Editor-in-Chief:
Assoc. Prof.
Nguyen Phuong Sinh

Received:
05/11/2025

Accepted:
05/12/2025

Published:
31/12/2025

DOI: 10.66517/jstmp.2025.5.6

Competing interests:
The authors have no competing interests to declare

Contact address:
No.284, Luong Ngoc Quyen Str., Phan Dinh Phung Ward, Thai Nguyen Province

Email:
jstmp_editorial@tnmc.edu.vn

CLINICAL AND PARACLINICAL CHARACTERISTICS OF PELVIC INFLAMMATORY DISEASE AT THAI NGUYEN NATIONAL HOSPITAL

Nguyen Thi Hang, Nguyen Thi Binh, Nguyen Thi Mo, Hoang Thi Ngoc Tram*
TNU - University of Medicine and Pharmacy
* Author contact: hoangthingoctram@tump.edu.vn

ABSTRACT

Background: Pelvic inflammatory disease (PID) is a common gynecological condition among women of reproductive age. Early diagnosis and proper management are essential to prevent complications. **Objective:** To describe the clinical and paraclinical characteristics of patients with PID treated at Thai Nguyen National Hospital from January 1, 2022, to April 30, 2025. **Methods:** A cross-sectional descriptive study was conducted on 113 medical records of diagnosed with PID from January 2022 to April 2025. Clinical features, laboratory inflammatory markers, and transvaginal ultrasonography findings were collected and analyzed using SPSS 25.0. **Results:** The majority of patients were aged 21 - 40 years (58.4%), with a mean age of 35.3 ± 11 years. Most patients had a history of genital infections (95.6%) or gynecological interventions such as intrauterine device insertion (38.1%) or cesarean section (30.1%). Common clinical features included bilateral pelvic pain (54.9%), vaginal discharge (83.2%), cervical inflammation (70.8%), and abdominal tenderness (100%). Fever was observed in 23% of cases. Laboratory results showed leukocytosis

(> 10 × 10^9/L) in 60.2%, and elevated CRP in 33.5% of patients. Transvaginal ultrasonography revealed adnexal masses in 95.6% of patients, most smaller than 5 cm (75.2%), with heterogeneous echogenicity being the most common feature (38%). **Conclusion:** PID predominantly affects women of reproductive age, often presenting with nonspecific symptoms. Most patients have a history of genital infections or gynecological interventions. Elevated inflammatory markers and transvaginal ultrasonography are valuable for diagnosis. Combining clinical assessment, laboratory evaluation, and imaging enables accurate diagnosis, early detection, and effective management.
Keywords: Vaginitis; Adnexitis; CRP

ĐẶC ĐIỂM LÂM SÀNG, CẬN LÂM SÀNG CỦA VIÊM PHẦN PHỤ TẠI BỆNH VIỆN TRUNG ƯƠNG THÁI NGUYÊN

Nguyễn Thị Hằng, Nguyễn Thị Bình, Nguyễn Thị Mơ, Hoàng Thị Ngọc Trâm*
Trường Đại học Y - Dược, Đại học Thái Nguyên
* Tác giả liên hệ: hoangthingoctram@tump.edu.vn

TÓM TẮT

Đặt vấn đề: Viêm phần phụ là một bệnh lý phụ khoa thường gặp ở phụ nữ trong độ tuổi sinh sản. Việc chẩn đoán sớm và điều trị thích hợp có vai trò quan trọng trong phòng ngừa các biến chứng. **Mục tiêu:** Mô tả đặc điểm lâm sàng và cận lâm sàng của bệnh nhân viêm vùng chậu điều trị tại Bệnh viện Trung ương Thái Nguyên từ ngày 01/01/2022 đến 30/04/2025. **Phương pháp:** Nghiên cứu mô tả cắt ngang được thực hiện trên 113 hồ sơ bệnh án được chẩn đoán viêm

