Alloscardovia omnicolens emerging presence in premature rupture of membranes

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SUMMARY

Alloscardovia omnicolens 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. omnicolens 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 PPROM 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. omnicolens and PPROM, although its pathogenic role has not yet been elucidated.

INTRODUCTION

Alloscardovia omnicolens 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. omnicolens is a Gram-positive, catalase- and oxidase-negative, non-mobile, 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. omnicolens from a genital localization, although they did not specify the type of sample. We highlight the report of bacteremia in a patient with endometritis 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 chemotherapy (Ogawa et al., 2016). We report the first case of an association between A. omnicolens and 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. omnicolens 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 hydorrhea, 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 hydorrhea of clear amniotic fluid. The cardiotocographic 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
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 Biody, 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 PPROM 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-

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

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>MIC* (mg/L)</th>
<th>Clinical Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlortetracycline</td>
<td>0.125</td>
<td>S</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>Ampicillin</td>
<td>0.5</td>
<td>S</td>
</tr>
<tr>
<td>Linezolid</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Imipenem</td>
<td>0.023</td>
<td>S</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>&gt;256</td>
<td>R</td>
</tr>
<tr>
<td>Moxifloxacin</td>
<td>0.75</td>
<td>S</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>0.25</td>
<td>S</td>
</tr>
</tbody>
</table>

*MIC (minimum inhibitory concentration).
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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 Chlamydia trachomatis and Neisseria gonorrhoeae in the endocervical sample, and M. hominis, Escherichia coli, Ureaplasma 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 fosfomycin 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 de Granada (Spain) granted permission to access and use the data.

References
