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CASE REPORT

Bacteramia Caused by Gardnerella Vaginalis in a Cesarean Section Patient

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SUMMARY

Background: **Gardnerella vaginalis is a facultative anaerobic and small gram-variable rod bacterium. G. vaginalis, which can be transmitted through sexual contact, is the common pathogen for the feminine bacterial pathogen (BV). Here we describe a case of bacteremia in a patient after cesarean section caused by G. vaginalis in China.**
Case presentation: **A 35-year-old woman suffered bacteremia caused by G. vaginalis after cesarean section. This patient, without evidence of polymicrobial infection, was treated with cefuroxime and had a good outcome.**
Conclusions: **G. vaginalis bacteremia is rarely reported. Our report expands the range of infection caused by G. vaginalis.**
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KEY WORDS

Gardnerella vaginalis, bacteremia, cesarean section

INTRODUCTION

Gardnerella vaginalis is a gram-negative to gram-variable, small, pleomorphic rod with no spore, capsule or flagella aero-anaerobic bacterium. Gardnerella vaginalis is a predominant bacterial species associated with BV which has been linked to serious public health consequences, including postoperative infections, pelvic inflammatory disease, acquisition and transmission of the HIV, preterm birth, and several adverse outcomes in pregnancy. Lower amount of G. vaginalis can also be found in the vaginal epithelium in healthy women [1-3]. It is also reported that there is a significant link between IBD and G. vaginalis biofilm [4].

CASE PRESENTATION

A 35-year-old Chinese woman was diagnosed with bacteremia with repeated fever for 5 days after cesarean section. Termination of pregnancy was performed due

Table 1. Summary of reported cases of Gardnerella vaginalis bacteremia.

Reference	Procedure	Gender	Underlying disease	Treatment	Outcome
E.K. Alidjinoul et al. 2013 [12]	a ureteral stent	male	diabetes, sigmoid tumor	three days of Amikacin; seven days of ceftriaxone and metronidazole	recovered
A. Babics et al, 2015 [9]		male	urethritis	day 1 - 14: ciprofloxacin azithromycin and ceftriaxone	recovered
Lagacé-Wiens PR et al. 2007 [8]	ureteroscopy	male	renal calculi and urosepsis	ciprofloxacin	recovered
Randy A. McCool et al. 2012 [7]	global endometrial ablation	female	not reported	day 3 - 5: piperacillin-tazobactam and metronidazole, day 6 - 12: metronidazole	recovered
Rene A. Amaya et al. 2002 [5]	none	female premature infant	respiratory distress	day1 - 3: ampicillin and gentamicin, day 5: metronidazole	recovered
H Y Joon et al. 2010 [13]	none	male	infective endocarditis and septic emboli in the kidney and brain	IV metronidazole, ceftriaxone and oral erythromycin oral metronidazole	recovered
J. C. Legrand,'* et al. 1989 [14]	none	male	alcohol abuser, pulmonary abscess and empyema	day 1 - 12: ceftazidime, day 13 - 15: penicillin, minocycline and metronidazole, clindamycin, minocycline and ampicillin, chloramphenicol	died
Aubert Agostini et al. 2003 [15]	vaginal myomectomy	female	chronic pelvic pain and genital bleeding previous vaginal delivery	day 1 - 2: cefoxitrin metronidazole	recovered
Eggink, et al. 2003[16]	electronic fetal monitoring	female infant	scalp hematoma	ampicillin and cefotaxime; gentamicin and cefotaxime; gentamicin and imipenem; clindamycin	recovered
This present case	Cesarean section	female	none	cefuroxime	recovered

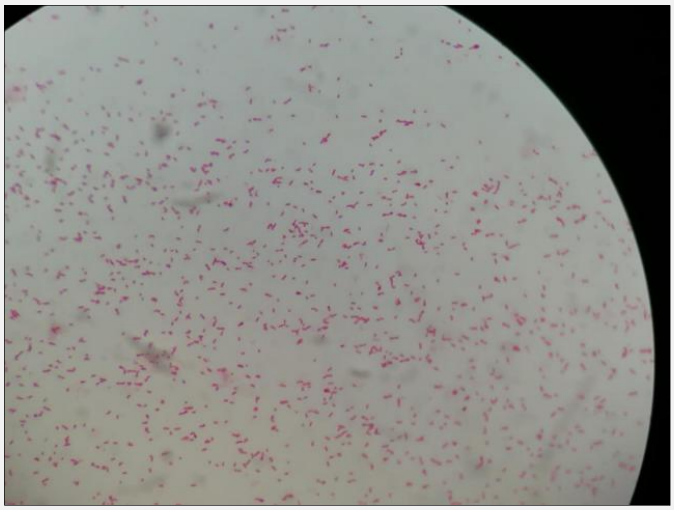

Figure 1. An initial gram staining of the blood culture revealed pleomorphic, gram-negative coccobacilli.

