Manual for Obstetrics & Gynecology Practitioners

Written by National experts in the field of Obstetrics and Gynecology the book serves as a ready reckoner for practitioners on the clinical situations that are most likely to be encountered. A manual which gives precise and evidence-based algorithms, standard investigations and treatment protocols for quick decision making in common situations and would also act as a guide to what should be done when things do not go well.

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EMPOWER WOMEN : EMPOWER INDIA
PLEDGE FOR EXCELLENCE
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FEDERATION OF OBSTETRIC & GYNAECOLOGICAL SOCIETIES OF INDIA
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for
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Dedication to

To the unnamed women who come to us with the expectation of care, and hope of cure!!

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Contents

Tumors that can cause hypogonadotropic hypogonadism include the following:

- Unclassified pituitary adenoma
- Craniopharyngioma
- Unclassified malignant tumor

Eugonadism may result from anatomic abnormalities or intersex disorders. Anatomic abnormalities include congenital absence of the uterus and vagina (CAUV) and cervical atresia. Intersex disorders include androgen insensitivity, 17-ketoreductase deficiency, and inappropriate feedback.

MANAGEMENT

Treatment of amenorrhea depends on the cause and need for fertility. Operative intervention for some Müllerian obstruction gives excellent result like vaginal septum, imperforate hymen. Hysteroscopic adhesiolysis for Asherman's syndrome is the choice of treatment and conception rate varies from 33–58% depending on the severity.

Removal of tumors of pituitary and brain tumors in selected cases and treating prolactinomas with dopamine agonists like bromocriptine and cabergoline give very encouraging results.

Psychological counseling for feeding disorders and normalization of body weights in anorexia Nervosa and bulimia cases is the treatment of choice.

Correction of thyroid disorders restores normal menstruation. For chronic anovulation, COC or progesterone is used if patient does not need conception. For premature ovarian failure cases, COC is given. Hypogonadotropic hypogonadism is treated with gonadotropins like FSH and LH or pulsatile GnRh analogue.

Successful management of amenorrhea depends upon correct diagnosis and assessment of the needs. Each woman will have different priority starting from fertility issues, hirsutism, delayed secondary sexual development, risk of osteoporosis and endometrial protection from unopposed estrogenic action and treatment must focus on these issues for the best possible care of this very common problem of reproductive period.

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5 Pelvic Infection

Manpreet Kaur J Tehalia, Vidya A Thobbi

INTRODUCTION

Pelvic inflammatory disease (PID) is one of the most serious infections in woman. Untreated or inadequately treated, it may lead to life-threatening consequences. Reproductive tract infections (RTIs), including sexually transmitted infections (STIs), present a huge burden of disease and adversely impacts the reproductive health.[1]

DEFINITION

Pelvic inflammatory disease is a polymicrobial infection of the upper genital tract (Endometrium, Fallopian tubes, ovaries and pelvic peritoneum),[1] as a result of direct spread of pathogenic organisms from the vagina and/or the endocervix. The terms acute PID and acute salpingitis are often interchangeably used. However, PID is not limited to tubal infection only.

A more descriptive term to differentiate the severity and extent of various forms of PID was introduced by Hemsell and colleagues.[2]

Upper genital tract infection (UGTI) and lower genital tract infection (LGTI)—diagnosis, appropriate treatment, follow-up and sequelae.

INCIDENCE AND PREVALENCE

The exact incidence of PID is unknown, because the disease cannot be diagnosed reliably from clinical symptoms and signs. Direct visualization of the Fallopian tubes by laparoscopy is gold standard but is invasive, lacks sensitivity and is not used routinely in clinical practice.

PID is the most common gynecological reason for admission to hospital in the USA, accounting for 18/10,000 hospital admissions. In England and Wales, the diagnosis of PID is 1/62 (1.6%) women aged between 16–45 years. However, because most PID is asymptomatic, this figure underestimates the true prevalence. In the developing countries, PID accounts for 17–40% of gynecological admissions in sub-Saharan Africa, 15–37% in Southeast Asia and 3–10% in India.[3]

The estimates also indicate that about 40% of women have RTI/STI at any given point of time, but only 1% completes the full treatment of both partners.[4]

ETIOLOGY AND PATHOPHYSIOLOGY

The vaginal flora of a normal, reproductive aged woman includes multiple aerobic or facultative species, and obligate anaerobic species. Of these, anaerobes

predominate. Some bacteria normally found in the vaginal flora have access to the upper reproductive tract.

