A GP's guide to pelvic inflammatory disease

Pelvic inflammatory disease (PID) is a serious infection in women that has important consequences for both the short and long term. Caring for patients and their contacts requires a sensitive and thorough approach.

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In Australia and New Zealand, pelvic inflammatory disease (PID) is the most common serious infection in young women. Approximately 80,000 patients are diagnosed with it each year and approximately 17,000 of these are hospitalised.[1] In the USA, PID generates annual healthcare costs of around US$4.2 billion.[2]

PID affects the female reproductive organs (the uterus, fallopian tubes and ovaries) and other pelvic viscera (see Figure 1). The inflammatory process may be acute or chronic. Most cases are caused by an ascending infection – *Chlamydia trachomatis* and *Neisseria gonorrhoeae* are the most common pathogens, together accounting for between 68 and 80% of cases in women under 25 years of age. (These causes are discussed in more detail in the box on page 36.) However, many other organisms (*Escherichia coli, Bacteroides* spp., beta haemolytic and anaerobic streptococci, and staphylococci) may ascend from the lower genital tract when the normal barriers to infection are breached – for example, following childbirth, abortion or uterine instrumentation. A few cases are caused by bloodborne spread from other sites of infection, and also by direct transperitoneal spread from appendicitis or diverticular disease or, on rare occasions, tuberculosis.

Risk factors

Risk factors for PID include unprotected sexual activity, multiple sexual partners, and a partner who has multiple sexual partners. Others include previous pelvic infections, recent instrumentation (e.g. uterine dilatation and curettage, endometrial sampling or introduction of an IUD) and regular douching. Improper use of a wetsuit when water skiing can also increase a woman's risk – if the crotch flap is not fastened then water can be forced into the vagina and uterus when she hits the water on her bottom.

IN SUMMARY

- **Most cases of PID are caused by an ascending infection, with sexually acquired *Chlamydia trachomatis* and *Neisseria gonorrhoeae* being the most common pathogens. However, other organisms may be involved when the normal barriers to infection are breeched – for example, during childbirth.**
- **A high index of suspicion is required to diagnose PID and STIs. Presentations vary according to the cause and severity of the disease, and all features may be absent or mild in the early stages.**
- **Patient education and reassurance about the security of information, and requirements for disease notification and contact tracing are important aspects of management.**
- **If a woman is treated for PID and her symptoms and signs do not resolve then the diagnosis should be reconsidered.**
- **There are serious long term consequences of PID. These include chronic pelvic pain and infection, and tubal occlusion with infertility. In addition, the rates of ectopic pregnancy are increased several fold.**

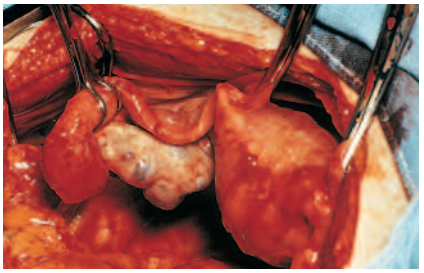

Figure 1. Pelvic infection. Note the acutely inflamed lateral end of the fallopian tube.

Barriers to infection

There are physiological barriers to infection, reaching the upper genital tract. These include the narrow diameter of the cervical canal and the downward flow of cervical mucus, which washes out infection, and is aided by antibacterial lysosomes and IgA produced by the cervix. In addition, the cyclical shedding of the endometrium and the mechanical barrier of the uterotubal junction contribute to the natural defence mechanisms of the upper genital tract.

Clinical aspects

Caring for women with PID and their contacts requires a range of clinical skills. These include sensitive history taking, thorough and gentle examination, correct collection of specimens and interpretation of results, and appropriate treatment and follow up. Patient education and reassurance about the security of information, and requirements for disease notification are also important. Using a nonjudgmental manner and establishing a good rapport with the woman are essential in optimising care and achieving the best clinical and psychological outcomes.

