

# *Peptostreptococcus asaccharolyticus* Renal Abscess: A Rare Cause of Fever of Unknown Origin

Veronica A. Mas Casullo, MD\*; Edward Bottone, PhD‡; and Betsy C. Herold, MD\*

**ABSTRACT.** Renal abscess is uncommon in pediatrics and is rarely a cause of fever of unknown origin. We recently cared for a patient who presented with a 3-week history of fever. An indium scan ultimately led to the diagnosis of a renal abscess. Aspiration yielded *Peptostreptococcus asaccharolyticus*. This unusual case prompted a review of the clinical and microbiologic features of renal abscess in pediatric patients at our hospital over the past 10 years. Seven additional patients with a discharge diagnosis of renal abscess were identified. Only 2 of the patients had identifiable risk factors (diabetes mellitus and polycystic kidneys). *Staphylococcus aureus* or *Enterobacteriaceae* were responsible for most infections, consistent with hematogenous and urinary tract sources, respectively. No other cases of anaerobic abscess were identified. This case highlights the importance of considering a renal abscess in the differential diagnosis of fever of unknown origin and of processing specimens for both aerobic and anaerobic organisms. *Pediatrics* 2001;107(1). URL: <http://www.pediatrics.org/cgi/content/full/107/1/e11>; fever of unknown origin, renal abscess, *Peptostreptococcus asaccharolyticus*.

ABBREVIATIONS. FUO, fever of unknown origin; MRI, magnetic resonance imaging; CT, computed tomography; CVA, costovertebral angle.

Renal abscesses are uncommon in pediatric patients and rarely a cause of fever of unknown origin (FUO).<sup>1-3</sup> The infrequent occurrence of this pathology poses a diagnostic challenge for physicians and often results in delayed recognition and treatment.<sup>4</sup> We recently cared for a child with a 3-week history of fevers. An indium scan ultimately led to the diagnosis of a renal abscess. Aspiration yielded a pure growth of the anaerobic Gram-positive bacterium, *Peptostreptococcus asaccharolyticus*. This unusual case prompted a review of the pediatric literature and of patients cared for by the pediatric services at the Mount Sinai Medical Center over the past 10 years.

## METHODS

Seven additional cases of cortical or corticomedullary renal abscess were identified after review of discharge diagnoses of

patients cared for on the pediatric services from December 1988 to December 1998. The medical charts were reviewed for clinical presentation, presence of underlying diseases, diagnostic procedures, microbiology, surgical procedures, antibiotic therapy, and outcome.

## RESULTS

### Index Case

An 11-year-old white boy with a history of coarctation of the aorta repaired at 11 months of age and a bicuspid aortic valve was admitted to the hospital with a complaint of 3 weeks of fever. He was in excellent health until 3 weeks before admission when he developed fever and transient lower back pain associated with lifting his backpack, which resolved within 24 hours. There were no further back, muscle, or joint pains, but he continued to have daily fevers that ranged between 38.5°C and 39.5°C. He was empirically treated with cephalexin orally, which was discontinued after 3 days because of gastric intolerance. His fevers persisted and he was admitted to the hospital for evaluation of FUO. Notably, 3 sets of blood cultures obtained as an outpatient yielded no growth. He had no history of previous dental procedures, bronchoscopy, or manipulation of the genitourinary tract. However, he had lost 2 deciduous teeth 2 weeks before the onset of fever. His physical examination on admission was significant for a temperature of 38.5°C and a pulse of 98 bpm. He had a grade III/VI systolic murmur heard best in the apex, which was unchanged from previous examinations. He had no hepatosplenomegaly. There were no petechiae or signs of peripheral emboli or vasculitis. His white cell count on admission was 14 700 with 45% of neutrophils and an erythrocyte sedimentation rate of 98 mm/hour.