The female upper genital tract is not sterile, but the presence of these bacteria does not indicate active infection.[6]

PROTECTIVE MECHANISMS OF THE VAGINAL FLORA

Within this vaginal ecosystem, some microorganisms produce substances such as lactic acid and hydrogen peroxide that inhibit nonindigenous organisms. Other antibacterial compounds, termed bacteriocins, provide a similar role. They have the ability to produce proteinaceous adhesions and attach to the vaginal epithelial cells. The vaginal epithelium, in turn, produces leukocyte protease inhibitor which protects local tissues against toxic inflammatory products and infection.[7]

COMMON ORGANISMS CAUSING PID[8]

Sexually Transmitted organisms
Chlamydia trachomatis ┐
Neisseria gonorrhoeae ┘ 65–75%
Viruses and Protozoa (rare)
Herpes simplex virus
Trichomonas vaginalis

Endogenous organisms
Genital tract Mycoplasma
Mycoplasma genitalium
Mycoplasma hominis
Ureaplasma urealyticum

Anaerobic bacteria
Bacteroides spp.
Peptostreptococcus spp.
Prevotella spp.

Facultative (aerobic) bacteria
Escherichia coli
Gardnerella vaginalis
Haemophilus influenzae
Streptococcus spp.

Mixed anaerobic and facultative bacteria (similar to BV-associated organisms) 25–35%.

PATHOLOGY

Figure 1 represents the pathology of infection.

- Bacteria enters the vagina
- Bacteria pass through cervix and uterus
- Bacteria then enters Fallopian tubes and ovaries which become infected
- Infection can leave Fallopian tube and spread to other parts of the body.

Microorganisms originating in the endocervix ascend into the endometrium, Fallopian tubes and peritoneum causing pelvic inflammatory disease (endometritis, salpingitis, peritonitis) (Flow chart 1).

CLINICAL FEATURES[9]

- *Minimum criteria*
  - Lower abdominal tenderness
  - Adnexal tenderness
  - Cervical motion tenderness

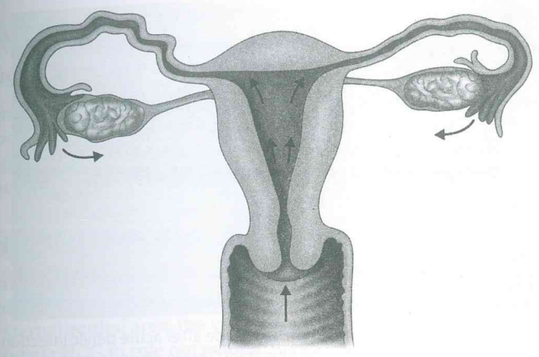
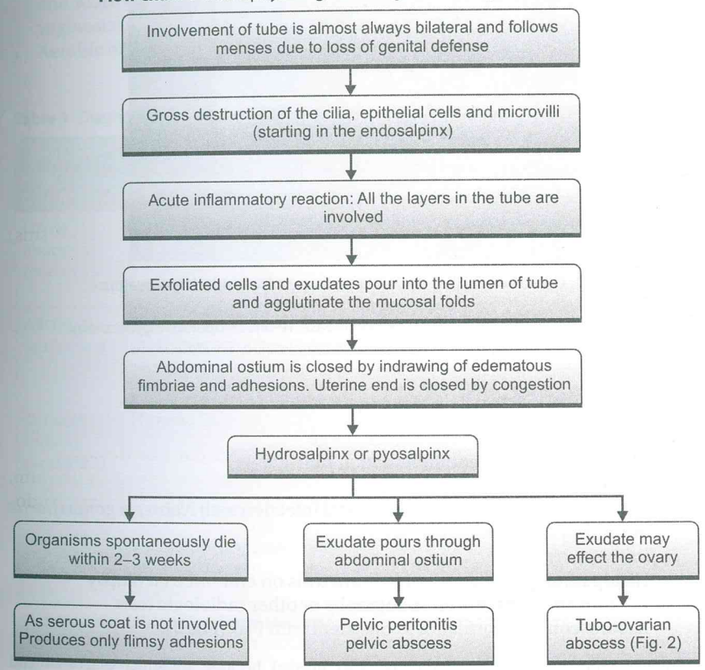


