

An Overview on Pelvic Inflammatory Disease Diagnosis and Management Approach

Shihanah Mansour Alshammari^{1*}, Nermeen Nasser Alrajhi², Shouq Sulaiman Al-Rumayh³, Mohammed Abdullah Alosaimi⁴, Renad Mohammed Alsharyufi⁵, Yara Sami Bukhari⁶, Seham Ayed Aldhrye⁶, Ghaday Haitham Kasem⁷, Reham Mutad J Aljohani⁸

¹Primary Health Care Center, Riyadh, KSA. ²Faculty of Medicine, King Saud bin Abdulaziz University for Health Sciences, Jeddah, KSA.

³Faculty of Medicine, Qassim University, Qassim, KSA. ⁴Faculty of Medicine, Imam Mohammed Bin Saud Islamic University, Riyadh, KSA.

⁵Faculty of Medicine, Ibn Sina National College of Medicine, Jeddah, KSA. ⁶Faculty of Medicine, Almaarefa University, Riyadh, KSA. ⁷Faculty of Medicine, Taibah University, Madinah, KSA. ⁸Faculty of Medicine, Vision college, Riyadh, KSA.

Abstract

In females, pelvic inflammatory disease (PID) is defined as inflammation and/or infection that affects the upper genital area, including the ovaries, uterus, and fallopian tubes. pelvic inflammatory disease can be caused by a variety of microorganisms found in sexually transmitted diseases, the most prevalent of which is Chlamydia trachomatis. We aim to review literature searching for the etiology of pelvic inflammatory disease, risk factors, diagnosis, clinical presentation, and management regarding this disease. PubMed database was used for the selection procedure of appropriate articles, and the following keywords were used in the mesh (“Pelvic inflammatory disease” [Mesh] (“Evaluation”[Mesh] AND/OR “Etiology”[Mesh] AND/OR “Risk factors”[Mesh] AND/OR “Diagnosis”[Mesh] AND/OR “Management”[Mesh])). Even though the pelvic inflammatory disease is relatively easy to treat, the core of the problem resides in late or misdiagnosis of the issue. Following the most recent guidelines in evaluating the patients for PID help the medical staff to provide the best management plan the patient needs and to prevent the unfortunate possible sequelae.

Keywords: Pelvic inflammatory disease, Chlamydia trachomatis, Salpingitis, Vaginal discharge

INTRODUCTION

Pelvic inflammatory disease (PID) is defined as inflammation and/or infection occurring in the upper segment of the genital tract in females, it may involve ovaries, uterus, and fallopian tubes. Various sexually transmitted infections’ microbes can lead to PID, most commonly *Chlamydia trachomatis*. Almost 15% of untreated chlamydial infections progress to PID, which has some serious complications such as infertility, ectopic pregnancy, and chronic pelvic pain [1-4]. In Saudi Arabia, two studies were conducted to determine the prevalence of chlamydia infection among infertile women. The prevalence stated to be around 15%, and 8% compared to only 1% in the control group, fertile women [5-7]. In this review, we will explore the etiology, risk factors, clinical presentation and diagnosis, management, and complications.

MATERIALS AND METHODS

PubMed database was used for the selection procedure of appropriate articles, and the following keywords were used in the mesh (“Pelvic inflammatory disease” [Mesh] (“Evaluation”[Mesh] AND/OR “Etiology”[Mesh] AND/OR “Risk factors”[Mesh] AND/OR “Diagnosis”[Mesh] AND/OR “Management”[Mesh])). The articles chosen for inclusion were based on meeting one or more of the following criteria: Pelvic inflammatory disease or its risk factors, management evaluation process, diagnosis, and/or

management. All other articles that did not match the requirements inclusion criterion were excluded.

Review Etiology and Pathogenesis

Pelvic inflammatory disease arises from ascending infection through the cervical orifice. Chlamydia trachomatis is the major pathogen linked to PID, with up to 60% of women with confirmed endometritis and/or salpingitis [8]. *Neisseria. Gonorrhoeae* used to be the least cause of PID, although it is not the current case, it still is one of the causes with more severe complications [8, 9]. Even when diagnostic testing for chlamydia and gonorrhea has a higher sensitivity, the

Address for correspondence: Shihanah Mansour Alshammari, Primary Health Care Center, Riyadh, KSA. Shi.man@gmail.com

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non commercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to cite this article: Alshammari SM, Alrajhi NN, Al-Rumayh SS, Alosaimi MA, Alsharyufi RM, Bukhari YS, et al. An Overview on Pelvic Inflammatory Disease Diagnosis and Management Approach. Arch Pharm Pract. 2021;12(2):103-5. <https://doi.org/10.51847/1jWkjj2kw>

proportion of instances of PID involving non-gonococcal, non-chlamydial etiology is present in women with endometritis and/or salpingitis. Anaerobes in the upper genital tract are usually detected in women with gonorrhea or chlamydia as multi-organism infections and are linked with more severe illness [9-11]. The cervix provides a physical barrier in bacterial ascension, however during the proliferative phase the, mucus tends to be thinner and the peristalsis of the uterus goes in the cephalic direction to harbor the sperms [12, 13].