vùng chậu từ tháng 01/2022 đến tháng 04/2025. Các đặc điểm lâm sàng, các chỉ số viêm trong xét nghiệm và kết quả siêu âm đầu dò âm đạo được thu thập và phân tích bằng phần mềm SPSS 25.0. **Kết quả:** Đa số bệnh nhân nằm trong độ tuổi 21 - 40 (58,4%), với tuổi trung bình là 35,3 ± 11. Phần lớn bệnh nhân có tiền sử nhiễm khuẩn sinh dục (95,6%) hoặc can thiệp phụ khoa như đặt dụng cụ tử cung (38,1%) hoặc mổ lấy thai (30,1%). Các triệu chứng lâm sàng thường gặp gồm đau vùng chậu hai bên (54,9%), khí hư bất thường (83,2%), viêm cổ tử cung (70,8%) và đau bụng khi thăm khám (100%). Sốt ghi nhận ở 23% trường hợp. Kết quả xét nghiệm cho thấy tăng bạch cầu (> 10×10^9/L) ở 60,2% và CRP tăng ở 33,5% bệnh nhân. Siêu âm đầu dò âm đạo phát hiện khối phần phụ ở 95,6% bệnh nhân, đa số có kích thước dưới 5 cm (75,2%), với đặc điểm hồi âm không đồng nhất là phổ biến nhất (38%). **Kết luận:** Viêm phần phụ chủ yếu gặp ở phụ nữ trong độ tuổi sinh sản và thường biểu hiện với các triệu chứng không đặc hiệu. Đa số bệnh nhân có tiền sử nhiễm khuẩn sinh dục hoặc can thiệp phụ khoa. Các chỉ số viêm tăng và siêu âm đầu dò âm đạo có giá trị trong chẩn đoán. Việc kết hợp đánh giá lâm sàng, xét nghiệm và chẩn đoán hình ảnh giúp chẩn đoán chính xác, phát hiện sớm và điều trị hiệu quả.
Từ khóa: Viêm âm đạo; Viêm phần phụ; CRP

INTRODUCTION

Pelvic Inflammatory Disease (PID) is one of the most common gynecological conditions, with a high incidence among women of reproductive and sexually active age, accounting for approximately 1 in every 250 women seeking medical care

annually [1]. In 2019, the global incidence of pelvic inflammatory disease was estimated at 53.19 per 100,000 population, with the highest rates reported in Western Africa, Australia, Central Africa, and particularly Western Europe [2]. Pelvic inflammatory disease is primarily caused by *Neisseria gonorrhoeae* or *Chlamydia trachomatis* infection. However, a wide range of other microorganisms can also be responsible for the disease, which underscores the need for broad-spectrum antibiotic regimens to achieve optimal treatment outcomes [3]. Currently, the management of pelvic inflammatory disease mainly relies on medical therapy, emphasizing the combination of broad-spectrum antibiotics tailored to antibiotic susceptibility testing, with surgical intervention reserved for specific indications. Although pelvic inflammatory disease has been widely studied, there have been no previous studies conducted at Thai Nguyen National Hospital; together with differences in patient characteristics and treatment practices, this indicates that clarifying the research question in this setting is necessary and clinically meaningful. Objective: *To describing the clinical and paraclinical characteristics of patients with pelvic inflammatory disease treated at Thai Nguyen National Hospital from January 1, 2022, to April 30, 2025*.

METHODS

Study Subjects

All medical records of patients diagnosed with pelvic inflammatory disease (PID) at the Department of Gynecology, Thai Nguyen National Hospital, were included in this study.

Inclusion Criteria: All inpatients diagnosed with PID and treated at the Department of Obstetrics and Gynecology, Thai Nguyen National Hospital, during the period from January 2022 to April 2025, were enrolled in the study.

The diagnosis of PID was made according to the Centers for Disease Control and Prevention (CDC) 2021 diagnostic [4]:

Major (minimum) criteria - required for diagnosis:

A sexually active young woman at risk of sexually transmitted infections, presenting with pelvic pain and no other identifiable cause of illness, with at least one of the following findings on pelvic examination:

- Cervical motion tenderness, or
- Uterine tenderness, or
- Adnexal tenderness.

Additional (supportive but not required) criteria:

- Oral temperature > 38.5°C.
- Abnormal vaginal or endocervical discharge (depending on the causative pathogen, such as *Candida spp*., *Trichomonas vaginalis*, *Neisseria gonorrhoeae*, *Gardnerella vaginalis*, etc.).
- Numerous white blood cells on Gram-stained cervical smear, or positive test for *Neisseria gonorrhoeae* or *Chlamydia trachomatis*.
- Elevated C-reactive protein (CRP) levels.
- Histopathological findings (in patients undergoing salpingectomy) consistent with chronic salpingitis, acute salpingitis, or granulomatous salpingitis.

