



Case Report

Pasteurella multocida multiple intrapelvic abscesses in a young woman with uterine cervical cancer[☆]

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ABSTRACT

Pasteurella multocida, a zoonotic pathogen in humans, is known to be associated with skin and soft tissue infections following animal bites, but rarely causes visceral infections. We report a case of *P. multocida*-associated multiple intrapelvic abscesses in a young woman with uterine cervical cancer. A 29-year-old unmarried woman was referred to us because of prolonged high fever accompanying abdominal pain with muscular guarding. She had a domestic cat but denied of any bites or scratches before that. Computed tomography demonstrated ascites and multiple abscesses around her uterus. Her condition did not improve with an initial treatment with flomoxef, clindamycin, and azithromycin. Further, we performed percutaneous pus drainage and switched the antimicrobial therapy to a combination of piperacillin/tazobactam and minocycline for 10 days. Although *P. multocida* was isolated from vaginal culture, no organisms were isolated from the pus culture. However, further investigation with specimen-direct 16S rDNA analysis diagnosed *P. multocida* as possibly a single pathogen responsible for the intrapelvic infection. After taking oral levofloxacin for two weeks, no recurrence was reported. Although *P. multocida* is known as an animal-related pathogen, it can transmit to humans without apparent bites or scratches. The present case illustrates that *P. multocida* can cause intrapelvic abscess as a result of ascending genital infection.

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1. Introduction

Pasteurella multocida is a zoonotic Gram-negative coccobacillus that forms part of the normal oropharyngeal flora of animals [1], including household pets such as cats and dogs, with estimated positivity rates of 90% in cats and 66% in dogs [2]. The organism typically causes soft tissue infections in humans after animal bites or scratches, but can also cause various other infections, including pneumonia, endocarditis, meningitis, osteomyelitis, and even fatal systemic infections [3–5]. As an intra-abdominal infection, *P. multocida* causes peritonitis, typically in patients with peritoneal dialysis who are in close contact with domestic animals [6,7]. Patients with cirrhosis possibly experience spontaneous bacterial

peritonitis caused by this pathogen [8–11]. Though extremely rare, *P. multocida*-associated gynecological cases have been described in the literature, such as salpingitis [12], vulval abscess [13], tuboovarian abscess [14–17], and intrauterine device endometritis [18]. We herein report a rare case of *P. multocida*-associated multiple intrapelvic abscesses in a young woman with uterine cervical cancer, probably subsequent to the vaginal colonization and ascending infection of the pathogen.

2. Case presentation

A 29-year-old unmarried woman, who had previously been healthy, noticed irregular vaginal bleeding after sexual intercourse over the course of a year. Two weeks prior to admission, she visited a gynecologist. Ultrasonography examination showed a cervical mass of 3.5-cm size, and the results of cervical cytology with papanicolaou smears were indicative of uterine cervical cancer (class V, squamous cell carcinoma). Further investigations for the histopathological diagnosis and clinical staging were planned.

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However, before that, she developed high fever with abdominal pain and was transferred to our hospital.

On admission, her vital signs were relatively stable—blood pressure, 110/67 mmHg; heart rate, 78 bpm; and body temperature, 37.0 °C. She lived with her partner and a domestic cat. Her cat stayed freely at her house; she denied having been bitten or scratched. A physical examination revealed tenderness and muscular guarding over her abdomen. Laboratory results demonstrated elevated white blood cell count (14,780/ μ L) and serum C-reactive protein levels (21.77 mg/dL) without other abnormal findings. Vaginal examination did not indicate apparent infectious manifestations. Vaginal discharge was not purulent; however, Gram staining showed Gram-negative rods infiltrated with neutrophils, and bacterial culture detected *P. multocida* (2+) and coagulase-negative Staphylococci (1+). Nucleic acid tests for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* were both negative. *P. multocida* was susceptible to penicillin, ceftriaxone, azithromycin, levofloxacin, and trimethoprim/sulfamethoxazole (Table 1). Two sets of blood cultures were negative. Contrast-enhanced computed tomography revealed ascites and encapsulated low density lesions surrounding her uterus, suggesting a multiple intrapelvic abscess; one on the ventral side of uterus fundus (84 × 54 mm), another adjacent to the right ovary, and the last one on the dorsal side of corpus uterus (Douglas fossa, 40 mm) (Fig. 1). Her right ovary seemed enlarged, suspecting the involvement of ovarian abscesses, but which was later confirmed as a chocolate cyst by magnetic resonance imaging test. In addition, her mesentery was entirely thickened and well contrasted, suggestive of peritonitis.

