



## Case report

*Atopobium vaginae* intrapartum bacteremia: A case report with a literature review

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## ABSTRACT

*Atopobium vaginae* is an anaerobic Gram-positive bacterium recognized as a causative agent of bacterial vaginosis and associated with preterm delivery. Invasive infection and bacteremia have been rarely reported. We describe the case of a woman expecting her firstborn child who presented with a *A. vaginae* bacteremia during labor. Identification was performed using 16S rRNA gene sequencing. Both maternal and fetal outcomes were favorable due to the maternal treatment with amoxicillin-clavulanic acid. We identified three other cases in the literature with different fetal outcome. The genetic diversity of *A. vaginae* should be further explored in order to reveal potential strains with differential pathogenic potential.

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## 1. Introduction

*Atopobium vaginae* is a facultative anaerobic Gram-positive bacterium which is part of the human vaginal microbiota [1,2]. The genus *Atopobium* was established in 1992 for a group of bacteria formerly known as *Lactobacillus minutum* or *L. rima* and *Streptococcus parvulus* [3]. Recently, different studies have emphasized the role of *A. vaginae* in bacterial vaginosis (BV) [2,4]. Among the bacterial species associated with BV, *A. vaginae* has been independently associated with a higher risk of preterm birth [5,6]. However, invasive disease caused by *A. vaginae*, including bacteremia, has been rarely reported [7–9].

We describe a case of *A. vaginae* bacteremia occurring during labor and present a short literature review of *A. vaginae* bacteremia during pregnancy.

## 2. Case presentation

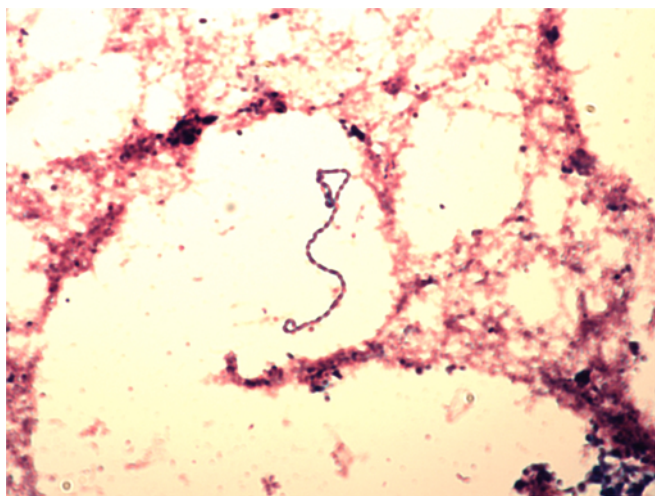
A 29-years old caucasian woman was admitted to the delivery room for ongoing labor. She was primigravid and it was a singleton pregnancy. Gestational age was 39 weeks and 3 days. The pregnancy was uneventful. During labor, acceleration of fetal heart rate was de-

tected indicating fetal distress. Delivery was assisted with vacuum and complicated by 0.5L blood loss. APGAR scores were 8, 9 and 10 at 1, 5 and 10 min respectively. Maternal temperature was elevated during labor and blood cultures were drawn. The empirical maternal treatment was initiated with intravenous amoxicillin-clavulanic acid immediately in the post-partum period. Two sets of blood cultures were collected and incubated in a Bactec system (Becton Dickinson, Erembodegem, Belgium) and anaerobic bottles were flagged as positive for gram-positive cocci in chain (Fig. 1). Matrix-Assisted Laser Desorption Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS) identification was *Atopobium* sp. Treatment by amoxicillin-clavulanic acid was continued with favorable response. Both the mother and the newborn were discharged on the third day post-partum.

Antimicrobial susceptibility testing (AST) using EUCAST clinical breakpoints for Gram-positive anaerobic bacteria (<http://www.eucast.org>) and antibiotic gradient strip test indicated susceptibility to penicillin (0.03 µg/mL), ampicillin (<0.016 µg/mL), clindamycin (<0.016 µg/mL), azithromycin (<0.016 µg/mL), linezolid 0.125 µg/mL, and resistance to metronidazole (>256 µg/mL). Partial sequencing of the 16S rRNA gene was performed (GenBank accession no.: MH628052.1; 1436 pb). The yielded sequence indicated 98.11% homology with *A. vaginae* strain DSM 15829(T) [1] by using EZBiocloud ([www.ezbiocloud.net/](http://www.ezbiocloud.net/)). Nevertheless, 98%–99% similarity was also found with other partial 16S rRNA sequences of *A. vaginae* (GenBank accession no.: AF325325.1, AJ585206.2, JQ511973.1,

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**Fig. 1.** Gram staining of *A. vaginae*: Gram staining of the blood culture isolate clearly shows Gram-positive cocci in chains.

NR\_029349.1, NR\_117757.1, Y17195.1) of the NCBI database ([www.ncbi.nlm.nih.gov/](http://www.ncbi.nlm.nih.gov/)).

