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When Pelvic Actinomycosis Mimics Cervical Neoplasia: A Diagnostic Challenge

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1. Abstract

1.1. Introduction: Actinomyces israelii is a Gram-positive anaerobic bacterium that can become pathogenic when tissue integrity is compromised. Pelvic actinomycosis is rare (~5% of cases) and is often associated with prolonged use of intrauterine devices (IUDs). This condition can mimic malignancies, leading to diagnostic delays and inappropriate treatment.

1.2. Case 1: A 50-year-old woman presented with intermenstrual bleeding and pelvic pain. Magnetic resonance imaging (MRI) and positron emission tomography (PET) scans suggested locally advanced cervical cancer (FIGO stage IIIC1). However, histopathological analysis of endocervical curettage and conization revealed an Actinomyces infection. A previously undocumented IUD was subsequently removed. Treatment with high-dose oral amoxicillin (6 g/day) led to complete resolution within six months.

1.3. Case 2: A 76-year-old woman undergoing evaluation for dermatomyositis was found to have hypermetabolic uterine foci on PET imaging, raising suspicion of malignancy. MRI confirmed a cervical mass with vaginal and parametrium extension. Biopsy revealed chronic cervicitis without evidence of malignancy. During surgery, an undetected IUD was removed, and microbiological analysis confirmed Actinomyces. The patient was initially treated with oral amoxicillin but developed a vaginal abscess requiring surgical drainage and intravenous antibiotics. Follow-up imaging demonstrated complete resolution.

1.4. Conclusion: Pelvic actinomycosis can closely mimic cervical neoplasia, often resulting in misdiagnosis and overtreatment. Imaging findings are frequently misleading, and a high index of suspicion is warranted, particularly in patients with a history of prolonged IUD use. Diagnosis relies on histopathological and microbiological confirmation, and treatment typically requires prolonged antibiotic therapy. Increased awareness of this condition is critical to avoid unnecessary surgical interventions.

2. Keywords

Actinomyces infection ; Antibiotic therapy ; Cervical neoplasia ; In trauterine device.

3. Introduction

Actinomyces israelii is a Gram-positive, anaerobic bacterium commensal in the gums, tonsils, and mucosal surfaces such as the vagina. It becomes pathogenic when tissue integrity is compromised, allowing the bacterium to invade deeper tissues [1]. Actinomycosis refers to a deep infection caused by Actinomyces and is characterized as a chronic granulomatous disease forming masses composed of aggregates of branching filamentous bacilli [2].

This rare condition primarily affects the face and neck, with pelvic forms accounting for approximately 5% of cases [3].

Patients with pelvic actinomycosis typically present with chronic abdominal or pelvic pain, upper genital tract infections complicated by tubo-ovarian abscesses, and, less commonly, pseudo-tumoral pelvic masses. A major risk factor is prolonged use of an intrauterine device (IUD) [4,5].

Diagnosis can be made via bacterial cultures from endometrial or endocervical samples, or by examining the IUD in suspected cases. Alternatively, it may be identified through histopathological analysis of surgical or biopsy specimens [5,6].

The nonspecific and often misleading clinical presentation can lead to delays in diagnosis, inappropriate treatment, and, in some cases, mutilating surgery. We present two pelvic actinomycosis cases mimicking cervical neoplasia.

4. Case 1

A 50-year-old premenopausal woman with a medical history of hypertension and inflammatory polyarthralgia treated with methotrexate. She has three living children, all delivered vaginally. Gynecologically, she has diffuse adenomyosis and a large anterior FIGO 2 myoma measuring 9 cm.

She was referred to the Gynecology Department at Pitié-Salpêtrière Hospital for suspected cervical neoplasia, staged at least FIGO IIIC1 (2018 FIGO Classification) on an MRI performed for heavy intermenstrual bleeding and pelvic pain.

She was afebrile. On clinical examination, the abdomen was soft, and no lymphadenopathy was palpable. Speculum examination revealed a healthy cervix. An endocervical curettage was performed. Vaginal examination suggested bilateral parametrial invasion without vaginal involvement.

