CASE REPORT

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Retained intrauterine devices and abdominal actinomycosis, diagnostic challenges from a case series

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ABSTRACT

Abdominal actinomycosis is an uncommon infection that may mimic malignancy or inflammatory bowel disease, leading to delayed diagnosis. Retained intrauterine devices (IUDs) have been associated with pelvic and abdominal actinomycosis. We report four women with prolonged IUD use presenting with non-specific abdominal symptoms and varied radiological findings, including abdominal wall, pelvic and hepatic abscesses. Diagnosis was supported by microbiological and/or histopathological findings. Management included IUD removal, prolonged antibiotic therapy and, in one case, surgery. These cases highlight the diagnostic challenges of abdominal actinomycosis and the importance of considering the diagnosis in women with long-term IUD use.

Keywords: Actinomycosis, intrauterine devices, intra-abdominal infections, liver abscess, delayed diagnosis, case reports

Introduction

Actinomycosis is a rare, chronic granulomatous infection caused by *Actinomyces israelii*, a filamentous, anaerobic Gram-positive bacterium that forms part of the normal flora of the oral cavity, gastrointestinal tract and female genital tract.[1,2] Infection typically occurs following mucosal disruption, resulting in a slow progressing, locally invasive disease characterised by abscess formation and fibrosis.

Cervicofacial disease accounts for approximately 60% of cases, with abdominal involvement reported in 20-30%.[1,2] Abdominal actinomycosis often presents insidiously and may mimic more common conditions such as diverticulitis, malignancy, tuberculosis or inflammatory bowel disease, contributing to delayed diagnosis.[2]

Intrauterine devices (IUDs) have been identified as a potential risk factor, particularly when retained beyond the recommended duration.[3-5] Although the mechanism remains unclear, prolonged foreign body presence may facilitate mucosal disruption and microbial proliferation.[4,6] The incidence of actinomycosis in IUD users is not well defined; however, a systematic review by Manterola et al.[7] identified IUD use in 14.3% of abdominal cases, and García-García et al.[8] reported a frequent association in pelvic disease.[9]

Despite increasing recognition, abdominal actinomycosis remains under-recognised and frequently requires microbiological or histopathological confirmation. It may be mistaken for advanced malignancy, leading to unnecessary surgical intervention.[10-12] With appropriate diagnosis, however, most cases respond well to prolonged antibiotic therapy and IUD removal.[4,5]

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We present a case series of four women with abdominal actinomycosis associated with retained IUDs, highlighting the variability in presentation and the diagnostic challenges encountered.

Methods

This study was conducted as a retrospective case series at Whittington Hospital. Medical records, including both paper and electronic, were reviewed over a 10-year period to identify female patients presenting with non-specific acute or chronic abdominal or pelvic symptoms and a history of long-term IUD use. Long-term or retained IUD use was defined as device retention beyond the recommended duration, or where the device had remained *in situ* for several years without documented follow-up or removal.

Cases were included if abdominal actinomycosis was confirmed by histopathological examination or microbiological culture and sensitivity testing from surgical specimens, aspirates or IUD samples. Abdominal actinomycosis was defined by a combination of compatible clinical presentation and radiological findings, supported by microbiological or histopathological evidence.

Isolation of *Actinomyces* species from sterile sites, such as intra-abdominal collections or surgical specimens, was considered diagnostic. Detection from IUD samples alone was interpreted with caution and was not considered sufficient in isolation, but rather supportive when consistent with clinical and radiological features of invasive infection. This approach was used to distinguish true infection from colonisation or contamination.

Antibiotic choice and duration were determined according to clinical presentation, disease severity and microbiological findings, in keeping with standard clinical practice.

All identified patients were contacted and provided informed written consent for publication of their clinical data, imaging and diagnostic results.

Case 1

A 68-year-old woman presented with a six-week history of progressively worsening right lower quadrant abdominal pain, associated with unintentional weight loss over the preceding three months. On examination, a firm, tender mass was palpable in the right lower quadrant.

Computed tomography (CT) imaging (Figure 1) demonstrated a 2.3 × 4.4 cm fluid collection within the anterior abdominal wall musculature with surrounding fat stranding, consistent with a chronic inflammatory process. A long-retained IUD was also identified. The patient reported insertion of a copper IUD approximately 30 years earlier, which had not been removed (Figures 1 and 2).