Exclusion Criteria: Medical records that were incomplete or lacked sufficient clinical or paraclinical information were excluded from the study.

Research Methods

- Study design: Cross-sectional descriptive study.
- Study period: From January 1, 2022, to April 30, 2025.
- Sample size: A non-probability convenience sampling method was applied. During the study period, 113 medical records that met the inclusion criteria were collected (n = 113).

Study variables and indicators: The study collected variables and indicators including demographic data (age), gynecological history (genital tract infection, IUD, abortion, surgery, previous PID), clinical signs (pelvic pain, discharge, cervical inflammation, abdominal tenderness, fever, bleeding), laboratory markers (WBC, neutrophils, CRP, CA-125, β-hCG), and ultrasonographic features of adnexal masses (presence, laterality, size, nature).

Data Processing: After data collection, all information was cleaned, coded, and analyzed using appropriate medical statistical algorithms. Data analysis was performed using SPSS software version 25.0.

Ethical Considerations: The study was conducted after obtaining approval from the Biomedical Ethics Committee No. 1806/QĐ-BV.

RESULTS

A total of 113 patients diagnosed with pelvic inflammatory disease (PID) who met the inclusion criteria were included in the study. The findings are presented in the following sections, describing the demographic characteristics, clinical manifestations, and paraclinical (laboratory and imaging) results of the study population.

Table 1. Age Distribution of Patients

Age group (years)	n	Percentage %
≤ 20	13	11,5

21 - 40	66	58,4
≥ 41	34	30,1
Mean age ($\bar{X}$ ± SD)	35,3 ± 11	
Min - Max	14 - 68	
Total	113	100

The majority of patients were in the 21 - 40 years age group, accounting for 66 cases (58.4%). The mean age of the study population was 35.3 ± 11 years, ranging from 14 to 68 years.

Table 2. Gynecological History of Patients

Gynecological History of Patients			**n = 113**	**Percentage %**
History of infection		No	5	4,4
		Yes	108	95.6
History of gynecological procedures	Yes	Intrauterine device (IUD) insertion	43	38,1
		History of abortion	36	31.9
		No	34	30.1
History of abdominal surgery	Yes	Obstetric and gynecological surgery	36	31.9
		General (non-gynecological) surgery	11	9.7
		No	66	58.4

The group with a history of genital tract infection accounted for 95.6% of cases. The proportion of patients with a history of intrauterine device (IUD) insertion was 38.1%, while those with a history of surgery represented 41.6% of the study population.

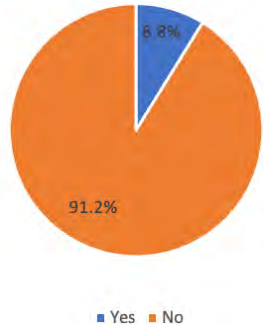

Figure 1. History of Pelvic Inflammatory Disease Among Study Participants

Among the study participants, 8.85% had a previous history of pelvic inflammatory disease and had received treatment for the condition.

Table 3. Clinical Signs and Symptoms at Admission

Clinical symptom	Category		n = 113	Percentage %
Pelvic pain	Unilateral		51	45.1
	Bilateral		62	54.9
Fever	Yes	≥ 38.5	16	14.2
		< 38.5	10	8.8
	No		87	77.0
Abnormal vaginal discharge	Yes		94	83.2
	No		19	16.8
Abnormal vaginal bleeding	Yes		19	16.8
	No		94	83.2
Cervical inflammation	Yes		80	70.8
	No		33	29.2
Adnexal mass present	Unilatera		44	38.9
	Bilateral		57	50.4
	No		12	10.6
Abdominal wall tenderness	Yes		113	100
	No		0	0

Among the clinical manifestations, bilateral pelvic pain, vaginal discharge, cervical inflammation, and abdominal wall tenderness were the most frequent findings, observed in 54.9%, 83.2%, 70.8%, and 100% of patients, respectively. Fever was present in 23% of cases, with high-grade fever (≥ 38.5°C) accounting for 14.2%. Abnormal vaginal bleeding was less common, detected in 16.8% of the study population (19 cases).

