

Pelvic inflammatory disease

Jonathan D C Ross

Abstract

Pelvic inflammatory disease (PID) is a common cause of morbidity in young women and is usually secondary to a sexually transmitted infection. The diagnosis is based on clinical history and examination, but is inaccurate and leads to overdiagnosis of the condition. Despite this, empirical antibiotic treatment based on a clinical assessment is still recommended because failure to treat PID can result in infertility, ectopic pregnancy or chronic pelvic pain in up to 40% of women. It is important to exclude an ectopic pregnancy before starting treatment for PID. Screening and treatment of male partners is important to prevent reinfection, which is associated with an increased risk of long-term sequelae.

Keywords Chlamydia; chronic pelvic pain; ectopic pregnancy; gonorrhoea; infertility; pelvic infection; pelvic inflammatory disease; salpingitis

Pelvic inflammatory disease (PID) is a common condition affecting young women; one study reported that 1 in 45 consultations by this group with their GP were related to pelvic inflammatory disease. Pelvic infection has unpleasant, short-term, physical and psychological affects, and also serious long-term sequelae in the form of chronic pelvic pain, increased risk of ectopic pregnancy and tubal factor infertility. The public health importance of many sexually transmitted infections (STIs), including gonorrhoea and chlamydia, includes their ability to cause PID and its complications, which are costly to treat and may justify primary prevention through screening for predisposing infections.

Epidemiology

Accurately measuring how many women have PID, their distribution and the factors associated with the disease is hampered by our inability to make an accurate clinical diagnosis and the multiple clinical settings in which they may present. In many developed countries, there has been a decline in the number of inpatient and outpatient diagnoses, although in the UK outpatient rates of infection continue to rise (Figure 1). Pelvic infection rates may be reduced in the future as a result of increased testing for chlamydia and gonorrhoea, increased public awareness of the risks of these STIs and the early use of effective antimicrobial therapy.

The main risks associated with PID are similar to those for any other sexually acquired infection – young age, multiple concurrent sexual partners and lack of barrier contraception use. Women taking the oral contraceptive pill appear to be at lower risk of developing severe PID, although this effect may be limited to those infected with chlamydia. Some, although not all, studies suggest that a delay of more than a few days between the onset of

symptoms and receiving antimicrobial therapy is associated with a subsequent increased risk of impaired fertility.

Vaginal douching has been previously linked with pelvic infection. In particular, women presenting with PID are more likely to give a history of douching compared to those without PID. However, two studies that prospectively followed women with a history of douching suggested that they are at no increased risk of developing PID and it is likely that the symptoms of PID, such as offensive vaginal discharge, may lead to increased douching rather than vice versa.

The microbial causes and associated clinical presentation of PID vary in different geographical regions, reflecting differences in the local prevalence of STIs.

Aetiology

PID occurs when pathogens spread from the lower genital tract through the cervix to produce an endometritis, before spreading to the fallopian tubes to cause salpingitis (Figure 2). An exception to this is tuberculosis, which may often infect the pelvis via the lymphatic system or blood.

Chlamydia trachomatis and *Neisseria gonorrhoeae* are the two pathogens most closely linked with pelvic infection and inflammation. The exact proportion of cases caused by these pathogens varies according to geographical location, but in developed countries gonorrhoea causes around 2–5% of infections, and chlamydia 15–40%. The mechanism by which gonorrhoea and chlamydia cause damage to the fallopian tubes differs. In gonococcal PID there is direct infection and destruction of the epithelial lining of the tube with an acute inflammatory response usually leading to acute symptoms. Women with chlamydial disease have a more indolent clinical picture where much of the tubal damage occurs secondary to the immune response to infection, possibly via cross-reactivity between human and chlamydia heat shock protein 60.

The microbial aetiology of the cases not caused by gonorrhoea or chlamydia remains unclear. Although a number of pathogens may have a role, including *Mycoplasma genitalium*, anaerobes, *Trichomonas vaginalis*, *Gardnerella vaginalis*, *Mobiluncus* and herpes simplex virus, some women carry the same organisms without going on to develop PID (Table 1).^{1,2} Of these, the evidence is strongest for *M. genitalium* and anaerobes (such as *Prevotella*).

Women with pelvic infection often also have bacterial vaginosis. In bacterial vaginosis there is an imbalance in the vaginal flora with loss of lactobacilli and an increase in other bacterial species, including *Gardnerella*, *Mobiluncus* and anaerobes, associated with an offensive vaginal discharge. Women presenting initially with bacterial vaginosis do not appear to be at an increased risk of developing PID, with two exceptions. First, those who have large quantities of Gram-negative anaerobes in the vagina have a slightly increased risk of developing upper genital tract infection; and second, those with bacterial vaginosis who subsequently acquire gonorrhoea or chlamydia are also at increased risk of subsequent salpingitis.³

Clinical presentation (Table 2)

Asymptomatic infection of the fallopian tubes is common and can lead to future tubal factor infertility in the absence of a

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Pelvic inflammatory disease diagnoses in sexual health clinics in England