Image-guided drainage of the collection was performed. Microbiological analysis identified *Actinomyces* species, and histopathological examination confirmed actinomycosis. The IUD was subsequently removed.

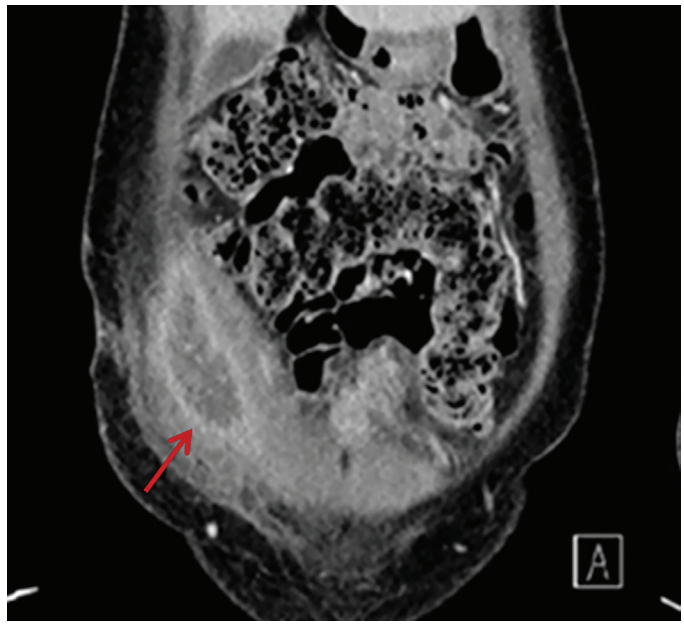

Figure 1. Coronal computed tomography abdomen and pelvis demonstrating a collection within the right abdominal wall musculature (right rectus and oblique muscles), measuring approximately 4.4 × 2.3 cm, with adjacent fat stranding.

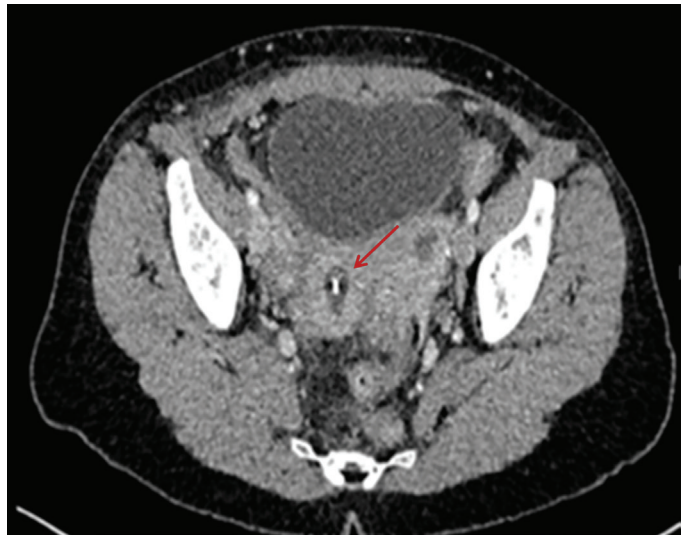

Figure 2. Axial computed tomography abdomen and pelvis showing an intrauterine device *in situ*.

She was treated with intravenous co-amoxiclav (1.2 g three times daily for 10 days) during admission, followed by oral amoxicillin (1 g four times daily) with a planned six-month course and monthly outpatient follow-up. She made a full clinical recovery, with complete resolution of symptoms and no evidence of recurrence at follow-up.

Case 2

A 50-year-old woman with no known comorbidities presented with a two-week history of diffuse abdominal pain, diarrhoea, vomiting and fever. Blood tests demonstrated markedly elevated inflammatory markers.

CT imaging (Figure 3) revealed multiloculated cystic lesions involving both adnexa, moderate ascites and peritoneal thickening, raising concern for disseminated pelvic infection, peritoneal tuberculosis or adnexal malignancy. A retained IUD was identified, reported to have been inserted several years earlier.

She was clinically septic with signs of generalised peritonitis and underwent emergency laparotomy. Intraoperatively, purulent fluid was present in all four quadrants, with a dense pelvic abscess involving the right adnexa, uterus and sigmoid colon. A right salpingectomy, left-sided abscess drainage and Hartmann's procedure were performed.