### 3. Discussion

*A. vaginae* bacteremia has been rarely reported. We identified three other cases in the literature that are summarized in Table 1. All cases occurred during pregnancy; one case during labor, one case following chorionic villus sampling and one case probably due to an infected subchorionic hematoma. The mother outcome was favorable in all cases but pregnancy was terminated in two cases.

Identification of *A. vaginae* was performed using 16S rRNA gene sequencing in all 3 cases. In one study, MALDI TOF-MS successfully identified *A. vaginae* (Table 1) [6]. In our case, at the time of the diagnosis, the MALDI Biotyper IVD 4.2.80 database (Bruker, Germany) included 19 *Atopobium* main spectral profile (MSP) covering four species: *A. parvulum* (n=6), *A. rimae* (n=5), *A. minutum* (n=4), *A. vaginae* (n=3) and *Atopobium sp.* (n=1). As previously

mentioned, our strain was only identified at the genus level, as “*Atopobium sp.*”, using MALDI-TOF MS. This identification was provided as the best match with a confident score value (>2.5). Interestingly, no matches with *Atopobium* MSP were encountered in the ten best matches listed. We assume that a high intra-species diversity could explain this phenomenon. This hypothesis is in agreement with the work of Mendes-Soares et al. who suggests that the genetic diversity among *A. vaginae* strains is underestimated [10]. The addition of *Atopobium* species MPS in the MALDI-TOF MS database, and of *A. vaginae* in particular, could therefore improve the microbiological diagnosis of such microorganisms in the future. The need to use 16S rRNA gene sequencing or MALDI-TOF MS techniques to identify *Atopobium* species might account for the few cases reports published and the low reported prevalence of peripartum infection due to different *Atopobium* spp.

Regarding the AST, *A. vaginae* is usually resistant to metronidazole [11] although MICs can be highly variable on the strains tested. Sensitivity to beta-lactams and clindamycin is generally conserved [12]. Amoxicillin-clavulanic acid was the treatment administered in most reported cases.

The association between *A. vaginae* and bacterial vaginosis has been found consistently in various studies: higher *A. vaginae* bacterial load is associated with higher risk of preterm birth [5,6]. However, it is noteworthy that substantial proportion of healthy women is also colonized by *A. vaginae*. Interestingly, a recent study performed in South Africa using quantitative PCR suggest a decrease of the vaginal concentration of *A. vaginae* during pregnancy [13]. Whether in our case, bacteremia was related to high vaginal concentration of *A. vaginae* could not be determined since the presence of *A. vaginae* was not specifically assessed.

Whether different species of *Atopobium* or different *A. vaginae* strains with distinct virulence co-exist in the vaginal microbiota remains to be established. Given the strong association between bacterial vaginosis, *A. vaginae* burden and unfavorable pregnancy outcome [5], trials to diagnose and treat BV associated with *A. vaginae* are ongoing [14]. This warrant more studies aiming at defining the genetic diversity and its relationship with virulence of *A. vaginae* isolates.

In conclusion, we report a case of *A. vaginae* bacteremia during labor. The fetal and maternal outcome was favorable. This case draws

**Table 1**  
Summary of the cases of *Atopobium vaginae* bacteremia reported during pregnancy.

Reference	Age	Clinical presentation	Gestational age (weeks, day)	Obstetric history	Identification	Antibiogram susceptibility testing (MICs mg/L)	Treatment received	Fetal Outcome	Maternal Outcome
Knoester, 2010 [7]	40 y	Sepsis post-chorionic villus sampling	12	G7P3	MALDI-TOF MS( <i>Atopobium sp.</i> ) and 16S rRNA gene sequencing	PEN S (0.094) MTZ R (24) CLI S (<0.016)	1/CXM 2/ AMX	Death	Favorable
Chan, 2012 [8]	33 y	Intrapartum sepsis with fetal distress	39,2	G4P2	16S rRNA gene sequencing	PEN S (0.25) MTZ R (>256)	AMC	Favorable	Favorable
Jacqmin, 2017 [9]	38 y	Infected subchorionic hematoma	12	G3P2	MALDI-TOF MS( <i>Atopobium sp.</i> ) and 16S rRNA gene sequencing	PEN S (0.016) MTZ S (1) AMC S (0.016) CLI S (<0.016)	1/AMC 2/AMX	Termination of pregnancy at 20 weeks for preterm premature rupture of membranes	Favorable
Present case	29 y	Intrapartum sepsis with fetal distress	39,3	G1P0	MALDI-TOF MS( <i>Atopobium sp.</i> ) and 16S rRNA gene sequencing	PEN S (0.03) AMP S (<0.0016) CLI S (0.016) MTZ R (>256)	AMC	Favorable	Favorable

AMC, amoxicillin-clavulanic acid; AMP, ampicillin; AMX, amoxicillin; CLI, clindamycin; CXM, cefuroxime; MIC, minimal inhibitory concentration; MTZ, metronidazole; PEN, penicillin; R, resistant; S, susceptible; y, years.

the attention that the genetic diversity *A. vaginae* isolates needs to be further explored, in order to assess if strains with different pathogenic potential exist within the species and whether this may be linked with unfavorable pregnancy outcome.

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