

First case of pregnant women bacteraemia and probable early-onset neonatal infection due to *Aerococcus urinae*

Christelle Jost^{1,2}, Bénédicte Breton³, Valérie Biran⁴,
Suonavy Khung⁵, Sarah Chekroune¹ and
Stéphane Bonacorsi^{1,2}

1) Service de Microbiologie, AP-HP, Hôpital Robert Debré, 2) Univ Paris Diderot, Sorbonne Paris Cité, 3) Service de Gynécologie-Obstétrique, AP-HP, Hôpital Robert Debré, 4) Service de Néonatalogie, AP-HP, Hôpital Robert Debré and 5) Service de Biologie du développement, AP-HP, Hôpital Robert Debré, Paris, France

Keywords: *Aerococcus urinae*, bacteraemia, pregnancy

Original Submission: 6 August 2014; **Revised Submission:** 29 October 2014; **Accepted:** 5 November 2014

Available online 18 November 2014

Corresponding author: Stéphane Bonacorsi, Service de Microbiologie, Hôpital Robert-Debré, 48 Boulevard Sérurier, 75019 Paris, France. Tel.: +33140032340; fax: +33140032450
E-mail: stephane.bonacorsi@rdb.aphp.fr

Sir,

A 36-year-old pregnant woman was admitted to Robert-Debré hospital for term spontaneous vaginal delivery. During labour, after seven hours rupture of membrane, the patient developed fever (40°C) and C-reactive protein increased to 128 mg/l (normal value < 10 mg/l). After blood and urine samples were taken for culture, the patient was treated with cefotaxime plus gentamicine as probabilistic antibiotic therapy. Microscopic examination of urine showed pyuria (670 000 white blood cells/ml), erythrocyturia (> 1 000 000 red blood cells/ml) and many tetrads or pairs of Gram-positive cocci. Quantitative urine culture yielded 10⁶ CFU/ml of Gram-positive cocci in pure culture, catalase negative and producing α -haemolysis on blood agar. Aerobic blood culture was positive in less than 24h and yielded the same type of bacteria. This bacterium was identified as *Aerococcus urinae* by the API 20 Strep system (bioMérieux, Marcy l'Etoile, France) with the following code 3462300 (99.2% level of identification). The species was confirmed by sequencing of the 16S rRNA gene and matrix-assisted laser desorption ionization–time of flight mass spectrometry (MALDI-TOF MS) (Bruker Daltonics) (score = 2.32)

[1]. Antimicrobial susceptibility was tested using the disk diffusion method on Mueller-Hinton blood agar (Bio Rad, Marnes-la-Coquette, France) according to the recommendations of the Antibiogram Committee of the French Microbiology Society for *Streptococcus* species since no guideline exists for *Aerococcus* spp. The bacterium was susceptible to all β -lactam antibiotics and vancomycin but it was resistant to cotrimoxazole. Minimal Inhibitory Concentrations of amoxicillin and cefotaxime determined by the E-test method (AB-Biodisk, Biomerieux) were respectively 0.047 mg/l and 0.25 mg/l. During her well monitored pregnancy (4th pregnancy), amniocentesis was performed at 34 weeks of gestation without complication for subnormal trisomy 21 risk (1/55) and group B streptococci vaginal carriage at 35 weeks of gestation was found negative. It should be noted a past of *Escherichia coli* urinary tract infection treated by cefixime 4 months before; but the patient had never had UTI before pregnancy. After seven days of treatment by amoxicillin, the patient had recovered.