Cultures from intra-abdominal pus and the removed IUD grew *Actinomyces* species. Postoperatively, she required CT-guided drainage of residual collections. Antibiotic therapy was escalated to intravenous meropenem (1 g three times daily for 7 days) and oral doxycycline (100 mg twice daily for 7 days), followed by a six-month course of oral doxycycline (100 mg twice daily). She completed a six-month course of oral antibiotics, with complete recovery. Her colostomy was successfully reversed at seven months.

Case 3

A 30-year-old woman presented with a 19-day history of abdominal pain, intermittent fever, and mucous rectal discharge with associated vaginal discharge. CT imaging (Figure 4) demonstrated features suggestive of segmental colitis involving the rectum and sigmoid colon, alongside a complex multiseptated cystic lesion in the left adnexa. A retained IUD was identified, which the patient confirmed had been *in situ* for several years.

Magnetic resonance imaging (MRI) confirmed a left-sided tubo-ovarian abscess with associated pyosalpinx. The IUD was removed, and microbiological culture of the device confirmed *Actinomyces* species.

Image-guided drainage was not feasible due to the deep pelvic location of the collection. She was therefore managed conservatively with oral co-amoxiclav (625 mg three times daily for 6 months). Her symptoms gradually resolved, and she was discharged with outpatient follow-up for 6 months. She made a full clinical recovery with no evidence of progression on follow-up imaging (Figure 4).

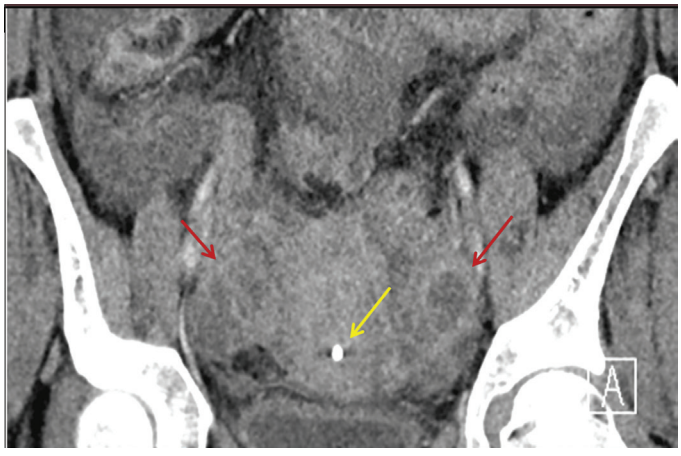

Figure 3. Coronal computed tomography abdomen and pelvis demonstrating multiloculated cysts in both adnexa and an intrauterine device within the uterus.

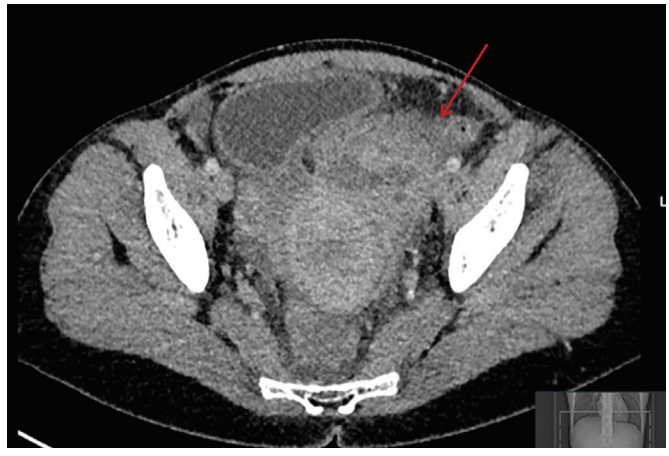

Figure 4. Axial computed tomography of the abdomen and pelvis demonstrating a complex collection within the left pelvis, located between the uterus and the left ovary posteriorly.

Case 4

A 62-year-old woman presented with a prolonged history of low-grade fever, weight loss and non-specific abdominal symptoms. She also reported recurrent abdominal wall abscesses and cutaneous boils affecting the thighs and gluteal region.

She had a prior diagnosis of abdominal actinomycosis confirmed by microbiological culture from an intra-abdominal abscess, which grew *Actinomyces* species. At that time, she was treated at an external institution with prolonged outpatient intravenous amoxicillin (1 g, four times daily) for 3 months, and a long-retained IUDs, *in situ* for over 22 years, was removed. The device itself also cultured *Actinomyces* species.