Fig. 1 Ascent and spread of infection
(*Source:* Soper DE. Upper genital tract infections. In: Copeland LJ (Ed). Textbook of Gynecology. Philadelphia, PA: Saunders. 1993. pp.521)

Flow chart 1 Pathophysiological changes in acute pelvic infection



(*Source:* Amso NN, Griffiths A. Pelvic Inflammatory Disease. Shaw, Luesley and Monga. Gynaecology: Churchill Livingstone, Elsevier: 2011. 4th ed)

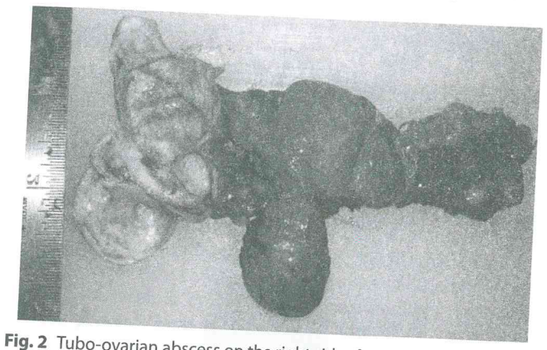


Fig. 2 Tubo-ovarian abscess on the right side after acute pelvic infection (*Source:* Amso NN, Griffiths A. Pelvic Inflammatory Disease. Shaw, Luesley and Monga. Gynaecology: Churchill Livingstone, Elsevier: 2011. 4th ed) *(For color version, See Plate 1)*

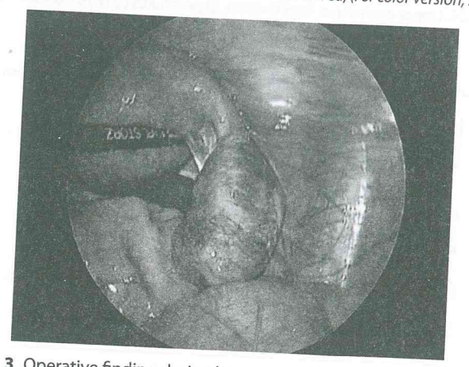


Fig. 3 Operative finding during laproscopy of left-sided hydrosalpinx following pelvic infection (*Source:* Martens M. Pelvic inflammatory disease. Te-linde's operative gynecology. 10th ed. 2011. pp.660-86.) *(For color version, See Plate 1)*

- *Additional criteria*[a]
  - Oral temperature >38.3°C (101°F)
  - Abnormal cervical or vaginal discharge
  - Elevated erythrocyte sedimentation rate
  - Elevated C-reactive protein
  - Laboratory documentation of cervical infection with *Neisseria gonorrhoeae* or *Chlamydia trachomatis*
- *Definitive criteria*[b]
  - Histopathologic evidence of endometritis on endometrial biopsy
  - Tubo-ovarian abscess on sonography or other radiologic tests
  - Laparoscopic abnormalities consistent with PID (Fig. 3).

[a]More elaborate diagnostic evaluation is often needed because incorrect diagnosis and management might cause unnecessary morbidity. These additional criteria may be used to increase the specificity of the diagnosis of the minimum criteria listed previously
[b]The definitive criteria for diagnosing PID are warranted in selected cases

COMPLICATIONS

Fitz-Hugh–Curtis Syndrome

This comprises right upper quadrant pain associated with perihepatitis which occurs in PID. Although laparoscopic division of hepatic adhesions has been performed, there is insufficient clinical evidence to make specific recommendations for treatment beyond those for uncomplicated PID.[11]

DIAGNOSIS (TABLE 1)

- A complete abdominal and pelvic examination should be performed in any patient with lower abdominal pain.
- The external genital area, the vagina and the cervix should be inspected.
- Serum beta HCG to rule out ectopic pregnancy.
- Endocervical swabs should be obtained for *Niesseria gonorrhoeae* and *Chlamydia trachomatis.*
- Cervical erosions should be sampled for herpes simplex virus, if suspected.
- Vaginal smears for culture, pH testing, amine odor whiff testing, normal saline and KOH wet preparations and Gram stain. Clinical assessment for bacterial vaginosis includes three of four Amsel's criteria (clue cells on microscopy).
- Aerobic or anaerobic culture.