Pelvic MRI revealed a 45-mm cervical T2-hyperintense lesion with restricted diffusion, extending to the proximal parametrium. Bilateral iliac lymphadenopathy measuring up to 1 cm was also

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observed (Figure 1).

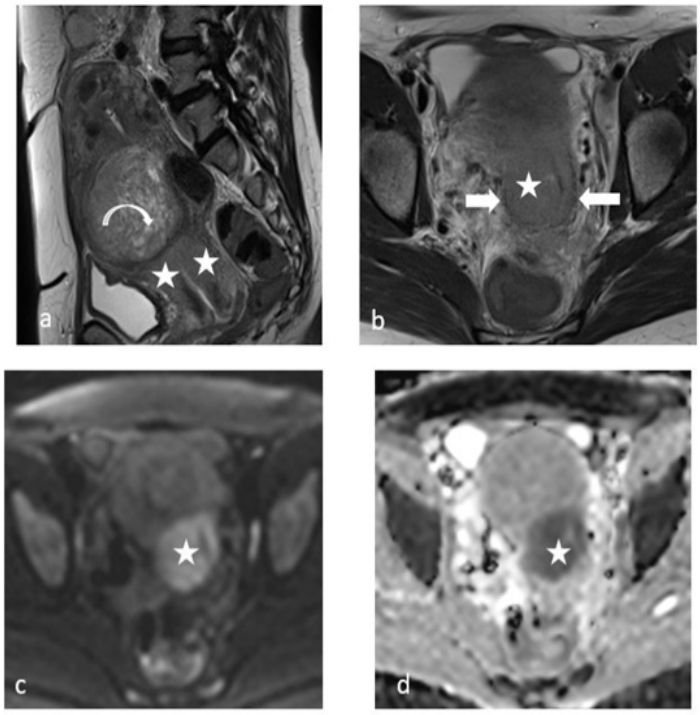
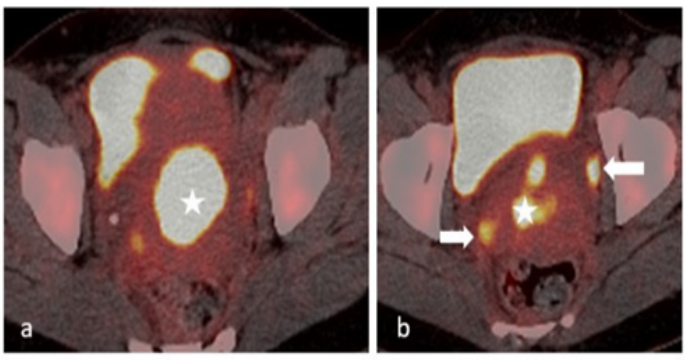


Figure 1: Sagittal T2 (a) and axial T2 (b) pelvic MRI sequences show cervical mass (asterisks) with parametrial invasion (arrows). Note a corporeal cellular myoma (curved arrow). The mass shows a hypersignal in diffusion sequence (c) (asterisks) with important restriction (d) (asterisks).

Laboratory findings showed no inflammatory syndrome, and tumor markers were not assessed.

Given the strong suspicion of locally advanced cervical neoplasia, positron emission tomography (PET) imaging was performed. It showed a hypermetabolic endocervical mass (SUVmax 30.2), along with a hypermetabolic focus on the right side of the mass (SUVmax 6.6), representing a peritumoral lymph node. Additional findings included two intensely hypermetabolic bilateral external iliac lymphadenopathy (SUVmax 10.3 on the right and 8.6 on the left) (Figure 2).



