


## Case Report

# Suture-Induced Tubo-Ovarian Abscess: A Case Report with Literature Review

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**Keywords:**

Tubo-ovarian abscess  
Pelvic inflammatory disease  
Silk suture  
Foreign body reaction  
Sterilization

Received: April 30, 2025  
Revised: May 28, 2025  
Accepted: June 15, 2025  
First Published: June 24, 2025

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Citation: Muhammad HM, Ahmed NHA, Ahmed SM, Mohammed ZM, Abdulkarim MM, Ali RM et al. Rare Etiology of Tubo-Ovarian Abscess: Case Report and Literature Review. Barw Medical Journal. 2025;3(3):56-61.  
<https://doi.org/10.58742/bmj.v3i3.190>

## Abstract

### Introduction

Suture is an underreported cause for tubo-ovarian abscess (TOA) that can cause significant morbidity. This report describes a case of TOA arising from a silk suture three years after bilateral tubal ligation.

### Case presentation

A 38-year-old woman with a history of tubal ligation presented with persistent pelvic pain and fever. Imaging revealed a suspicious left adnexal mass with features concerning for malignancy or abscess. Surgical exploration revealed a TOA adherent to surrounding structures, containing a retained silk suture from prior surgery. The abscess and suture were removed, and histopathology confirmed chronic inflammation without malignancy. The patient underwent additional procedures for thorough management, including polypectomy and contralateral tubal ligation.

### Literature Review

A total of nine cases of TOAs and suture-induced abscesses were reviewed. Of these, seven were TOAs, six of which occurred postoperatively. Three cases developed following tubal ligation procedures. The abscesses ranged in size from 1 to 7.6 cm. The interval between the presumed inciting event and abscess detection varied widely, with one case presenting more than three decades after surgery. Isolated microorganisms included *Escherichia coli*, *Streptococcus pyogenes*, and *Peptostreptococcus anaerobius*. All patients underwent surgical intervention via various approaches, and several also received adjunctive antibiotic therapy.

### Conclusion

Suture-induced TOA following sterilization may result in considerable morbidity, and surgical intervention may provide favorable outcomes.

## 1. Introduction

Pelvic inflammatory disease (PID) is a polymicrobial infection resulting from the ascent of pathogens from the cervix or vagina to the upper genital tract. It is most commonly caused by *Chlamydia trachomatis* and *Neisseria gonorrhoeae*, which together are responsible for approximately 60–75% of cases. Once these pathogens ascend, they can infect the endometrium, fallopian tubes, ovaries, and surrounding pelvic structures, triggering an inflammatory response [1].

A tubo-ovarian abscess (TOA) is a severe complication of PID, characterized by the formation of a purulent abscess involving the uterus, fallopian tubes, and ovaries [2]. This condition primarily affects women of reproductive age, with the highest incidence occurring in the fourth decade of life. Approximately 4.4% of sexually active women have a history of PID, placing them at increased risk for TOA development [3]. Given its non-specific clinical presentation, TOA can be challenging to diagnose, often requiring differentiation from other acute abdominal and pelvic conditions. The differential diagnosis includes ovarian torsion, ectopic pregnancy, appendicitis, gastroenteritis, constipation, and urinary tract infection, all of which can present with overlapping symptoms such as pelvic pain, fever, nausea, and gastrointestinal discomfort [2].

Although TOAs are commonly associated with PID, they can also develop from less common etiologies, such as the presence of surgical sutures. Reports of TOAs linked to surgical sutures remain scarce in the literature. This report highlights a unique case of a TOA that developed due to a silk suture three years after the patient had undergone bilateral tubal ligation, a procedure intended for permanent female sterilization. This case underscores the need for awareness of non-infectious etiologies in the differential diagnosis of TOAs, particularly in patients without a recent history of PID. The report was written according to the CaReL guidelines, and unreliable sources were excluded [4,5].

## 2. Case Presentation

### 2.1. Patient information

A 38-year-old female presented with a one-month history of worsening, persistent pelvic pain. Her medical history was unremarkable, and her surgical history included bilateral tubal ligation performed three years earlier.

### 2.2. Clinical findings

Physical examination revealed a high temperature, tenderness in the left suprapubic area, and the presence of an immobile pelvic mass upon palpation.