Table 4. Inflammatory indices

Inflammatory test		n = 113	Percentage %
White blood cell count ($\times 10^9$/L)	> 10	68	60.2
	≤ 10	45	39.8

Neutrophil count (%)	> 75%	59	52.2
	≤ 75%	54	47.8
CRP (mg/l)	< 6	36	31.9
	6 - 48	38	33.5
	49 - 96	15	13.3
	97 - 192	16	14.2
	> 192	8	7.1
CA125	< 35 UI/L	17	15.0
	35 - 300UI/L	17	15.0
	300 - 1000 UI/L	5	4.4
	Not performed	74	65.6
β-hCG (n = 63)	0 - 5 IU/L	60	53.1
	5 - 50 IU/L	3	2.7
	Not performed	50	44.2

In terms of laboratory findings, elevated inflammatory parameters were observed in a significant proportion of patients.

White blood cell counts exceeding 10×10^9/L were found in 60.2% of cases, while increased neutrophil counts (> 75%) were recorded in 52.2%.

Most patients (33.5%) had CRP levels ranging from 6 to 48 mg/L.

Among the 39 patients tested for CA-125, 22 (56.4%) showed elevated concentrations.

Table 5. Ultrasonographic characteristics of adnexal masses

Ultrasound parameter	**Characteristic**	**n**	**Percentage (%)**
Location	Unilateral adnexal mass	47	41.6
	Bilateral adnexal mass	61	54.0
	Undefined	05	4.4
Size (cm)	< 5 cm	85	75.2
	5 - 10 cm	26	23.0
	> 10 cm	2	1.8

Nature of the mass	Thick-walled	29	25.6
	Heterogeneous echogenicity	43	38.1
	Tubular appearance	36	31.9
	Undefined	05	4.4

Ultrasound examination revealed that adnexal masses were clearly visualized in 95.6% of patients. The majority of adnexal masses measured less than 5 cm in diameter (75.2%). Regarding laterality, unilateral adnexal masses were more common than bilateral ones. In terms of the nature of the mass, the most frequent sonographic feature was heterogeneous echogenicity (31.1%), followed by thick-walled and tubular appearances.

DISCUSSION

The findings of our study should be interpreted in the context of global epidemiological trends. According to a recent analysis, Global burden of pelvic inflammatory disease and ectopic pregnancy from 1990 to 2019, PID remains a significant global public health problem, affecting millions of reproductive aged women worldwide. Although the age standardized prevalence rate (ASPR) of PID has shown a slight decline over the past decades, the overall number of affected women continues to rise due to population growth. This global burden underscores the importance of local data such as ours, which helps understand disease patterns in specific settings - like Thai Nguyen National hospital.

The age distribution of the study population was mainly concentrated in the 21-40-year group, accounting for 58.4% of cases (n = 66). The mean age was 35.3 ± 11 years, with the youngest being

14 years and the oldest 68 years. This age pattern is consistent with the findings of Nguyen Thi Thu Ha, who reported a mean age of 37.59 ± 9.68 years, with patients ranging from 15 to 56 years, and the 21-40-year age group being the most prevalent [5].

In our study, 108 patients (95.6%) had a history of gynecological infections (vaginitis, cervicitis, or salpingitis), while only five patients had no such history. These cases may be related to inadequate genital hygiene or previous gynecologic and obstetric interventions.

Regarding gynecologic procedures, according to the CDC, intrauterine device (IUD) insertion is one of the risk factors associated with pelvic inflammatory disease. In our study, 38.1% of patients had a history of IUD insertion. Similarly, Le Kieu Trang reported that 27.7% of cases had a history of IUD use [6]. Additionally, while those with a history of surgery represented 41.6% of the study population, which may have contributed to pelvic adhesions or subsequent pelvic inflammatory conditions.

In our study, 8.85% of patients had a previous history of pelvic inflammatory disease and had received treatment. This finding indicates that a subset of women are prone to recurrent infections, which may be related to persistent risk factors such as prior gynecological interventions, suboptimal genital hygiene, or untreated asymptomatic infections. Recurrent PID is clinically significant because repeated episodes can lead to chronic pelvic pain, tubal damage, infertility, and increased risk of ectopic pregnancy.

This emphasizes the importance of early detection, complete treatment, and patient education on genital

hygiene and follow-up care to prevent recurrence. Additionally, clinicians should consider a patient's history of PID when assessing current symptoms and planning both medical and surgical management. The presence of recurrent cases also aligns with previous studies suggesting that a history of PID is a recognized risk factor for future pelvic infections.

