

# An unusual case of fulminant generalized peritonitis secondary to purulent salpingitis caused by *Prevotella bivia* – case report with literature review

Stoyan Kostov<sup>1</sup>, Stanislav Slavchev<sup>2</sup>, Deyan Dzhenkov<sup>3</sup>, Strahil Strashilov<sup>4</sup>, Angel Yordanov<sup>5,\*</sup>

## Abstract

**Introduction** *Prevotella* bacilli are prevalent in the body as members of the normal flora and in some cases they can be involved in infections throughout the body. *Prevotella bivia* is a member of a nonpigment group found in the resident flora of the female genital tract and it is occasionally seen in the oral cavity.

**Case report** We describe the very rare case of a 39-year-old woman with fulminant generalized peritonitis secondary to purulent salpingitis caused by *Prevotella bivia*.

**Discussion** In most cases described in the literature, *Prevotella bivia* was mixed with aerobes and caused bacterial vaginosis and pelvic inflammatory disease, whereas in our case study *Prevotella bivia* was the only microbe that was isolated. The infection was fulminant and caused generalized peritonitis. Rapid and systemic infections typically occur in immunocompromised hosts, however our patient was in good health condition and immunocompetent.

**Conclusions** *Prevotella bivia* may cause rapid and systemic infections, even in immunocompetent hosts. Multidisciplinary team management is mandatory in order to estimate the optimal treatment regimen.

**Keywords** *Prevotella bivia*, fulminant generalized peritonitis, surgery

## Introduction

The genus *Prevotella* includes both pigmented and nonpigmented bacilli that were previously classified as genus *Bacteroides*.<sup>1</sup> *Prevotella* bacilli are prevalent in the body as members of the normal

flora. However, in some cases they can be involved in infections throughout the body.<sup>2</sup> *Prevotella bivia* is a member of a nonpigment group found in the resident flora of the female genital tract and it is occasionally seen in the oral cavity.<sup>3,4</sup> *P. bivia* is associated with infections in the female urogenital tract. The growth of *P. bivia* increases during the follicular phase of the menstrual cycle due to the increased levels of estrogen.<sup>3,5,7</sup> *P. bivia* can be associated with infections in rare locations of the body such as chest wall, intervertebral discs, paronychia and knee joint.<sup>5,7,8</sup> We describe a very rare case of a 39-year-old woman with fulminant generalized peritonitis secondary to purulent salpingitis caused by *P. bivia*.

## Case report

A 39-year-old woman presented to our emergency department complaining of two days of abdominal pain, vaginal discharge, fever of 38.5°C and diarrhea. At the onset of pain, she took nonsteroidal anti-inflammatory drugs for temperature and pain relief. The patient had had two deliveries through caesarean section – four

Received: 21 October 2019; revised: 18 November 2019; accepted: 02 December 2019.

<sup>1</sup>Clinic of Gynecology, University Hospital “St. Anna”-Varna, Bulgaria; Bul. Tzar Osvoboditel 100, Varna, Bulgaria;

<sup>2</sup>MD, Clinic of Gynecology, University Hospital “St. Anna”-Varna, Bulgaria; Bul. Tzar Osvoboditel 100, Varna, Bulgaria;

<sup>3</sup>MD, Department of General and Clinical Pathology, Forensic Medicine and Deontology, Medical University Varna, Marin Drinov Str 55, Varna, Bulgaria; <sup>4</sup>MD, Department of Plastic Restorative, Reconstructive and Aesthetic Surgery, Medical University Pleven; Bul. Georgi Kochev 8A, Pleven, Bulgaria; <sup>5</sup>MD, Department of Gynecologic Oncology, Medical University Pleven, Bulgaria; Bul. Georgi Kochev 8A, Pleven, Bulgaria.

