Solved Papers
Obstetrics & Gynecology
for PG Students

A must for MS MD DNB OBG

Past 10 years Exam Questions and Answers Across Various Universities

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CHAPTER 19

Pelvic Inflammatory Disease and Infections

Preeti F Lewis, Swati Thatharia

LONG ANSWER QUESTIONS

Q1. Discuss etiology of pelvic inflammatory disease. How will you manage a case of acute PID in young women in your practice? *(Repeated many times—MUHS) (25 marks)*

Ans. *Definition:*

Pelvic inflammatory disease is a clinical syndrome characterized by infection and inflammation of upper genital tract.

Ascending spread of microorganisms occurs from the vagina or cervix to endometrium, fallopian tubes, ovary and pelvic peritoneum.

Inflammation of the various areas of the genital tract are as follows:

- *Endometrium:* Endometritis
- *Fallopian tube:* Salpingitis
- *Ovary:* Oophoritis
- *Parametrium:* Parametritis

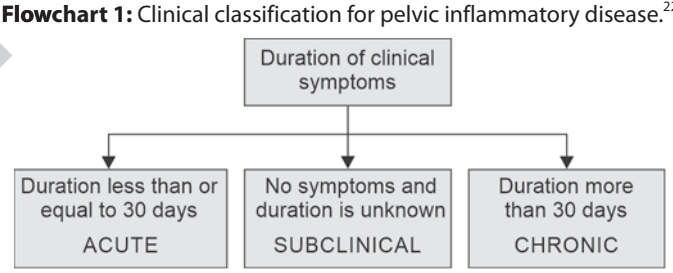
Incidence

- *Around world:* 1 % in age group of 15 to 25 years of age group around world.[1]
- *In India:* 24 to 32 %.[2]

Microbiology of PID

The organisms associated with PID vary according to the **clinical presentation/duration of disease**.

Flowchart 1: Clinical classification for pelvic inflammatory disease.[22]



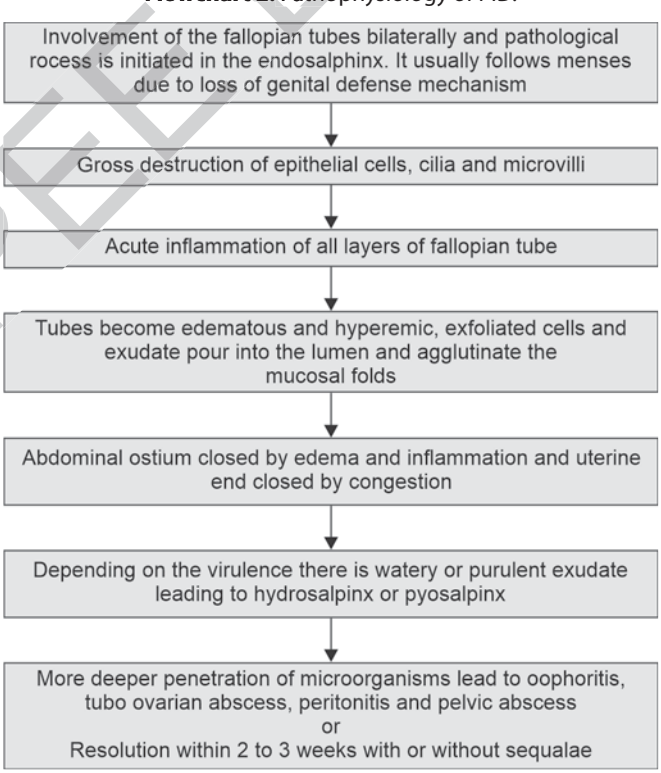
Most cases of acute PID are **polymicrobial**, but in many cases no pathogen is identified.