Table 1 Diagnostic criteria for PID[10]

Minimum diagnostic criteria	*Additional diagnostic criteria*	*Definitive diagnostic criteria*
Lower abdominal tenderness	Oral Temperature >38.3° C(101° F)	Endometrial biopsy with histopathologic Evidence of endometritis (at least 1 plasma cell x 120 field and at least 5 neutrophils per x 400 field)
Adenexal tenderness	Presence of >3 WBCs/HPF on saline microscopy of vaginal secretions/wet mount	Transvaginal sonography or other imaging Techniques showing thickened fluid filled tubes, with or without free fluid or tubo-ovarian complex
Cervical motion tenderness	Elevated ESR	Gold standard: Laparoscopy demonstrating abnormalities consistent with PID, such as Fallopian tube erythema and /or mucopurulent exudates
	Elevated CRP	
	Laboratory documentation of cervical infection with NG/CT	

Abbreviations: PID, pelvic inflammatory disease; WBCs, white blood cells; HPF, high power field; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein; NG/CT, *Neisseria gonorrhoeae/ Chlamydia trachomatis*

(*Source:* Canadian Guidelines on Sexually Transmitted Infections; 2007)

- Detection of Gram-negative intracellular diplococcic on a stained smear of endocervical secretions, positive results of a diagnostic test for *N. gonorrhoeae* or *Chlamydia trachomatis*, or both.
- Detection of *N. gonorrhoeae* and *C. trachomatis* may be enhanced by nucleic acid amplification test (NAAT).
- Complete blood count, ESR, CRP and endometrial biopsy.

Negative laboratory results do not rule out a diagnosis of PID.
A normal ultrasound study does not rule out a diagnosis of PID.
Ultrasound may aid in the diagnosis if tubo-ovarian abscess is suspected.

DIFFERENTIAL DIAGNOSIS[12]

Ectopic pregnancy: Pregnancy should be excluded in all women suspected of having PID.

Acute appendicitis: Nausea and vomiting occurs in most patients with appendicitis but only in 50% of those with PID.

Endometriosis: The relationship between symptoms and the menstrual cycle may help in the diagnosis.

Torsion or rupture of ovarian cyst.

Urinary tract infection: Often associated with dysuria and/or frequency of micturition.

The staging of acute and chronic PIDs are given in Tables 2 and 3, respectively.

Table 2 Staging of acute PID[1]

Stage	*Pathology*
I	Acute salpingitis without peritonitis
II	Acute salpingitis with peritonitis
III	Acute salpingitis with superimposed tubal occlusion or tubo-ovarian complex
IV	Ruptured tubo-ovarian abscess
V	Tubercular salpingitis

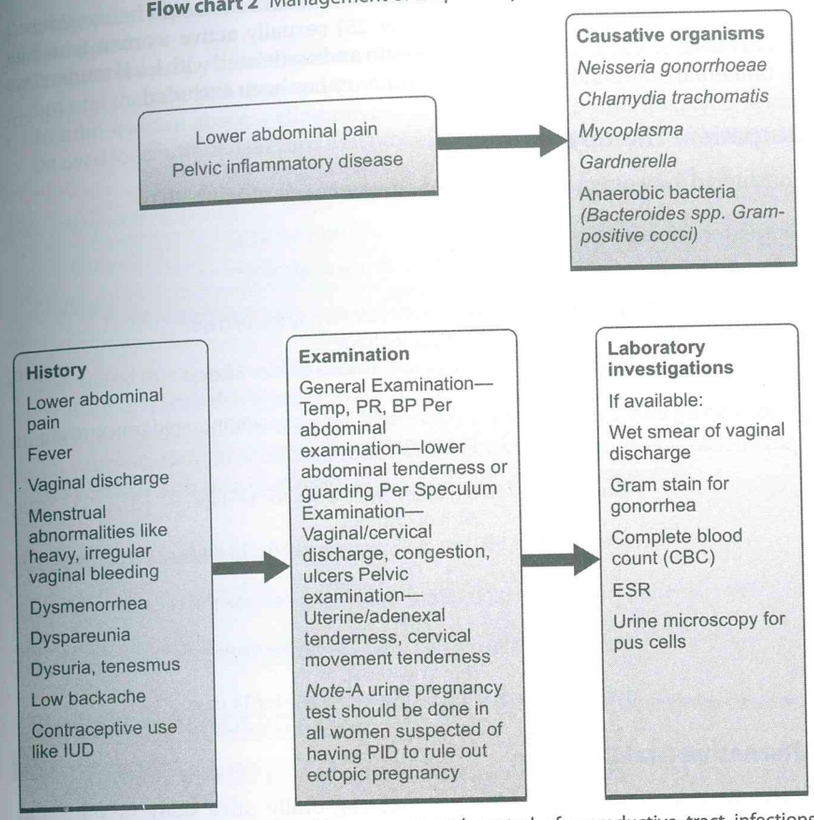
(*Source:* Padubidri VG, Daftary SN. Howkins and Bourne Shaw's Textbook of Gynaecology. New Delhi. Elsevier, 2011. pp.449)