Multiple blood and urine cultures yielded no growth, and stool cultures showed normal enteric flora. Urinalysis was normal. A chest radiograph was unremarkable. Two 2-dimensional and a multiplane transesophageal echocardiogram revealed a bicuspid aortic valve with no vegetations. The possibility of an occult abscess was considered. An indium scan revealed a large defect in the superior pole of the right kidney. This was confirmed subsequently by a magnetic resonance image (MRI) of the abdomen, which showed an abscess (5.5 × 3.6 × 4.1 cm) in the upper pole of the right kidney (Fig 1). He was empirically treated with intravenous nafcillin and gentamicin; nafcillin was replaced with clindamycin because of intense venous discomfort during the infusion. He remained febrile despite antibiotic therapy and,

From the Department of \*Pediatrics and ‡Medicine, Mount Sinai School of Medicine, New York, New York.

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Reprint requests to (V.A.M.C.) Division of Infectious Diseases, Box 1657, Mount Sinai Medical Center, 1 Gustave L. Levy Pl, New York, NY 10029. E-mail: [tepera01@doc.mssm.edu](mailto:tepera01@doc.mssm.edu)

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**Fig 1.** Axial T2-weighted MRI image of the kidney showing a loculated collection in the upper pole of the right kidney. The findings suggest a right cortical abscess.

therefore, the abscess was drained under computed tomography (CT) guidance. Seven milliliters of purulent fluid was removed, which subsequently grew a pure culture of the anaerobic streptococcus, *P asaccharolyticus*. The fever resolved 3 days after percutaneous drainage. The patient received a total of 6 weeks of clindamycin and gentamicin; the latter was discontinued after 3 weeks of treatment. A follow-up MRI revealed complete resolution of the abscess.

#### Isolation of *P asaccharolyticus*

Gram-stained smears of the purulent percutaneous aspirate showed small Gram-positive cocci in pairs and short chains. Growth occurred after 72 hours on thioglycolate broth. On 5% sheep blood agar incubated anaerobically, small (~1 mm) compact colonies encircled by a zone of  $\beta$ -hemolysis developed after 72 hours of incubation, whereas growth was absent on blood agar plates incubated aerobically. Because of the striking and unsuspected hemolytic activity about the colonies, the isolate was serotyped (Streptest, Murex Biotech LTD, Dartford, England) and rendered strong solitary agglutination with group F antisera. Biochemically, through the use of Mycroscan rapid anaerobic identification panel (Dade Behring, Inc, West Sacramento, CA), the isolate was identified as *P asaccharolyticus*.

#### Other Cases

Seven additional pediatric patients with a diagnosis of renal abscess were identified among 43 224 medical records reviewed over this 10-year period, supporting the rarity of this diagnosis (Table 1). The patients' ages ranged from 4½ months to 19 years. There were 5 girls and 2 boys. Five had corticomedullary abscesses and 2 had cortical abscesses. Only 2 of the patients had a predisposing condition that may have contributed to the development of a renal abscess. One patient had insulin-dependent diabetes,

**TABLE 1.** Descriptive Data of Patients

Patient	Type of Abscess	Age and Sex	Signs and Symptoms	Underlying Conditions	Urine Culture	Blood Culture	Abscess Culture	Urinalysis	ESR	Diagnostic Studies	Surgical Intervention	Medication
1*	Right cortical abscess	11 y; M	3-wk fever	None	Negative	Negative	<i>P asaccharolyticus</i>	Normal	98	Indium scan	Percutaneous drainage	Clindamycin, gentamicin
2	Right cortical abscess	16 y; M	1-wk fever, CVA tenderness	IDDM	Negative	Negative	MSSA	Normal	53	Abdominal CT	Percutaneous drainage	Ampicillin, gentamicin
3	Right corticomedullary abscess	17 y; F	1-wk fever, dysuria	None	<i>E coli</i>	Negative	<i>E coli</i>	20 WBC, 15 RBC	91	Abdominal CT	Percutaneous drainage	Ampicillin, gentamicin
4	Right corticomedullary abscess	19 y; F	5-d fever, dysuria	None	<i>E coli</i>	<i>E coli</i>	Not done	20 WBC, 25 RBC	86	Abdominal ultrasound	None	Ceftriaxone, gentamicin
5	Left corticomedullary abscess	18 y; F	2-d fever, abdominal pain	PCKD	<i>P mirabilis</i>	Negative	Not done	25 WBC, 10 RBC	70	Abdominal ultrasound	None	Ampicillin, gentamicin
6	Left corticomedullary abscess	15 y; F	2-d fever, CVA tenderness	Pregnancy (5 mo)	<i>E coli</i>	Negative	Not done	25 WBC, 5 RBC	54	Abdominal ultrasound	None	Ceftriaxone
7	Right corticomedullary abscess	4 mo, F	1-d fever, irritability	None	Negative	Negative	<i>E coli</i>	Normal	74	Abdominal CT	Percutaneous drainage	Ampicillin, gentamicin
8	Left cortical abscess	4 mo, M	2-wk fever, weight loss	None	Negative	Negative	MRSA	Normal	144	Abdominal CT	Nephrectomy	Vancomycin

