

Alloscardovia omnicoles emerging presence in premature rupture of membranes

Inmaculada Cardona-Benavides¹, Alberto Puertas-Prieto¹, Francisco José Pinilla-Martín², José María Navarro-Marí², José Gutiérrez-Fernández^{2,3}

¹Department of Obstetrics and Gynecology, University Hospital Virgen de las Nieves– Instituto de Investigación Biosanitaria de Granada.ibs Granada, Granada, Spain;

²Microbiology Laboratory, University Hospital Virgen de las Nieves, Instituto de Investigación Biosanitaria de Granada.ibs-Granada, Granada, Spain;

³Department of Microbiology, University of Granada– Instituto de Investigación Biosanitaria de Granada.ibs-Granada, Granada, Spain

SUMMARY

Alloscardovia omnicoles is a recently-reported microorganism with unknown pathogenic implications. It has been isolated in various clinical localizations but not in the endocervix. We isolated *A. omnicoles* in an endocervical sample from a 31-yr-old patient with preterm premature rupture of membranes (PPROM) in week 33+3 of pregnancy. The main risk of PPRM is prematurity and the possibility of developing infectious chorioamnionitis, which can be lethal for the mother and newborn. This is the first report of an association between *A. omnicoles* and PPRM, although its pathogenic role has not yet been elucidated.

Received March 23, 2019

Accepted September 16, 2019

INTRODUCTION

Alloscardovia omnicoles was first isolated in 2007 by Huys *et al.* (2007). It is a member of the *Bifidobacteriaceae* family, which includes numerous species that are not considered strict pathogens. These have been reported as part of digestive tract and oral cavity microbiota and have been used as probiotics to protect against intestinal pathogens (Mahlen & Clarridge, 2009). *A. omnicoles* is a Gram-positive, catalase- and oxidase-negative, non-motile, non-spore-forming microorganism, infrequently isolated and fastidious, that appears in stainings in the form of irregular bacilli (Isnard *et al.*, 2016). It grows better in anaerobic conditions at 37°C and after 24 h in modified Columbia agar (MCA) or modified Man-Rogose-Sharpe (mMRS supplemented with 0.05% cysteine hydrochloride media (Huys *et al.*, 2007). However, it can also grow slowly in aerobic conditions, producing spotted colonies on MCA medium at 72 h of incubation (Huys *et al.*, 2007). Few cases of its clinical isolation have been reported, and its pathogenic significance has not always been clarified (Mahlen & Clarridge, 2009; Isnard *et al.*, 2016). Only Isnard *et al.* (2016) isolated *A. omnicoles* from a genital localization, although they did not specify the type of sample. We highlight the report of bacteremia in a patient with endometrium cancer who did not meet sepsis criteria and underwent total hysterectomy with bilateral salpingo-oophorectomy and pelvic and para-aortic lymphadenectomy; the bacteremia was detected while the patient was receiving chemo-

therapy (Ogawa *et al.*, 2016). We report the first case of an association between *A. omnicoles* and an episode of preterm premature rupture of membranes (PPROM) and only the second case of its isolation in the genital tract (Isnard *et al.*, 2016), specifically in the endocervix. We describe the clinical and diagnostic findings and therapeutic measures and explore the possible pathogenesis of this event.

CASE REPORT

We report the isolation of *A. omnicoles* in the endocervix of a 31-year-old woman in week 33⁺³ of pregnancy. She had a history of obesity (body mass index of 34), irritable colon, gastritis, and bronchial asthma, with no previous surgery. She reported one previous eutocic delivery and one miscarriage. She came to the Obstetrics and Gynecology emergency department of our hospital due to the onset of hydrorrhea, with no vaginal bleeding or sensation of uterine dynamics. The development of her pregnancy was normal and periodically monitored at our hospital, with negative serologies in the first and second trimester for HIV, hepatitis B virus, and *Treponema pallidum*, and a negative O'Sullivan test. Examination at admission was unremarkable except for hydrorrhea of clear amniotic fluid. The cardiocotographic record was classified as category I of the American College of Obstetricians and Gynecologists with no uterine dynamics. Abdominal ultrasound findings were normal, showing fetal biometrics appropriate to the gestational age and normal amniotic fluid volume. Tests at admission included full blood count, biochemistry with C-reactive protein, coagulation tests, urine sediment, urine culture, and microbiological analysis of vaginal, cervical, and vagino-rectal smears for *Streptococcus agalactiae*, following previously reported protocols (Hidalgo-Chicharro *et al.*, 2017; Sorlózano-Puerto *et al.*, 2018). Antibiotic treatment was prescribed with azithromycin (1 g single oral

Key words:

premature rupture of membrane; *Alloscardovia omnicoles*; emerging infection.

