

Septic Arthritis in an Infant With Vesicoureteral Reflux and Urinary Tract Infection

Sharmila Nair, MD, and Morris J. Schoeneman, MD

ABSTRACT. A 4-week-old boy with previous urinary tract infection and documented vesicoureteral reflux presented with urosepsis and septic arthritis of the right hip. Compliance with prophylactic antibiotic therapy had been poor at home. Complications such as bone and joint infection are known to occur after urinary tract infection in children with urologic abnormalities. However, previous similar reports describe discovery of the urinary tract anomalies only as part of an evaluation performed after the systemic complications have occurred. The purpose of this report is to stress the importance of defining urinary tract abnormalities in a case of antenatal hydronephrosis or at the time of the first urinary tract infection in infants so that appropriate investigations, management, and support of parental compliance can be undertaken to avoid systemic complications. *Pediatrics* 2003;111:e195–e196. URL: <http://www.pediatrics.org/cgi/content/full/111/2/e195>; *septic arthritis, vesicoureteral reflux, urinary tract infection.*

ABBREVIATIONS. VUR, vesicoureteral reflux; UTI, urinary tract infection.

Infants with congenital vesicoureteral reflux (VUR) often develop ascending urinary tract infections (UTIs).¹ These may lead to bacteremia, urosepsis, and, rarely, suppurative complications such as osteomyelitis and septic arthritis.^{2,3} To date, 1 such case has been reported, but the urologic abnormality was detected only after discovery of septic arthritis caused by *Escherichia coli*.⁴ We describe the unusual case of an infant who had known congenital VUR and was poorly compliant with antibiotic prophylaxis and developed urosepsis and septic arthritis of the right hip.

CASE REPORT

A 4-week-old boy was admitted to the hospital with a 5-day history of diarrhea, vomiting, and fever. Physical examination showed mild dehydration, but the infant was otherwise normal. Examination of the hips revealed no tenderness or restriction of motion.

History revealed that he was the product of a 36-week gestation to a 34-year-old mother. The prenatal course was remarkable for fetal hydronephrosis but without oligohydramnios. Birth weight was 2.2 kg. A postnatal sonogram showed bilateral hydronephrosis, and a voiding cystourethrogram revealed bilateral grade 4

VUR. He had been placed on prophylactic antibiotic therapy at the time of discharge from the nursery, and urologic follow-up had been arranged to evaluate the need for subsequent ureteral reimplantation. The child's mother admitted to poor compliance with the administration of antibiotic prophylaxis, and she had not taken the child for urologic consultation.

A catheterized urine specimen grew >100 000 colonies/mL of *Klebsiella pneumoniae*, and a blood culture was negative. On the basis of the sensitivity pattern of the organism, intravenous ampicillin and third-generation cephalosporins were administered and the infant seemed to be doing well until the sixth day of therapy, when he stopped moving his right leg. Examination revealed the right hip held at partial flexion with signs of pain on passive motion. There was no history or physical evidence of trauma.

The white blood cell count was 18 200/mm³ on admission but had decreased to 9500/mm³ by the sixth day, with a sedimentation rate of 106. Renal function was normal (serum creatinine: 18 μM/L). Urinalysis revealed 50 to 60 white blood cells per high-power field, as well as highly positive reactions for nitrites and leukocyte esterase. Radiographs revealed soft tissue swelling of the right hip, and a bone scan showed asymmetrically increased signal activity in the right hip. The hip joint was aspirated and revealed growth of *K pneumoniae* with a sensitivity pattern identical to that of the urine culture. After 4 weeks of appropriate hip joint drainage and intravenous antibiotics, the patient was clinically well. However, follow-up plain films showed evidence of necrotic changes in the right proximal femur and acetabulum.

