Pelvic actinomycosis mimicking ovarian malignancy: three cases

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Summary

Objective: Three cases of pelvic actinomycosis initially diagnosed as pelvic malignancy and treated surgically are reported. *Cases:* The first case was a 38-year-old multiparous woman who was referred to our clinic because of bilateral ovarian solid masses. With the impression of ovarian carcinoma, a laparotomy was performed. During surgery adhesiolysis, total abdominal hysterectomy, bilateral salpingo-oophorectomy, infracolic omentectomy, appendectomy, peritoneal washings, and peritoneal abscess drainage were performed. The second patient was a 37-year-old woman who presented with a left-sided fixed solid mass highly suggestive of pelvic malignancy. Both ureters were found to be dilated with hydronephrosis in the right kidney supporting the diagnosis of retroperitoneal fibrosis. Excision of the mass, colectomy and temporary diverting colostomy and stent insertion to the left ureter were performed. Colostomy repair was performed five months later. On the fifth day postoperatively, fascial necrosis developed so a Bogota-bag was placed on the anterior abdominal wall and left for secondary healing. The third patient was a 51-year-old postmenopausal woman incidentally diagnosed as having a pelvic mass while having been investigated for constipation and nausea. She had had a colostomy one year before and a reanastomosis two months after. Total abdominal hysterectomy and bilateral salpingo-oophorectomy were performed. In all cases, histopathologic staining of the specimens revealed chronic inflammation containing actinomycosis abscesses confirmed with microbiologic identification. *Conclusion:* Pelvic actinomycosis is an uncommon cause of a pelvic mass. However, it should be kept in mind in the differential diagnosis of pelvic masses, especially in the patients with a history of IUD use to avoid an unnecessary extensive surgical procedure.

Key words: Pelvic actinomycosis; Ovarian carcinoma; Retroperitoneal fibrosis; Colon carcinoma; IUD.

Introduction

Actinomycosis is a slowly progressive bacterial infection caused by a variety of gram-positive filamentous anaerobic or microaerophilic rods, *genus Actinomyces*, most commonly by *Actinomyces israeli*. It has the ability to cause suppurative lesions and diseases that have the classical actinomycotic clinicopathologic stigmata: granulation tissue, severely dense fibrosis, multiple small abscesses and draining sinuses. Once established, actinomycosis spreads contagiously in a low, progressive manner infiltrating the tissue planes. The disease usually presents as an abscess or a mass lesion that is often fixed to underlying tissue and mistaken for a tumor [1].

Actinomycotic infection of the pelvis occurs most commonly in association with an IUD [2]. Symptoms are typically indolent such as fatigue, anorexia, weight loss and abdominal pain. The earliest stage of disease progresses to a limited pelvic mass or tuboovarian abscess. Since the diagnosis is often delayed, a frozen pelvis mimicking malignancy may develop by the time of recognition.

Definitive diagnosis is usually established on the basis of the histology of infected tissue obtained by biopsy or culture of *Actinomyces spp*. or both. A correct diagnosis is almost impossible based on clinical findings alone, and actinomycosis is often not considered in the differential diagnosis because of the rarity of the condition.

We describe three cases of pelvic actinomycosis treated surgically, diagnosed as pelvic masses suggesting malignancy preoperatively.

Case Reports

Case 1

A 38-year-old gravida 3, para 2 woman was referred to our clinic with weight loss and fatigue of three months duration. With the diagnosis of typhoid fever, she had been treated with ciprofloxacin for 14 days. Aside from typhoid fever, her past history was unremarkable and her periods were regular.

On admission, her temperature was 37.2°C. Her blood pressure was 110/70 mmHg and her pulse was regular at 80 beats/min. Gynecologic examination and ultrasound showing bilateral fixed adnexal masses were confirmed with abdominopelvic magnetic resonance imaging (MRI) which showed 6-cm heterogeneous solid masses with focal areas of diminished attenuation in the left adnexal area as well as right-side involvement. A 3-cm solid mass in the right adnexal area infiltrating the right ureter was also noted. Laboratory data included hematocrit of 26%, white blood cell count of 10,200 mm^3/ml with all the other parameters including tumor markers within normal limits.

The patient was referred for surgery with the clinical diagnosis of a pelvic mass suspicious for malignancy despite a true-

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cut biopsy revealing inflammatory granulation tissue. Exploratory laparotomy revealed a 5-6 cm pelvic mass conglomerated with the left ovary and fallopian tube, right ovary and tube adhering to the colon, multiple segments of bowel densely adhering to the Douglas pouch and omentum thickened and adhering to the anterior abdominal wall. Frozen section examination showed inflammatory nonmalignant tissue. Total abdominal hysterectomy, bilateral salpingo-oophorectomy, infracolic omentectomy, appendectomy, peritoneal washing, and peritoneal abscess drainage were performed.