### 2.3. Diagnostic approach

A pelvic ultrasound (US) showed a left-sided heterogeneous lesion measuring 44 x 30 mm. The mass was a vascular solid lesion with calcifications, exhibiting indistinct margins and evidence of invasion into the adjacent peritoneum and the left rectus abdominis muscle. Doppler imaging demonstrated high

vascularity, with a score of 3-4. These characteristics were highly suspicious for a desmoid tumor or a primary peritoneal tumor; however, direct invasion of the left ovary could not be excluded (Figure 1). Computed tomography (CT) with IV contrast revealed a 6 x 4 x 3 cm, multilocular mass located in the left lower abdomen, arising from the left adnexa and attached to both the uterus and left ovary. The mass extended into the posterior aspect of the left rectus muscle. It was in proximity to the left inferior epigastric artery and a loop of small intestine, though no direct invasion was observed. Surrounding fat stranding raised the possibility of infection, such as a TOA, though malignancy could not be excluded. Mild pelvic free fluid was noted, and no suspicious lymph nodes were identified. The other abdominal organs, including the liver, spleen, pancreas, kidneys, and adrenal glands, appeared normal. The laboratory results revealed the following: Carcinoembryonic Antigen (CEA) was 0.471 ng/ml (normal range: 0-5 ng/ml), Cancer Antigen 125 (Ca125) was 33.6 IU/ml (normal range: <35 IU/ml), and Carbohydrate Antigen 19-9 (CA 19-9) was 5.73 IU/ml (normal range: <33 IU/ml), all of which fell within the normal reference ranges. Serum C-reactive protein (CRP) level was slightly elevated at 8.38 mg/L, above the normal range of <5.0 mg/L.



**Figure 1:** Normal-sized uterus with a 10 mm endometrial lining containing a 20×8 mm endometrial polyp. Both ovaries were normal in size; the right ovary showed a 21 mm dominant follicle and a 14 mm corpus luteum. Adjacent to the left ovary, a 44×30 mm heterogeneous, vascular solid mass with calcifications and indistinct margins was noted, demonstrating a Doppler score of 3–4. The mass showed invasion into the adjacent peritoneum and left rectus abdominis muscle, raising suspicion for a desmoid tumor or other malignant process, with possible involvement of the left ovary.

### 2.4. Intervention

To ensure accurate diagnosis and appropriate management, consultations were held with oncology and gastrointestinal surgery specialists. After a thorough evaluation, an explorative laparoscopy was planned. During the procedure, a TOA was found, firmly adherent to the omentum and anterior abdominal wall. The abscess was carefully aspirated using suction, and a biopsy was taken for frozen section analysis. The preliminary histopathology report indicated inflammation and fibrosis, confirming the lesion's nature. As the surgery progressed, an unexpected finding was discovered: an unabsorbable silk suture embedded within the abscess. This suture, most likely a remnant from her previous procedure, was carefully excised along with the surrounding fibrotic tissue and sent for further histopathological analysis. To reduce the risk of recurrence, the contralateral fallopian tube was also removed and securely

ligated. In addition to addressing the abscess and suture, a hysteroscopy and polypectomy were performed to ensure thorough treatment. The procedure was completed successfully, with all abscess material and pathological tissues removed. The histopathological examination revealed a hyperplastic endometrial polyp with background secretory changes consistent with progestin exposure, without evidence of atypia or malignancy. The left tubal mass showed chronic nonspecific salpingitis, and the attached omentum exhibited severe acute-on-chronic inflammation with fibrosis, consistent with an abscess wall. The right fallopian tube revealed para-tubal cysts and Walthard cell rests, while the right ovarian cyst was identified as a hemorrhagic corpus luteum. No malignancy was detected in any of the submitted specimens.

### 2.5. Follow-up

Post-operative treatment included intravenous Flagyl (Metronidazole) and Claforan (Cefotaxime), and there were no complications. After six months of follow-up, no significant complication was observed.

### 3. Discussion

The development of PID and TOAs has long been considered a rare complication of tubal sterilization. The most frequently isolated pathogens of these abscesses include *Escherichia coli* and *Bacteroides* species. Additional identified organisms in these abscesses comprise *Peptostreptococcus*, *Peptococcus*, and aerobic *Streptococcus* species [1]. Although rare, infections involving *Staphylococcus* species and *Burkholderia pseudomallei* have also been reported in the literature [6,7]. Among the reviewed cases, six patients developed TOAs following surgical procedures. Among the cases in which microbiological data were reported, *Escherichia coli* was identified in two patients, *Streptococcus pyogenes* in another two, and *Peptostreptococcus anaerobius* in one (Table 1) [1,2,8-12].