\*Corresponding author: Angel Danchev Yordanov, angel.jordanov@gmail.com

Article downloaded from www.germs.ro

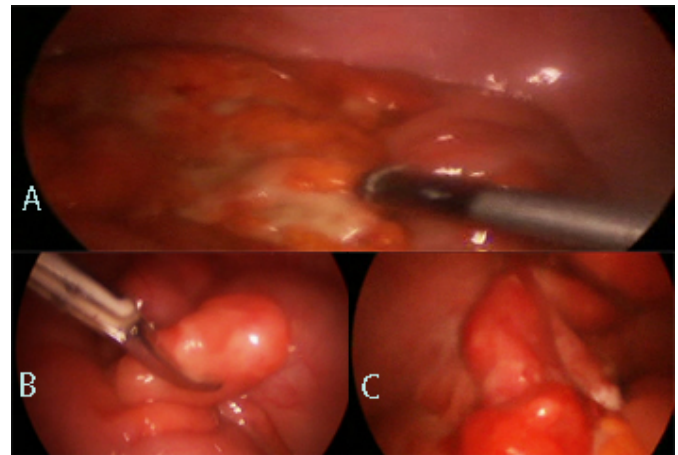
Published March 2020

© GERMS 2020

ISSN 2248 – 2997

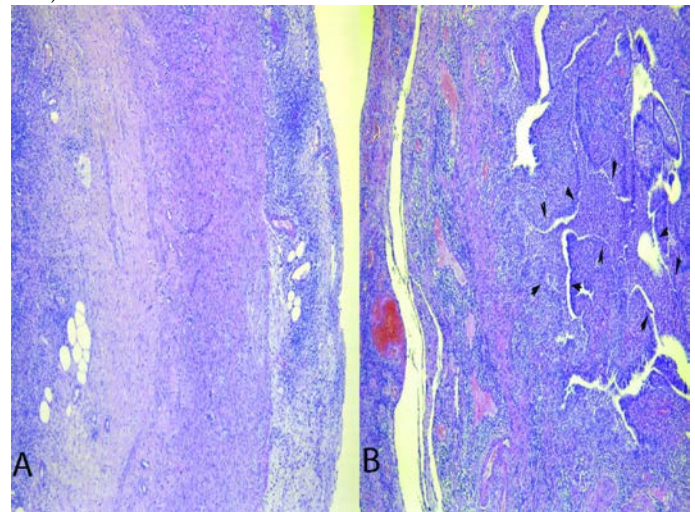
ISSN – L = 2248 – 2997

and seven years previously, respectively. She was on the 12<sup>th</sup> day of her menstrual cycle. She did not have medical history of gynecological problems or any major medical diseases – diabetes mellitus, cardiovascular or renal issues. The abdominal examination revealed pain in the lower abdomen, muscle rigidity and rebound tenderness. During gynecological examination, the patient had pain in the left fallopian tube and cavum Douglasi. Transvaginal sonography showed free fluid in cul-de-sac, thickness and hyperechoic structures on the wall of the left fallopian tube. Laboratory data results revealed leukocytosis accompanied by a left shift, hypoproteinemia, hypoalbuminemia and high levels of fibrinogen. Pelvic inflammatory disease was suspected and after surgical examination, we admitted the patient in the gynecology clinic. Immediately after hospitalization culdocentesis was performed. We aspirated 60 mL purulent material from the cavum Douglasi and sent it for aerobic and anaerobic pathogenic cultures. Initial empirical antimicrobial therapy was initiated immediately: gentamicin (120 mg every 12 h, i.m.), cefazolin (2 g every 12 h, i.v.), metronidazole (500 mg every 8 h, i.v.). Empirical antimicrobial therapy was continued for 48 hours, until microbiological results became available. On the second day the patient got worse: the temperature increased to 39°C and vomiting, abdominal pain and reduced intestine peristalsis occurred. Abdominal X-ray and surgical examination were ordered to evaluate alimentary tract obstruction or perforation. Abdominal X-ray showed air-fluid levels in the intestine without free gas under the diaphragm. Our conclusion was that she might be suffering from generalized peritonitis due to gynecological pathology. The patient underwent diagnostic laparoscopy. She was informed that there is a possibility for conversion from laparoscopic to open surgery. We performed the open technique method of first port insertion in order to avoid bowel perforation. Intraoperative findings included: around 300 mL purulent fluid and fibrinous adhesions in the peritoneal cavity, small bowel dilation, edematous left fallopian tube and fibrinopurulent exudate on serosa of the appendix, without perforation (Figure 1).



**Figure 1.** A) The greater omentum and intestine covered with a fibrinous and purulent exudate; B) Edematous appendix with fibrinopurulent exudate on the serosa; C) Edematous and thick left fallopian tube with purulent exudate on the serosa

After intraoperative consultation with the surgeon, we decided to perform a median laparotomy to thoroughly explore the abdominal cavity. Liver, gall-bladder and alimentary organs were normal. Left salpingectomy, appendectomy and abdominal peritoneal lavage were performed. We left two drains in the abdominal cavity. Histopathological examination revealed periappendicitis and purulent salpingitis (Figure 2).



