

CASE REPORT

Sepsis and ARDS due to actinomycosis and *Fusobacterium nucleatum* associated with intrauterine contraceptive device use

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Abstract. We present the case of a 40-year-old woman with sepsis and acute respiratory distress syndrome (ARDS) due to an infection with *actinomyces* and *Fusobacterium nucleatum* associated with intrauterine contraceptive device (IUD) use. After being in position for 10 years, her IUD had become colonized with *actinomyces*. *Actinomyces* probably provided the mucosal breach needed to permit *Fusobacterium nucleatum* invasion from the urogenital tract. We should be aware of the possibility of *actinomyces* and *Fusobacterium nucleatum* infection in abdominal sepsis with ARDS after prolonged use of an IUD.

Introduction

Intrauterine devices (IUDs) to prevent pregnancy have been used for a very long time. They are a safe and long-acting method of contraception. The use of an IUD is associated with a certain risk of pelvic infection. We report a rare case of an abdominopelvic infection associated with the use of an IUD complicated by sepsis and ARDS.

Case history

A 40-year-old woman was admitted to our intensive care unit with sepsis and ARDS. She had presented at our department three days earlier with diverticulitis. Her clinical condition worsened. Ultrasonography revealed a solid mass in the right side of her abdomen and a mass above the uterus. Acute peritonitis was suspected and she underwent emergency surgery. Preoperative broad spectrum antibiotics were administered (amoxicillin 6 x 1000 mg daily, tobramycin 240 mg daily and metronidazole 3 x 500 mg daily). Laparotomy showed a necrotic right ovary; both the right ovary and the omentum contained abscesses with much pus. The right ovary and part of the omentum were resected. Two days later she developed tachypnoea (34 breaths/min), tachycardia (135 beats/min), fever (38.5 °C) and a white blood cell count of $28.7 \times 10^9/l$.

Despite oxygen suppletion with FIO₂ 1.0 oxygenation deteriorated (arterial blood gas analysis: pH 7.43, pCO₂ 5.2 kPa, pO₂ 8.3 kPa). Chest radiography revealed bilateral pulmonary infiltrates. She was septic and developed ARDS. She was transferred to the intensive care unit, where she was intubated and ventilated in pressure control mode, with inspiratory peak pressure of 30 cm H₂O, positive end-expiratory pressure (PEEP) of 10 cm H₂O, and a fractional inspired oxygen (FIO₂) of 1.0. Blood cultures were negative. Culture of pus from the abdomen revealed *Fusobacterium nucleatum*. Histological examination of the resected omentum revealed granulomatous infiltrates with sulfur granules, representing colonies of *actinomyces*. Four months earlier after 10 years of use, her IUD had been removed

because *actinomyces* had been detected on routine cervical smear. At that time cultures of the IUD has also shown colonies of *actinomyces* growth. Antibiotic therapy was changed to intravenous penicillin G 10 million units daily and metronidazole 1500 mg daily. Under this treatment regimen she recovered. She was extubated after 7 days. For the *actinomyces*, penicillin therapy was later changed to amoxicillin 1500 mg daily for 6 months. She was discharged from the intensive care unit after a stay of 8 days.

Discussion

Although IUD use is increasing, pelvic infections with *actinomyces* are uncommon. This was first described by Henderson in 1973 [1]. In a longitudinal study in 15 women done by Persson and Holmberg, *actinomyces* isolates were found in 13% of the vaginal samples (45/349). Five of the women were IUD-users [2]. In a later review of literature, *actinomyces* were identified in 10% of the asymptomatic IUD-users and in 25% of IUD-users with symptoms [3]. However, it is unclear if all isolates caused actinomycosis. *Actinomyces*, an anaerobic gram positive rod, normally just dwells in the oral cavity and intestines. But the longer an IUD is in place the more likely *actinomyces* is to be present in the genital tract [4,5,6]. In our case, the IUD had been in place for 10 years. The *actinomyces* probably migrated up the IUD tail after spreading from the bowel to the perineum and vagina. *Fusobacterium nucleatum* is an anaerobic gram negative bacillus commonly present in the urogenital tract. Under ordinary conditions *actinomyces* do not cross mucosal barriers. In our case, no predisposing factor other than prolonged IUD use resulting in local inflammation and disruption of the mucosa was found [6,7,8]. *Actinomyces* spreads by contiguity, disregarding tissue planes and providing the mucosal breach for invasion of *Fusobacterium nucleatum* invasion. *Actinomyces* species grow as colonies, forming granulomatous tissue, abscesses and fistulas. Very often other bacteria are present when such lesions exist, including fusobacteriae, bacteroides, enterobacteriaceae, streptococci and staphylococci [6,8]. In this case, *Fusobacterium nucleatum* was found. Definitive diagnosis of actinomycosis is usually based upon culture of *actinomyces* or histological identification of actinomycotic sulfur granules. These sulfur granules represent colonies of *actinomyces* and

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are characterized by a zone of granulation tissue with filamentous non-acid-fast, gram-positive bacilli radiating from these granules [6,9] (Figure 1.). In this case the treatment was surgical resection of the lesions. Penicillin G, 10-20 million units daily intravenously for 4-6 weeks is the preferred antibiotic. We used metronidazole to treat *Fusobacterium nucleatum*. In our case, the abdominopelvic disease was complicated by sepsis and ARDS. Blood cultures stayed negative due to prior antibiotic therapy. We should be aware of the possibility of actinomyces and *Fusobacterium nucleatum* infection in abdominal infections complicated by sepsis and ARDS after prolonged use of an IUD.

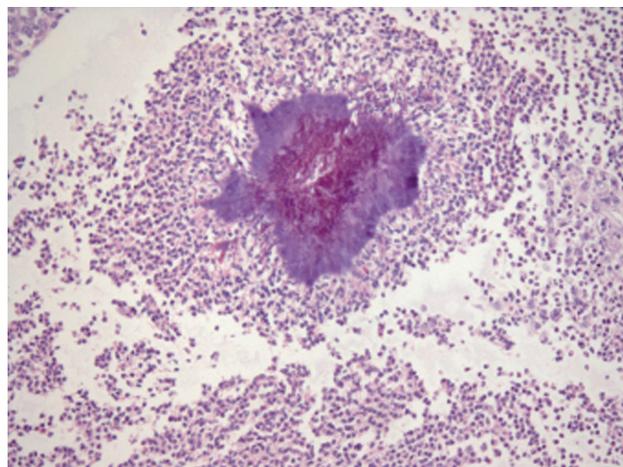


Figure 1. Histological examination of the resected omentum with sulfur granules. These sulfur granules are characterized by a zone of granulation tissue with filamentous nonacid-fast, gram-positive bacilli radiating from these granules.

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