Peritoneal abscess culture demonstrated actinomycosis. The patient was discharged on the 8th day postoperatively in a stable condition with intravenous high-dose penicillin treatment for six months. Her follow-up has been uneventful.

Case 2

The second patient was a 37-year-old, gravida 3, para 3 woman who presented with vertigo and fatigue for the previous two months. Her menstrual cycles were regular, and her past history and familial history were unremarkable.

The vital signs were stable and the patient was afebrile. A left-sided nontender fixed firm mass arising from the left side of the pelvis highly suggestive of malignancy was found at gynecologic examination under anesthesia. An abdominopelvic MRI showed the presence of a cystic lesion of 8 cm lateral to the right-sided hydronephrosis expanding to the pelvic rim, both ureters dilated, and irregular soft tissue densities lying retroperitoneally, suggesting retroperitoneal fibrosis in the differential diagnosis (Figure 1). The patient's hematocrit was 28%, and leucocytosis of 12,600 mm^3/ml was present. Tumor markers and all other parameters were within normal limits.

Exploratory laparatomy revealed an approximately 20-cm solid mass conglomerated with the bowels on the left side and the left ovary and tube densely adhering to the pelvic wall laterally with a normal uterus. The right ovary contained an 8-cm multiloculated serous cystic lesion with smooth contours, and the left tube and ovary seemed to be stuck to the peritoneum at the posterior side of the uterus obliterating the Douglas pouch. A highly vascularized mass densely adhering to the rectum was excised, and colectomy and temporary diverting sigmoid colostomy were performed. A stent was inserted into the left ureter via cystoscopy. Frozen section of the mass did not contain any malignant cells but did show fibrosis. Histopathologic staining of the specimen confirmed chronic inflammation containing actinomycosis abscesses. The patient was discharged on the 13th day postoperatively with a treatment plan of penicillin for six months.

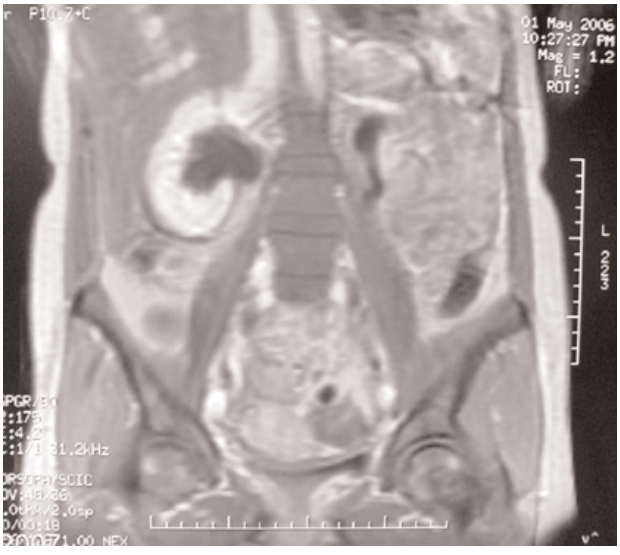

Figure 1. — Advanced actinomycotic infection causing pelvic mass and retroperitoneal fibrosis.

Colonic reanastomosis was performed five months later. A foul smelling purulent material draining from the subcutaneous hemovac drain and a temperature rise in the 5th day postoperatively were the warning signs of fascial necrosis. The patient's temperature was 39°C. Leucocytes were 18,100 mm^3/ml and CRP was 179 mg/l. Immediate exploratory laparatomy was performed: anastomosis was intact, and anterior abdominal fascia seemed to be necrotic. The necrotic tissue was debrided and a Bogota-bag was placed on the anterior abdominal wall, and left for secondary healing with daily dressings. Cultures collected from necrotic tissues revealed ampicillin resistant *Escherichia coli*. After 14 days of ceftriaxone 1 x 2 g IV, metronidazole 4 x 500 mg IV treatment, her WBC was 11,400 mm^3/ml and CRP was 5 mg/dl. She was discharged on the 35th day postoperatively with the abdominal wall almost closed and her general condition improved.

Case 3

The third patient was a 51-year-old postmenopausal woman who was referred from the general surgery clinic due to detection of pelvic masses while being evaluated for constipation and nausea. She had been on a triple antibiotic regimen of metronidazole, ceftriaxone, and penicillin for 14 days for suspected pelvic inflammatory disease. In her obstetric history there were two vaginal deliveries and six curettages.