**Figure 2.** A) Appendix with inflammation and edema in serosa and subserosal adipose tissue (periappendicitis). H&E staining x100; B) Marked and diffuse neutrophilic infiltrate, congestion and edema, collection of pus in Fallopian tube. H&E staining x100

The purulent specimen from cavum Douglasi was inoculated onto Schaedler blood agar and thioglycolate broth. *P. bivia* was identified on bacterial anaerobic culture test 48 hours later through Vitek 2 system. There was an absence of pathogenic aerobes. *P. bivia* was found to be metronidazole sensitive. Therefore, the patient continued treatment with a seven-day course of metronidazole (500 mg every 8 h, i.v.). On the next three postoperative days, the patient was subfebrile with normal peristalsis and diuresis. On postoperative day 5 both drainages were removed and the patient felt well. On postoperative day 8, the patient was discharged in good health condition and oral metronidazole 500 mg twice daily for seven days was prescribed. A year and a half after the operation the patient is in good health.

### Discussion

*Prevotella bivia* is a common vaginal commensal, which has been detected in the vaginal epithelia in 40% of healthy women.<sup>4,9</sup> In bacterial vaginosis there is a symbiosis between *P. bivia* and other anaerobes.<sup>3</sup> *Gardnerella vaginalis* biofilm stimulates growth of *P. bivia*.<sup>9</sup> *P. bivia* is also detected concomitantly with aerobic bacteria.<sup>3</sup> It has been reported to invade the cervix, causing intrauterine infections with pregnancy complications – preterm labor, premature rupture of membranes, or postpartum endometritis.<sup>4</sup> In gynecology, *P. bivia* causes bacterial vaginosis, endometritis and pelvic inflammatory disease.<sup>4,5,8</sup> Several unusual gynecological cases associated with *P. bivia* have been reported. Sang-Min Shim reported a case of a 40-year-old woman with a 6 cm abscess on the cuff two months after laparoscopic supracervical hysterectomy. *P. bivia* was identified on bacterial culture test. He concluded that clinicians should be aware of the possibility of *P. bivia* infections despite their rarity.<sup>4</sup> Purushothaman and colleagues described a case of spondylodiscitis caused by the anaerobe *Prevotella* that indicated the underlying diagnosis of serous cystadenofibroma of the ovaries. They concluded that the genitourinary system should be inspected if a musculoskeletal infection is caused by

*Prevotella*.<sup>8</sup> *P. bivia* can be associated with infections in atypical locations of the body. Hsu and colleagues reported a case of a chest wall abscess due to *P. bivia*.<sup>7</sup> Mirza described two cases of mixed infections of the paronychium with *P. bivia*.<sup>5</sup> Cases of fasciitis, osteomyelitis, septic arthritis of the knee joint, all caused by *P. bivia* have been described.<sup>5</sup>

A diagnosis of *P. bivia* requires starting the culture within 1 hour after sampling.<sup>2,3</sup> For rapid detection of *Prevotella*, both direct and indirect fluorescent antibody techniques may be an option.<sup>2</sup> Initial empiric antibiotic therapy should be administered immediately as microbiological results do not become available for 24 to 72 hours. There is no utilized consensus for the optimal antimicrobial treatment of *P. bivia* infections.<sup>5,7</sup> Studies have reported that clindamycin, amoxicillin/clavulanate, metronidazole, and imipenem are effective against *P. bivia*.<sup>2,5,7,10</sup> One-third to one-half of *Prevotella* strains are resistant to tetracyclines, ciprofloxacin, and most *P. bivia* strains are  $\beta$ -lactamase positive.<sup>1,7</sup> If antibiotic treatment fails, surgery should be performed. This includes drainage of abscesses and/or excision of necrotic tissue.<sup>1</sup>

In our survey from literature, we did not find a case of generalized peritonitis secondary to purulent salpingitis caused by *P. bivia*. It is suggested that sex steroids regulate the growth of this microbe as *P. bivia* increases during the follicular phase of the menstrual cycle.<sup>3</sup> Our case seems to confirm this, as the patient's symptoms started during the follicular phase of the menstrual cycle. Mimako observed *P. bivia* in a rat pyometra model. He concluded that in a mixed infection (*P. bivia* and aerobes), the rate of inflammatory change of the uterus was higher than in a sole infection with *P. bivia*.<sup>6</sup> In most cases described, *P. bivia* was mixed with aerobes and caused bacterial vaginosis and pelvic inflammatory disease, whereas in our case study *P. bivia* was the only microbe that was isolated. The infection was fulminant and caused generalized peritonitis. Rapid and systemic infections typically occur in immunocompromised hosts, however our patient

was in good health condition and immunocompetent.<sup>7,10</sup> We cannot explain the fulminant infection in our case study. Nevertheless, we can conclude that multidisciplinary team management is crucial for managing the infection.