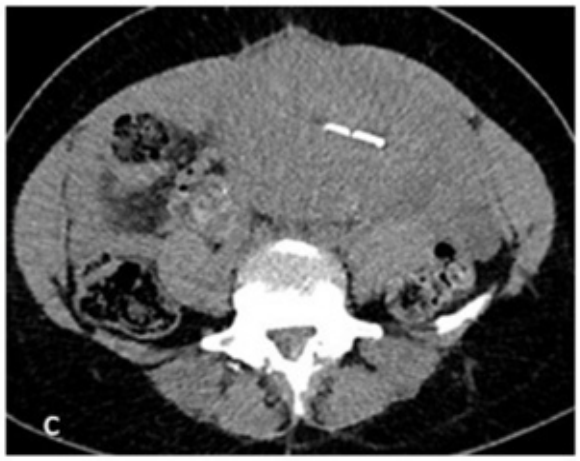


Figure 2: PET scan (a, b) in the same patient shows an intense FDG uptake of the mass (asterisks) and of a left iliac lymph node (arrow). Axial CT scan (c) shows the IUD, which is the key of the diagnoses.

Based on this presentation, locally advanced cervical cancer (stage IIIC1) was suspected. Standard treatment would involve concurrent chemoradiotherapy and brachytherapy, with optional lombo-aortic lymphadenectomy for staging.

To confirm the diagnosis, an endocervical curettage was performed at the initial consultation. When the pathology was inconclusive, cervical conization under general anesthesia was performed. Pathological analysis revealed Actinomyces without malignancy.

Additional targeted biopsies of the high posterior cervical lesion were performed via operative hysteroscopy. A hormonal IUD, not previously reported by the patient, was incidentally discovered on imaging and removed during hysteroscopy. Pathological examination confirmed the diagnosis of Actinomyces.

An antibiotic treatment was initiated by high-dose oral amoxicillin (2 grams three times daily). Clinical improvement was excellent, with complete resolution of symptoms. A follow-up pelvic MRI at three months showed near-complete regression of the cervical lesion, with only a small residual thickening (12 mm) (Figure 3).

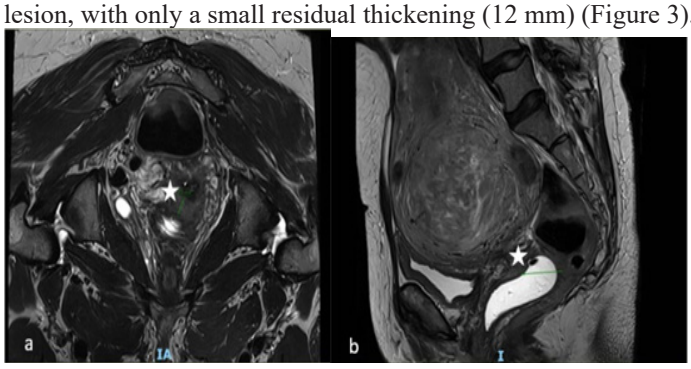


Figure 3: Axial T1-weighted (a) and sagittal T2-weighted (b) pelvic MRI after three months of antibiotic therapy shows only a small residual thickening (12 mm) (asterisks).

At six months, pelvic MRI revealed complete resolution of the cervical lesion and restoration of the fibrous cervical ring, allowing discontinuing antibiotic therapy (Figure 4).

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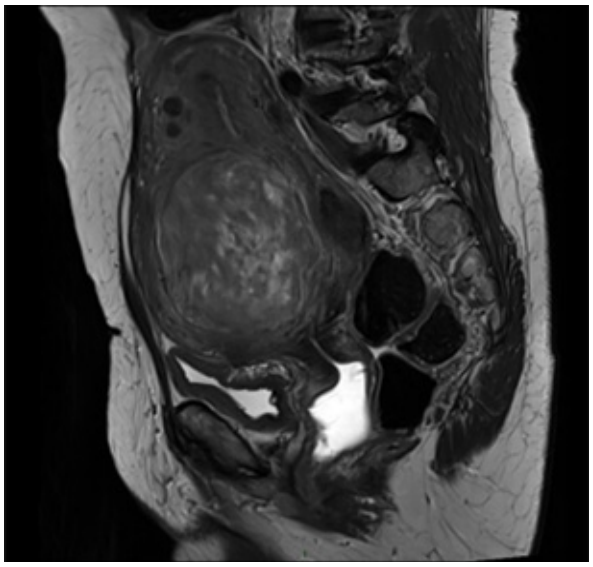

Figure 4: Sagittal MRI after 6 months-antibiotherapy shows a complete regression of the mass.