Risk Factors

Risk factors of this disease are related to sexual practices, age of less than 25, and first sexual encounter before age of 15 are significantly related to PID. Both of those risk factors are modifiable with proper education and awareness. Other related risk factors include lower socioeconomic status, adverse pregnancy outcome, history of a sexually transmitted disease, and or *C. trachomatis*. Which also can be managed by early intervention and frequent gynecology clinic visits [14, 15].

Clinical Evaluation and Diagnosis

As stated by the Centers for Disease Control and Prevention (CDC), a patient who presents with pelvic and/or lower abdominal pain should behave pelvic inflammatory disease as one of the top differential diagnoses. Other differentials shall include ectopic pregnancy, pregnancy, ovarian torsion, and adnexal mass, among other non-gynecological diseases (surgical and non-surgical). The initial steps in dealing with the patient in emergency care or clinic are full abdominal examination to detect pain and tenderness, vaginal speculum examination to visualize the cervix status and the presence of any discharge, bimanual examination to assess cervical motion, uterus, and adnexal tenderness or masses [16, 17]. Presumptive therapy for PID should be given to any sexually active woman at a childbearing age or risk of sexually transmitted diseases with unexplained discomfort or pain in the lower abdomen or pelvic region with at least one of the following clinical criteria on physical examination: uterine, cervical motion, and/or adnexal tenderness, see **Table 1** for full detailed criteria [18].

Table 1. Pelvic inflammatory disease according to 2021 CDC guidelines

Minimal clinical criteria ^a	Uterine tenderness
Additional criteria ^b	Cervical motion tenderness
	Adnexal tenderness
	Oral temperature of more than 38.3°C (>101°F)
	Cervical friability
	Abnormal cervical mucopurulent discharge
	Presence of a high number of WBCs on saline microscopy of vaginal fluid

Specific criteria^c

- Laboratory confirmation of cervical infection with *N. gonorrhoeae* or *C. trachomatis*
- High ESR (erythrocyte sedimentation rate)
- High C-reactive protein levels
- Endometrial biopsy with histopathologic evidence of endometritis
- Transvaginal ultrasound and/or magnetic resonance imaging with fluid-filled, thick tubes with or without tubo-ovarian complex and/or free pelvic fluid
- Doppler studies suggestive of pelvic infection
- Any laparoscopic findings affirmative of pelvic infection disease

^a Treatment is started if one and/or more of these criteria are met.

^b If any minimal criterion is present, one or more of these additional findings will increase the specificity of the diagnosis.

^c Most specific criteria to the diagnosis of PID (one or more).

Management

According to the latest CDC 2021 guidelines, PID initially should be treated as an outpatient case, unless a surgical emergency (like ovarian torsion) cannot be excluded, pregnancy, tubal and/or ovarian abscess, poor response to medical treatment, severe illness symptoms, or poor compliance or cannot tolerate orally. The outpatient regimen includes a combination of oral therapy and intramuscular injections. Different regimens are proposed for the treatment of this condition. However, all of them include antibiotics as the mainstream, one regimen include the usage of ceftriaxone (500 mg) as an intramuscular injection as a single dose with doxycycline (100 mg) orally (twice a day) for 14 days and metronidazole (500 mg) orally (twice a day) for 14 days. Another regimen uses cefoxitin (as a single injection), probenecid (orally as a single dose), doxycycline (twice a day, orally for 14 days), and metronidazole (twice a day, orally for 14 days). Moreover, third-generation cephalosporin (like ceftizoxime) with doxycycline (twice a day, orally for 14 days) and metronidazole (twice a day, orally for 14 days) is used. In some inpatient cases, a parenteral regimen can be used, and this can be in form of ceftriaxone (1 gram, IV, once a day), with doxycycline (100 mg, orally or IV, twice a day), and metronidazole (500 mg, orally or IV, twice a day). Other parenteral regimens include cefotetan (2 gram, IV every, twice a day), or cefoxitin (2 gram, IV, four times a day), with doxycycline (100 mg, orally or IV, twice a day). Patient education is an important part of the management, as abstaining from sexual intercourse and treating the partner are very crucial aspects. Follow-up of outpatient management is important to determine whether to continue as such or in case of no response within the first three days, ward admission is required. After completion of the treatment course, a clinic visit after 3 months is required, if it is not possible it should not exceed 12 months [18].

CONCLUSION

Pelvic inflammatory disease is one the disease that should be dealt with with a very vigilant eye, due to its poor prognosis

if left untreated. PID can be easily confused with other diseases which lead, often, to misdiagnosis or underdiagnosis, therefore general practitioners, emergency doctors, and gynecologists should be familiar with every aspect of it including evaluation criteria and management. The consequences of PID are very severe; the most significant one is infertility which affects the psychological well-being of the patient and is considered a burden on the healthcare system.