Most common pathogens identified with Acute PID: *Neisseria gonorrhea* and *Chlamydia trachomatis*. *Chlamydia Trachomatis* is responsible for 35% of cases of PID in UK.[3]

TABLE 1: Microorganisms in PID.[4,5]

Clinical syndrome	*Causes*
Acute pelvic inflammatory disease	**Cervical pathogens:** • *Neisseria gonorrhoeae* • *Chlamydia trachomatis* • *Mycoplasma genitalium* **Bacterial vaginosis pathogens:** • *Peptostreptococcus* • *Bacteroides* • *Atopobium* • *Leptotrichia* • *M. hominis* • *Ureaplasma urealyticum* • *Clostridia* species **Respiratory pathogens:** • *Haemophilus influenzae* • *Streptococcus pneumoniae* • *Group A streptococcus* • *Staphylococcus* **Enteric pathogens:** • *Escherichia coli* • *Bacteroides fragilis* • *Group B streptococci* • *Campylobacter*
Subclinical pelvic inflammatory disease	***C. trachomatis, N. gonorrhoeae***
Chronic pelvic inflammatory disease	***Mycobacterium tuberculosis, Actinomyces species***

Flowchart 2: Pathophysiology of PID.



Risk factors for PID:

- Multiple sexual partners
- Age less than 25 years
- Recent new partners
- Male partners with gonorrhea or chlamydia
- Septic abortions, puerperal sepsis
- Non-use of condom
- Recurrent/repeated douching
- Forgotten tampon use
- Bacterial vaginosis
- History of PID, the damage that occurs to the fallopian tube mucosa during an episode of PID makes women more susceptible to recurrent infection.
- Recent insertion of IUCD: The insertion of an IUD has been shown to increase the risk of PID by 6-fold in the first 21 days of placement, but after 21 days the risk returns to baseline.[6] FSRH guideline says that the overall risk is less than 1 %, but is increased in the first 3 weeks after insertion.[3]
- IUCD use can lead to tubo-ovarian actinomycosis which presents with chronic suppurative condition with formation of multiple abscesses, granulation tissue and fibrosis. On imaging it has predominantly solid appearance.

Clinical features:

Symptoms:

- Lower abdominal pain
- Deep dyspareunia
- Abnormal vaginal bleeding: postcoital, intermenstrual bleeding, menorrhagia
- Secondary dysmenorrhea
- Abnormal vaginal or cervical discharge often purulent

Systemic symptoms:

- Fever
- Chills
- Nausea
- Vomiting

Signs:

- Lower abdominal tenderness, usually bilateral
- Adnexal tenderness
- Cervical motion tenderness
- Uterine tenderness
- Fever >38

Differential diagnosis of acute PID

- Appendicitis present with nausea and vomiting
- Ectopic pregnancy , urine pregnancy test is positive.
- Endometritis
- Endometriosis causes cyclical pain
- Ovarian cyst, rupture or torsion presents with sudden onset pain
- Nephrolithiasis
- Urinary tract infection
- Adenomyosis

Diagnostic criteria for acute PID.

BOX 1: CDC 2015 criteria for diagnosis of PID.

Minimal criteria:
- Lower abdominal tenderness
- Adnexal tenderness
- Cervical motion tenderness

Additional criteria:
- Oral temperature more than 101 F/38.5 C
- Abdominal cervical or vaginal discharge
- Elevated ESR
- Elevated CRP
- Lab documentation of cervical infection with *Nisseria gonorrhoea*e or *Chlamydia trachomatis*

Specific criteria:
- Endometrial biopsy with histopathologic
- Evidence of endometritis transvaginal ultrasound or magnetic resonance imaging showing thickened, fluid filled tubes with or without free pelvic fluid or tubo-ovarian complex
- Doppler studies suggesting pelvic infection
- Laparoscopic findings consistent with PID

Stages of PID:

According to IDSOG (Infectious Diseases Society for Obstetrics and Gynecology):[7]

- **Stage 1:** women who fulfil the CDC diagnostic criteria but who do not have overt peritonitis and which do not have prior documented STD upper tract infections.
- **Stage 2:** Above criteria + peritonitis.
- **Stage 3:** Women with demonstrable tubo-ovarian complex or tubo-ovarian abscess evident on physical or ultrasonographic examination.
- **Stage 4:** Women with ruptured tubo-ovarian abscesses.