Antimicrobial therapy was initiated with a combination of flomoxef, clindamycin, and azithromycin. After 2 days, she was consulted to an infectious disease service, and the antibiotics were changed to piperacillin/tazobactam and minocycline to cover drug-resistant Gram-negative organisms, anaerobes, and atypical pathogens, such as *Mycoplasma* spp. or *Ureaplasma* spp.. On day 3, she underwent percutaneous abscess drainage guided by ultrasonography. Gram staining of the pus showed numerous neutrophils, but pathogens were not detected. The results of aerobic and anaerobic bacterial culture were negative even after incubation for 1 week. Although no pathogenic organism was identified by the conventional methods, her fever and abdominal pain gradually subsided. The intravenous treatment was continued for 10 days, and she was discharged with oral levofloxacin, which was continued for 2 weeks without recurrence.

Two days after discharge, magnetic resonance imaging of the pelvis was performed. The cervical mass, 4.1 cm in size, protruded outward reaching to her vaginal wall, but did not invade the pelvic wall tissues. There were no findings suggesting lymph node metastasis. Under an estimated diagnosis of cervical cancer at FIGO (the International Federation of Gynecology and Obstetrics) staging IIB, the patient thereafter underwent a chemoradiotherapy.

Table 1
Antimicrobial susceptibility testing of the pathogen.

	MIC (μ g/mL)	Susceptibility
Penicillin G	0.12	S
Ampicillin	0.25	S
Amoxicillin/clavulanate	≤ 0.25	S
Ceftriaxone	≤ 0.12	S
Erythromycin	>2	R
Azithromycin	1	S
Levofloxacin	≤ 2	S
Trimethoprim/sulfamethoxazole	≤ 0.5	S

MIC, minimum inhibitory concentration. Antimicrobial susceptibility was interpreted on the basis of Clinical & Laboratory Standards Institute Guideline (M45–A2, *Pasteurella* species).

We assumed that *P. multocida* from her cat colonized her vagina and caused a secondary intrapelvic infection because of the anatomical abnormality.

3. Bacterial analysis

Thereafter, we attempted a genetic diagnosis for the pathogen of her pelvic abscess. Using universal primers for 16S rDNA [8UA (5'-AGA GTT TGA TCM TGG CTC AG-3') and 1485B (5'-TAC GGT TAC CTT GTT ACG AC-3')], we directly performed PCR of the drained pus. A nucleic acid sequence data was clearly deciphered, indicating the presence of a single pathogen. The sequence data were analyzed using BLAST sequence homology search programs (GenBank, EzBioCloud, and leBIBI), and finally *P. multocida* DNA was detected in the specimen. This corresponded with the type strain of *P. multocida* subsp. *gallicida* (NCTC 10,204; accession number, AY078998) with an accuracy of 99.9% (1462 bp/1464 bp), and with the type strain of *P. multocida* subsp. *multocida* (ATCC 43,137; accession number, CP008918) with an accuracy of 99.8% (1461 bp/1464 bp). These two subspecies were indistinguishable by 16S rDNA analysis; however, the negative result of a dulcitol fermentation test [19], examined using api 50 CH (bioMérieux, Marcy l'Etoile, France), suggested the isolate to be *P. multocida* subsp. *multocida*.