ACKNOWLEDGMENTS: None

CONFLICT OF INTEREST: None

FINANCIAL SUPPORT: None

ETHICS STATEMENT: None

REFERENCES

- Ness RB, Soper DE, Holley RL, Peipert J, Randall H, Sweet RL, et al. Effectiveness of inpatient and outpatient treatment strategies for women with pelvic inflammatory disease: results from the Pelvic Inflammatory Disease Evaluation and Clinical Health (PEACH) Randomized Trial. *Am J Obstet Gynecol.* 2002;186(5):929-37. doi:10.1067/mob.2002.121625
- Haggerty CL, Gottlieb SL, Taylor BD, Low N, Xu F, Ness RB. Risk of sequelae after Chlamydia trachomatis genital infection in women. *J Infect Dis.* 2010;201(Suppl 2):S134-55. doi:10.1086/652395
- Price MJ, Ades AE, De Angelis D, Welton NJ, Macleod J, Soldan K, et al. Risk of pelvic inflammatory disease following Chlamydia trachomatis infection: analysis of prospective studies with a multistate model. *Am J Epidemiol.* 2013;178(3):484-92. doi:10.1093/aje/kws583
- Soper DE. Pelvic inflammatory disease. *Obstet Gynecol.* 2010;116(2 Pt 1):419-28. doi:10.1097/AOG.0b013e3181e92c54
- Kamel RM. Screening for Chlamydia trachomatis infection among infertile women in Saudi Arabia. *Int J Womens Health.* 2013;5:277-84. doi:10.2147/IJWH.S46678
- Alfarraj DA, Somily AM, Alssum RM, Abotalib ZM, El-Sayed AA, Al-Mandeel HH. The prevalence of Chlamydia trachomatis infection among Saudi women attending the infertility clinic in Central Saudi Arabia. *Saudi Med J.* 2015;36(1):61-6. doi:10.15537/smj.2015.1.9967
- Lestari SW, Japari A, Makes D, Wasian G, Hartono J, Supardi P, et al. Imaging of the male genital tract: a review of the mechanism of sperm quality impairment in infertility. *Int J Pharm Phytopharmacol Res.* 2020;10(1):87-96.
- Taylor-Robinson D, Jensen JS, Svenstrup H, Stacey CM. Difficulties experienced in defining the microbial cause of pelvic inflammatory disease. *Int J STD AIDS.* 2012;23(1):18-24. doi:10.1258/ijsa.2011.011066
- Taylor BD, Ness RB, Darville T, Haggerty CL. Microbial correlates of delayed care for pelvic inflammatory disease. *Sex Transm Dis.* 2011;38(5):434-8. doi:10.1097/OLQ.0b013e3181ffa7c7
- Ness RB, Hillier SL, Kip KE, Soper DE, Stamm CA, McGregor JA, et al. Bacterial vaginosis and risk of pelvic inflammatory disease. *Obstet Gynecol.* 2004;104(4):761-9. doi:10.1097/01.AOG.0000139512.37582.17
- Heinonen PK, Miettinen A. Laparoscopic study on the microbiology and severity of acute pelvic inflammatory disease. *Eur J Obstet Gynecol Reprod Biol.* 1994;57(2):85-9. doi:10.1016/0028-2243(94)90048-5
- Katz DF. Human cervical mucus: research update. *Am J Obstet Gynecol.* 1991;165(6 Pt 2):1984-6. doi:10.1016/s0002-9378(11)90559-6
- Kuijsters NPM, Methorst WG, Kortenhorst MSQ, Rabotti C, Mischi M, Schoot BC. Uterine peristalsis and fertility: current knowledge and future perspectives: a review and meta-analysis. *Reprod Biomed Online.* 2017;35(1):50-71. doi:10.1016/j.rbmo.2017.03.019
- Das BB, Ronda J, Trent M. Pelvic inflammatory disease: improving awareness, prevention, and treatment. *Infect Drug Resist.* 2016;9:191-7. doi:10.2147/IDR.S91260
- Simms I, Stephenson JM, Mallinson H, Peeling RW, Thomas K, Gokhale R, et al. Risk factors associated with pelvic inflammatory disease. *Sex Transm Infect.* 2006;82(6):452-7. doi:10.1136/sti.2005.019539
- Mitchell C, Prabhu M. Pelvic inflammatory disease: current concepts in pathogenesis, diagnosis, and treatment. *Infect Dis Clin North Am.* 2013;27(4):793-809. doi:10.1016/j.idc.2013.08.004
- Saraswat N, Sachan N, Chandra P. A Detailed Review on the rarely found Himalayan herb *Selinum vaginatum*: Its Active constituents, pharmacological uses, traditional and potential benefits. *Pharmacophore.* 2020;11(2):40-52.
- (CDC) C for DC and P. No Title Pelvic Inflammatory Disease (PID). Published 2021. Accessed August 16, 2021. Available from: <https://www.cdc.gov/std/treatment-guidelines/pid.htm>