TABLE 2: Laparoscopic criteria for PID.[8]

	Clinical criteria	***On laparoscopy***
Mild PID	Uncomplicated Limited to **tubes and or ovaries with or without peritonitis**	The tube is hyperemic mobile but with **no** purulent exudates
Moderate PID	Complicated PID with inflammatory mass or **abscess** involving tubes and or ovaries	Tube is edematous, shows **gross purulent** material and the **fimbriae may be adherent** with tubal blockage
Severe PID	Infection may spread to structures **beyond** the pelvis, or **ruptured** tubo-ovarian abscess	Pyosalpinx, inflammatory tubo ovarian **complex mass** or abscess

Complications of PID

- *Fitz–Hugh–Curtis syndrome* presents with right upper quadrant pain and peri- hepatitis. It is generally secondary to *Chlamydia trachomatis* PID. There is no specific treatment for it.
- *Tubo ovarian abscess* presents with severe pelvic pain and patient may be systemically unwell. A mass is palpable on examination. Imaging studies like USG, CT scan or MRI may be done. Parenteral antibiotics and anaerobic cover is required.
- *PID may present with intrauterine device in situ*. In mild to moderate cases leave in situ and review in 48 – 72 hours. IUCD has to be removed if no response. Emergency contraception may be offered in case of removal.[9]
- Long term complications include *ectopic pregnancy, infertility and chronic pelvic pain.*

Investigations:

- **Raised CBC**
- **Raised CRP**
- **Vaginal smear:** Abundant WBC on vaginal smears. *Absence of endocervical or vaginal pus cells is a good negative predictive value (95%) but presence has a low positive predictive value (17%)*
- **Vaginal secretions:** Culture in Blood agar and Mc Conkey's agar at 37°C for 24 hours. Blood culture plays no role in diagnosis of PID
- **DNA probes:** Gonorrhea and chlamydia probes (recovery rates of 5–56%) have a high specificity of 100% on diagnosis
- **Nucleic Acid Amplification Test (NAAT)** positive supports diagnosis, however negative NAAT does not exclude the diagnosis. Performed 3–6 months after Rx to rule out reinfection
- **PCR**
- **Chlamydia Antibodies:** IgG and IgM
- Test for other infections: **Syphilis, HIV and UTI**
- Urine pregnancy test to always rule out pregnancy.

However, there is no gold standard test for diagnosis of PID.[9] Hence a pragmatic approach is taken.

Radiological investigations:

USG: Predictor: **Thickened >5 mm fluid filled tubes, indistinct borders, moderate to large amount of fluid filled in pouch of Douglas**, multiple cysts in ovaries.

USG is helpful mainly for **abscess and hydrosalpinx**.[9]

Cogwheel appearance of tubes on cross section seen in Tubo-ovarian abscess.

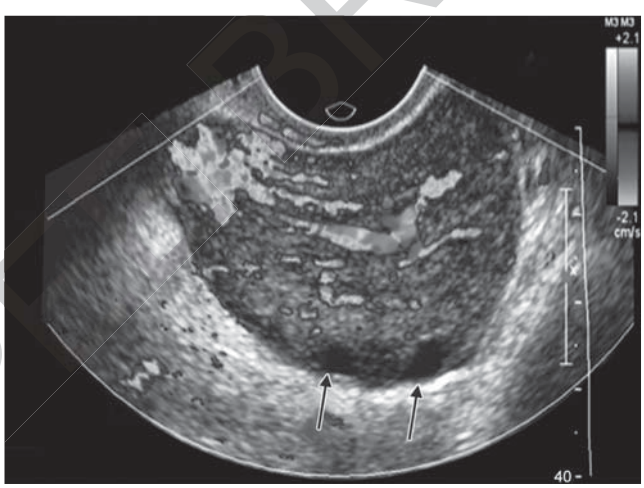


Fig. 1: Increased vascularity and hydrosalpinx.

CT scan: Not better than USG for findings of Pelvic inflammatory disease. May be helpful to rule out *bowel involvement* and specific features of *TO abscess* can be identified.

Endoscopy and Laparoscopy: Not first line of investigations.

- Done when there is **no relief** of symptoms post outpatient management
- Done when imaging is not conclusive of **diagnosis**.