4. Discussion

In this case, we presented a rare case of *P. multocida* intrapelvic abscess. Peritonitis with *P. multocida* has been well described in patients with peritoneal dialysis [6,7] and hepatic cirrhosis [9–11,20]. However, our patient had no such conditions, and clinical and image findings were not suggestive of peritonitis. Though uncommon, previous literature has shown that *P. multocida* can induce genital infections. In some cases of tubo-ovarian abscess, it was assumed that the infection occurred as a consequence of bacteremia subsequent to pet scratches or bites [12,16,17]. Furthermore, *P. multocida* has a pathogenic potential to ascend genital tract and cause uterine or ovarian infections [13–15,18,21], or even expose neonates to serious infections [22–24]. The pathogen can transmit from animals to humans without bites or scratches [25]; even through the inhalation of respiratory secretions [26]. In this case, considering the absence of ovarian involvement and a history of pet-related trauma, the intrapelvic abscess could have occurred subsequent to vaginal colonization. Her underlying disease—the invasive uterine cervical carcinoma—was thought to be associated with the growth of the pathogen as a triggering factor of the rare disease.

Considering the pathological mechanism, the infection could have been a polymicrobial etiology. However, the specimen-direct 16S rDNA analysis was suggestive of a single infection by *P. multocida*. A previous report has demonstrated the utility of the specimen-direct genetic diagnosis in *P. multocida* genital infection [14]. Though inconclusive, we believe that this case might be a *P. multocida* mono-infection according to the result of genetic investigation.

Risk factors for invasive *P. multocida* infection include cirrhosis, malignancy, diabetes mellitus, HIV infection, chronic pulmonary disease, and chronic kidney disease [4]. Although our patient had uterine cervical cancer as an underlying disease, she recovered well with the combination of antibiotics and percutaneous drainage therapy. *P. multocida* usually shows a preferable antimicrobial susceptibility pattern [27]. Beta-lactam antibiotics are the treatment of choice, but some isolates may produce beta-lactamases [10]. Thus, penicillin with a beta-lactamase inhibitor or third-generation cephalosporin is usually recommended [6].

In summary, we described a rare case of *P. multocida* multiple intrapelvic abscesses, which was assumed to be caused by ascending infection of the organism. *P. multocida* should be

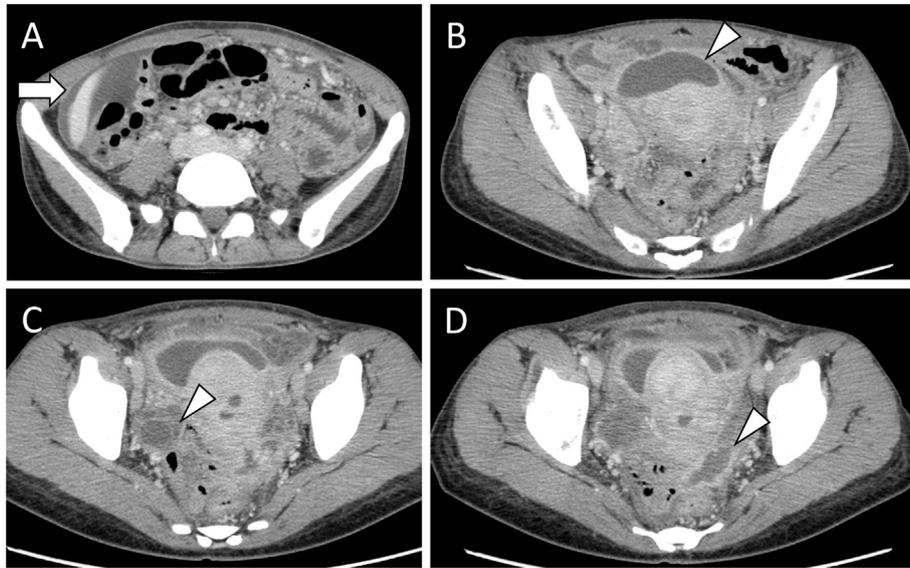


Fig. 1. Contrast-enhanced computed tomography of the multiple intrapelvic abscess. A fluid retention around Morrison's fossa, suggesting peritonitis, was observed (A, arrow). In the pelvic region, there were multiple abscess formations (arrow heads); in front of the fundus of uterus (B), surrounding right ovary (C), and at Douglas fossa (D).

considered as a possible pathogen for genital tract infection, particularly in a patient having a domestic animal.

Declarations of interest

None.

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