5. Case 2

The second case concerns a 76-year-old patient who underwent an intrafamilial kidney donation in 2020, with an estimated glomerular filtration rate (eGFR) of 48 mL/min. Her medical history includes osteoporosis, dyslipidemia, and two orthopedic operations. She is postmenopausal since the age of 52 and has one child delivered vaginally.

In May 2023, she developed scalp pruritus followed by a rash involving her face, eyelids, hands, and scalp. She also experienced inflammatory joint pain with polyarthritis and edema. Initially suspected to have psoriasis, her diagnosis was later revised to dermatomyositis. Treatment with prednisone (50 milligrams per day) was initiated in this context, and led to transient improvement. A PET scan was performed in December 2023 to assess the etiological workup of this dermatomyositis and revealed two highly hypermetabolic uterine foci, with an SUVmax of 7.6, raising suspicion of malignancy.

On clinical examination, the abdomen was soft, with no palpable lymphadenopathy, pain, or other abnormalities. Speculum examination revealed a vaginal synechia limiting access to the cervix. A firm mass was palpable behind the synechia during a bimanual pelvic examination. She initially presented with a biological inflammatory syndrome, with a white blood cell count of 12 G/L and a C-reactive protein (CRP) level of 85 mg/L. Tumor markers had not been measured.

A pelvic MRI performed in February 2024 identified a 3-cm cervical mass involving the exocervix and endocervix, with extension to the upper third of the vagina and left parametrium with no evidence of suspicious lymphadenopathy. A posterior corporeal uterine fibroid measuring 8 mm was also noted (Figure 5).