Advantage of laparoscopy and endoscopy:

- *Sample obtained for histopathology and culture*
- *Direct visualization* of complications such as tubo-ovarian abscess and Fitz-Hugh-Curtis syndrome.
- *Management of the above* said complications.

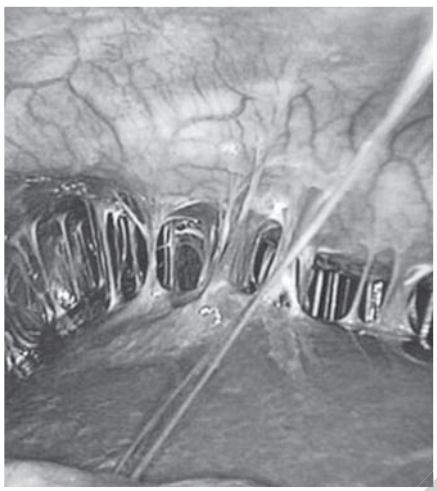


Fig 2: Violin string appearance in Fitz-Hugh-Curtis syndrome. *(For color version, see Plate 5)*

Management of PID:

Aims of management of PID

- Symptomatic relief (analgesia)
- Treatment of acute condition (infection)
- Prevention of sequelae

Admission criteria in hospital for PID:

- Inability to exclude surgical emergencies (e.g., appendicitis, ectopic pregnancy)
- **Tubo ovarian abscess**
- Pregnancy
- **Severe illness**, nausea and vomiting or temperature greater than 38.5°C or 101 F
- **Need for emergency surgery** cannot be ruled out
- Inability to follow or tolerate an outpatient oral regimen.
- **Nonresponse to oral** therapy, as defined by failure to respond clinically to outpatient antimicrobial therapy **within 48 to 72 hours**. Admit for **investigations, rest, analgesia and parenteral antibiotics or surgery. Outpatient regimens considered in mild to moderate cases**.

Patients should be advised to avoid sexual contact. They should be informed about implications for themselves and partners. The aim is to prevent recurrent infections and sequelae.

According to CDC guidelines.[10]

TABLE 3: Oral and parenteral regimen according to CDC 2021 treatment guidelines.

Risk Category	*Recommended Regimen*	*Alternatives*
Parental treatment	Ceftriaxone 1 g by IV every 24 hours + doxycycline 100 mg orally or by IV every 12 hours PLUS, metronidazole 500 mg orally or by IV every 12 hours	Ampicillin-sulbactam 3 g by IV every 6 hours PLUS doxycycline 100 mg orally or by IV every 12 hours
	Cefoxitin 2 g by IV every 12 hours PLUS Doxycycline 100 mg orally or by IV every 12 hours	OR Clindamycin 900 mg by IV every 8 hours PLUS gentamicin 2 mg/kg body weight by IV or IM, **FOLLOWED BY** 1.5 mg/kg body weight every 8 hours. Can substitute with 3–5 mg/kg body weight 1 x/day
	Cefoxitin 2 g by IV every 6 hours PLUS Doxycycline 100 mg orally or by IV every 12 hours	

Contd…

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Risk Category	Recommended Regimen	Alternatives
Intramuscular/ oral treatment	Ceftriaxone 500 mg IM in a single dose PLUS doxycycline 100 mg orally 2x/day for 14 days WITH metronidazole 500 mg orally 2x/ 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 2x/day for 14 days WITH Metronidazole 500 mg orally 2x/day for 14 days	
	OR Other parenteral third-generation cephalosporin (e.g., ceftizoxime or cefotaxime) PLUS Doxycycline 100 mg orally 2x/day for 14 days WITH metronidazole 500 mg orally 2x/day for 14 days	

Centers for Disease Control and Prevention. Pelvic Inflammatory Disease (PID) - STI Treatment Guidelines. 2021

The choice of antibiotics may vary according to local antibiotic sensitivity and epidemiology.