to "fetal distress" by lower uterine segment crosscutting cesarean section with amniotic fluid turbidity. Routine antibiotic cefuroxime was used to prevent infection. Two days after the cesarean section, laboratory examination showed a white blood cell count of 18.06 x 10^9/L with 91.2% neutrophils. The temperature was 38.8°C. The hemoglobin was 113 g/L. The PCT was 0.30 ng/mL. Specimens for blood culture were taken. On the sixth day of incubation, the anaerobic blood culture from the first set was flagged positive by the automated BacT/Alert system. An initial gram stain of the blood culture revealed pleomorphic, gram-negative coccobacilli (Figure 1). The blood culture isolate was plated on in-house-prepared 5% sheep blood agar and chocolate agar in 5% CO2-MacConkey agar for aerobic incubation, and Brucella agar with vitamin K for anaerobic incubation. After 48 hours of incubation, small gray colonies were observed on the chocolate agar, with poor growth of gray, non-hemolytic colonies found on the sheep blood agar. To confirm the identity of the isolate, a fragment of the 16S rRNA gene was amplified using primer sets 16S-forward (5` AGAGTTTGATCCT GGCTCAG 3) and 16S-reverse (5´ GGTTACCTTGTT ACGACTT 3) by the polymerase chain reaction, and the resultant polymerase chain reaction product was sequenced. The best match returned was the *Gardnerella vaginalis*, ATCC 14019 type strain, with 99.2% identity. The biological characteristics and 16S rRNA gene sequencing data strongly supported the identification of *G. vaginalis*.

The antibiotic susceptibility of the Gardnerella vaginalis strain was determined by the Kirby-Bauer disk diffusion method on Mueller-Hinton agar plates with 5% horse blood with use of Oxoid disks (Oxoid Ltd Basingstoke, Hants, RG24 8PW, UK). Although there are no categorical interpretative criteria for antimicrobial susceptibility testing (AST) data for G. vaginalis, the isolate exhibited large inhibition zone (millimeter) for most of antimicrobials tested: ampicillin 34 mm, ceftriaxone 34 mm, imipenem 40 mm, TEP 40 mm, vancomycin 34 mm, cefoperazone/sulbactam 40 mm, clindamycin 6 mm, cefaclor 15 mm, and cefepime 16 mm. The MIC observed was ≤ 0.38 for meropenem. The patient was treated with 1.5 g intravenous cefuroxime every 12 hours for five days. The patient was discharged home on oral cefuroxime as her hemogram returned to normal with a good outcome.

DISCUSSION

Gardnerella vaginalis, once named *Hemophilus vaginalis* and *Corynebacterium vaginale*, is a gram-negative to gram-variable, small, pleomorphic rod. *G. vaginalis*, an aerobic bacteria which is difficult to grow in the general medium, needs a special selection medium to improve the positive detection rate. The medium of choice for its isolation is Columbia agar with human blood, on which it causes hemolysis [5]. Incubation at 35 to 37°C for 48 hours in a humidified atmosphere of air with 5 to 10% CO_2 is helpful for the growth of *G. vaginalis*. It appears to be gray, translucent, smooth, and dew-like colony [6]. Leukocytosis is common in patients with *Gardnerella vaginalis* bacteremia [7].

G. vaginalis can also be identified by a typical profile revealed by the results of multiple tests. The most valuable characteristics of biochemical reactions are the presence of ca-glucosidase, absence of P-glucosidase, and tests for oxidase, indole, H2S, nitrate reduction, ß-glucuronidase, catalase, and tributyrin hydrolysis are negative. The bacterium produces a hemolysin and a sialidase which play a role in the evasion of mucosal immunity and result in local tissue damage [8].

The bacterium is also susceptible to macrolides and beta-lactams; metronidazole and clindamycin are frequently used as empirical treatments in patients presenting with urethritis [9]. Studies have shown that other antibiotics are effective *in vitro* for treatment. In Kharsany's test, 93 isolates of *G. vaginalis* were evaluated for their susceptibilities to 25 antibiotics. Minimal inhibitory concentrations (MICs) were determined by the agar dilution method. All strains were susceptible to penicillin, ampicillin, erythromycin, clindamycin, and vancomycin, while resistant to amikacin and sulfamethoxazole. Most of the strains were susceptible to metronidazole [10]. However, the *Gardnerella vaginalis* in our case is resistant to clindamycin. Cefuroxime did have a good effect on the patient of our case.

Gardnerella vaginalis bacteremia has been reported after vaginal and cesarean section delivery, dilation and curettage, intrauterine device placement, vaginal hysterectomy, and in association with pelvic infection in a review in 1989 [11]. Figure 1 summarizes bacteremia caused by *Gardnerella vaginalis* during the last 25 years. It has been found in male patients with tumors, urinary tract diseases, empyema, infective endocarditis, and septic emboli in the kidney and brain, while in female patients, it was associated with endometrial ablation or vaginal myomectomy. There were two cases reported in female infants as well. Most of the bacteremia caused by *G. vaginalis* can have a good outcome which depends on the basic situation of the patient.

CONCLUSION

We reported, in detail, a case of *G. vaginalis* bacteremia after cesarean section. Our case suggested that we should prevent *G. vaginalis* bacteremia after cesarean section and select the appropriate approaches to improve the detection rate. Moreover, it is very necessary to take effective antibiotic treatment for such infections.

Declaration of Interest:
The authors declare no competing financial interest.

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