CASE REPORT
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A rare case of abdominal actinomycosis mimicking ovarian cancer with presumed hepatic involvement and abdominal wall involvement

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ABSTRACT

Abdominal actinomycosis is a chronic infection caused by anaerobic Gram-positive *Actinomyces* species. Because of its infiltrative growth, abscess formation, and fibrotic reaction, it may closely mimic malignant disease. We report the case of a 53-year-old woman presenting with abdominal pain and a palpable epigastric mass. Imaging showed a pelvic mass with abdominal wall involvement and a hepatic lesion, initially suggestive of advanced pelvic malignancy. Tumor markers were within normal limits. Because of persistent diagnostic uncertainty, the patient underwent elective exploratory laparoscopy with biopsy. Intraoperative findings showed a firm pelvic mass involving the right adnexa and uterus, without a clear tissue plane. Frozen-section examination initially suggested a small-cell neoplasm, whereas definitive histological examination confirmed abdominal actinomycosis. The hepatic lesion was not biopsied; therefore, hepatic involvement was considered presumptive, based on the radiological findings and complete regression after prolonged antibiotic therapy. Long-term intrauterine device use represented a relevant predisposing factor. Abdominal actinomycosis should be considered in the differential diagnosis of infiltrative pelvic masses. A conservative diagnostic surgical approach combined with prolonged antibiotic therapy may avoid unnecessary radical surgery.

Keywords: Actinomycosis, intrauterine devices, ovarian neoplasms, diagnosis, differential, abdominal wall

INTRODUCTION

Actinomycosis is a chronic infection caused by anaerobic, Gram-positive bacteria belonging to the genus *Actinomyces*. These microorganisms are commensals of the oral cavity, gastrointestinal tract, and female genital tract. The infection may present as an infiltrative mass associated with abscess formation, fibrosis, and chronic granulomatous inflammation. The cervicofacial, thoracic, abdominal, and pelvic regions may be involved. In women, pelvic *Actinomycosis* has been associated with the long-term use of an intrauterine device (IUD) (1-3).

The infiltrative and abscess-forming characteristics of actinomycosis may make its differentiation from malignant and other inflammatory diseases particularly difficult. We report a case of abdominal actinomycosis mimicking a pelvic malignancy with abdominal wall involvement and presumed hepatic involvement.

CASE REPORT

A 53-year-old woman presented with a palpable epigastric mass and pain in the right iliac fossa. Her family and past medical histories were unremarkable. She was in good general condition. Physical examination revealed a palpable epigastric mass and tenderness in the right iliac fossa. The abdomen was soft. Laboratory tests showed leukocytosis (12.43×10^9/L), with 80% neutrophils and 12% lymphocytes, an erythrocyte sedimentation rate of 86 mm/h, and gamma-globulin levels approximately twice the upper reference limit. Serum tumor markers, including carcinoembryonic antigen, cancer antigen-125, alpha-fetoprotein, and carbohydrate

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antigen 19-9, were within normal limits. Ultrasonography showed enlargement of the left hepatic lobe with a hypoechoic lesion suggestive of a space-occupying process and a pelvic mass in the right parametrium measuring 6.2 cm in maximal diameter. No ascites was detected. Written informed consent was obtained from the patient for the publication of this case report and the accompanying images.

Diagnostic Assessment

Contrast-enhanced computed tomography (CT) of the abdomen revealed a hypodense lesion with hyperdense peripheral rims in the epigastric region, involving the superficial abdominal wall and measuring 5 cm in maximal diameter (Figure 1). In the left hepatic lobe, a hypodense lesion of approximately 6 cm was observed in all contrast phases, with peripheral enhancement in the late phase (Figure 2). In the pelvic area, at the right paramedian level, an inhomogeneous solid formation measuring 51 mm was identified in close continuity with the uterus, although its origin could not be determined with certainty (Figure 3). Ultrasonography estimated the maximal diameter of the pelvic lesion at 6.2 cm, whereas CT measured the solid component at 51 mm; this difference may have reflected the use of different imaging planes and the ill-defined infiltrative margins of the lesion. These findings were suggestive of a pelvic neoplasm with suspected liver and abdominal wall involvement.