Her female newborn weighing 2.7 g, born at term, with a gestational age of 38+3 weeks, presented symptoms of early onset neonatal infection (EONI) with polypnea (respiratory rate : 75 cycles/min, 90% SaO₂ of desaturation), fever (38.1°C) and tachycardia (heart rate : 200 bpm) 15 minutes after birth [2]. Biological features showed increase of procalcitonine in the cord blood (22 μ g/l, normal value < 0.5 μ g/l), as well as newborn CRP one hour after birth (54 mg/l). Analysis of ear, gastric fluid and placenta samples did not yield *Aerococcus* by culture. Although microscopic examination of gastric fluid showed some Gram-positive cocci in pairs, broad range PCR based on 16S rRNA didn't detected *Aerococcus*. After her transfer in neonatal intensive care for monitoring and initial treatment by amoxicillin, cefotaxime and gentamicine during 48 hours, respiratory signs regressed. Then an antibiotic treatment by amoxicillin was continued for a total period of seven days. CRP returned to normal value six days after birth. Blood culture and lumbar puncture performed after treatment initiation remain negative. Histology analysis of placenta confirmed intense chorioamnionitis with moderate funisitis.

Aerococcus urinae is a Gram-positive coccus; originally designated as an *Aerococcus*-like organism [3] and recognized as a distinct species in 1992 [4]. *A. urinae* is known to be an uncommon urinary tract pathogen that causes mild urinary tract infections in adults, especially elderly [5] and/or people with predisposing factors (diabetes, cancer, genitourinary tract pathology or granulocytopenia) [3, 6]. Invasive infections due to *A. urinae* such as endocarditis [7], spondylodiscitis [8], septicaemia [2, 3], cellulitis [9] and peritonitis [10] have been only reported sporadically for over 25 years mainly in older

men. According to studies from Sweden and Denmark, bacteraemia incidence of *A. urinae* occurs between 0.5 to 3 cases per million inhabitants per year [2, 3]. Literature reports only one young man (37 years) with bacteraemia and without associated risk factor [3]. Although infections are mainly described in men, some cases of cystitis or invasive disease were reported in women. USA and French studies reported respectively 26 and 22 women over 65 years of age with predisposing factor affected by mild UTI [5, 6], whereas only four cases of bacteraemia were described in women aged between 55 to 89 year-old with predisposing factor (myeloma, diabetes, disseminated sclerosis) [2, 3, 6, 11]. Our patient had no known risk factor for UTI, except pregnancy. UTI due to *A. urinae* in adult patients presenting neither urological nor systemic predisposing condition are very rare and none had bacteraemia. Moreover bacteremia with *A. urinae* is rarely accompanied by a positive urinary culture [2, 3, 5, 6]. No chorioamnionitis case due to *A. urinae* has been described before in human, but cases of reproductive disease in ovine should be noted. *A. urinae* was isolated from the bloody vulvovaginal discharge (after lambing) of ewes, reporting *postpartum* fever [12]. Finally to our knowledge, no *A. urinae* EONI have been previously reported. We describe the first case of *A. urinae* urinary tract infection with bacteraemia in a pregnant woman with chorioamnionitis and probable EONI. Although EONI due to *A. urinae* wasn't confirmed by a positive blood culture, this diagnosis is very likely considering clinical, histological and biological features. Despite microscopic examination of gastric fluid was positive, mother antibiotic treatment during pregnancy may had negative the newborn samples cultures.

Because *A. urinae* may be misidentified as α -haemolytic streptococcus (mimicking *viridians* group *Streptococcus*) in routine laboratory practice [2, 6], prevalence of *A. urinae* infections is probably underestimated. Indeed, using the manufacturer's interpretation of API 20 Strep system, *A. urinae* may not be distinguished in some cases from *Streptococcus plurianimalium* or *acidominimus* and 16S rRNA sequence analysis or MALDI-TOF MS may be necessary to perform correct identification [1, 12]. Moreover culture conditions needing blood agar and 5% CO₂ incubation may also participate to the underestimation of this pathogen prevalence. In our laboratory, chromogenic medium and sheep blood agar are systematically used for urine culture. Fortunately, the isolate of *A. urinae* is always susceptible to β -lactam and fluoroquinolones [13]. However as it's frequently reported, our isolate was resistant to cotrimoxazole, an antibiotic usually used for UTI treatment [2, 5].