An important note in the medical history was the colostomy operation one year before because of a bowel injury at explorative laparatomy for suspected colon carcinoma and reanastomosis two months later. One year before, she had been admitted to a clinic with the complaint of constipation; the proctosigmoidoscopy revealed a hard fragile mass compressing the mucosa 6 cm above the anal sphincter as well as severe narrowing of the bowel lumen 15 cm above the anal sphincter resulting from extrinsic compression. Biopsies revealed edema and focal mucosal erosion but no malignancy. Besides the 5-cm cystic mass containing multiple septations and soft tissue densities in the right adnexal area, her abdominopelvic computed tomography (CT) showed an 8-cm mass with poorly defined margins constricting the rectal lumen and infiltrating the perirectal space. To rule out malignancy and to relieve her symptoms she was submitted to surgery. At laparotomy, the mass extended to the pelvic sidewall involving the uterus and bladder. Colectomy and sigmoid loop colostomy were performed. Histopathological specimens revealed chronic inflammatory granulation tissue, chronic colitis and fibrosis. Two months later, colonic reanastomosis was performed. In her follow-up, symptoms of constipation and nausea recurred so proctosigmoidoscopic balloon dilatation was performed twice.

The patient was referred to us because of the adnexal mass detected at CT. On admission, her body temperature was 36.6°C and blood pressure was 130/80 mmHg. Gynecologic examination revealed a frozen pelvis. CT imaging showed a 4-cm cystic mass with thick walls in the right adnexal area adhering to the ovary, uterus and bowels. Proximal rectal wall thickening, which caused narrowing of the lumen and posterior bladder wall thickening, was also seen. Leukocyte count was 7300, CRP was 1 mg/l with all the other parameters including tumor markers within normal ranges.

Ileal and colonic segments were adhering to the anterior

abdominal and pelvic sidewall and posterior wall of the uterine corpus at laparotomy. The bladder was adhering to the entire anterior wall of the uterus ascending to the fundus. Both ovaries and fallopian tubes were stuck to the bowels superiorly and the pelvic sidewalls laterally. Adhesiolysis, total abdominal hysterectomy and bilateral salpingo-oophorectomy were performed. Histopathological samples were correlated with the cultural identification of chronic actinomycotic infection. She was discharged on the 13th day postoperatively with ampicillin 4 x 1 g treatment in good general condition. Six months of oral penicillin treatment was planned. Her follow-up has been uneventful.

Discussion

An anaerobic, gram-positive, branching filamentous bacterium *A. israeli,* a common inhabitant of the mouth, often cultured from the gastrointestinal tract, bronchi, and female genital tract, is the microorganism responsible for most cases of actinomycosis. It acts as an opportunistic infection, usually with other bacterial invasion. It tends to follow a break in the normal mucosal barrier. More than 50% of actinomycosis infections occur in the cervicofacial region. Other sites are the thoracic region (22%), ileocecal region (15%), and less commonly other locations (6%) [2].

Actinomyces colonization and pelvic abscesses occur most commonly in women using an intrauterine device (IUD) which was the common history of our three cases. In a systematic review, Fiorino identified 92 actinomycotic IUD-associated abscesses reported from 1926 to 1995 [3]. Gupta and associates identified Actinomyces in a Pap smear of a woman with an IUD in 1976 [4]. Later investigations of pap smears among IUD users reported a prevalence of Actinomyces-positive smears ranging from 0% to 31%, with an average of 7% [3, 5]. In a review, Lippes emphasized that removal of the IUD of a patient with a positive culture is not necessary and in the absence of evidence for pelvic infection, antibiotics are not required [6]. Actinomycotic abscesses are extremely rare so the pap test has a high false-positive rate and an extremely low positive-predictive value. Furthermore, only half of the women with abscesses described in published reports had had a previous pap test that was positive for Actinomyces-like organisms. In predicting Actinomycotic abscess formation, the prognostic significance of a pap test is minimal [7].