Oral regimens recommended by BASHH guideline UK are as follows:

- First line: Ceftriaxone 1 g single intramuscular with
  Oral Doxycycline 100 mg twice a day for 14 days with
  Oral Metronidazole 400 mg twice a day for 14 days
  (Though the trial was for cefoxitin as it is not available in UK, Ceftriaxone is recommended which has a similar spectrum. Replaceement of ceftriaxone with Cefixime is not recommended in UK)
- Second line: Oral Ofloxacin 400 mg twice a day for 14 days with
  Oral Metronidazole 400 mg twice a day for 14 days
  Or
  Oral Moxifloxacin 400 mg once a day for 14 days (is effective for *Mycoplasma genitalium*)

Ceftriaxone 1 g intramuscular with Azithromycin 1g/week for 2 weeks is an alternative option. It is not preferred due to Macrolide resistance.

Inpatient regimens recommended by BASHH guideline UK are as follows:

- Intravenous Ceftriaxone 2 g daily plus intravenous Doxycycline 100 mg twice daily followed by oral Doxycycline 100 mg twice daily plus oral Metronidazole 400 mg twice daily for a total of 14 days.
- Intravenous Clindamycin 900 mg 3 times daily plus intravenous Gentamycin 2 mg/kg loading dose followed 1.5 mg/kg 3 times a day followed by oral Clindamycin 450 mg 4 times a day or oral doxycycline 100 mg twice a day with oral Metronidazole 400 mg twice a day for 14 days.

Intravenous antibiotics are **continued for 24 hours after clinical improvement and then switched to oral**.

- Intravenous Ofloxacin 400 mg twice a day plus intravenous Metronidazole 500 mg three times a day for 14 days

In **pregnancy with PID** there can be increased maternal and fetal morbidity. Hence parenteral treatment is preferred. Intravenous ceftriaxone with intravenous Erythromycin and intravenous metronidazole to cover *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and anaerobes.

Surgical management is considered if medical management fails. It may be needed in tubo-ovarian abscess for drainage and adhesiolysis. Laparotomy is needed in severe cases. Perihepatic adhesiolysis may be done by laparoscopy.

Syndromic management approach[11]

Started by WHO in poor resource settings.

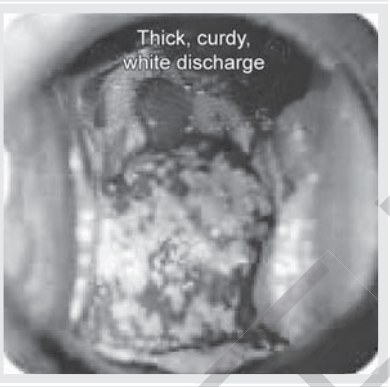
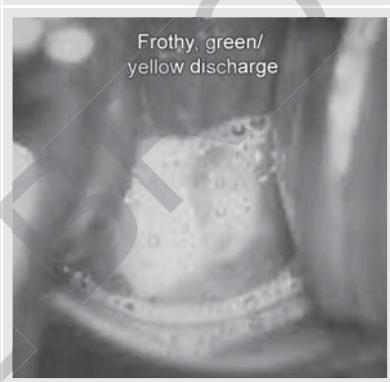
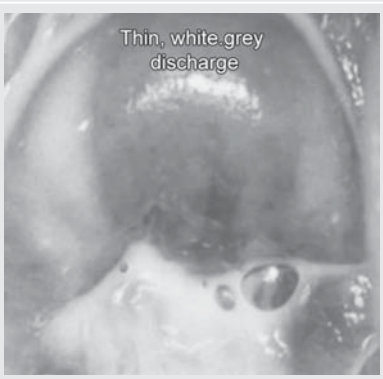
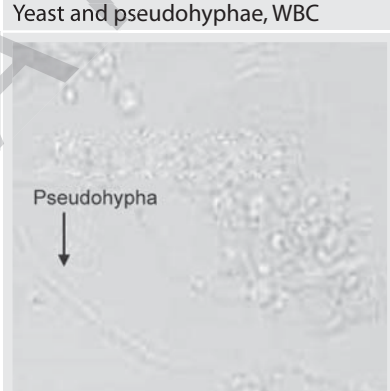
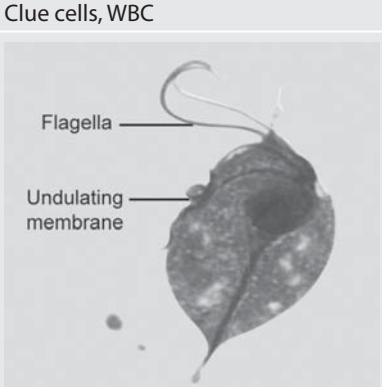
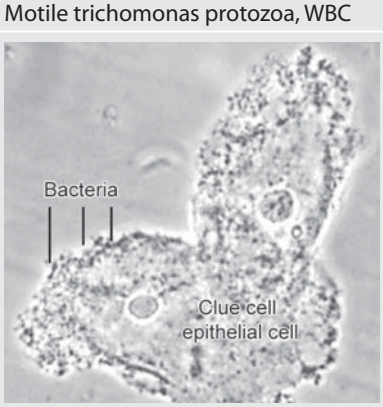
In low resource countries like India where availability of **laboratory test are not available syndromic management** is preferred and is endorsed by **NACO** (National AIDS Control Organization of India).

