generally more rare than testicular torsion before puberty [5] but has a similar distribution overall [6]. Among young infants, testicular torsion has been observed to be more common in patients younger than 1 month, while EO is more prevalent in the 1- to 3-month age group [1]. There are some reports of neonatal scrotal abscess [7, 8] and EO in older infants [1, 9]; however, there are few reports of EO cases less than 1 month of age, and only one other in which scrotal pus was aspirated [5].

The rapid progression of the scrotal swelling and development of abscess in our case is only described in one other case in an infant, and the timing of symptoms with EO is variable. In the case of an older infant [9], testicular swelling preceded the symptoms of meningitis caused by *E. coli*. Testicular findings may also lag behind systemic illness. This was demonstrated in the case of a neonate who was being treated for *E. coli* bacteremia and who developed scrotal symptoms after 5 days [10], suggesting that epididymal inflammation lagged behind the systemic sepsis syndrome. These cases stress the importance of aggressive investigation and treatment of testicular swelling at presentation for young infants, as well as close monitoring for development of systemic signs and symptoms in this population.

**CONCLUSION**

Although patients with EO usually present with fever, scrotal pain, and leukocytosis, the limited number of
reported cases of neonatal EO illustrate variation in presentation and clinical course. Physicians should institute aggressive antimicrobial therapy for suspected EO, particularly during infancy; additionally, consultation with pediatric urology services is prudent for initial guidance as well as possible complications that may arise, as they did in our case. There is not a significant amount of data regarding best practice for length of treatment, follow-up imaging, or future testicular function and fertility in these patients; however, early diagnosis and empiric antimicrobial therapy remain the standard.

Acknowledgments

Potential conflicts of interest: All authors: No reported conflicts.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

References