DISCUSSION

Childhood VUR is a manifestation of immaturity or congenital anomaly of the vesicoureteral junction.^{3,5,6} The child with VUR is at risk of pyelonephritis, renal scarring, hypertension, bacteremia, urosepsis, and hematogenous suppurative complications such as the septic arthritis seen in our patient.¹ The rate of VUR in children younger than 1 year with UTI approaches 50% in some series.¹ The International Study Classification of VUR into grades 1 to 5 is based on the extent of reflux and dilation of the ureter and renal pelvis. This grading system is clinically important because the natural history and risk of renal scarring vary by grade.³ Management is aimed at avoiding complications of VUR and may involve ureteral reimplantation surgery or, as in our case, long-term antibiotic prophylaxis while awaiting spontaneous ultimate resolution. During the 12 months or more of treatment, careful follow-up is indicated to diagnose and treat recurrences of pyelonephritis.

If pyelonephritis recurs, then bacteremia and urosepsis may develop. Septic arthritis is most often acquired by the hematogenous route; thus, the possibility of urosepsis leading to infection in a joint space such as the hip is of great concern.⁷ Occasionally, arthritis of the hip is attributable to direct extension of osteomyelitis through the metaphysis of

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the femoral neck into the joint space.² In either case, early and appropriate treatment with antibiotics and drainage is critical because of the tenuous vascular supply to the head of the femur and the risk of permanent joint disability.⁷ We know of only 1 other report of septic arthritis in a child with a genitourinary source.⁴ In that case, VUR was found as part of the evaluation of a child with septic arthritis of the left shoulder, caused by *E coli* found in the joint fluid, blood, and bone marrow. A study of septic arthritis by Jackson and Nelson² found *E coli*, *Klebsiella*, and *Enterobacter* to be the bacteriologic agent in only 7 of 351 patients in the newborn to 5-year-old age group. There is no evidence that the urinary tract of any of these 7 children was investigated for urologic abnormalities. In contrast, *Haemophilus influenzae* and *Staphylococcus aureus* accounted for 146 of the infections in this group. Similarly, a more recent review reported only 23 cases of septic arthritis caused by Gram-negative enteric organisms in a group of 574 children in the newborn to 5-year-old age group.⁸

Although our case represents a rare presentation, it underscores the importance of thoroughly evaluating a young child with antenatal hydronephrosis or a first UTI to avoid missing an anatomic anomaly such as VUR. If VUR or other less common urologic abnormalities are discovered, then they must be managed appropriately to minimize the risk of re-

current pyelonephritis and its attendant renal and extrarenal suppurative complications. When long-term antibiotic prophylaxis is the treatment of choice, as in our patient's case, close contact with the family is vital to maximize compliance with the drug regimen.

REFERENCES

1. American Academy of Pediatrics, Committee on Quality Improvement, Subcommittee on Urinary Tract Infection. Practice parameter: the diagnosis, treatment, and evaluation of the initial urinary tract infection in febrile infants and young children. *Pediatrics*. 1999;103:843-852
2. Jackson MA, Nelson JD. Etiology and management of acute suppurative bone and joint infections in pediatric patients. *J Pediatr Orthop*. 1982;2:313-323
3. Report of the International Reflux Study Committee. Medical versus surgical treatment of primary vesico-ureteral reflux. *Pediatrics*. 1981;67:392-400
4. Egan SC, LaSalle MD, Stock JA, Hanna MK. Septic arthritis secondary to vesicoureteral reflux into single ectopic ureter. *Pediatr Nephrol*. 1999;13:932-933
5. Report of the International Reflux Study Committee. Medical versus surgical treatment of primary vesicoureteral reflux: a prospective international reflux study in children. *J Urol*. 1981;125:277-283
6. DeVargas A, Evans K, Ransley P, et al. A family study of vesicoureteral reflux. *J Med Genet*. 1978;5:85-96
7. Krogstad P, Smith AL. Osteomyelitis and septic arthritis. In: Feigin RG, Cherry JD, eds. *Textbook of Pediatric Infectious Diseases*. 4th ed. Philadelphia, PA: WB Saunders; 1998:698-703
8. Trujillo M, Nelson JD. Suppurative and reactive arthritis in children. *Semin Pediatr Infect Dis*. 1997;8:242-249

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