PCKD indicates polycystic kidney disease; IDDM, insulin-dependent diabetes mellitus; MSSA, methicillin-susceptible *S aureus*; MRSA, methicillin-resistant *S aureus*; ESR, erythrocyte sedimentation rate.  
\* Index case.

which is a common risk factor in adults; the other patient had polycystic kidney disease.

Renal abscesses can result from hematogenous spread or as a complication of infection from the lower urinary tract.<sup>5,6</sup> Patients 3, 4, 5, and 6 presumably developed corticomedullary abscesses as a complication of a urinary tract infection because they had symptoms of dysuria, costovertebral angle (CVA) tenderness or abdominal pain, significant pyuria, and a urine culture that grew *Escherichia coli* (3/4 cases) or *Proteus mirabilis*. Patients 2 and 8 may have developed cortical abscesses after hematogenous seeding by *S aureus*. Patient 8 was referred from a community hospital with a presumptive diagnosis of Wilms' tumor or neuroblastoma because of his young age and a palpable mass. The index case (case 1) was the only child in whom an anaerobic bacterium was isolated.

Most adult patients with renal abscess present with fever and unilateral pain in the flank, abdomen, or CVA.<sup>5</sup> This was true for 3 of the pediatric cases; 2 others had fever and dysuria. Two infants had fever as their predominant symptom. The sedimentation rate was elevated in all of the cases. Pyuria was found in 4 patients, all of whom had bacteria isolated by urine culture. In contrast, the 4 patients with normal urinalysis (including the index case) had bacteria isolated from the abscess; this was the only source of bacterial isolation.

Imaging studies contributed to the correct diagnosis in all of the cases. Ultrasonography led to the correct diagnosis in 3 of 8 cases; CT in 4 of 8 and an indium scan in the index case. MRI confirmed the diagnosis in the latter patient. Notably, the index case did initially have an ultrasound, which was nondiagnostic because of technical difficulties and poor patient cooperation.

Three of the 8 patients responded to medical management with intravenous antibiotics (Table 1). Percutaneous drainage was required in 4 of the 8; 1 infant had a nephrectomy because of a presumptive diagnosis of tumor with destruction of renal parenchyma and invasion of the adjacent tissues. This pathology, termed xanthogranulomatous pyelonephritis, is rare, but often mimics tumors.<sup>7</sup> All of the patients received at least 2 weeks of intravenous antibiotics. Five of the 8 patients received a total of 4 to 6 weeks of antibiotics, with the last 1 to 2 weeks given orally. Four of the 8 patients underwent percutaneous drainage and only 1 required open surgery; the other 3 patients received only antibiotic treatment. All of the patients recovered fully.

