Case Report

Bloodstream infection with *Oligella ureolytica* in a newborn infant: a case report and review of the literature

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Abstract
Oligella species are small, Gram-negative, nonsaccharolytic aerobic rods or coccobacilli that are catalase and oxidase-positive, mostly isolated from the urinary tract and rarely from wounds, bloodstream infections, septic arthritis, or peritonitis.In this article, we report a case of *O.ureolytica*-related bloodstream infection in a newborn infant and we review the literature for previously reported cases of *Oligella* infections.

Key words: Bacteremia; *Oligella* spp*;* CDC group IVe

J Infect Dev Ctries 2014; 8(6):793-795. doi:10.3855/jidc.3260

(Received 27 December 2012 – Accepted 11 May 2013)

Case Report

A 24 hour-old female, full term infant, (2,800 g weight, spontaneous vaginal delivery) was admitted to Pediatrics Intensive Care Unit ward of Ahi Evran University, Training and Research Hospital, Kirsehir, with the symptoms of poor feeding, jaundice and fever with presumptive diagnosis of sepsis. Respiratory, cardiovascular and abdominal examination were unremarkable but weakness in newborn reflexes and icterus were observed. Fetal membrane was intact up to two hours before labor and no premature membrane rupture or any signs of chorioamnionitis such as maternal fever or uterine tenderness were detected. Amniotic fluid was clear. Fetal heartbeat monitoring with intermittent auscultation was performed during labor and constant variation in the heart rate was detected indicating a sign of well-being of the baby. There was no need for resuscitation and the baby was breastfed after delivery. Histopathological examination of the fetal membranes were not performed for the diagnosis of intrauterin infections and chorioamnionitis. Maternal medical history was unremarkable.

On admission, acute phase reactants, total cell count, urine culture and two sets of blood cultures were sent to the microbiological laboratory. Platelet, white blood cell count (20.4% neutrophiles and 68.3% lymphocytes) and hemoglobin level were normal. Low levels of RBC (3.38×10^6/ml), hematocrite (35.8%) and high levels of MCV, MCH, MCHC and PDW were observed. Serum electrolite levels were normal. Minimal decrease in serum albumin and glucose and increase in bilirubin was detected. CRP was 2.9 mg/dL. Chest radiography and urinalysis were unremarkable and the urine culture was sterile. Following two days of incubation of blood culture, small, smooth, nonhemolytic colonies of 1 mm in diameter on blood agar were detected in two blood culture samples. Microscopy revealed small Gram-negative coccobacilli. The organism was oxidase-positive, catalase-positive and nonfermentative. Positive test results were obtained for nitrate reduction, urea hydrolysis and motility and it was identified as *Oligella ureolytica* by VITEK-2 Compact automated system (bioMerieux, Marcy l'Etoile, France).

The infant was given an empiric therapy including ampicillin (100mg/kg/day) and netilmicin (5mg/kg/day) on the day of admission. As there is no standardized antimicrobial susceptibility testing for *Oligella* spp. recommended by the Clinical and Laboratory Standards Institute (CLSI), cut-off values of Gram-negative bacteria other than *Enterobacteriaceae* on CLSI [1] were used for interpretation. The organism was susceptible to amoxicillin-clavulanic acid, gentamicin, cefuroxime,

ceftriaxone, ceftazidime, ciprofloxacin, carbapenems and had intermediate resistance to ampicillin and was resistant to co-trimoxazole (SXT). The infant was given a ten-day course of netilmicin (5mg/kg/day) after the susceptibility test results. Additionally, phototherapy was performed for the management of hyperbilirubinemia. The patient's condition improved gradually after four days of treatment and was discharged after full recovery.

Oligella species are small, Gram-negative bacilli able to grow on blood agar in two to four days. Incubation in the presence of 5% CO_2 will usually enhances growth. The urease reaction and motility are the distinctive features for species differentiation [2]. *O. ureolytica,* is an urease-positive, motile bacterium capable to reduce nitrate to nitrite in contrast to *O. urethralis* [2-4].