### Conclusions

Although *Prevotella bivia* is a rare infectious agent, obstetricians and gynecologists should be aware of the possibility of its occurrence in their practice. *Prevotella bivia* may cause rapid and systemic infections, even in immunocompetent hosts. Multidisciplinary team management is mandatory in order to estimate the optimal treatment regimen.

**Consent:** Written informed consent was obtained from the patient for publication of this case report and the accompanying images.

**Authors' contributions statement:** Conceptualization – SK, AY; methodology – SK, AY; formal analysis – DD, SS; investigation – SK, DD; resources – SK; data curation – SS; writing – original draft preparation – SK; writing – review & editing – SS; visualization – SS; supervision – AY; patient management – SK, SS. All authors read and approved the final version of the manuscript.

**Conflicts of interest:** All authors – none to declare.

**Funding:** None to declare.

### References

1. Finegold SM, Jousimies-Somer H. Recently described clinically important anaerobic bacteria: medical aspects.

- Clin Infect Dis 1997;25 Suppl 2:S88-93. <https://doi.org/10.1086/516237>
2. Baron S, editor. Medical Microbiology. 4<sup>th</sup> edition. Galveston, TX, USA: University of Texas Medical Branch at Galveston; 1996.
3. Mikamo H, Kawazoe K, Izumi K, Sato Y, Tamaya T. Studies on the clinical implications of anaerobes, especially *Prevotella bivia*, in obstetrics and gynecology. J Infect Chemother 1998;4:177-87. <https://doi.org/10.1007/BF02490164>
4. Shim SM, Kim YS. *Prevotella bivia* infection following supracervical hysterectomy: case report with a review of literatures. Soonchunhyang Med Sci 2014;20:128-30. <https://doi.org/10.15746/sms.14.032>
5. Mirza A, Bove JJ, Litwa J, Appelbe G. Mixed Infections of the paronychium with *Prevotella bivia*. J Hand Microsurg 2012;4:77-80. <https://doi.org/10.1007/s12593-011-0054-7>
6. Mikamo H, Kawazoe K, Izumi K, Watanabe K, Ueno K, Tamaya T. Studies on the pathogenicity of anaerobes, especially *Prevotella bivia*, in a rat pyometra model. Infect Dis Obstet Gynecol 1998;6:61-5. <https://doi.org/10.1155/S1064744998000155>
7. Hsu GJ, Chen CR, Lai MC, Luh SP. Chest wall abscess due to *Prevotella bivia*. J Zhejiang Univ Sci B 2009;10:233-6. <https://doi.org/10.1631/jzus.B0820289>
8. Purushothaman B, Lakshmanan P, Gatehouse S, Fender D. Spondylodiscitis due to *Prevotella* associated with ovarian mass-a rare case report and review of literature. World Neurosurg 2010;73:119-22. <https://doi.org/10.1016/j.surneu.2009.07.003>
9. Randis TM, Ratner AJ. *Gardnerella* and *Prevotella*: co-conspirators in the pathogenesis of bacterial vaginosis. J Infect Dis 2019;220:1085-8. <https://doi.org/10.1093/infdis/jiy705>
10. Riesbeck K. Paronychia due to *Prevotella bivia* that resulted in amputation: fast and correct bacteriological diagnosis is crucial. J Clin Microbiol 2003;41:4901-3. <https://doi.org/10.1128/JCM.41.10.4901-4903.2003>

Please cite this article as:

Kostov S, Slavchev S, Dzhenkov D, Strashilov S, Yordanov A. An unusual case of fulminant generalized peritonitis secondary to purulent salpingitis caused by *Prevotella bivia* – case report with literature review. GERMS. 2020;10(1):51-54. doi: 10.18683/germs.2020.1185