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Review Article

PELVIC INFLAMMATORY DISEASE

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ABSTRACT
Pelvic Inflammatory Disease (PID) is a very common condition and often missed in its early stage leading to serious complications like chronic pelvic pain, infertility, ectopic pregnancy, chronic back pain, pelvic abscess, Fitz-Hugh-Curtis syndrome etc. The doctors treating PID forget the most important aspect of management which is partner notification (PN) leading to chronicity and serious complications. Therefore the treatment should be appropriate and adequate PN should be undertaken.

Key Words: *PID, PN, Salpingitis, Chlamydia, Gonorrhoea, Anaerobes*

INTRODUCTION
Pelvic Inflammatory Disease (PID) is usually referred to the inflammation of the upper genital tract in a woman. The inflammation of the endometrium is called endometritis; the inflammation of the fallopian tubes is called salpingitis. When the inflammation has spread to ovaries it is referred to oophoritis or salpingo-oophoritis. The infection may spread to the Pouch of Douglas to form pelvic abscess. Sometimes non genital ascending infection like inflamed appendix may involve fallopian tubes and ovaries without endometritis. PID is a broad term mostly referring to pelvic pain due to endometritis, salpingitis or oophoritis or in any combination, parametritis, adenexitis etc. The aetiology is almost always related to ascending microbial infection necessitating contact tracing known as partner notification (PN) and the treatment of the partner. The sexual partners are usually asymptomatic. Lack of treatment of the sexual partner may result in the recurrence of PID.

Epidemiology
There is no true prevalence of PID anywhere in the world. It is estimated that over 750,000 cases of PID are treated in USA every year (Sutton *et al.*, 2005) and out of these about 100,000 become infertile. In England and Wales 72000 cases are estimated to have PID each year (Simms and Stephenson, 2000). The authors have applied an economic model of direct and indirect cost of PID. Accordingly the cost of treatment of PID in England and Wales is £75 million per year. They said 10% of this cost i.e. £7.5 million is related to Chlamydia infection which could be prevented. In USA the cost of treatment of PID was $4.2 billion in 1990. The estimated annual incidence of PID in industrialised countries is less than 1 in 1000 but it is increased to 1.5-2 per 1000 if the age group is between 15-24. There are several other factors of high prevalence of PID other than above age group. They are as follows;

- Multiple sexual partners and frequency of sexual intercourse
- New partner in last six months
- Past history of sexually transmitted infection (STI)
- Past history of PID and untreated partner
- Uterine instrumentation i.e. termination of pregnancy, IUD insertion, IVF, endometrial biopsy and histerosalpingography
- Vaginal douching
- Smoking.
- Possible carriage of bacteria by spermatozoa
- There are several factors which can reduce the risk of getting PID
- Using a condom regularly during sexual intercourse with casual contacts
- Use of spermicidal

Progesterone only contraceptive pill which produces a luteal type endometrial secretion to plug the internal os of cervix and reduces the endometrial inflammatory response (Pattman *et al.,* 2005)

Aetiology

PID is an ascending infection from the endocervix causing endometritis. The infection can spread further to cause salpingitis, salpingo oophoritis, tubo-ovarian abscess and pelvic abscess and pelvic peritonitis.

Neisseria gonorrhoeae and Chlamydia trachomatis which are sexually transmitted are the main organisms implicated as causative organisms for PID (Bevan *et al.*, 1995; Templeton 1996). These infections only account for 25% of all PID in UK Other organisms i.e. Anaerobes including Prevotella, Atopobium, Leptotrichia etc., Gardnerella vaginalis, Mycoplasma genitalium are also implicated. Actinomyces israelii can cause occasional pelvic abscess and usually associated with IUD of plastic variety. Salmonella spp. can spread from intestine in typhoid or paratyphoid to cause pelvic abscess. Haematological spread from Mycobacterium tuberculosis in high prevalence area can be possible.

Clinical Features

- Acute PID
- The following symptoms are present less than three weeks
- Lower abdominal pain (pelvic pains) mild in Chlamydia, moderate in gonorrhoea and severe in anaerobic infection
- Deep dyspareunia
- Post coital bleeding
- Intermenstrual bleeding
- Menstrual irregularity
- Pyrexia
- Nausea and vomiting
- Examination
- Bimanual examination should be carried out with care to find following signs
- Positive cervical excitation
- Tender lateral fornices
- Tenderness in Pouch of Douglas

Speculum examination should carry out to visualise the state of cervix and take samples for Neisseria gonorrhoeae (GC) and Chlamydia trachomatis from endocervix. High vaginal swabs should be taken for anaerobes, Trichomonas vaginalis, for bacterial vaginosis. Endo-urethral swab should be taken for Chlamydia. Chlamydia is only tested by nucleic acid amplification test (NAAT) and GC by culture.

Immediate microscopic examination of cervical discharge, urethral sample and vaginal secretion can be done after Gram staining. A wet preparation of the vaginal discharge for microscopy may be helpful for finding Trichomonas and clue cells for bacterial vaginosis. If PID is caused by GC, this can be visualised by microscopic examination in the clinic and correlates to a positive diagnosis. In the Gram stained cervical smear the presence of numerous pus cells may suggest PID. This finding has a poor positive predictive value. However absence of pus cells in cervical smear has got a good negative predictive value and rules out PID in 95% (Yudin *et al.,* 2003). Per abdominal examination should be done to grade the tenderness in the iliac fossae and presence of rebound phenomenon. Supra pubic tenderness may suggest urine tract infection (UTI). Urine culture should be done.