Gastroscopy was unremarkable. On the fourth day of hospitalization, erythema and fluctuation developed over the epigastric lesion, accompanied by fever up to 38.5 °C. The collection subsequently drained spontaneously, releasing corpuscular material. Microbiological cultures were negative for bacterial and fungal growth.

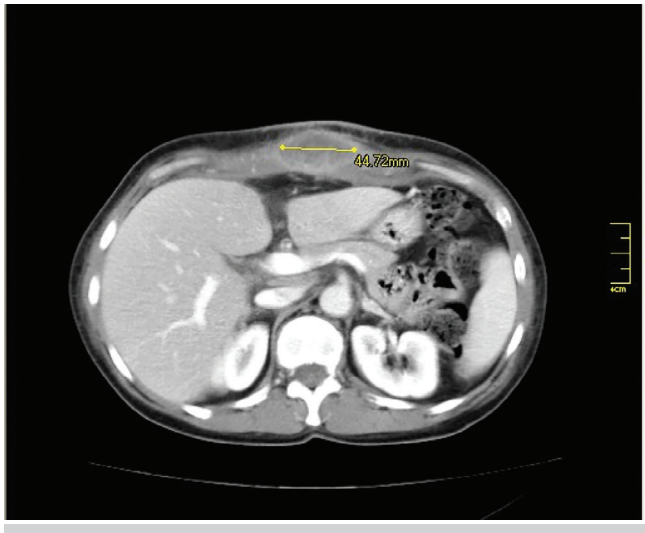

Figure 1. Contrast-enhanced CT scan of the abdomen showing a hypodense lesion with hyperdense peripheral rims in the epigastric region, involving the superficial abdominal wall, with a maximum diameter of 5 cm.

CT: Computed tomography.

Empirical antibiotic therapy was initiated with ceftriaxone 2 g intravenously once daily and amikacin 500 mg intramuscularly twice daily. In the following days, we proceeded with dressing at the incision site; the patient remained in fair general condition and was afebrile, with occasional colicky pain in the right iliac fossa and progressively reduced wound drainage. Because of the persistence of the solid lesions and the continued diagnostic uncertainty, elective exploratory laparoscopy with biopsy of the pelvic mass was planned. Intraoperative exploration showed an ileal loop retracted and angulated toward the right iliac fossa and a firm mass involving the right adnexa and uterus. No clear tissue plane could be identified between the involved structures, resulting in a "frozen pelvis". A biopsy of the pelvic mass and an appendectomy were therefore performed. Frozen-section examination suggested a small-cell neoplasm, pending definitive histological characterization.

The postoperative course was uneventful, with no further wound drainage, and the patient was discharged on postoperative day 8.

The definitive histological examination showed fibrotic tissue with a dense plasmacytic infiltrate, CD138-positive plasma cells, basophilic aggregates consistent with mycelial drusen, sulfur granules, and absence of neoplastic cells (Figure 4).

The histological findings were consistent with abdominal actinomycosis involving the pelvis and abdominal wall, with presumed hepatic involvement. The identification of sulfur granules within fibrotic tissue supported the diagnosis. Long-term IUD use represented a relevant predisposing factor. Further history revealed that an IUD, which had remained in place for approximately 20 years, had been removed 30 days before hospital admission.

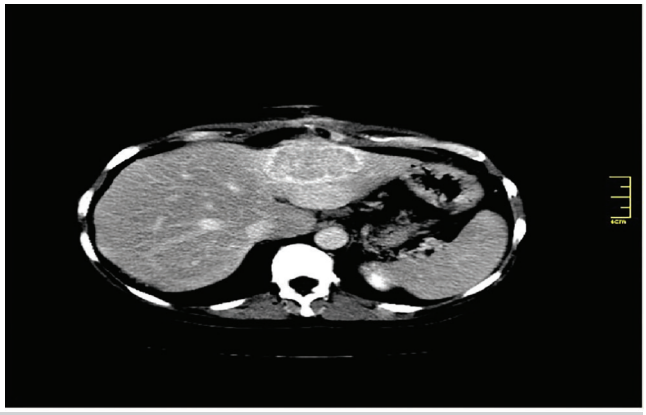

Figure 2. Contrast-enhanced CT scan of the abdomen showing a hypodense lesion of approximately 6 cm in the left hepatic lobe, visible in all contrast phases, with peripheral enhancement in the late phase.