Corresponding author:
José Gutiérrez-Fernández
josegf@ugr.es

Figure 1 - Image of colonies of *Alloscardovia omnicolens* in blood agar culture medium after 48-h incubation under anaerobic conditions (left) and in the presence of clindamycin and linezolid in the E-test (right).

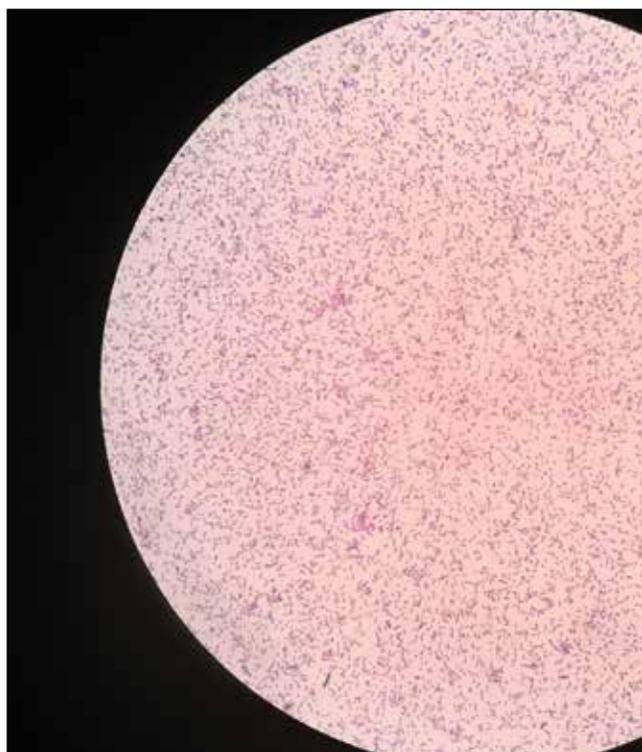


Figure 2 - Image of *Alloscardovia omnicolens* Gram staining.

Table 1 - Antibiotic susceptibility profile of *Alloscardovia omnicolens*, according to the EUCAST and CLSI breakpoints.

Antibiotic	MIC* (mg/L)	Clinical Category
Clindamycin	0.125	S
Erythromycin	0.12	
Ampicillin	0.5	S
Linezolid	0.5	
Imipenem	0.023	S
Metronidazole	>256	R
Moxifloxacin	0.75	S
Vancomycin	0.25	S

*MIC (minimum inhibitory concentration).

dose), ampicillin (2 g i.v., at admission and subsequently 1 g/4 h), and gentamicin (240 mg/24 h). No *Candida* spp., *Trichomonas vaginalis*, or *Gardnerella vaginalis* were detected in vaginal exudates (Becton-Dickinson Diagnostics, Sparks, MD, USA). PCR study (BD Max, Becton-Dickinson Diagnostics, Sparks, MD) of the cervical canal exudate was negative for *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis*, *Mycoplasma genitalium*, *Mycoplasma hominis*, and *Ureaplasma urealyticum*. However, after 48-h incubation in CO₂ in blood agar medium (Becton-Dickinson, Spain), abundant colonies identified as *A. omnicolens* by the Maldi-Tof technique (Bruker Biotyper, Billerica, MA, USA) (score 2.103) were isolated in the cervical canal culture (Figures 1 and 2) and confirmed by 16S rRNA gene sequencing at the National Microbiology Center (CNM Majadahonda, Madrid, Spain). E-test was performed according to 2018 EUCAST and CLSI (for moxifloxacin alone) criteria for anaerobic Gram-positive bacilli (CMI value in mg/L) on Brucella agar supplemented with hemin (5 µg/mL), vitamin K1 (1 µg/mL), and laked sheep blood (5% v/v) (Becton Dickinson, BD, Franklin Lakes, NJ, USA), incubating plates for 48 h at 35°C under 5% CO₂ (except for metronidazole, tested anaerobically). The results are shown in Table 1. The patient progressed favorably during her hospital stay, remaining afebrile at all times, with no elevation in C-reactive protein or leukocyte counts and reporting no sensation of uterine dynamics. In week 34⁺¹ of pregnancy and after fetus lung maturation with corticoids, labor was induced with vaginal prostaglandins (controlled-release dinoprostone) to reduce the risk of infection. Delivery was eutocic, and the newborn showed an Apgar index of 9/9 and no clinical signs of infection.