The sensitive issue of contact tracing must also be addressed. Initial tracing is undertaken by the woman herself and involves informing her partners of their need to be screened for sexually transmissible infections (STIs).

Presentations

Possible symptoms and signs of PID are listed in Table 1, but it is important to note that presentations vary according to the cause and severity of the disease. In the early stages, all features may be absent or mild and not initiate presentation. Therefore, a high index of suspicion is required to diagnose PID and STIs. Hospital admission is required for all patients with other than mild disease and is mandatory if a tubo-ovarian abscess is suspected.

Fitz-Hugh–Curtis syndrome, a perihepatitis, may occur in association with PID (Figure 2). It presents clinically with pleuritic pain in the right upper quadrant of the abdomen, and liver tenderness.

Laboratory investigations

It is important to obtain a urine sample for nucleic acid testing for *C. trachomatis* and *N. gonorrhoeae,* and to screen for other STIs (including syphilis and HIV) as well as pregnancy. Other tests may include:[5]

- A wet preparation. This involves a drop of vaginal secretion mixed with a drop of normal saline and examined with 400 x magnification. The presence of many polymorphs supports a diagnosis of cervical infection and raises the question of upper tract infection.
- An endocervical swab for Gram staining (Figure 3). This is used for detecting gonococci and other bacteria.
- An endocervical swab for culturing gonococci, aerobes and *Mycoplasma* spp. This is sent to the laboratory at room temperature in Amies or charcoal-containing Stuart's transport media.

Common sexually acquired causes of PID

Chlamydial infection

In 1999, the Australian incidence of *C. trachomatis* infection was 74.1 per 100,000 population; by 2001, this had increased to 103.9 per 100,000.[3] The World Health Organization estimates that 92 million new cases occur each year worldwide.

Chlamydial infection is asymptomatic in 70% of women and 33% of men. Symptoms that occur in men are usually mild. If one partner in a couple is infected with *C. trachomatis* then the probability that the other partner is also infected is between 40 and 60%. The risk of maternal–fetal transmission is estimated to be 50%.

Epidemiological studies have confirmed the association between chlamydial infection and PID and shown that treatment of asymptomatic infection reduces the risk of clinically symptomatic PID.[4] Resolution of untreated but diagnosed chlamydial infection has been reported in between 22 and 28% of women and, if it occurs, is usually within 10 to 45 days. Spontaneous resolution appears to be least likely in younger women, in whom the prevalence is highest, but the reason for this is not clear.

Several epidemiological studies have suggested that chlamydial infection is an independent risk factor for the development of cervical cancer. However, this association requires further scrutiny.

Gonorrhoea

In 1999, the Australian incidence of gonorrhoea was 29.8 per 100,000 population; by 2001, this had increasing to 32.9 per 100,000.[3] Associated chlamydial infection may occur in 20% of men and 40% of women with gonococcal infection.

Gonorrhoeal infections are asymptomatic in 80% of infected females and 88% of infected males. Symptoms in women include a vaginal discharge due to a mucopurulent cervicitis, lower abdominal pain, dysuria and dyspareunia. Symptoms in men include urethritis with a purulent urethral discharge and dysuria, epididymitis and rarely balanitis. Proctitis and pharyngitis may occur following anal or oral sex.

- An endocervical – not vaginal – swab to test for *C. trachomatis*. Adequate sampling of endocervical cells is required. Each test has its own specific requirements – contact your local pathologist for further information and advice.

Imaging

The diagnostic gold standard is laparoscopy, which shows infected and inflamed fallopian tubes in PID. The procedure allows swabs to be taken from the fimbrial ends, and will also reveal pyosalpinges, tubo-ovarian abscess and pelvic adhesions.

Pelvic ultrasound is not used in the routine diagnosis of uncomplicated PID. However, it is a valuable adjunct in the diagnosis of tubo-ovarian abscess and assists in differentiating between other causes of pelvic masses.

