

Infected ovarian endometrioma: Case series and management outcomes

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Dear Editor,

Infected endometrioma, which is the superimposed infection and abscess formation of ovarian endometrioma, is increasingly understood to be a distinct clinical entity from tubo-ovarian abscess (TOA). The pathophysiology of infected endometriosis has been postulated to be a result of endometriotic fluid acting as a culture medium for pathogens, weakened cyst walls and immune dysregulation.¹ Multiple routes of spread have been identified including haematogenous, lymphatic, gastrointestinal translocation or by ascending vaginal route.² Although the true prevalence of endometriosis is unknown, the burden in Asian populations is likely to be high, especially due to delayed diagnosis.³ However, the current paucity of literature and clinical guidelines on infected endometriosis hampers consensus on its optimal management. We present a series of 10 cases of infected endometrioma with prospectively recruited patients who were treated at the National University Hospital in Singapore from January to October 2023, to provide insights on the identification and treatment of infected endometriosis. Ethical approval from the National Healthcare Group Domain Specific Review Board (Reference: 2023/00017) and patients' written consent were obtained.

The demographic and clinical information for the 10 patients is summarised in Table 1. The patients had a median age of 40 years and 50% were nulliparous. The clinical history of all patients was atypical for TOA; none were immunosuppressed, obese, reported prior sexually transmitted infections (STI) or had preceding pelvic procedures. Interestingly, 4/10 of cases had no prior diagnosis of endometriosis.

The clinical diagnosis of infected endometriosis was made on the basis of abdominal pain, sepsis, raised inflammatory markers, characteristic

ultrasound findings of low-echo ovarian cysts. All patients were admitted and commenced on empirical intravenous broad-spectrum antibiotics based on existing TOA guidelines,⁴ commonly ceftriaxone and metronidazole. Doxycycline cover was included until vaginal swabs for *Chlamydia trachomatis* were negative. Prior to antibiotics, routine STI screening and blood cultures were obtained—the former yielded only 1 positive result for *Trichomonas vaginalis* and the latter were all negative for all causative organisms. Once clinical response was achieved, antibiotics were converted to an oral course for a further 2 weeks. Two patients failed the trial of antibiotics and required drainage of the endometrioma for source control—one transabdominally and the other transvaginally; fluid cultures from drainage were positive for *Haemophilus influenzae* and *Peptoniphilus* species, respectively. On discharge, 9/10 patients were given hormonal suppression for endometriosis and 8/10 underwent definitive surgery with cystectomy or pelvic clearance at an interval of 3–17 months. All surgical candidates had evidence of deep infiltrating endometriosis (DIE), confirmed on histopathology. No recurrences were observed in the 1 year post-surgery.

This case series highlights the unique aspects of managing infected endometriosis. While the presenting symptoms may be similar to TOA, a detailed history may unveil dysmenorrhoea and infertility. Our patient profile was notably older (median 40 years), nulliparous and without typical risk factors for TOA like obesity, immunosuppression and barring 1 case, concomitant STI. Prior series have described iatrogenic inoculation during pelvic surgery² or oocyte retrieval,⁵ but this was not observed in our patients. Ultrasound imaging plays a crucial role in differentiating the 2 conditions. Infected endometrioma is identified by thick smooth walls, low-echo contents and lack

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Accepted: 4 December 2025

Table 1. Clinical summary of cases admitted for infected endometrioma at the National University Hospital, Singapore from January to October 2023.

Age, years	Parity	Laterality and size of endometrioma (cm)	Causative organism	Antibiotic therapy	Surgical drainage	Hormonal suppression	Definitive surgery
49	2	Right: 7.6	None isolated	Ceftriaxone, metronidazole, doxycycline	NA	GnRH agonist	THBSO
49	3	Right: 8.7, Left: 3.6	<i>Trichomonas</i>	Ceftriaxone, metronidazole, doxycycline	NA	Dienogest	THBSO
36	VI	Left: 4.5	None isolated	Amoxicillin clavulanic acid	NA	Dienogest	Defaulted
34	2	Right: 5.8, Left: 6.0	None isolated	Ceftriaxone, metronidazole, doxycycline	NA	Dienogest	Cystectomy
46	0	Left: 22.0	<i>Haemophilus Influenza</i>	Piperacillin tazobactam	Percutaneous radiologically-guided	GnRH agonist	THBSO
29	0	Right: 7.6, Left: 2.7	<i>Peptoniphilus sp.</i>	Ceftriaxone, metronidazole	Transvaginal drainage	GnRH agonist	Cystectomy
42	0	Right: 4.8, Left: 9.8	None isolated	Ceftriaxone, metronidazole, doxycycline	NA	Depot medroxyprogesterone acetate	Cystectomy
37	1	Right: 14.6	None isolated	Ceftriaxone, metronidazole	NA	Dienogest	Cystectomy
31	0	Right: 6.0, Left: 6.0	None isolated	Ceftriaxone, metronidazole, doxycycline	NA	GnRH agonist	Cystectomy
51	4	Right: 3.8	None isolated	Ceftriaxone, metronidazole, doxycycline	NA	NA	Declined