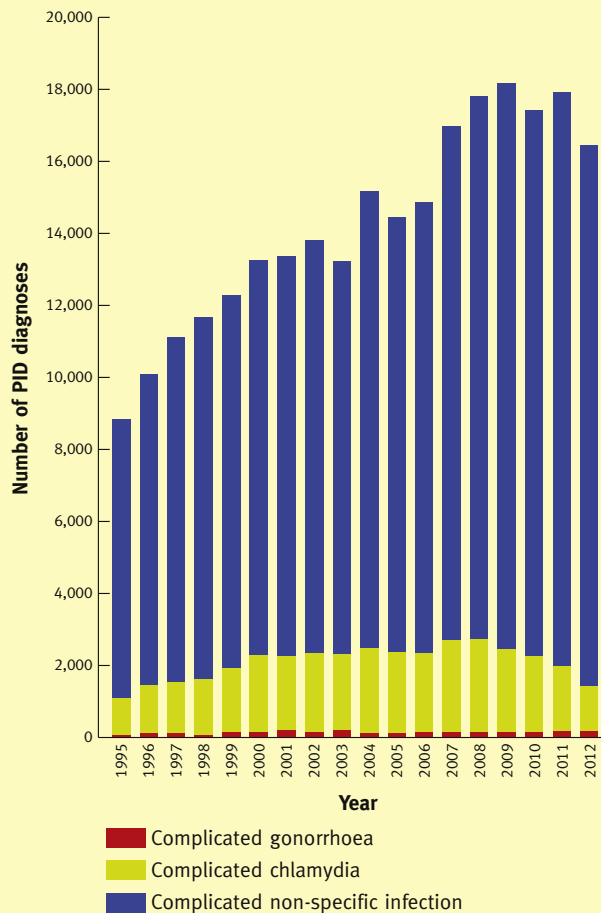


Figure 1

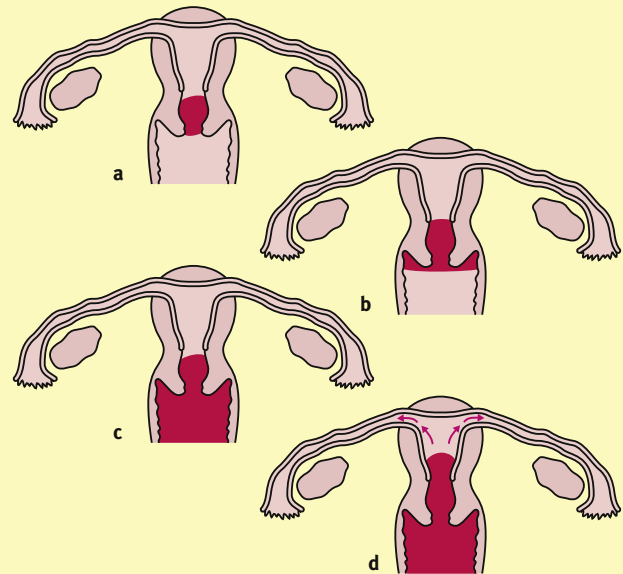
history of clinical PID, particularly following chlamydia infection. When symptoms are present, the patient often complains of bilateral, recent-onset lower abdominal pain associated with dyspareunia, vaginal discharge and postcoital/intermenstrual bleeding. Those with more severe PID also manifest systemic features, such as fever, malaise, nausea and vomiting. Around 5% of women develop an associated perihepatitis producing right upper quadrant abdominal pain and tenderness (Fitzhugh–Curtis syndrome).

Abdominal and pelvic examination should be performed. Abdominal and adnexal tenderness is often present with pain noted on movement of the cervix in severe disease (cervical excitation). A fever is uncommon in mild-to-moderate PID, but occurs more frequently in severe disease.

Further investigations may help in making a diagnosis. Erythrocyte sedimentation rate (ESR) and serum C-reactive protein (CRP) are useful markers of severity of disease, but have poor specificity. All patients should be screened for STIs, including gonorrhoea and chlamydia, using nucleic acid amplification tests where possible. A pregnancy test should be performed to help exclude an ectopic pregnancy. Ultrasound imaging is useful to detect a tubo-ovarian abscess, hydrosalpinx

Pathogenesis of pelvic inflammatory disease

PID begins with cervicitis (a). This is followed by a change in the cervicovaginal micro-environment (b) that leads to bacterial vaginitis (c). Finally, the original cervical pathogens, the flora causing bacterial vaginitis or both ascend into the upper genital tract (d). The red areas indicate the affected portions of the genital tract.



McCormack W M. *N Engl J Med* 1994; **330**: 115–19.

Figure 2

or pyosalpinx, but is operator dependent and lacks sensitivity for PID unless a pelvic collection is present. Computerized tomography (CT) and magnetic resonance imaging (MRI) of the pelvis have not yet been fully validated and their role in the diagnosis of PID remains uncertain. A transcervical endometrial biopsy can provide histological evidence of endometritis that supports the diagnosis of PID, but is not used routinely because of difficulties in ensuring consistent interpretation of the biopsy and the delay while waiting for biopsy processing and reporting.

Microbial aetiology of pelvic inflammatory disease

Pathogen	Associated features
<i>Chlamydia trachomatis</i>	Indolent, asymptomatic infection
<i>Neisseria gonorrhoeae</i>	Severe, acute-onset infection
<i>Mycoplasma genitalium</i>	Probable cause of pelvic inflammatory disease
Anaerobes	Often detected in tubo-ovarian abscess
<i>Trichomonas vaginalis</i>	Role as primary pathogen uncertain
<i>Gardnerella vaginalis</i>	Role as primary pathogen uncertain
<i>Mobiluncus</i>	Role as primary pathogen uncertain
Herpes simplex virus	Role as primary pathogen uncertain

Table 1

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