CT: Computed tomography.

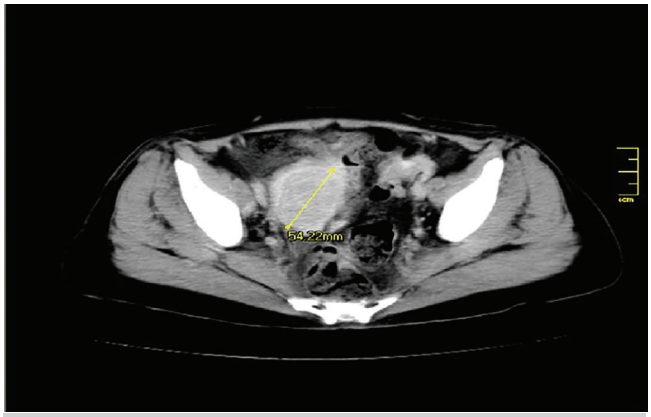

Figure 3. CT scan of the pelvis showing an inhomogeneous solid formation measuring 51 mm at the right paramedian level, in close continuity with the uterus and adnexal region.

CT: Computed tomography.

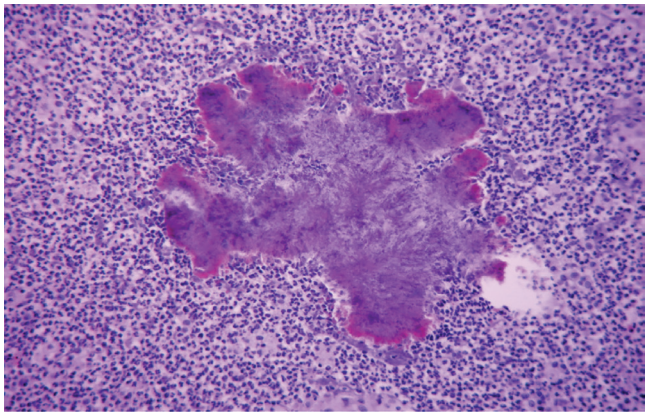

Figure 4. Histological findings showing a dense inflammatory infiltrate with CD138-positive plasma cells, basophilic aggregates consistent with mycelial drusen, sulfur granules, and no evidence of neoplastic cells.

Treatment and Follow-up

The patient received prolonged antibiotic therapy with penicillin G, 30 million IU per day for 4 weeks, followed by oral amoxicillin, 3 g per day for 6 months. Serial ultrasound examinations showed progressive reduction and eventual resolution of the lesions. At the most recent follow-up, the patient was in good clinical condition.

DISCUSSION

Actinomycosis is an infectious disease caused by Gram-positive anaerobic bacteria, most commonly *Actinomyces israelii*. It is characterized by chronic granulomatous inflammation, abscess formation, and a marked fibrotic reaction (1,4). The most common forms involve the cervicofacial region, followed by abdominal and thoracic disease (1,4-6). Abdominal involvement accounts for approximately 20-25% of cases and most commonly affects the cecum and appendix (1,5-7).