The atypical, noninfectious nature of the clinical presentation is a challenge to clinicians in distinguishing pelvic actinomycosis from intraabdominal or pelvic malignancies. The presenting symptoms are often nonspecific, such as weight loss, lower abdominal pain, and fatigue, as in our patients. Generally, neither fever nor leukocytosis is present. The diagnosis of abdominopelvic actinomycosis is seldom made preoperatively (10%) [8]. Because of its chronicity and ability to cross conventional tissue planes, it will often simulate malignancy in a range of sites, including the genitourinary tract. Only a few case reports have been published in which an advanced actinomycotic pelvic infection mimicked a pelvic malignancy [8-13]. Hoffman *et al*. reported two cases of actinomycotic pelvic inflammatory disease simulating advanced ovarian carcinoma and advanced cervical carcinoma [9]. Perlow *et al*. reported a case of disseminated pelvic actinomycosis presenting as metastatic carcinoma associated with the Progestasert IUD [10]. Like our first case, Powell *et al*. reported the case of a patient with a large pelvic mass simulating ovarian carcinoma both by clinical presentation and by imaging modalities [11]. As a result of misdiagnosis, both patients were treated surgically.

The infection can be infiltrative, causing marked induration and extensive fibrosis. In the literature, there are cases with retroperitoneal fibrosis like the second case we presented [14, 15]. Milam *et al*. described a case with right hydronephrosis and abdominal CT images showing a right retroperitoneum consistent with retroperitoneal fibrosis as in our second case. In that case, right ureteral stent placement and true-cut biopsies were performed confirming the diagnosis of idiopathic retroperitoneal fibrosis. Worsening of the patient's condition on methylprednisolone treatment was the cause for proceeding to exploratory laparatomy which revealed a tuboovarian abscess [15]. Ureteral stricture [16, 17, 19] and rectal stricture [20] due to pelvic actinomycosis have been reported. Like our second patient, Haj *et al*. presented a case with right hydro-ureteronephrosis and a large board-like pelvic mass infiltrating the retroperitoneum, involving the distal part of the right ureter. In their case, a diverting sigmoidostomy was created and the ureter was drained by a pig-tail catheter introduced through the urinary bladder, as in our patient. Invasion of infection and fibrosis beyond the abdominal viscera may necessitate extensive surgery including ureteral stent insertion and colostomy which was the procedure performed in two of our cases.

Cases mimicking colon cancer have also been reported [20, 21]. Like the third patient we have presented, Rose *et al*. reported a case with an abdomenal mass that after colonoscopy the preoperative presumptive diagnosis was carcinoma of the colon [20]. The same surgical intervention – colectomy and colostomy – was the operation performed in both their case and ours. Also Scribner *et al*. described a patient with a pelvic mass suggesting colorectal carcinoma revealing actinomycosis after colectomy [8].

The infection is characterized by abscesses or indurated masses with hard, fibrous encasement and soft central loculations that contain purulent debris. Microscopically, a typical actinomycosis abscess consists of an outer zone of granulation around central purulent loculations that contain variable numbers of granules. The granulation zone consists of thick cellular tissue containing collagen fibers, fibroblasts, lymphocytes, plasma cells, and sometimes, giant cells. Necrosis is rarely seen. The central zone is characterized by typical 'sulfur' granules, which is of great significance for diagnosis [22]. With routine culture techniques it is difficult to identify this fastidious, obligate anaerobic and slowly growing bacterium.

Imaging modalities have a minimal contribution in the differential diagnosis. However Ha *et al*. published a retrospective study of ten patients whose CT scans showed predominantly solid masses with focal areas of diminished attenuation as in our first patient, or cystic masses with thickened walls as in our third patient. The aggressive nature of invasion and infiltration of contagious tissues is confirmed with CT as seen in our patients [23]. In the literature there is only a small number of published data about abdominopelvic MRI of actinomycosis. In a case report, Hawnaur *et al*. reported that relatively low signal intensity in T2-weighted sequences in abdominopelvic MRI of a tuboovarian mass may suggest a fibrotic process rather than malignancy [24].

The disease has an excellent prognosis with appropriate antibiotic management. Since antimicrobial therapy alone can cure extensive disease, it is unclear how often surgical intervention is actually necessary. However, surgical intervention can still play a role in facilitating recovery in selected patients and is useful to rule out malignancy in some instances. Penicillin is the drug of choice. A prolonged treatment regimen is required because of the poor penetration of antibiotics into the fibrotic tissues. Dose recommendations include 18 to 24 million units of penicillin intravenously for two to six weeks, followed by oral therapy with penicillin or amoxicillin for six to 12 months. If therapy is extended beyond the point of resolution of measurable disease, the risk of relapse will be minimized [1]. All our patients responded well to penicillin treatment without recurrence. Tetracycline, minocycline, erythromycin and clindamycin are alternatives for penicillin-allergic patients.

Conclusion

Actinomycosis remains a rare cause of pelvic masses, but should be kept in mind in the differential diagnosis. A previous history of IUD use may be the only clue directing the clinician to such a rare condition which has a favorable prognosis with prior antibiotherapy instead of extensive surgery.

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