Table 3 Staging of chronic PID[1]

Stage	*Pathology*
I	Tubo-ovarian mass without peritonitis
II	Tubo-ovarian mass with peritonitis
III	Tubo-ovarian abscess
IV	Ruptured tubo-ovarian abscess
V	Tubercular salpingitis

(*Source:* Padubidri VG, Daftary SN. Howkins and Bourne Shaw's Textbook of Gynaecology. New Delhi. Elsevier, 2011. pp.449)

Flow chart 2 Management of suspected pelvic infection



(*Source:* Guidelines on Prevention. Management and control of reproductive tract infections including sexually transmitted infections. Ministry of Health and Family Welfare and NACO. August, 2007)

MANAGEMENT (FLOW CHART 2)

Early diagnosis and treatment are crucial to the maintenance of fertility.[12]

Antibiotics can be administered orally or parenterally, and in inpatient or outpatient settings.

CRITERIA FOR OUTPATIENT TREATMENT[13]

- Can be recommended for women with mild to moderately severe acute PID because the clinical outcomes among women treated with oral therapy are similar to those treated with parenteral therapy
- Patients who do not respond to oral therapy within 72 hours should be reevaluated to confirm the diagnosis and should be administered parenteral therapy on either an outpatient or inpatient basis

A diagnosis of PID and empirical antibiotic treatment should be considered and usually offered in any young (under 25) sexually active woman who has recent onset, bilateral lower abdominal pain and associated with local tenderness on bimanual examination, in whom pregnancy has been excluded.

Outpatient Therapy[13]

Considered for women with mild-to-moderately severe acute PID.

Recommended regimen

Ceftriaxone 250 mg IM in a single dose
Plus
Doxycycline 100 mg orally twice a day for 14 days
With or without
Metronidazole 500 mg orally twice a day for 14 days
Or
Cefoxitin 2 g IM in a single dose and Probenecid, 1 g orally administered concurrently in a single dose
Plus
Doxycycline 100 mg orally twice a day for 14 days
With or Without
Metronidazole 500 mg orally twice a day for 14 days
Or
Other parenteral third generation cephalosporin (E.g. ceftizoxime or cefotaxime)
Plus
Doxycycline 100 mg orally twice a day for 14 days
With or Without
Metronidazole 500 mg orally twice a day for 14 days

Alternative Oral Regimen

- Use fluoroquinolones (levofloxacin 500 mg orally once daily or ofloxacin 400 mg orally twice daily for 14 days) with or without metronidazole (500 mg twice daily for 14 days)
- Test for gonorrhea should be performed before instituiting therapy and managed as follows if test is positive:
  - If culture for gonorrhea is positive, treatment should be based on results of antimicrobial susceptibility.
  - If isolate is determined to be quinolone resistant *N. gonorrhea*, parenteral cephalosporin therapy is recommended. If not feasible, addition of azithromycin 2 g orally as a single dose to quinolone-based PID regimen is recommended.

Parenteral Treatment[13]

Recommended parenteral regimen A

Cefotetan 2g IV every 12 hours
Or
Cefoxitin 2g IV every 6 hours
Plus
Doxycycline 100 mg orally or IV every 12 hours

- Doxycycline should be administered orally when possible because of pain associated.
- Parenteral therapy should be discontinued 24 hours after clinical improvement, but oral therapy with doxycycline should continue for 14 days.
- In tubo-ovarian abscess clindamycin or metronidazole with doxycycline can be used for continued therapy as it provides more effective anaerobic coverage.