Two months later, she re-presented with upper abdominal pain and fever. CT imaging (Figure 5) demonstrated multiple complex septated hypodense lesions in the liver with peripheral enhancement, consistent with hepatic abscesses secondary to actinomycosis (Figure 5).

The liver abscesses were drained under radiological guidance, and microbiological analysis again confirmed *Actinomyces* species. She was restarted on intravenous antibiotics (amoxicillin 1 g four times daily) for 7 days, followed by prolonged oral therapy (amoxicillin 1 g four times daily orally for 6 months).

She improved clinically with resolution of symptoms, normalisation of inflammatory markers, and radiological regression of hepatic lesions on 6-month follow-up.

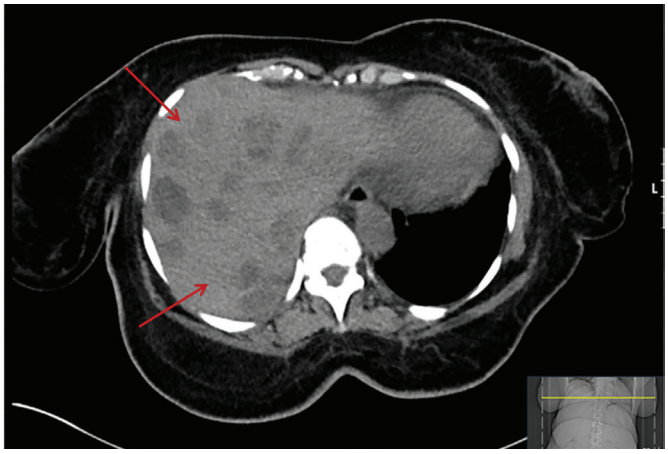

Figure 5. Axial computed tomography of the abdomen and pelvis demonstrating multiple complex, septated cystic lesions in the liver, consistent with multiple abscesses.

Patient Perspective

Due to the retrospective nature of this case series and the prolonged interval between the original clinical presentations and manuscript preparation, formal patient perspectives were not obtainable. Written informed consent for publication of clinical details and imaging was obtained from all patients.

Discussion

Abdominal and pelvic actinomycosis remains a diagnostic challenge.[8] Although an association with IUD use is observed, a causal relationship cannot be confirmed from this case series. *Actinomyces* species are commensals of the female genital tract, and IUD colonisation does not necessarily indicate invasive infection. Disease development is likely multifactorial, involving mucosal disruption, prolonged foreign body exposure and host factors.

The condition is frequently under-recognised due to its ability to mimic gastrointestinal, gynaecological and malignant disease.[2,10,11] Unlike typical pelvic inflammatory disease, actinomycosis often follows an indolent course with fibrosis, abscess formation and delayed diagnosis.[2,8,13]

Previous series, including Fiorino's[14] review of 92 cases and García-García et al.'s[8] systematic review of 63 cases, highlight its association with pelvic disease but focus mainly on tubo-ovarian presentations. In contrast, our cases demonstrate a broader spectrum, including abdominal wall infection, hepatic abscesses and presentations mimicking colitis or malignancy, reflecting its protean nature.[2,10,12]

Imaging is often non-specific. CT and MRI may demonstrate abscesses or inflammatory masses that are frequently misinterpreted as malignancy or peritoneal carcinomatosis.[2,11] In our series, this contributed to major surgical intervention in one case and concern for metastatic disease in another. Definitive diagnosis therefore relies on microbiological or histopathological confirmation where possible.[11,14]

Microbiological confirmation was not uniform. Isolation of *Actinomyces* from IUDs alone may represent colonisation rather than infection, whereas isolates from sterile sites carry greater diagnostic weight. Where tissue confirmation was unavailable, diagnosis was supported by clinical features, imaging findings and response to therapy.

All patients had long-term IUD use, ranging from several years to over 30 years. While colonisation is relatively common and often asymptomatic, invasive disease appears associated with prolonged exposure and mucosal disruption.[3-6,15] Detection on cervical or device cultures alone has limited predictive value and should be interpreted in context.