According to the 2021 CDC guidelines, the clinical manifestations of pelvic inflammatory disease (PID) are highly variable, ranging from mild or even asymptomatic presentations to severe symptoms in advanced stages. Although the clinical signs are often nonspecific, the most common manifestations include lower abdominal pain, adnexal tenderness, and cervical motion tenderness [4].

In our study, the most frequently observed clinical features were bilateral pelvic pain (54.9%), vaginal discharge (83.2%), cervical inflammation (70.8%), and abdominal wall tenderness (100%), while fever was present in only 23% of patients, with the majority exhibiting temperatures $\geq 38.5°C$ (14.2%). Abnormal vaginal bleeding was less common, observed in 16.8% of cases. These findings are consistent with previous reports, indicating that PID often presents with variable and sometimes subtle clinical signs, highlighting the importance of thorough pelvic examination in suspected cases. These findings are consistent with the study by Nguyen Thi Thu Ha, in which 77.2% of patients had palpable adnexal masses and tenderness on pelvic examination [5].

These findings further emphasize that PID commonly presents with nonspecific and variable symptoms, in which pelvic pain and abnormal vaginal discharge

are the most prominent features, while fever is not consistently present. The relatively low rate of fever suggests that relying solely on systemic signs may lead to underdiagnosis, particularly in mild or subacute cases.

The high prevalence of cervical inflammation and abdominal tenderness underscores the importance of careful pelvic and physical examination in detecting early inflammatory changes. Meanwhile, the lower frequency of abnormal vaginal bleeding indicates that this symptom is less sensitive for diagnosis but may still suggest more advanced or complicated disease.

Overall, the variability in clinical presentation highlights the need for a high index of suspicion and a comprehensive approach, combining clinical examination with laboratory and imaging findings to ensure timely and accurate diagnosis of PID.

Patients often experience a dull, deep-seated pain, which may worsen during heavy physical activity or sexual intercourse. This can be explained by inflammatory adhesions resulting from pelvic infection, which cause traction on the intra-abdominal organs. Accordingly, surgical adhesiolysis can help alleviate pain and improve patients' quality of life [7].

Most patients showed elevated inflammatory markers (leukocytosis 60.2%, neutrophilia 52.2%, CRP 33.5%), reflecting the systemic inflammatory response characteristic of PID. The lower CRP rate may relate to testing timing or disease stage, suggesting its greater value in assessing severity rather than diagnosis.

Elevated CA-125 (56.4%) indicates pelvic inflammation and peritoneal irritation, but its low specificity requires cautious interpretation to avoid

confusion with malignancies. The absence of marker elevation in some cases highlights the heterogeneous presentation, possibly due to early-stage disease or prior treatment.

Overall, inflammatory markers are supportive and should be integrated with clinical and imaging findings for accurate diagnosis and management.

Concerning ultrasonographic characteristics, adnexal masses were clearly visualized in 95.6% of patients. The majority of masses measured less than 5 cm (75.2%). Unilateral adnexal masses were more common than bilateral ones, while a few cases did not show a clearly defined mass on ultrasound. Regarding the nature of the mass, heterogeneous echogenicity was observed in 31.1% of cases, followed by thick-walled and tubular appearances. These sonographic features are compatible with inflammatory or abscess formation in the adnexa, supporting clinical diagnosis and assessment of the extent of tissue involvement.

Transvaginal ultrasonography remains a valuable tool in the assessment of pelvic inflammatory disease due to its simplicity, non-invasiveness, and low cost. Although a typical tubular appearance of the fallopian tubes is considered characteristic, it was observed in only 31.9% of patients in our study, with heterogeneous echogenicity being the most common finding (38%). This observation is consistent with the study by Nguyen Thi Luong (2022), which reported a typical tubular appearance in only 8.9% of patients [8].

In clinical practice, the absence of a classic tubular image is frequent. Most patients present with bilateral adnexal masses, which can be difficult to distinguish from ovarian pathology. Therefore, ultrasonography

should be interpreted in conjunction with clinical examination and laboratory findings to improve diagnostic accuracy.

Regarding mass size, adnexal masses smaller than 5 cm were most commonly observed (70.8%), indicating that even relatively small lesions can be clinically significant and symptomatic. These findings highlight the importance of careful imaging evaluation in all patients suspected of pelvic inflammatory disease, not solely relying on the presence of typical sonographic features.