Chronic PID

The symptoms and signs are no different from acute PID but the duration is longer than three weeks. Usually pyrexia and nausea and vomiting are absent. Patients may feel tired and have been unwell for some time. Chronic PID can be asymptomatic and can be discovered during examination for infertility.

Diagnosis

- Clinical examination
- Endo-cervical and urethral swabs for microscopy and culture for GC and NAAT for Chlamydia

- Blood test for ESR and C reactive protein
- Urine culture
- Pregnancy test
- Ultrasound scan of pelvis
- Diagnostic Laparoscopy

Differential Diagnosis

- Ectopic Pregnancy; pregnancy test will be positive
- Endometriosis: relationship of pain to the menstrual cycle and Laparoscopy necessary for final diagnosis
- Rupture of ovarian cyst: sudden onset of severe pain
- UTI: positive culture
- Irritable bowel syndrome: colonoscopy required and symptoms may be suggestive
- Functional pelvic pain: long standing symptoms and diagnosed by exclusion

Complications and Sequelae

- Tubo-ovarian and pelvic abscesses
- Infertility: It is common following PID and occurs in 8% after first attack, 20% after second attack and 40% after the third recurrence of PID (Pattman *et al.*, 2005)
- Ectopic pregnancy: There is a 7 fold increase of ectopic pregnancy following PID
- Fitz-Hugh-Curtis Syndrome (perihepatitis): It occurs in about 10-29% cases with PID. The mechanism is exactly not known. It is believed to the spread of Chlamydial or gonococcal infection from peritoneal or from lymphatic spread from the pelvis. The inflammation has got a characteristic appearance of violin strings between the liver and abdominal wall. (Pattman *et al.*, 2005)

Management

The treatment of PID is usually conservative using appropriate antibiotics directed towards causative organisms. Occasionally surgery may be needed for tubo-ovarian abscess and in order to make a definite diagnosis (Csonka and Oates, 1990). The following drug treatment is recommended by BASHH (British Association of Sexual Health and HIV) and evidence based. (BASHH, 2010 PID guidelines)

Outpatient Regimens:

- Ceftriaxone 500mg IM single dose followed by doxycyclinie 100mg twice daily orally and metronidazole 400mg twice daily orally, both for 14 days, or
- Ofloxacin 400mg twice daily and metronidazole 400mg twice daily, both orally for 14 days, or
- Moxifloxacin 400mg once daily orally for 14 days, or
- Levofloxacin 500mg once daily for 14 days orally

Recently there are areas in the world where quinolones resistant Neisseria gonorrhoea has emerged. If the local prevalence of resistant GC is more than 5%, Ofloxacin, Moxifloxacin and Levofloxacin should not be used before the culture and sensitivity report. In mild to moderate PID, anaerobes are less likely the cause of PID. If the patient is intolerant to metronidazole, this can be discontinued.

Alternative Treatment to Above: Ceftriaxone 500mg IM single dose plus 1 gram Azithromycin weekly for two doses (two weeks) orally.

Inpatient Regimens:

The PID patients are admitted to hospital depending on the severity of pelvic infection. Sometimes a decision of emergency diagnostic laparoscopy is made to make a correct diagnosis and at other times patients are given drug treatment to observe the response after a clinical diagnosis. The inpatient drug treatment is as follows;

- IV Ceftriaxone 2g daily + doxycyclinie 100mg twice daily po + metronidazole 400mg twice daily po for 14 days, or
- IV clindamycin 900mg three times daily + IV gentamycin (2mg/kg as loading dose) followed by1.5mg/kg three times daily or a single daily dose of 7mg/kg may be substituted, both for 14 days.

Alternative Regimens:

- IV Ofloxacin 400mg twice daily + IV metronidazole 500mg three times daily both for 14days, or
- IV ciprofloxacin 200mg twice daily + IV/oral doxycyclinie 100mg twice daily + IV metronidazole 500mg three times daily all for 14 days

PID in Pregnancy

There is insufficient data on safety to recommend any therapy in pregnancy. However empirical therapy directed against gonorrhoeae, Chlamydia and anaerobes should be used. The following recommendation should be followed: IM Ceftriaxone 500mg single dose + IV/oral erythromycin 500mg four times daily for 14 days + IV/oral metronidazole 500mg three times daily for 14 days in clinically severe PID. This treatment is safe in first trimester (BASHH).

Surgical Treatment

Diagnostic laparoscopy is helpful in the diagnosis of PID and can exclude the pelvic pain due to other causes. It also helps to drain any pelvic abscess and can divide his adhesions during the procedure.

Partner Notification (PN)

All male partners of patients with PID within previous six months should be contacted and be treated. If gonorrhoea or Chlamydia is diagnosed in the partner s they should be appropriately treated. If nothing is diagnosed they should treated for Chlamydia with a single dose of 1 gram Azithromycin or one week's course of doxycyclinie 100mg twice daily p.o. If tests to diagnose gonorrhoea and Chlamydia are not available the partners should receive treatment for both gonorrhoea and Chlamydia i.e. IM Ceftriaxone 500mg + 1 gram Azithromycin p.o.

Follow Up

Patients should be seen 72 hours after starting the treatment to see the response to treatment. It is expected to have a significant improvement by this time. If no improvement, diagnostic laparoscopy should be done. If there is improvement patients should be seen after 14 days when they complete the PID treatment. At this stage, if there is no improvement surgical intervention is advised. At this stage compliance to treatment should assessed and a second course should be advised in poor or no compliance. Patients should be advised to abstain from sex until all the partners and the index patient had completed the treatment. If gonorrhoea is diagnosed, a test of cure (TOC) for gonorrhoea should be carried out in the follow up visit at two weeks after completion of PID treatment. Partner notification should be complete with all contacts being treated adequately

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