## DISCUSSION

Renal abscesses are rare, although the exact incidence in children is not known. The incidence in adults is estimated to range from 1 to 10 cases per 10 000 hospital admissions.<sup>5</sup> We could only identify 8 cases over the past 10 years at our institution (~40 000 records), which is consistent with this low prevalence. In contrast to what has been described for adults, the majority of pediatric cases occur in otherwise healthy children without identifiable risk factors.<sup>5,8,9</sup>

*S aureus* is the most common isolate in cortical abscesses and has been found in 90% of reported cases.<sup>5</sup> This follows because most cortical abscesses result from hematogenous spread. This was probably the route of infection in 3 of 8 pediatric cases found in this review; cultures of 2 grew *S aureus*, whereas the index case was unusual because the culture yielded an anaerobe. Notably, in all 3 of these cases the blood and urine cultures yielded no growth and the urinalysis was normal. In contrast, corticomedullary abscesses usually follow urinary tract infection and are frequently caused by Gram-negative organisms.<sup>5,6</sup> Presumably, this was the route of infection in 4 of 8 cases and is supported by the finding of abnormal urinalyses. One additional case (case 7) may also have resulted from an antecedent urinary tract infection in an infant. Although at the time of presentation, the urinalysis was normal, the infant had a corticomedullary abscess that yielded *E coli*. As previously reported, both CT and ultrasonography facilitated the diagnosis of renal abscess in these cases.<sup>4</sup>

The index case described here is unusual for several reasons. First, none of the cases of renal abscess described in the literature presented as F.U.O.<sup>6</sup> The possibility of endocarditis seemed most likely given the patient's history of bicuspid aortic valve. It was only when extensive evaluation for endocarditis proved unrevealing that a nuclear scan using <sup>111</sup>indium-labeled leukocytes was performed.<sup>10</sup> Most pediatric renal abscesses present as failure to respond to antibiotics for presumptive pyelonephritis, fever after or associated with urinary tract or abdominal surgery, urinary tract obstruction, kidney trauma, abdominal flank pain, or unilateral renal mass.<sup>2,11</sup> In retrospect, this child did have back pain on the day of the onset of fever, but it was transient and no CVA tenderness or abdominal pain was elicited on repeated physical examinations. Second, the case is unique because of the microorganism isolated. Anaerobic bacteria are rarely associated with renal abscesses. Only one study in the literature examined the role of anaerobic bacteria in pediatric renal abscesses.<sup>12</sup> The author reported 10 children with cortical or corticomedullary abscesses in whom rigorous attempts to recover anaerobic bacteria were undertaken. In 9 of 10 patients, anaerobes were recovered. However, in contrast to the case described in this study, all of the cultures were polymicrobial (average 2 organisms per specimen); 7 of the 9 had mixed anaerobic and aerobic bacteria and 2 of the 9 had anaerobic bacteria only. The predominant isolates were *Bacteroides fragilis* group.

This is the first case described in the literature in which *P asaccharolyticus* was isolated from a renal abscess. The genus *Peptostreptococcus* includes obligate anaerobic Gram-positive cocci that occur in pairs, irregular masses, and short chains. The 3 species most commonly isolated from clinical specimens are *P magnus*, *P anaerobius*, and *P asaccharolyticus*. This *P asaccharolyticus* isolate was unusual in producing  $\beta$ -hemolytic colonies on sheep blood agar and in rendering strong agglutination with group F streptococcus antisera. Possibly, the presence of a  $\beta$ -he-

molysin could have increased the virulence potential of this strain. Notably, this patient had lost 2 deciduous teeth before onset of fever. However, this is not likely to have been the source of the bacteria because *P. asaccharolyticus*, unlike other *Peptostreptococcal* species, is not usually part of normal mouth flora, but rather is found in the gastrointestinal or genitourinary tract.

The need for percutaneous drainage of the abscess in this case is not surprising. In a retrospective review of adult renal abscesses, it was found that 100% of small abscesses (<3 cm) resolved with antibiotic treatment alone. In contrast, the cure rate for larger abscesses treated with antibiotics alone was only 50%; the majority of patients with larger abscesses required percutaneous drainage or open surgical intervention.<sup>13</sup>

### CONCLUSION

This is the first reported case of *P. asaccharolyticus* causing a renal abscess in a pediatric patient and presenting as FUO. This case highlights the importance of considering a renal abscess as a cause of FUO. Moreover, it underscores the importance of processing culture specimens appropriately for both aerobic and anaerobic bacteria.

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