Although the exact incidence of upper genital tract infections following surgical sterilization remains unknown, traditional gynecologic literature emphasizes that such occurrences are exceedingly rare. However, other data suggest that the upper genital tract may remain vulnerable to infection even after sterilization. A study found that 6% of hospitalized PID cases involved patients with prior sterilization, with symptoms including systemic toxicity and requiring surgical evaluation in some instances [13].

The postoperative infection in the current patient was caused by the use of silk sutures for tubal ligation. This resulted in the development of a suture abscess, which is a type of foreign body reaction that forms in response to the presence of exogenous suture material introduced during surgery. When this foreign material becomes contaminated with bacterial or fungal organisms, it can lead to the formation of an abscess at the site of the previous surgical procedure [8].

The use of absorbable sutures is preferred for tubal ligations, as they allow the ligated ends to separate naturally over time, thereby reducing the risk of infections and enhancing the effectiveness and permanence of the sterilization [14]. Silk and

other multifilament suture materials, on the other hand, permit capillary penetration of bacteria and fluids into the spaces between the filaments, creating an environment that promotes inflammation and increases the risk of both acute and latent infections [15]. This is what is suspected to have happened with the current patient. Post-sterilization infections can manifest within weeks of the procedure or years later. In the present case, the patient developed a TOA three years after undergoing sterilization. Similarly, Weinberger et al. reported three cases of delayed TOA, occurring 8, 15, and 9 years post-sterilization [9]. Suture-related abscesses can present in an even more delayed manner, as demonstrated by Zein et al., who reported a case in which a suture abscess developed 37 years after the original surgical procedure [10].

Efforts to identify predictors for surgical versus antibiotic treatment of TOAs have focused on factors like abscess size, laterality, age, and inflammation severity. Yagur et al. found that bilateral TOAs were more likely to require surgery than unilateral ones, despite no size difference between the two groups. This contrasts with earlier studies, which linked larger abscess size to increased surgical intervention [14]. Among the reviewed cases of TOA, similar to the current patient, surgical intervention was performed in all instances, irrespective of the lesion's laterality or size [1,2,9,11,12].

Currently, the management of TOA typically involves the administration of parenteral broad-spectrum antibiotics. Early diagnosis combined with prompt antibiotic therapy has led to successful medical management in approximately 70–75% of cases. However, the remaining 25–30% of patients require surgical drainage, often utilizing minimally invasive techniques such as laparoscopic drainage or ultrasound-guided transvaginal aspiration and drainage [11]. When managing TOAs, clinicians need to obtain a comprehensive surgical and gynecological history to guide the appropriate therapeutic approach. In cases where a foreign body is suspected or confirmed preoperatively, surgical intervention may offer improved long-term outcomes. A notable limitation of this case report was the absence of microbiological testing. Empirical postoperative treatment was administered based solely on clinical symptoms, which may have limited the ability to definitively identify the underlying pathogen.

### 4. Conclusion

Suture-induced TOAs following sterilization may result in considerable morbidity. In these cases, surgical intervention may provide favorable outcomes.