Oligella spp. infection has rarely been reported in the literature. This may be due to misidentification of the organism or uncertainty of its pathogenicity. Due to the positive urease reaction, *O.ureolytica* can be confused with *B.bronchiseptica* or *Achromobacter* spp [2]. A search of the literature published since 1978 on PubMed revealed nine case reports. Table 1 shows the clinical features of cases reported [4-11]. Although, *O.ureolytica* is more frequently recovered from urethral and respiratory tract specimens as a commensal organism [4,5], it is commonly isolated from urine of patients with indwelling urinary catheters [5,6]. *O.urethralis* is occasionally isolated from urinary tract infections, septic artritis, peritonitis and it is also a commensal of the genitourinary tract. Additionally, isolations from ear, blood and wounds have been reported [6-8]. Both species have been reported to cause urosepsis [2,4,10].

In this article, we report a case of *O.ureolytica* related bacteremia. To our knowledge, this is the first reported case of *O.ureolytica*-related bacteremia in a newborn infant. In the previous reports, most of the patients were adults with underlying diseases in contrast to our case. Urinary tract obstruction is a predisposing factor for bacteremia [10]. In our case, urine culture was sterile and therefore, there was no clinical or laboratory evidence to suggest any abnormality of the urinary tract thus the mechanism of infection remains unclear.

In contrast to *O. urethralis* strains which are susceptible to several classes of antibiotics including penicillin, *O. ureolytica* strains are generally resistant to ampicillin, chloramphenicol, erythromycin, penicillin G, tetracycline and co-trimoxazole, but susceptible to aminoglycosides and cephalosporins [2-4]. *O. ureolytica* strains highly resistant to penicillins, cephalosporins, carbapenems, ciprofloxacin and co-trimoxazole were also reported [3-5,8], in contrast to the studies displaying susceptibility to co-trimoxazole [6,11]. In this study, our strain had intermediate resistance to ampicillin and was resistant to co-trimoxazole. Although *in vitro* resistance to ampicillin was detected, good response and recovery was achieved with ampicillin and netilmicin after a ten-day course treatment. Although *in vitro* susceptibility testing may yield conflicting results, studies have shown that co-trimoxazole, imipenem and aminoglycosides have good *in vivo* activity against these organisms, indicating that *Oligella* spp related infections appear to respond quickly to antimicrobials [4,10]. In our patient, following therapy with ampicillin and netilmicin, blood culture became sterile, suggesting eradication of *O. ureolytica*. In this study strain identification was performed by an automated identification system and biochemical tests.

Table 1. Clinical features of reported cases of *Oligella* infections, 1978-2012 (Source: PubMed)

Year	Reference	Age (years)	Isolate	Source	Underlying conditions	Outcome
1978	7	5	*O. ureolytica*	Blood, urine	Uterine adenocarcinoma, obstructive uropathy	Recovered
1992	4	83	*O. uretralis*	Knee fluid	Rectal adenoca, septic artritis	Recovered
1993	9	75	*O. uretralis*	Blood, urine	Metastatic colorectal ca, obstructive uropathy	Recovered
1993	6	40	*O. ureolytica*	Blood	AIDS, sacral ulcer, fungemia	Responded, died secondary to fungemia
1996	2	45	*O. ureolytica*	Lymph node	Lymphoma	Recovered
2001	10	70	*O. uretralis*	Urine	Bladder operation, histerektomi, chronic pyelonephritis	Recovered
2001	1	18 mo	*O. ureolytica*	Blood	Pneumoniae	Recovered
Present study		Newborn	*O. ureolytica*	Blood	Sepsis	Recovered

It is clear that the major limitation of this study was the lack of molecular based confirmation of the strain. In conclusion, this case has emphasized the potential role of *Oligella ureolytica* as an infectious agent related with bacteremia.

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Conflict of interests: No conflict of interests is declared.