Table 1. Possible clinical features of PID

Symptoms

- Lower abdominal pain
- Pain on micturition or defaecation
- Abnormal vaginal discharge or bleeding
- Dyspareunia
- Tenderness or dull ache in the abdomen
- Fevers and rigors
- Nausea and vomiting

Signs

- An ill appearance
- Pain at the time of the presentation
- Fever and tachycardia
- Abdominal distension
- Abdominal tenderness due to peritonitis
- Ileus
- Vaginal discharge or bleeding
- Pain on rocking the cervix
- Tenderness in the lateral fornices
- Unilateral or bilateral masses in the fornices

Differential diagnoses

The differential diagnoses for PID include the following:

- endometriosis
- a urinary tract infection
- a complication of pregnancy, such as ectopic location (Figure 4) or abortion
- irritable bowel syndrome
- appendicitis
- ovarian pathology
- inflammatory bowel disease.

In older patients, the possibility of malignant tumours, complications of uterine fibroids and diverticular disease must also be considered.

Treatment

For treatment purposes, acute PID can be divided into two types – either sexually acquired or non-sexually acquired. Options are described in detail in the box on page 38.

If a woman is treated for PID and her symptoms and signs do not resolve then the diagnosis should be reconsidered.

Consequences

The short and long term consequences of PID are listed in Table 2. About 18% of women who have had a single episode of PID will have chronic pelvic pain. Tubal occlusion with infertility occurs at an increasing rate with each episode – the risk of tubal obstruction is 10 to 15% after one episode, 30 to 35% after two, and up to 75% after three. Rates of ectopic pregnancy are increased seven- to 10-fold in women who have had PID.

Prevention

The only strategy that has been documented in a randomised controlled trial to prevent PID is selective testing for chlamydial infection in primary care.[4] Use of safe sexual practices is a currently unproven but plausible way of reducing

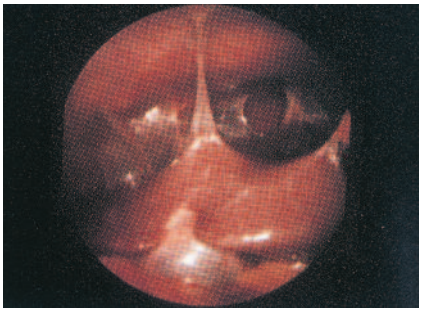

Figure 2. Perihepatitis. Note the multiple bands of adhesions between the liver and diaphragm.

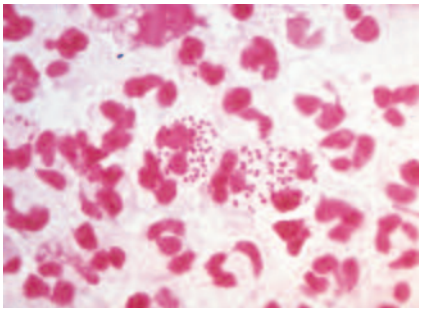

Figure 3. *Neisseria gonorrhoeae*. Note the presence of intracellular Gram-negative diplococci.

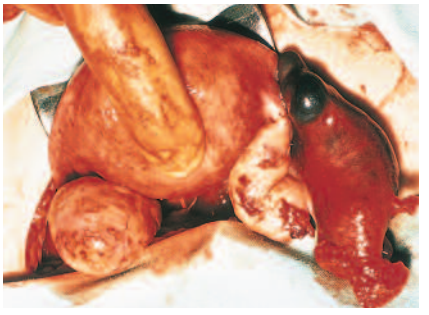

Figure 4. Ectopic pregnancy. Note the swelling in the fallopian tube on the right.