Recommended parenteral regimen B

Clindamycin 900 mg IV every 8 hours
Plus
Gentamycin loading dose IV or IM (2 mg/kg) followed by a maintenance dose (1.5 mg/kg) every 8 hours. Single daily dosing 3–5 mg/kg can be substituted

- Parenteral therapy should be discontinued 24 hours after clinical improvement.
- Oral therapy with doxycycline 100 mg twice daily or clindamycin 450 mg orally four times a day for a total of 14 days.
- In tubo-ovarian abscess, clindamycin should be continued rather than doxycycline as it provides more effective anaerobic coverage.

Alternative Parenteral Regimen

Ampicillin/sulbactam 3 g IV every 6 hours
Plus
Doxycycline 100 mg orally or IV every 12 hours

CRITERIA FOR HOSPITALIZATION[13]

- Surgical emergencies like appendicitis cannot be ruled out
- The patient is pregnant
- The patient does not respond clinically to oral antimicrobial therapy
- The patient is unable to follow/tolerate oral regimen
- The patient has severe illness, nausea and vomiting or high fever
- The patient has a tubo-ovarian abscess
- Consider hospitalization for observed or parenteral therapy in the following cases:
  - HIV infection
  - Youth/adolescents (particularly if compliance is an issue)

SPECIAL CASES

Allergy[9]

Patients known to be allergic to one of the suggested regimens should be treated with an alternative.

Pregnancy and Lactation[12]

PID is uncommon in pregnancy, especially after the first trimester. If present, however, it is associated with an increase in both maternal and fetal morbidity; therefore, parenteral therapy is advised although none of the suggested evidence

based regimens are of proven safety in this situation. There is a large differential diagnosis of acute pain abdomen in pregnancy and consultation with an expert should be sought.

Intrauterine Contraceptive Device and PID[13]

The risk of PID associated with an IUD is confined to the first three weeks after insertion and is uncommon after that.

In patients wit an intrauterine device in situ ,the device should not be removed until after treatment has been started and at least two doses have gone (24 to 48 hours).

Adolescents

Consideration should be given to hospitalization for adolescents with suspected PID if compliance is expected to be an issue.

HIV[9]

Women with HIV may have more severe symptoms associated with PID, have longer hospital stays, are at higher risk for the development of tubo-ovarian abscesses and are more likely to require surgical intervention. They respond well to standard antibiotic treatment. To consider hospitalization for treatment.

PID during Pregnancy[13]

Inj ceftriaxone
Plus
Inj or tab erythromycin
Plus
Inj metronidazole 500 mg TID

SURGICAL MANAGEMENT[1]

Indications

- Ruptured abscess
- Failed response to medical treatment
- Uncertain diagnosis.

Type of Surgery

- Colpotomy
- Percutaneous drainage
- Exploratory laprotomy.

SEXUAL PARTNERS[13]

Gonorrhea or chlamydia detected in the male partner should be treated appropriately and concurrently with the index patient.

Broad spectrum empiric therapy should also be offered to male partners, example Azithromycin 1 g single dose.

If screening for gonorrhea is not possible, additional specific antibiotics effective against *Neisseria gonorrhoeae* should be offered, for example IM injection ceftriaxone 500 mg single dose.[9]

Partners should be advised against sexual intercourse, until they have completed the treatment.

FOLLOW-UP[13]

Review at 72 hours is recommended, especially for those with a moderate or severe clinical presentation, and should show a substantial improvement in clinical symptoms and signs.

Follow-up for Moderate/Severe PID At 72 hours

Repeat bimanual examination to assess resolution of signs and refer if not improved.

To ask:
- Unprotected intercourse?
- Tolerated medication?
- Notifiable contacts informed?
- Any risk of reinfection? Will need further treatment if re-exposed to untreated contact.

Follow-up for Mild PID: 1–2 week

- Reinfection is common; offer repeat STI check in 3–6 months
- Further review at 2–4 weeks after therapy may be useful to ensure:
  - Adequate clinical response to treatment
  - Compliance with oral antibiotics
- Screening and treatment of sexual partners
- Creating awareness of the significance and sequelae of PID
- To repeat pregnancy test, if indicated clinically
- Repeat testing for gonorrhea and Chlamydia at 2–4 weeks is appropriate for those in whom persisting symptoms.
- If no improvement within 72 hours after outpatient oral or parenteral therapy, further assessment of the antibiotic regimen and diagnostics including the consideration of diagnostic laparoscopy for alternative therapy.