The aim of this approach is to start management **at the first visit at the clinic and educate about the various sexually transmitted diseases**.

The following complaints are grouped and accordingly the kits are dispatched to the patient presenting in the clinic:

- Vaginal/urethral discharge
- Vesicular and or nonvesicular genital ulcers
- Inguinal bubo
- Lower abdominal pain/scrotal pain

TABLE 4: Most common vaginal discharges in reproductive years with signs and symptoms.[12]

Feature	*Vulvovaginal candidiasis*	*Bacterial vaginosis*	*Trichomoniasis*
Symptoms	Thick white discharge	Thin discharge	Scanty to profuse or frothy yellow discharge
	Non offensive odor	Offensive or fishy odor	Offensive odor
	• Vulval itch • Superficial dyspareunia • Dysuria	No discomfort or itch	• Vulval itch or soreness • Dysuria (external) • Low abdominal pain • Dyspareunia
			
Signs	Vulval erythema, oedema, fissures, satellite lesions	Discharge coating vagina and vestibule, no inflammation of vulva	Vulvitis and vaginitis "strawberry cervix" Leopard skin appearance with Lugol's iodine.
pH of the vaginal fluid	Vaginal pH <4.5	Vaginal pH > 4.5	Vaginal pH >5
Fishy odor with KOH	Negative	Positive	Positive
Microscopy	Yeast and pseudohyphae, WBC	Clue cells, WBC	Motile trichomonas protozoa, WBC
			

Flowchart 2: Syndromic management algorithm.