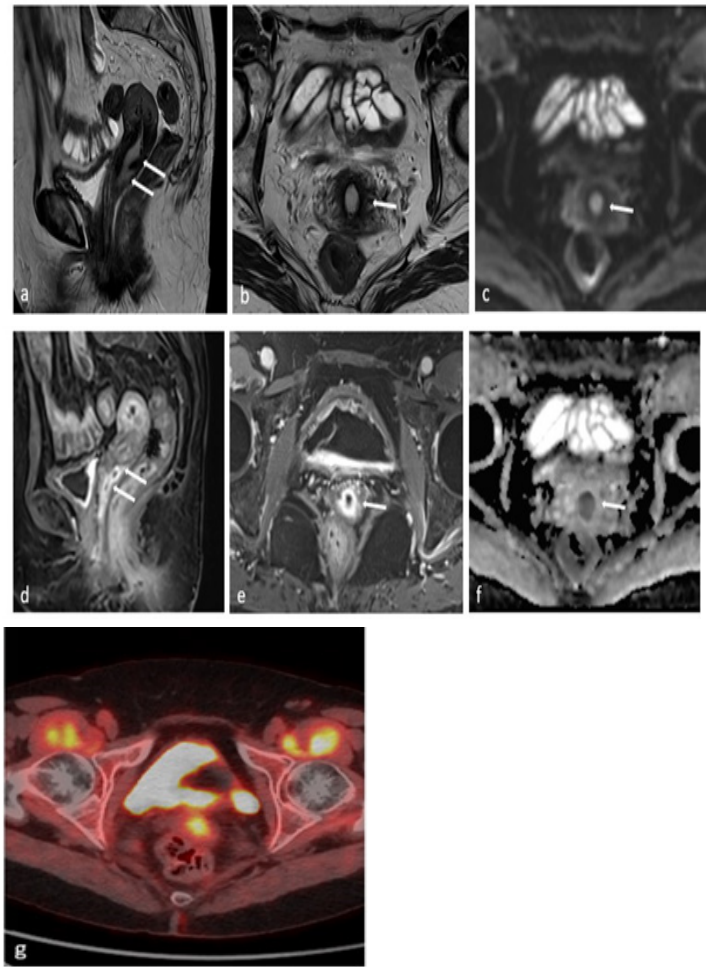

Figure 5: Pelvic MRI (a-f): sagittal T2-weighted (a) shows a cervical mass with an intermediate signal on T2 and well-defined borders. Axial T2-weighted (b) shows that the cervical mass doesn't involve the parametrium. This cervical mass has an early enhancement (arrow) on axial and sagittal T1 post-contrast images (d, e) and a homogenous restricted diffusion on DWI (c) with its respective ADC (f). Moreover, there is no extension to uterus or fallopian tubes. TEP-CT shows an intense uptake in uterine cervix (g).

A cervical biopsy was performed and revealed well-differentiated squamous metaplasia, severe chronic cervicitis, and granulation tissue suggestive of a pseudo-tumoral lesion.

The patient underwent surgery in March 2024. Complete vaginal synechia was manually lysed, exposing the cervix. No visible cervical mass was observed. However, an IUD, previously unknown to the patient, was discovered and removed. The IUD was sent for microbiological analysis.

Histopathological examination confirmed the presence of Actinomyces israelii, establishing the diagnosis of pelvic actinomycosis. Antibiotic therapy with oral amoxicillin (2 grams three times daily) was initiated. In May 2024, the patient was hospitalized for a vaginal abscess caused by Actinomyces and Eikenella, likely exacerbated by corticosteroid use. Management included surgical drainage of the abscess and triple intravenous antibiotic therapy with Amoxicillin 1 grams three times per day, Augmentin 1 grams three times per day, and Ceftriaxone 1 grams

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per day, for 3 weeks, followed by a switch to oral Amoxicillin.

Follow-up imaging in July 2024 confirmed complete resolution of the uterine abnormalities. A pelvic MRI showed regression of the cervical lesion previously described, with no evidence of recurrence (Figure 6). The biological assessment no longer showed evidence of an inflammatory syndrome.