Other complications of this pathology are abdominal abscesses, vaginal fistulas, liver and retroperitoneum lesions. Extension to the abdominal wall is atypical and even rarer, with only a limited number of cases reported in the literature (8,9). These complications are rarely associated with each other. The concomitant pelvic and abdominal wall involvement, together with presumed hepatic involvement, illustrates the ability of actinomycosis to cross tissue planes and mimic disseminated malignancy. Preoperative diagnosis is very difficult because abdominal actinomycosis may mimic ovarian or colorectal infiltrating malignancies on imaging and intraoperatively (5-6,10). CT findings are often non-specific and may show infiltrative masses, abscess-like lesions, and inflammatory involvement of adjacent structures, thereby reinforcing the suspicion of malignancy (11). The surgical procedure in these cases may increase the risk of intraoperative complications due to the absence of clear surgical tissue planes with the risk of bleeding and iatrogenic lesions. In fact, in the literature there are reported cases of bladder perforations, entero-cutaneous fistulas, colorectal perforations. The differential diagnosis also includes intestinal tuberculosis, subacute appendicitis, intestinal amoebiasis, diverticular disease, inflammatory bowel disease, rectus sheath hematoma, and endometriosis. In our case, the pre-operative and intra-operative diagnosis seemed in favor of a pelvic tumor with liver and abdominal wall metastases. Fortunately, the procedure was limited to the biopsy only due to pelvic frozen which would not have allowed an oncologically radical procedure. The only data in our case that was in contrast with the neoplastic origin was a substantial state of well-being of the patient (lack of weight loss, asthenia, anemia) which undoubtedly appeared strange in consideration of the extent of the "presumed neoplasm". Culture tests are positive in less than 40% of cases and false negatives are common. Diagnosis can be reached with certainty only with histology for the detection of sulfur granules. The granules vary in size from 40-400 μm and have a Gram-positive staining with a structure similar to fungi. In our case, the presence of a solid mass in the right iliac fossa, located between the right ovary and the uterus, together with the absence of a clear cleavage plane between the lesion and the adjacent structures, including a segment of the small bowel, and its firm consistency, strongly suggested a neoplastic process from the outset. Moreover, the marked fibrosis and inflammatory reaction complicated the intraoperative frozen-section evaluation, which was initially interpreted as suggestive of a small-cell neoplasm.

Long-term IUD use is a recognized predisposing factor for pelvic and abdominopelvic actinomycosis, although colonization does not necessarily indicate invasive infection (2,3). In the present case, the approximately 20-year duration of IUD use

represented a clinically relevant predisposing factor. However, the incidental detection of *Actinomyces*-like organisms in an asymptomatic IUD user does not by itself establish a diagnosis of pelvic actinomycosis. The medical treatment of abdominal actinomycosis involves the use of penicillin G (10-20 million IU/day) for four weeks followed by penicillin V orally (2-4 g/day) for two to twelve months (12). In patients with penicillin allergy, alternative agents may include clindamycin, tetracyclines, or macrolides.

Additional antimicrobial coverage may be considered when concomitant microorganisms are suspected or identified.

Surgery may be required when malignancy cannot be excluded or for the management of complications such as abscesses, obstruction, fistulas, perforation, or necrotic tissue. Atad et al. (13) suggested that surgical drainage or resection of actinomycotic abscesses may reduce the required duration of antibiotic therapy. Currently, combined medical and surgical treatment is generally associated with favorable outcomes in selected cases (1,10,14).

Study Limitations

This case has some limitations. First, the hepatic lesion was not histologically confirmed, as no liver biopsy was performed. Therefore, hepatic involvement should be considered presumptive rather than definitively proven. Its infectious origin was inferred from the radiological appearance and from the complete regression of the lesion after prolonged antibiotic therapy. Consequently, the main diagnostic value of this case lies in the potential pitfall of abdominal actinomycosis mimicking advanced pelvic malignancy with abdominal wall involvement and presumed hepatic involvement. Second, microbiological cultures were negative, as frequently reported in actinomycosis; therefore, the final diagnosis relied on histopathological evidence, particularly the identification of sulfur granules and the absence of neoplastic cells.

CONCLUSION

Abdominal actinomycosis may closely mimic intra-abdominal malignancy. Histopathological examination is essential when preoperative and intraoperative findings remain inconclusive and may prevent unnecessary radical surgery. Treatment should be individualized and may combine prolonged antibiotic therapy with limited surgery for diagnostic purposes or for the management of complications. A multidisciplinary approach is important to ensure appropriate diagnosis, treatment, and follow-up.

Ethics

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

Footnotes

Author Contributions

Concept - G.C., F.C., E.V., L.C., R.L.; Design - G.C., F.C., E.V., L.C., R.L.; Data Collection or Processing - G.C., O.P., C.M., M.T., R.L.; Analysis or Interpretation - G.C., G.M., S.C., G.A., R.L.; Literature Search - G.C., I.B., G.P.M., F.C., E.V., L.C., R.L.; Writing - G.C., O.P., I.B., G.P..M., G.M., C.M., M.T., S.C., G.A., F.C., E.V., L.C., R.L.

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