DISCUSSION

“The causes of PPRM have not been fully elucidated. Besides an idiopathic etiology, infection and local inflammatory processes have most often been proposed as triggering events” (Anonymous, 2012). Vulvovaginal infections are responsible for more than 30% of gynecological consultations. They are most frequently candidiasis infections, followed by bacterial vulvovaginitis and trichomonas vulvo-

vaginitis. Numerous possible microorganisms have been implicated in bacterial vulvovaginitis, and co-infection is frequently observed. Risk factors for vulvovaginitis include hormonal alterations, the utilization of hormonal or mechanical contraceptives, immunological deficiencies, the receipt of wide-spectrum antibiotics, vaginal lavage, or, as in the present case, pregnancy. Sorlózano *et al.* (2018) reported that this type of infection, usually mild and almost asymptomatic, can be associated with complications that increase perinatal morbidity and mortality, especially in relation to the risk of preterm delivery and PPROM.

The main risk of PPROM is prematurity, with possible associated comorbidities for newborns, alongside the risk of developing chorioamnionitis, which may be lethal for mother and child. Patients admitted with PPROM rarely have symptoms of infection, and acute-phase reactants such as C-reactive protein and leukocyte counts are usually normal. However, microbiological analysis of vaginal and endocervical smears at admission can help determine whether the cause of membrane rupture is infectious, enabling the ordering of specific treatments and the minimization of complications. According to our hospital microbiological data (Hidalgo-Chicharro *et al.*, 2017; Sorlózano-Puerto *et al.*, 2018), the microorganisms most frequently detected in women with PPROM are *Ch. trachomatis* and *N. gonorrhoeae* in the endocervical sample, and *M. hominis*, *Escherichia coli*, *U. urealyticum*, or *Gardnerella vaginalis* in the vaginal sample. Hence, they are often normal regional microbiota. In the present case, *A. omnicolens* was isolated in the endocervical smear culture of a woman with PPROM. The precise role of *A. omnicolens* in this case remains unknown, and there has been no previous report or pathogenicity study of cases in this localization.

Isnard *et al.* (2016) performed an *in-vitro* study investigating possible therapeutic approaches to *A. omnicolens* and other members of the *Bifidobacteriaceae* family and reporting antibiogram results for *A. omnicolens*. They observed that *A. omnicolens* is usually susceptible to all beta-lactams, macrolides, glycopeptides, linezolid, tetracyclines, tigecycline, cotrimoxazole, and rifampicin. However, drugs used against urinary infections, such as nitrofurantoin or fosfo-

mycin were not found effective, and gentamicin and metronidazole also appear to have limited impact. These findings support the usefulness of the treatment prescribed to our patient at admission, i.e., a single dose of azithromycin followed by a regimen of ampicillin and gentamicin.

Ethical statement

The study protocol was carried out in accordance with the Declaration of Helsinki. This was a non-interventional study with no additional investigation of routine procedures. Biological material was only used for standard infection diagnostics following physicians' prescriptions. No additional sampling or modification of the routine sampling protocol was performed. Data analyses were carried out using an anonymous database. For these reasons, ethics committee approval was considered unnecessary according to national guidelines. The Clinical Microbiology Clinical Management Unit of the University Hospital Virgen de las Nieves of Granada (Spain) granted permission to access and use the data.

References

- Anonimous. (2012). Sociedad Española de Ginecología y Obstetricia. Sección Medicina Perinatal. Rotura prematura de membranas. *Prog. Obstet. Ginecol.* **55**, 520-540.
- Hidalgo-Chicharro A., Abad-Torreblanca R., Navarro-Marí J.M., Gutiérrez-Fernández J. (2017). 32-week premature rupture of membranes caused by oropharyngeal microbiota. *JMM Case Rep.* **4**, e005121.
- Huys G., Vancanneyt M., D'Haene K., Falsen E., Wauters G., Vandamme P. (2017). *Alloscardovia omnicolens* gen. nov., sp. nov., from human clinical samples. *Int. J. Syst. Evol. Microbiol.* **57**, 1442-1446.
- Isnard C., Lienhard R., Reissier S., Rodríguez S., Krähenbühl J., et al. (2016). In-vitro antimicrobial susceptibility of *Alloscardovia omnicolens* and molecular mechanisms of acquired resistance. *Diagn. Microbiol. Infect. Dis.* **84**, 227-229.
- Mahlen S.D., Clarridge J.E. (2009). Site and clinical significance of *Alloscardovia omnicolens* and *Bifidobacterium* species isolated in the clinical laboratory. *J. Clin. Microbiol.* **47**, 3289-32893.
- Ogawa Y., Koizumi A., Kasahara K., Lee S., Nakano R., et al. (2016). Bacteremia secondary to *Alloscardovia omnicolens* urinary tract infection. *J. Infect. Chemother.* **22**, 424-425.
- Sorlózano-Puerto A., Esteban-Sanchís P., Heras-Caña V., Fernández-Parra J., Navarro-Marí J.M., Gutiérrez-Fernández J. (2018). Estudio prospectivo de la incidencia de patógenos genitales oportunistas y estrictos que crecen en medios de cultivo artificiales. *Rev. Lab. Clín.* **11**, 123-130.