Generally considered to be a low grade pathogen, *Aerococcus urinae* may cause bloodstream infections in adults presenting

predisposing urological disease and/or systemic underlining condition. Clinicians and microbiologist should be aware that *A. urinae* infection may occur in pregnant women and may cause EONI underlining the potential invasiveness of this pathogen during pregnancy.

Transparency declaration

The authors declare no conflicts of interest.

Acknowledgments

We thank Dr Bercot Béatrice (APHP, Groupe Hospitalier Saint Louis-Lariboisière-Fernand Widal, Service de Bactériologie-Virologie) for MALDI-TOF analysis.

References

- [1] Senneby E, Nilson B, Petersson AC, Rasmussen M. Matrix-assisted laser desorption ionization-time of flight mass spectrometry is a sensitive and specific method for identification of aerococci. *Journal of clinical microbiology* 2013;51:1303–4.
- [2] Senneby E, Petersson AC, Rasmussen M. Clinical and microbiological features of bacteraemia with aerococcus urinae. *Clinical microbiology and infection. the official publication of the European Society of Clinical Microbiology and Infectious Diseases* 2012;18:546–50.
- [3] Christensen JJ, Jensen IP, Faerk J, Kristensen B, Skov R, Korner B. Bacteremia/septicemia due to aerococcus-like organisms: Report of seventeen cases. Danish also study group. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America* 1995;21:943–7.
- [4] Aguirre M, Collins MD. Phylogenetic analysis of some aerococcus-like organisms from urinary tract infections: description of aerococcus urinae sp. Nov. *Journal of general microbiology* 1992;138:401–5.
- [5] Cattoir V, Kobal A, Legrand P. Aerococcus urinae and aerococcus sanguinicola, two frequently misidentified uropathogens. *Scandinavian journal of infectious diseases* 2010;42:775–80.
- [6] Sierra-Hoffman M, Watkins K, Jinadatha C, Fader R, Carpenter JL. Clinical significance of aerococcus urinae: a retrospective review. *Diagnostic microbiology and infectious disease* 2005;53:289–92.
- [7] de Jong MF, Soetekouw R, ten Kate RW, Veenendaal D. Aerococcus urinae: severe and fatal bloodstream infections and endocarditis. *Journal of clinical microbiology* 2010;48:3445–7.
- [8] Astudillo L, Sailer L, Porte L, Lefevre JC, Massip P, Arlet-Suau E. Spondylodiscitis due to aerococcus urinae: a first report. *Scandinavian journal of infectious diseases* 2003;35:890–1.
- [9] Schuur PM, Sabbe L, van der Wouw AJ, Montagne GJ, Buiting AG. Three cases of serious infection caused by aerococcus urinae. *European journal of clinical microbiology & infectious diseases : official publication of the European Society of Clinical Microbiology* 1999;18:368–71.
- [10] Naghibi M, Javaid MM, Holt SG. Case study: Aerococcus urinae as pathogen in peritoneal dialysis peritonitis—a first report. *Peritoneal dialysis international. journal of the International Society for Peritoneal Dialysis* 2007;27:715–6.

- [11] Colakoglu S, Turunc T, Taskoparan M, et al. Three cases of serious infection caused by *aerococcus urinae*: a patient with spontaneous bacterial peritonitis and two patients with bacteremia. *Infection* 2008;36:288–90.
- [12] Twomey DF, Carson T, Foster G, Koylass MS, Whatmore AM. Phenotypic characterisation and 16s rRNA sequence analysis of veterinary isolates of *streptococcus pluranimalium*. *Vet J* 2012;192: 236–8.
- [13] Cattoir V, Kobal A, Legrand P. First molecular characterization of fluoroquinolone resistance in *aerococcus* spp. *Antimicrobial agents and chemotherapy* 2011;55:451–2.