POSTEXPOSURE PROPHYLAXIS OF STI[4]

For protection against syphilis, gonorrhoea and chlamydia:
Tab azithromycin 1 g orally single dose under supervision
Plus
Tab cefixime 400 mg orally single dose

Protection against trichomonas vaginalis:
Tab metronidazole 2 g orally single dose
Or
Tab tinidazole 2 g orally single dose

FAQs

Have you recently developed any of these symptoms:

STI (Genital infections) Checklist

For Men

- Discharge or pus (drip) from penis
- Urinary burning or frequency
- Genital sores (ulcers) or rash or itching
- Scrotal swelling
- Swelling in groin
- Infertility.

For Women

- Abnormal vaginal discharge(increased amount, abnormal odor, abnormal color)
- Genital sores, rash or itching
- Urinary burning or frequency
- Dysmenorrhea, menorrhagia, irregular menstrual cycles
- Pain in lower abdomen
- Infertility.

High Risk Sexual Behavior

- For all adolescents: Have you begun having any kind of sexual activity yet?
- If sexually active, do you use condom consistently?
- Do you have any reason to think that you may have a sexually transmitted disease. If so, what reason?
- Have you had sex with any man, woman, gay or a bisexual?
- Have you or your partner had sex with more than one partner?
- Has your partner(s) had any genital infections? If so, which ones?
- Do you indulge in high-risk sexual behavior like anal sex?
- Do you practice correct and consistent condom usage while having sex. If yes, whether everytime or sometimes?
- Sex workers: Frequency of partner change: Use of condoms with regular partners and also with clients.

STI History

In the past have you ever had any genital infections, which could have been sexually transmitted? If so, can you describe it.

STI Treatment History

- Have you been treated in the past for any genital symptoms? By whom (qualified or unqualified)?
- Did your partner receive treatment for the same at that time?

- Has your partner been treated in the past for any genital symptoms? By whom (qualified or unqualified)?
(Menstrual and obstetric history in women and contraceptive history in both should be asked).

SYNDROMIC APPROACH BY WHO[14]

The syndromic approach by World Health Organization has been given in Table 4.

Table 4 Vaginal discharge (syndromic approach by WHO)

Characteristics	*Trichomoniasis*	*Candidiasis*	*Bacterial vaginosis*	*Chlamydia*	*Normal vaginal discharge*
Color	Greenish yellow	Curdy white	Grey white to green	Mucopurulent	White
Consistency	Thin, frothy	Thick	Thin	Thick	Thin
Whiff test	Negative	Negative	Positive	Negative	Negative
pH	>5	<4.5	>5	<4.5	<4.5
Pruritis	+++	++	Nonirritating	-	-
Diagnosis (wet mount)	Motile *Trichomonas*	Hyphae or spores	Clue cells >20%	Chlamydia NAAT	-
Treatment	Metronidazole 2 g single dose or 200 mg TID for 7 days	Fluconazole 150 mg orally weekly for 6 weeks	Metronidazole 200 mg TID for 7 days	Azithromycin 1 g orally single dose	-

(*Source*: Available from: apps.who.int/medicinedocs/en/d.../2.4.ht)

