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CASE REPORTS

Urinary Tract Infection Due to Staphylococcus lugdunensis in a Healthy Child

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Staphylococcus lugdunensis is being increasingly reported as a pathogen with an outcome resembling that of Staphylococcus aureus rather than coagulase-negative staphylococci. The authors describe a case of a child with left grade II vesicoureteral reflux and pyelonephritis caused by Staphylococcus lugdunensis. The child was successfully treated with cefotaxime.

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INTRODUCTION

Staphylococcus lugdunensis is a member of the coagulase-negative staphylococci (CoNS) which was first described by Freney et al. in 1988 (1). S. lugdunensis is commonly found on the human skin and is a rare contaminant in cultures (2). It has only rarely been reported to cause urinary tract infections, and then predominantly in adults as part of mixed flora (3). We were unable to locate reports of this organism as a cause of urinary tract infection in otherwise healthy children. We report a successfully treated case of urinary tract infection caused by S. lugdunensis in a healthy child.

CASE REPORT

A 6-y-old girl was admitted with a 16 h history of fever to 39.7°C, flank pain, nausea and vomiting. A general surgeon consulted to rule out appendicitis found no signs of an acute abdominal problem. Previously her only medical problems had been one hospitalization at age 7 months for bronchiolitis.

On physical examination, she appeared mildly ill and had shaking tremors. There was some guarding on deep palpation of the abdomen. Laboratory studies revealed the following results: white blood cell count 18.14×10^3/ml, with 11% band forms and 69% neutrophils. The CRP level was 148 mg/l. Red blood cell count, platelet count, serum electrolyte and creatinine concentrations and capillary blood gas were normal. A catheter specimen of urine was obtained for culture and analysis. Urinalysis showed proteinuria (1+), traces of blood and absence of nitrites; microscopic analysis showed 10–20 leukocytes, and 0–1 erythrocyte per high-power field with a small number of bacteria. The urine culture showed growth of $>100{,}000$ colonies/ml of S. lugdunensis in a pure culture. The microorganism was identified by the WIDER MIC-ID/GP (Soria Melguizo, Madrid, Spain) and ID 32 STAPH (API system, bioMerieux). Abdominal and chest radiographs were normal and blood culture was negative.

Antimicrobial minimal inhibitory concentrations (MIC) were (in mcg/ml): clindamycin ≤ 2; gentamicin ≤ 2; cefotaxime ≤ 1; trimethoprim-sulfamethoxazole $\leq 1/19$; vancomycin ≤ 0.5. The organism was resistant to penicillin >4; ampicillin >2 and erythromycin >2.

Abdominal ultrasonography revealed that the left kidney was slightly hyperechoic. A voiding cystourethrogram showed a left grade II reflux, and a renal scan with dimercaptosuccinic acid showed several small focal defects in the left kidney consistent with pyelonephritis.

Empirical antibiotic therapy was started with i.v. cefotaxime (50 mg/kg every 8 h). Once the antibiogram was known, it was decided to continue parenteral therapy with the same antibiotic to complete a 7-d course; oral prophylactic trimethoprim-sulfamethoxazole (2/10 mg/kg) was then given. A follow-up urine culture performed after 48 h of antibiotic therapy was negative. The child's clinical status improved during the first 24 h and she remained febrile for 2 d.

DISCUSSION

S. lugdunensis is a CoNS that has considerable potential as an opportunistic pathogen of humans (1, 4). It has been mainly associated with skin and soft tissue infections (4) but has also been shown to be associated with a wide variety of more serious infections such as respiratory infections, endocarditis, septicaemia, brain abscess, vascular prosthesis infection and osteomyelitis. The clinical course and virulence of infections due to S. lugdunensis is known to resemble that of infections due to S. aureus (4).

S. lugdunensis is commonly found on the human skin. It has been suggested that the perineal region may be the natural habitat of this bacteria (5). Van der Mee-Marquet et al. (6) reported that 22% of the patients carried S. lugdunensis in the inguinal and pubic areas, and carriage at both inguinal folds was frequent (68% of carriers). The highest frequency of carriage was observed in women aged 65 y and above (51%). Among 229 consecutive clinical isolates of S. lugdunensis, 9.7% were isolated from urogenital specimens (4). Haile et al. (3) isolated 500 CoNS from 4652 consecutive urine specimens. 31 (6%) of these 500 isolates of CoNs were identified as S. lugdunensis, but none were identified with a pure growth.

Because our patient was otherwise healthy, it is tempting to view the culture result as showing contaminants. As this organism can be a constituent of the perineal flora, it may

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contaminate urine during the collection process. However, the patient's clinical course was consistent with urinary tract infection, urine was collected via a catheter and the S. lugdunensis isolate was in a pure culture.

Specific virulence factors for S. lugdunensis have not been fully elucidated. Only few known virulence factors have been variably produced such as lipase, esterase, glycocalyx and fibrinogen affinity factor. The virulence of S. lugdunensis is thought to be due in part to the production of a delta-like toxin with phenotypic properties similar to the S. aureus delta-haemolysin (7). Additionally, accessory gene regulator (agr)-related sequences have also been demonstrated in S. lugdunensis; agr is considered a major regulatory determinant for virulence in S. aureus (8).

S. lugdunensis isolates are beta-lactamase positive in 24–40% of cases, with penicillin MIC of ≥ 0.5 mcg/ml (3, 9), and 2–12% are resistant to erythromycin (2, 6, 9). Third generation cephalosporins are commonly used to treat pyelonephritis. In our case, given that empirical therapy had started with cefotaxime, it was decided to maintain this for its sensitivity in the antibiogram and for the good clinical response.

In conclusion, S. lugdunensis can be a urinary tract pathogen in children without the presence of indwelling catheters or other obvious medical problems. Cultures that show this organism should not be attributed to skin contamination, especially when the clinical findings are compatible with urinary tract infection or pyelonephritis.

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