### Declarations

**Conflicts of interest:** The authors have no conflicts of interest to disclose.

**Ethical approval:** Not applicable.

Author/year	Age	Sex	Pregnancy	Gynecological history	Surgical history	Comorbidities	Symptoms	Location	Mass size (cm)*	Treatment	Presence of Foreign Body	Identified pathogens	Pathological findings	Outcome
Sun et al./2024 [9]	18	M	N/A	N/A	Mucocele excision	None	Soft and tender nodule	Lower lip	1	Total excision of the lesion	Silk suture	N/A	Acute and chronic inflammation & multinucleated foreign body giant cells	Recovery
Linck et al./2023 [16]	51	F	3	Abnormal uterine bleeding	D&C hysteroscopy & polypectomy	None	Heavy menstrual bleeding, fever & abdominal pain	Right posterior pelvic area	5.1	Antibiotic, Interventional radiology percutaneous drainage, laparotomy, total hysterectomy & bilateral salpingo-oophorectomy	None	Escherichia coli	Acute inflammation & acute serositis	Recovery
Campbell et al./2021 [2]	15	F	None	Unremarkable	Appendectomy	None	Abdominal pain	Right adnexa	7.1	Laparoscopy, drainage of the right pyosalpinx, removal of the stump appendix & antibiotics	Stump appendix	None	Necrotic material with acute inflammatory debris	Recovery
Zein et al./2021 [13]	58	M	N/A	N/A	Retinal detachment repair	HIV infection	Swollen conjunctiva, bulbar injection, and tearing	Left eye	1	Corticosteroids, excision of the lesion, & Amniotic membrane transplantation	Silk suture	None	Chronic inflammation	Recovery
Naredi et al./2021 [15]	45	F	2	Unremarkable		Hypertension & obesity	Lower abdominal pain	Left adnexa	7.6	Intravenous antibiotics, drainage, laparotomy & left salpingo-oophorectomy	N/A	N/A	Inflammation	Recovery

Solt et al./2010 [1]	24	F	3	Menarche at 12 & irregular menstrual cycles	Colectomy, appendectomy, cesarean deliveries, elective abortion, lami nectomy, breast augmentati on & Essure placement	Mitochondrial neurogastrointes tinal encephalopathy, progressive gastrointestinal dysmotility, symmetric polyneuropathy, asymptomatic leukoencephalo pathy, asthma, antiphospholipi d syndrome, supraventricular tachycardia, renal lithiasis, and bipolar disorder.	Right lower quadrant pain, nausea, and vomiting	Right adnexa	N/A	Laparoscopy, total abdominal hysterectomy & antibiotics	Essure microinse rts	<i>Streptococc us pyogenes</i>	N/A	Develope d acute peritoniti s
	34	F	3	PID	Bilateral tubal ligation	None	Lower abdominal pain, fever	Right adnexa	6.1	Antibiotics, adhesiolysis, total abdominal hysterectomy, right salpingo-oophorectomy, & vaginal T-tube drain placement	Silastic band	<i>Peptostrept ooccus anaerobius</i>	Acute necrotizing oophoritis	Recovery
	37	F	2	Unremarka ble	Bilateral tubal ligation	None	bilateral lower quadrant pain, fever, tenderness, vaginal spotting & discharge	Left adnexa	4	Laparoscopy, laparotomy, bilateral salpingectomies, right oophorectomy, endometrial biopsy, incidental appendectomy & antibiotics	None	<i>Streptococc us pyogenes</i>	Acute suppurative salpingitis, ovarian cortex hemorrhage	Recovery
Weinberge r et al./1996 [12]	38	F	2	Unremarka ble	Tubal fulguration, kidney transplant	Systemic lupus erythematosus, immunocompro mised	bilateral lower quadrant pain, fever, tenderness & yellow discharge	Ovaries	4.4	Laparotomy, bilateral distal salpingectomy & antibiotics.	None	<i>Escherichia coli</i>	Proliferativ e phase endometriu m Acute suppurative salpingitis & paratubal abscess formation	Recovery

M: Male, F: Female, N/A: Not Available, D&C: Dilation and curettage, HIV: Human immunodeficiency virus, PID: Pelvic inflammatory disease

\*Only the largest dimension is reported in the table.

**Patient consent (participation and publication):** Written informed consent was obtained from the patient for publication.

**Funding:** The present study received no financial support.

**Acknowledgements:** None to be declared.

**Authors' contributions:** HMM and NHAA were significant contributors to the conception of the study and the literature search for related studies. SMA, ZMM, OHGH, AGHH, ADS, SOA, LAA, SJJ, and MAA were involved in the literature review, the study's design, and the critical revision of the manuscript, and they participated in data collection. MMA and RMA were involved in the literature review, study design, and manuscript writing. NSS was the radiologist who assessed the case. HMM and MMA confirm the authenticity of all the raw data. All authors approved the final version of the manuscript.

**Use of AI:** ChatGPT-3.5 was used to assist in language editing and improving the clarity of the manuscript. All content was reviewed and verified by the authors. Authors are fully responsible for the entire content of their manuscript.

**Data availability statement:** Not applicable.

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