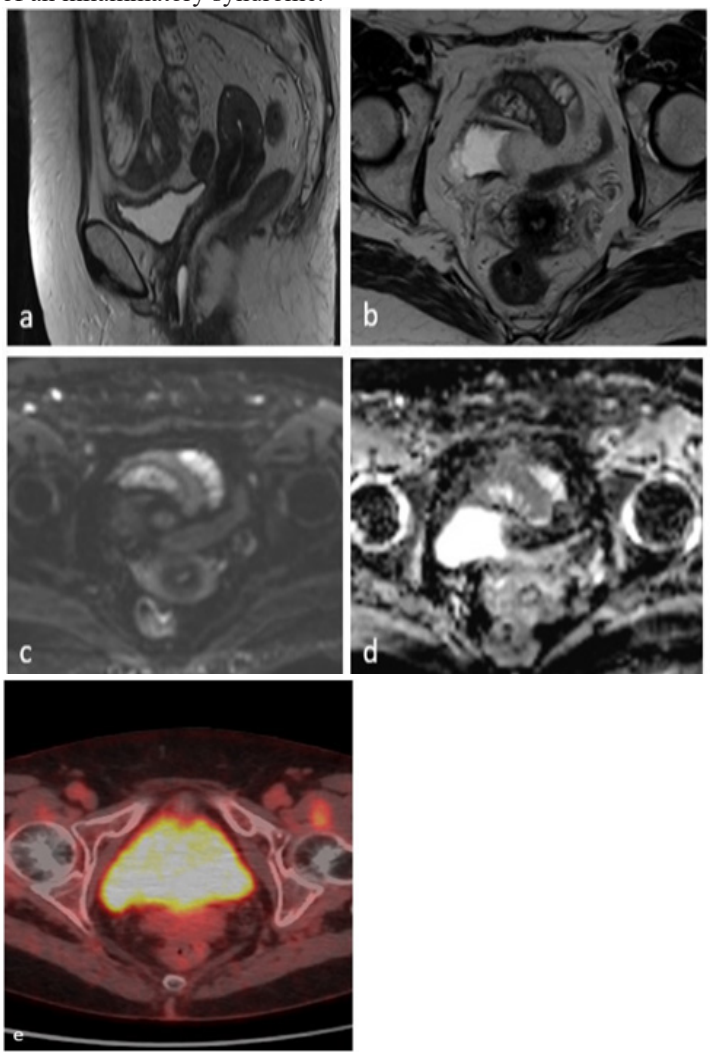

Figure 6: After three months of antibiotic therapy, a pelvic MRI was requested to evaluate the status of the cervical lesion (a-d): sagittal T2-weighted (a), axial T2-weighted (b) and diffusion sequences (c, d) show the complete resolution of the cervical mass. TEP-CT shows no cervical hypermetabolism (e).

6. Discussion

The association between prolonged use of IUDs or their recent removal and infection with Actinomyces is now well established [2,5,7–9].

Our patients presented with clinical and radiological findings entirely compatible with the diagnosis of pelvic actinomycosis or cervical neoplasia. Symptoms are variable, with intermenstrual bleeding and pelvic pain being the most commonly reported [6,7]. Weight loss is also frequently described in the literature [2,5,10,11]. However, neither of our patients presented with weight loss, which would not have been a distinguishing factor given the suspicion of neoplasia.

Another potential entry point for the disease is a presentation of pelvic peritonitis caused by an upper genital tract infection, often with large tubo-ovarian abscesses visible on imaging. While clinical and radiological discrepancies are frequent in cases of Actinomyces infection, patients may sometimes present with acute fever and pain, which may require surgical intervention [5,12].

Biologically, the presence of an inflammatory syndrome is classic, regardless of the clinical presentation, as observed in our second case [5,12].

Imaging findings are often equivocal and suggestive of neoplasia, even when reviewed at expert cancer centers. This interpretive bias is further complicated by misleading findings, such as the presence of external iliac lymphadenopathy in our first case, which is typically absent in pelvic actinomycosis [13,14]. Moreover, pelvic actinomycosis more commonly mimics ovarian neoplasms than cervical neoplasms, although a few cases of the latter have been reported in the literature [15,16].

There is no standardized national consensus for the medical management of pelvic actinomycosis, but the most described approach involves initial intravenous Penicillin G, with or without Metronidazole, followed by oral high-dose Amoxicillin (6 grams per day). The total duration of antibiotic therapy varies, ranging from 2 months to 12 months [5,10,11,17].

In the first case, the patient was treated exclusively with high-dose oral amoxicillin (6 grams per day), resulting in favorable clinical outcomes at 3 months and complete resolution of the cervical lesion and pelvic lymphadenopathy at 6 months. In the second case, clinical progress was complicated by a vaginal abscess, likely linked to corticosteroid therapy, requiring intravenous antibiotics and surgical drainage.

Diagnosing pelvic actinomycosis is challenging and should be considered in cases of pelvic pain, fever, ovarian or pelvic masses, and tubo-ovarian abscesses in the context of prolonged IUD use or recent IUD removal. It is now well established that women with IUDs may asymptomatically harbor Actinomyces, which is identified in 7–13.7% of cervical smears [18–21].

However, asymptomatic colonization does not require IUD removal or antibiotic treatment [22]. Current French guidelines from the Collège National des Gynécologues et Obstétriciens Français (CNGOF) also advise against IUD removal or initiating antibiotics in asymptomatic patients [23].

In both cases already presented, the unawareness of the presence of IUDs delayed consideration of Actinomyces infection as a potential diagnosis.

7. Conclusion

Pelvic actinomycosis is a challenging diagnosis that typically mimics pelvic inflammatory disease with abscess formation. However, it may also present as a neoplasm, most often of ovarian origin and, less frequently, of cervical origin. Accurate and timely diagnosis is critical, as the disease consistently responds to long-term antibiotic therapy. The context of prolonged IUD use or recent IUD removal must help clinician to suggest the diagnosis.

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