Management typically involves prolonged antibiotic therapy, with penicillin-based regimens as first line, and surgery reserved for complications or diagnostic uncertainty.[5,7] In our series, antibiotic regimens varied according to severity and initial uncertainty, with broader-spectrum antibiotics used in septic patients or where alternative diagnoses were considered, and subsequently rationalised based on microbiology and clinical response.

Treatment duration was individualised based on clinical response, inflammatory markers and radiological resolution, reflecting current practice.

Early recognition remains essential. Actinomycosis should be considered in women with prolonged IUD use and unexplained abdominal or pelvic masses, including extra-pelvic presentations such as hepatic or abdominal wall disease.

Management of IUDs should be individualised. Removal is recommended in suspected infection, while incidental colonisation alone does not mandate removal. Sampling from sterile sites is preferred, and a multidisciplinary approach is important to avoid misdiagnosis.

This series demonstrates that IUD-associated actinomycosis is not limited to tubo-ovarian disease but may involve multiple abdominal sites with varied presentations (Table 1).

Table 1. Clinical overview of cases: symptoms, IUD duration, imaging findings, microbiology, management and outcomes.

Case	Age	Symptoms	IUD duration	Imaging findings	Microbiology	Management	Outcome	Antibiotic regimen	Follow-up
1	68	Abdominal pain, weight loss (3 months)	30 years	2 × 1.5 cm anterior abdominal wall collection (Figure 1)	IUD and aspirate positive for *Actinomyces*	IUD removal, antibiotics	Full recovery	IV Co-amoxiclav 1.2 g TDS for 10 days, followed with Amoxicillin 1 g QDS oral for 6 months	6 months
2	50	Abdominal pain, vomiting, fever, diarrhoea	10+ years	Bilateral adnexal cysts, ascites, peritoneal thickening (Figure 3)	IUD and pus positive for *Actinomyces*	Surgery (Hartmann's), abscess drainage, antibiotics	Recovery: stoma reversed at 7 months	IV meropenem 1 g TDS for 7 days + oral doxycycline 100 mg BD for 7 days → 6 months oral doxycycline 100 mg BD	OP follow up for 6 months → Stoma reversal at 7 months
3	30	Abdominal pain, fever, mucus PR, vaginal discharge	Several years	Colitis, left tubo-ovarian abscess, pyosalpinx (Figure 4)	IUD culture positive for *Actinomyces*	IUD removal, conservative antibiotics	Complete recovery with follow-up	Oral co-amoxiclav 625 mg TDS for 6 months	6 months
4	62	Weight loss, low-grade fever, abdominal wall abscesses, skin boils	22 years	Multiple complex liver abscesses (Figure 5)	IUD and liver aspirate positive for *Actinomyces*	IUD removal, IR drainage, long-term antibiotics	Improved on long-term antibiotics	IV amoxicillin 1 g QDS for 7 days → 6-month oral amoxicillin 1 g QDS	6 months

IUD: Intrauterine device, IV: Intravenous, TDS: Three times daily, QDS: Four times daily, BD: Twice daily, IR: Interventional radiology, OP: Outpatient.

Study Limitations

This study has several limitations. It is a small, retrospective case series from a single centre, which limits generalisability. There is potential for selection bias, as only clinically significant or atypical cases are likely to have been identified. Microbiological confirmation was not uniform across all cases, and no comparator group of long-term IUD users without actinomycosis was available. These factors should be considered when interpreting the findings.

Conclusion

Abdominal actinomycosis remains an important but often under-recognised differential diagnosis in women with long-standing IUD use. While an association is observed, a direct causal relationship cannot be established from this series. The condition may present with a wide spectrum of clinical features, including non-gynaecological manifestations, contributing to diagnostic uncertainty. Recognition relies on careful clinical evaluation, appropriate imaging, and microbiological confirmation where feasible. Management with IUD removal and antibiotic therapy appears effective in selected cases, although treatment should be individualised. Further studies are required to better define the relationship between IUD use and invasive actinomycosis and to guide optimal management strategies.

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Informed consent: All identified patients were contacted and provided informed written consent for publication of their clinical data, imaging and diagnostic results.

Data sharing: The data supporting this study will be made available in a public repository. There are no ethical or legal restrictions preventing data sharing.

Transparency: I, as the lead author, affirm that this manuscript is an honest, accurate, and transparent account of the study being reported. I confirm that no important aspects of the study have been omitted and that any discrepancies from the study as planned (and, if relevant, registered) have been fully explained.

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