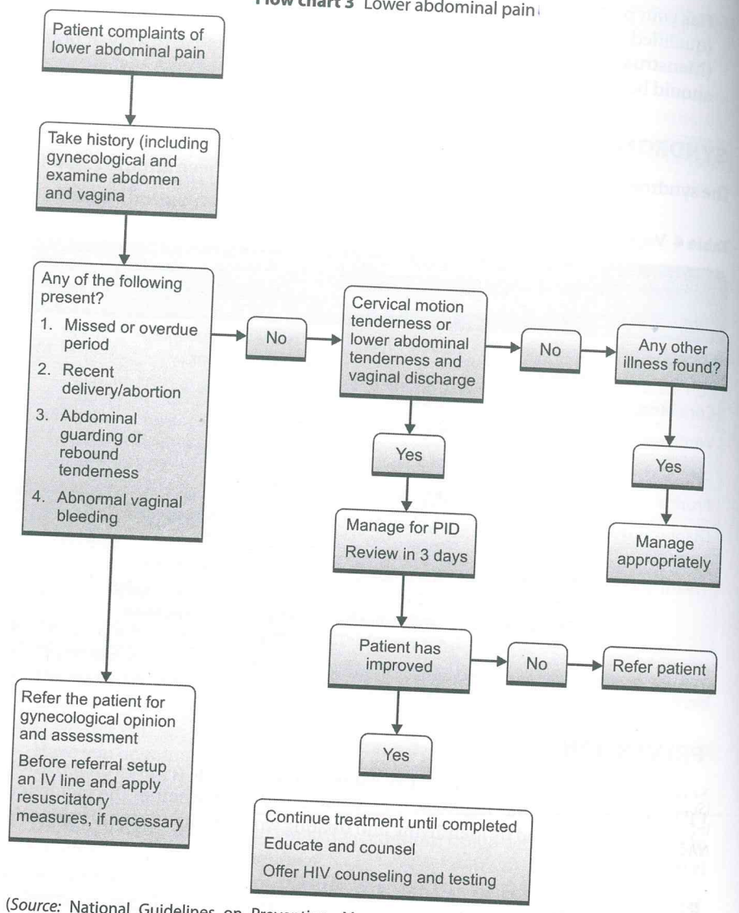
PREVENTION

Screening and treating sexually active women for Chlamydia reduces their risk for PID. Although bacterial vaginosis is associated with PID, whether the incidence of PID can be reduced by identifying and treating women with bacterial vaginosis is unclear.

CONCLUSION

Delaying treatment for PID increases the risk of long-term sequelae such as ectopic pregnancy, infertility and pelvic pain. Moreover, the clinical symptoms and signs of acute PID vary considerably and are usually nonspecific. Over that, many patients may have very little symptomatology, a condition called silent or asymptomatic pelvic inflammatory disease. These women may have tubal infertility without prior history of symptoms or signs consistent with acute infection. Because of this and because of lack of definitive diagnostic criteria, a low threshold for empiric treatment with broad-spectrum antibiotics to cover *Neisseria gonorrhoeae, Chlamydia trachomatis* and a host of aerobic

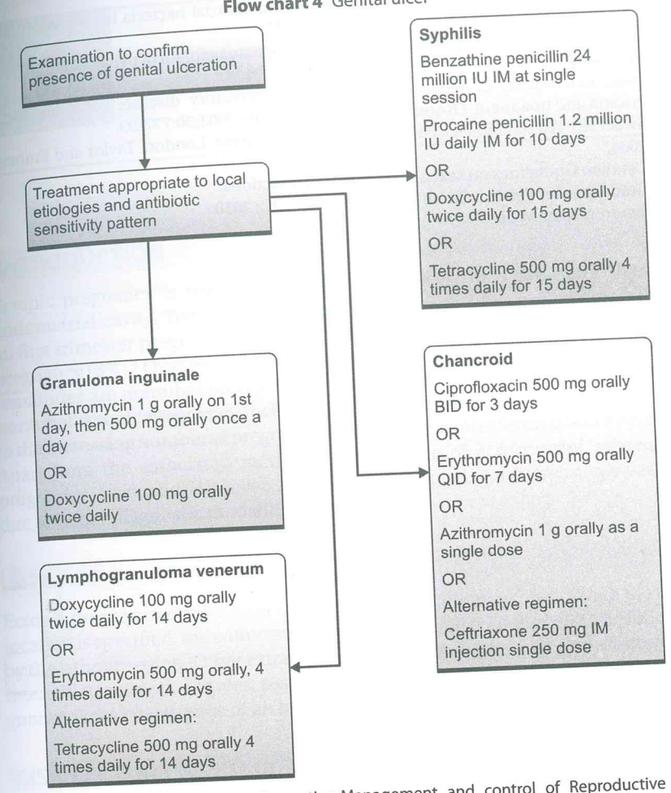
Flow chart 3 Lower abdominal pain



(*Source:* National Guidelines on Prevention, Management and control of Reproductive Tract Infections Including Sexually Transmitted Infections. Ministry of Health and Family Welfare and NACO. August 2007)

and anaerobic bacteria, should be initiated. Some of the best evidence for the effectiveness of antibiotic therapy in preventing the long-term complications of PID comes from the Pelvic Inflammatory Disease Evaluation and Clinical Health Study, 2002 (PEACH study) where women were treated with Cefoxitin followed by doxycycline-pregnancy rates after three years were similar to or higher than those in the general population.

Flow chart 4 Genital ulcer



(*Source:* National Guidelines on Prevention,Management and control of Reproductive Tract Infections Including Sexually Transmitted Infections. Ministry of Health and Family Welfare and NACO. August 2007)

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