Ultrasonography, combined with thorough clinical assessment and laboratory tests, plays a critical role in the early detection, diagnosis, and management of PID, facilitating timely treatment and improving patient outcomes.

Overall, the results concerning clinical manifestations, inflammatory markers, and ultrasonographic findings in our study are consistent with international guidelines and previous studies, emphasizing the importance of combining thorough clinical examination, laboratory evaluation, and imaging for the diagnosis and monitoring of pelvic inflammatory disease.

Pelvic inflammatory disease (PID) is an infection of the upper genital tract occurring predominantly in sexually active young women. *Chlamydia trachomatis* and *Neisseria gonorrhoeae* are common causes; however, other cervical, enteric, bacterial vaginosis-associated, and respiratory pathogens, including Mycobacterium tuberculosis, may be involved [9]. Moreover, emerging evidence highlights under-recognized pathogens in PID. A recent meta analysis, Systematic review and meta-analysis of the association between Mycoplasma

genitalium and pelvic inflammatory disease (PID), found that infection with Mycoplasma genitalium is associated with a 67% increased odds of PID (pooled OR = 1.67, 95% CI 1.24 - 2.24), and M. genitalium was detected in about 10.3% of PID cases [10]. This suggests that standard diagnostic panels focusing only on classical pathogens (e.g., gonorrhea, chlamydia) may miss a substantial proportion of PID cases, which may partly explain why in our cohort some patients had clinical and ultrasonographic features of PID despite negative routine cultures.

However, our study was retrospective, and the microbiological test results of patients were not consistently recorded. Therefore, investigating the associated factors was challenging. This represents a limitation of our study, and future research will aim to address this issue more comprehensively.

CONCLUSION

Pelvic inflammatory disease is common among women of reproductive age and often presents with nonspecific clinical symptoms. Most patients have a history of genital infections or gynecological interventions. Inflammatory markers are frequently elevated, and transvaginal ultrasonography is a valuable diagnostic tool. Combining clinical examination, laboratory tests, and ultrasonography facilitates accurate diagnosis, early detection, and effective management of pelvic inflammatory disease.

REFERENCES

1. Department of Obstetrics and Gynecology, Hanoi Medical University. Obstetrics and Gynecology Lectures. Hanoi: *Medical Publishing House;* 2020.

2. He D, Wang T, Ren W. Global burden of pelvic inflammatory disease and ectopic pregnancy from 1990 to 2019. *BMC Public Health*. 2023; 23(1):1894. doi:10.1186/s12889-023-16663-y.
3. Walker CK, Wiesenfeld HC. Antibiotic therapy for acute pelvic inflammatory disease: the 2006 Centers for Disease Control and Prevention sexually transmitted diseases treatment guidelines. *Clin Infect Dis.* 2007;44(Suppl 3):S111-S122. doi:10.1086/511424.
4. Workowski KA, Bachmann LH, Chan PA, Johnston CM, Muzny CA, Park I, et al. Sexually Transmitted Infections Treatment Guidelines, 2021. *MMWR Recomm Rep.* 2021;70(4):1-187. doi:10.15585/mmwr.rr7004a1.
5. Nguyen TT. *Study on laparoscopic outcomes in pelvic inflammatory disease at the National Hospital of Obstetrics and Gynecology*, 2016-2018 [thesis]. Hanoi; 2019.
6. Le KT. *Study on surgical outcomes of pelvic inflammatory disease at the Department of Obstetrics and Gynecology, Bach Mai Hospital* [thesis]. Hanoi Medical University; 2020.
7. Black CM. Current methods of laboratory diagnosis of *Chlamydia trachomatis* infections. *Clin Microbiol Rev.* 1997;10(1):160-184. doi:10.1128/CMR.10.1.160.
8. Nguyen TL. *Review of the treatment situation of pelvic inflammatory disease at the National Hospital of Obstetrics and Gynecology* [thesis]. Hanoi; 2022.

9. Curry A, Williams, T, Penny ML. Pelvic Inflammatory Disease: Diagnosis, Management, and Prevention. *Am Fam Physician.* 2019;100(6): 357-364 (2019).
10. Htaik K, Vodstrcil LA, Plummer EL, et al. Systematic review and meta-analysis of the association between Mycoplasma genitalium and Pelvic inflammatory disease (PID). *Clin Infect Dis.* 2024. doi:10.1093/cid/ciae295.