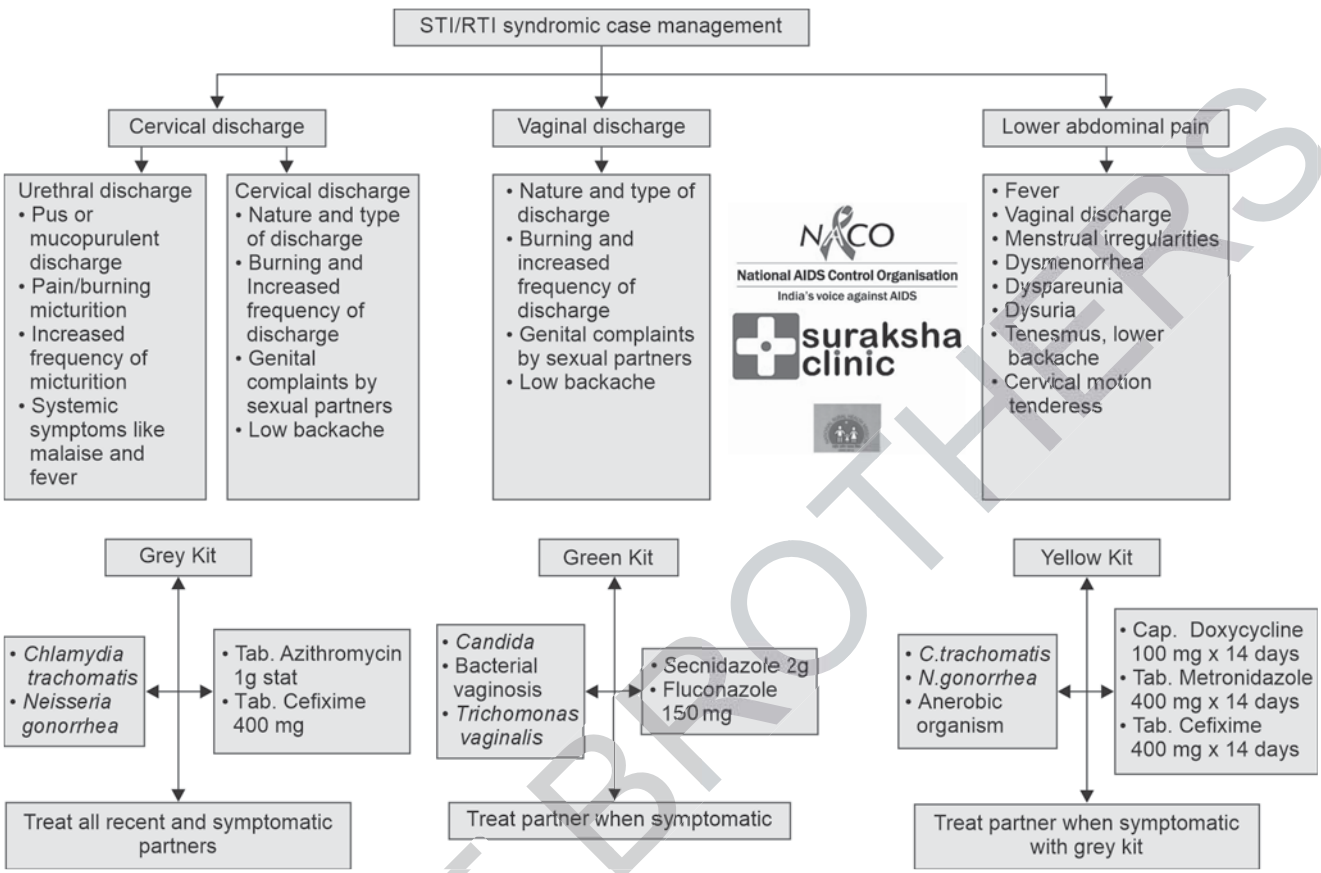


TABLE 5: Syndromic management kits.

Kit	***Organism suspected***	***Drug treatment***
Grey Kit	*C. trachomatis, N. gonorrhea*	Azithromycin 1 g stat, Cefixime 400 mg
Green Kit	*Candida*, bacterial vaginosis, *Trichomonas vaginalis*	Secnidazole 2 g, Fluconazole 150 mg
Yellow Kit	*C. trachomatis, N. gonorrhoeae*, anaerobic organism	Doxycycline 14 days, Metronidazole 14 days, Cefixime 14 days

Patient may have vaginal discharge, cervical discharge, urethral discharge and urinary symptoms. They may present with lower abdominal pain, dysmenorrhea, dyspareunia with discharge and irregular bleeding.

For treatment of PID in Indian population according to NACO guidelines have recommended **YELLOW KIT/KIT 6**
Tab Cefixime 400 mg
Tab Metronidazole 400 mg 1 BD X 14 days
Tab Doxycycline 100 mg 1 BD X 14 days

