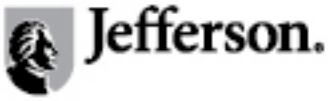

8-1-1993

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SCIENTIFIC ARTICLE

Ochrobactrum anthropi Bacteremia in a Child

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Children undergoing chemotherapy for cancer are at increased risk of supervening infection, including bacteremia. This may be due to immunosuppression as well as the presence of intravascular devices such as central venous catheters. Bacteria responsible for these infections include those found in the child's endogenous flora as well as in environmental sources.

We report the case of a child with acute lymphoblastic leukemia (ALL) who developed bacteremia secondary to *Ochrobactrum anthropi*. Details of this extremely rare infection are the focus of this report.

Case

The patient was a 7-year-old female with ALL in remission, admitted because of fever and difficulty in drawing blood through both lumens of her Hickman catheter. She was otherwise asymptomatic and had a normal physical examination. After appropriate cultures, the patient was begun on Vancomycin, Ceftazidime, and Gentamicin. Pertinent laboratory data on admission included normal urinalysis, SMA-12, chest radiograph, and a complete blood cell count showing a white blood cell count of 1000/mm3 with an absolute neutrophil count of 800/mm3. Throughout the hospitalization the patient's absolute neutrophil count remained between 800 and 1800/mm3. Initial blood culture drawn through the catheter grew *O. anthropi,* while a concurrent peripheral culture was sterile. The patient subsequently had six positive catheter-drawn blood cultures for *O. anthropi* over the next seven hospital days. All peripheral blood cultures remained sterile. Ceftazidime and Vancomycin were stopped three days after admission based on antibiotic sensitivities, and the patient was treated with Gentamicin alone. Because blood cultures remained positive for *O. anthropi,* Imipenem was added six days after admission and the Hickman catheter was removed one day later. A subclavian catheter was inserted and the patient was treated with Imipenem and Gentamicin for an additional seven days without complications.

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Discussion

O. anthropi is an oxidase-positive, gram negative, non-lactose fermenting bacillus that oxidizes glucose and grows readily on MacConkey agar.[1] Formerly classified as CDC group Vd, these bacilli are all aerobic, do not produce fluorescent pigments, and are peritrichously flagellated.[1,2] The superficial resemblance *O. anthropi* to Pseudomonas species may have resulted in previous infections being mis-identified. It has been isolated from many environmental sources, including hospital water,[2] but has rarely been reported to cause infections in humans.

Of the 12 previously reported cases of *O. anthropi* infection, only two occurred in children.[2,3] Ten of these 12 patients had bacteremia and all 10 had a central venous line in place. Three of the reported cases of *O. anthropi* infection were severely immunocompromised at the time.[2-4]

As reported in the literature, our patient's isolate had a rather extensive antimicrobial resistance pattern (Table). Resistance was noted to Ampicillin, Aztreonam, Ceftazidime, Mezlocillin, and Cephalothin. Best antimicrobial activity was noted with Ciprofloxacin, Gentamicin, Trimethoprim/Sulfamethoxasole (TMP/SMX) and Imipenem. It is notable that our patient had persistent bacteremia in the face of apparently adequate therapy with Gentamicin (MIC 0.2 mcg/ml).

Persistence of infection with *O. anthropi* despite antibiotic therapy has been reported in previous cases.[2,3] This has been attributed to the broad range of antimicrobial resistance encountered with this organism, the immunosuppressive condition of the patient, and most recently to the presence of indwelling central venous catheters.[3]

Our patient's absolute neutrophil count remained between 800 and 1800/mm3 throughout the course of her bacteremia. It is unlikely that her persistent infection resulted from this degree of immunosuppression. Similarly, antibiotic failure cannot be indicated as the primary source of the patient's continued bacteremia, since there is good evidence of sufficient in-vitro antibacterial activity of Gentamicin against her organism.

Rather it would appear that our patient's persistent bacteremia, lack of clinical findings other than fever, and negative peripheral blood cultures would support the concept of catheter-related infection.

Although our patient was ultimately treated with a combination of Gentamicin and Imipenem, it remains to be proven whether the use of two antimicrobials is desirable in certain high-risk patients and whether Imipenem alone is efficacious in this infection.

In a recent review of *O. anthropi* infections, recommendations were made to consider TMP/SMX as first-line antimicrobial therapy, since uniform sensitivity to this antimicrobial has been reported in the literature.[2] Our patient's organism was likewise sensitive to TMP/SMX, although it is interesting that her bacteremia occurred in the face of a standard (Mon-Wed-Fri) prophylactic regimen with TMP/SMX.

We believe that our case supports the concept that the rare occurrence of human infection with O. *anthropi* is in most cases catheter-related. Although immunosuppression and antimicrobial resistance may play a role in persistent bacteremia, it is likely that the presence of an indwelling venous catheter may be the primary cause.

Successful therapy of *O. anthropi* bacteremia includes removal of central venous lines (if present) and appropriate antimicrobial therapy based on in vitro sensitivity testing. Although our patient's organism was sensitive to Ceftriaxone and moderately sensitive to Cefoxitin, most reported isolates of *O. anthropi* have been resistant to all cephalosporins.[3,5] Presumptive therapy could include TMP/SMX, an aminoglycoside, or possibly Imipenem, pending definitive sensitivities. Questions concerning the ideal length of therapy and the desirability of using two antimicrobials directed against this microorganism remain to be answered.

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Acknowledgment

The authors thank Lynn Steele-Moore for performing the antimicrobial sensitivities.

ANTIMICROBIAL SUSCEPTIBILITY OF O. ANTHROPI ISOLATE

Antibiotic	MIC (mcg/ml)*		ATCC Control**		MIC (mcg/ml)*	Acceptable Range
Amikacin	6.25	(S)	E. coli	#25922	1.6	(0.5 - 4.0)
Ampicillin	100.0	(R)	E. coli	#25922	3.12	(2 - 8)
Cefoxitin	12.5	(MS)	E. coli	#25922	3.12	(1 - 4)
Aztreonam	>100.0	(R)	Ps. aerug.	#27853	3.12	(2 - 8)
Ceftazidime	>100.0	(R)	Ps. aerug.	#27853	1.6	(1 - 4)
Ciprofloxacin	<0.1	(S)	Ps. aerug.	#27853	0.2	(0.25 - 1.0)
Mezlocillin	>100.0	(R)	E. coli	#25922	1.6	(2 - 8)
Gentamicin	0.2	(S)	E. coli	#25922	0.2	(0.25 - 1)
Imipenem	0.8	(S)	E. faecalis	#29212	0.8	(0.5 - 2.0)
Rifampin	3.12	(I)	E. faecalis	#29212	0.8	(1 - 4)
Tobramycin	0.8	(S)	E. faecalis	#29212	12.5	(8 - 32)
Trimeth/Sulfa	0.25/4.75	(S)	Ps. aerug.	#27853	16/304	(8 - 32)
Ceftriaxone	6.25	(S)	Ps. aerug.	#27853	12.5	(8 - 32)
Cephalothin	>100.0	(R)	E. coli	#25922	12.5	(4 - 16)
Tetracycline	12.5	(I)	E. coli	#25922	3.12	(1 - 4)

* MIC determined by macrobroth tube dilution

** American Type Culture Collection
Rockville, Maryland

S= Sensitive

I= Intermediate

R= Resistant

MS= Moderately Sensitive