GnRH: gonadotrophin-releasing hormone; NA: not applicable; THBSO: total hysterectomy, bilateral salpingo-oophorectomy; VI: virgo intacta bilateral salpingo-oophorectomy

of mobility in the posterior cul-de-sac.³ In contrast, TOA appears as a complex adnexal mass with thickened irregular walls and elongated dilated mass suggestive of pyosalpinx.⁴ Computed tomography provides little additional benefit and should be done only to exclude other intra-abdominal pathology. Colonic or vaginal flora are thought to be implicated in infected endometriosis. We found this to be consistent in our series; the 2 positive cultures identified *Peptoniphilus*, a known vaginal and gut commensal,⁶ and *Haemophilus influenzae*, a commensal of the upper respiratory tract which may cause endometritis.⁷ Only 1 patient tested positive for an STI, *Trichomonas vaginalis*. We propose that empirical antibiotics should be broad-spectrum with anaerobic coverage, and despite the low frequency of STI in our series, coverage for common STIs should be included until swabs return negative.

In patients who fail to respond to antibiotics, surgery for source control is required.⁴ The objective of surgery during acute infection differs from definitive treatment once the flare is over. During active infection, the aim is for drainage of the abscess to treat underlying sepsis, and for cultures to direct antibiotic therapy. Minimally invasive approaches, such as radiologically-guided or laparoscopic drainage, have been described with good outcomes.⁸ The location of the endometrioma should inform a transvaginal or transabdominal approach.

Once infection has been resolved, the underlying endometriosis must be treated. A key difference in management is the introduction of hormonal suppression to down-regulate oestrogen-mediated endometriosis⁹ and complement antibiotic therapy. Hormonal suppression treats symptoms of DIE, reduces risks of recurrence and limits progression

of endometriosis. At our hospital, we have effectively used progestogens (dienogest and depot medroxyprogesterone acetate) or gonadotrophin-releasing hormone agonist. The choice of suppression was at the discretion of the treating clinician.

In patients with infected endometriomas, it is uncertain whether long-term suppression will be sufficient to prevent recurrent infections, or whether surgical clearance should be routinely offered. Extrapolation from data on TOA suggests that the risk of recurrence is significant. Without definitive treatment, patients will remain symptomatic and at risk of recurrence causing further morbidity. We propose definitive surgical treatment to excise all endometriotic tissue should be deferred for at least 6 weeks after an acute flare, as friable inflamed tissues increase risk of complications.⁴ Extent of surgery should be guided by fertility intent and age, for example cystectomy in pre-menopausal, or oophorectomy in peri-menopausal women, along with excision of all endometriotic nodules. Our findings of histologically-confirmed DIE in all our surgical candidates corroborate with findings from Chen et al., in that infected endometriomas were associated with advanced endometriosis.¹⁰

In summary, this case series outlines the acute management and bridge to long-term treatment of infected endometriomas. A 2-pronged treatment approach is required, first to control sepsis with antibiotics and source control, and second to treat the underlying disease with hormonal suppression and eventual excisional surgery. There is a need for more prospective multicentre studies to develop consensus guidelines in the Asian context on the optimal management of this condition.

Ethics statement

Ethical approval from the National Healthcare Group Domain Specific Review Board (Reference:

2023/00017) and patients' written consent were obtained.

Declaration

The authors declare they have no affiliations or financial involvement with any commercial organisation with a direct financial interest in the subject or materials discussed in the manuscript.

Keywords: *endometriosis, infectious diseases, minimally invasive surgery, obstetrics and gynaecology, ovarian endometrioma, pelvic abscess*

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