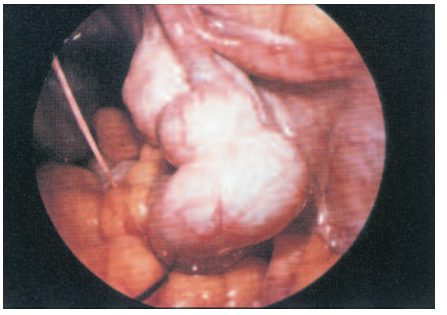

Figure 5. Hydrosalpinx, a possible long term consequence of PID.

continued

Recommended treatment options for women with PID

These recommendations are from the *National Management Guidelines for Sexually Transmissible Infections* by the Venereology Society of Victoria in conjunction with the Australasian College of Sexual Health Physicians.[5] I strongly recommend this booklet to all medical practitioners.

Acute PID in young sexually active women with no predisposing factors

Outpatient treatment of mild to moderate STI-related PID

Treat immediately with:

- oral azithromycin (Zithromax), 1 g
- if gonorrhoea is suspected or proven, add a single dose of either intramuscular ceftriaxone (Rocephin), 250 mg, or oral ciprofloxacin, 500 mg

followed by (for all patients):

- oral doxycycline, 100 mg twice daily for 14 days, plus oral metronidazole, 400 mg twice daily for 14 days.

Inpatient treatment for severe STI-related PID

Commence treatment with intravenous:

- cefotaxime (Claforan), 1 g eight-hourly, or
- cefoxitin (Mefoxin), 2 g six-hourly, or
- ceftriaxone, 1 g daily

together with:

- intravenous metronidazole, 500 mg eight-hourly, plus
- oral doxycycline, 100 mg 12-hourly, or oral roxithromycin (Biaxsig, Rulide), 150 mg twice daily or 300 mg once daily.

Continue until the patient is afebrile and improved, then treat with:

- oral doxycycline, 100 mg twice daily for two to four weeks, or
- oral roxithromycin, 150 mg twice daily or 300 mg once daily for 2 to 4 weeks.

Patients who develop PID after a recent pregnancy, abortion or gynaecological procedure, and those with a prior history of PID or IUD insertion or removal

Outpatient treatment of mild to moderate procedure-related PID

Treat with:

- oral doxycycline, 100 mg twice daily for two to four weeks, or
- oral amoxycillin, 500 mg three times daily, plus metronidazole, 400 mg three times daily, for two to four weeks.

Inpatient treatment of severe procedure-related PID

Treat with:

- intravenous clindamycin, 600 mg six-hourly, plus intravenous gentamicin, 1.5 mg/kg, eight-hourly, until the patient is afebrile; then, oral clindamycin (Cleocin, Dalacin C), 150 to 300 mg four-times daily for 2 weeks, or
- either intravenous cefotetan (Apatef), 2 g 12-hourly, or intravenous ceftroxitin, 2 g six-hourly plus oral doxycycline, 100 mg twice daily, until the patient is afebrile; then, oral doxycycline, 100 mg twice daily, for two weeks.

Inpatient treatment for severe septicaemic procedure-related PID

Treat with:

- intravenous amoxycillin, 2 g four-hourly, plus intravenous gentamicin, 1.5 mg/kg eight-hourly, plus intravenous metronidazole, 500 mg eight-hourly, until the patient is afebrile, then
- oral doxycycline, 100 mg twice daily, for two weeks.

risk – measures include using condoms, limiting sex to one uninfected partner, and avoiding sexual contact with anyone who may be infected.[4] In addition, avoiding coitus soon after childbirth, abortion or instrumentation of the uterus should reduce risk.

Table 2. Consequences of PID

Short term

- Pyosalpinx
- Tubo-ovarian abscess
- Pelvic peritonitis
- Perihepatitis
- Colitis

Long term

- Infertility
- Chronic pelvic pain
- Increased risk of ectopic pregnancy
- Chronic infection
- Hydrosalpinx (Figure 5)

Final comments

A high index of suspicion for the possibility of the presence of a STI is very important if the problems associated with PID are to be reduced. Presentations vary according to the cause and severity of the disease, and all features may be absent or mild in the early stages. MT

References

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DECLARATION OF INTEREST: None.