Urethral discharge	Cervical discharge	Painful scrotal swelling	Vaginal discharge	Genital ulcer-non herpetic		Genital ulcer-herpetic	Lower abdominal pain (lap)	Inguinal bubo (1B)
• Urethral discharge (Pus or muco-purulent) • Pain or burning while passing urine • Increased frequency of urination • Systemic symptoms like malaise, fever	• Nature and type of discharge (quantity, color and odor) • Burning while passing urine, increased frequency • Genital complaints by sexual partners • Low backache *(take menstrual history to rule out pregnancy)*	• Swelling and pain in the scrotal region • Pain or burning while passing urine • Systemic symptoms like malaise, fever • History of urethral discharge	• Nature and type of discharge (quantity, color and odor) • Burning while passing unine, increased frequency • Genital complaints by sexual partners • Low backache *(take menstrual history to nule out pregnancy)*	• Genital ulcer, single or multiple, painful or painless • Burning sensation in the genital area • Enlarged lymph nodes		• Genital ulcer or vesicles single or multiple, painful, recurrent • Burning sensation in the genital area	• Lower abdominal pain • Fever • Vaginal discharge • Menstrual irregularities like heavy, irregular vaginal bleeding • Dysmenorrhea, dyspareunia, dysuia, tenesmus • Lower backache • Canvical motion tendemess	• Swelling in inguinal region which may be painful • Preceding history of genital ulcer or discharge • Systemic symptoms like malaise, fever *etc.*
Tab. Azithromycin 1 g OD stat + Tab. Cefixime 400 mg OD stat	Tab. Azithromycin 1 g OD stat + Tab. Cefixime 400 mg OD stat	Tab. Azithromycin 1 g OD stat + Tab. Cefixime 400 mg OD stat	Tab. Secnidazole 2 g OD stat + Tab. Fluconazoie 400 mg OD stat	Inj. Benzathine penicilin (2, 4MU) -1 vial Tab. Azithromycin-(1 g) single dose	If allergic to Inj. penicillin: Doxycycline 100 mg (Bid for 15 days) Azithromycin 1g single dose	Tab. Acyclovir 400 mg TDS for 7 days	Tab. Cefixime 400 mg OD stat Tab. Metronidazole 400 mg BD X 14 days + Doxycycline 100 mg BD X 14 days	Tab. Azithromycin 1 g OD stat + Tab. Doxycycline 100 mg BD for 21 days
								
Treat all recent partners	Trat partners when symptomatic	Treat all recent parters	Treat partners when symptomatic	Treat all sexual partners for past 3 months		No partner treatment	Treat male partners with Kit 1	Treat all sexual partners for past 3 weeks

Fig. 3: Syndromic approach for vaginal, cervical and lower abdominal pain.
(*Source:* CDC)

Complications of acute PID

- Local tissue damage
- Fallopian tube edema
- Tubal occlusion
- Development of adhesions
- Fitz–Hugh–Curtis syndrome
- Tubo ovarian abscess

Fitz–Hugh–Curtis syndrome:

- Extension of *inflammatory process to the liver capsule called perihepatitis.*
- It is generally secondary to *Chlamydia trachomatis* PID. There is no specific treatment for it.
- The capsular inflammation leads to adhesions called violin string adhesions
- Incidence: 4-14% and incidence is higher 27% in teens[11]
- Presentation: right upper quadrant pain that is accentuated with movement or inspiration.
- Diagnosis: CT Contrast: increased perihepatic enhancement, usually the right lobe of liver.
- Laparoscopy is diagnostic.

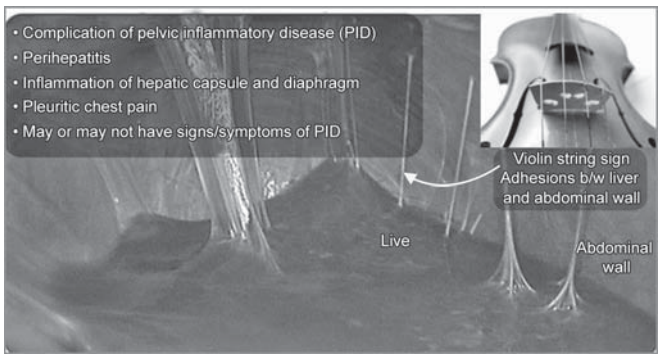


Fig 4: Laparoscopic image showing Fitz–Hugh–Curtis syndrome. *(For color version, see Plate 5)*

Tubo ovarian abscess is a serious complication of PID.
Inflammatory mass involving a fallopian tube, ovary or both that is characterized by the presence of pus.

Incidence: 30% in women hospitalized with PID.[12,14]

Clinical presentation:
- Abdominal pain
- Fever
- Vaginal discharge
- Nausea
- Abnormal vaginal bleeding
- Signs include presence of unilateral or bilateral tenderness, cervical movement tenderness, discharge and fever.
- Systemic sepsis may present with tachycardia, hypotension, increased respiratory rate and increased lactate levels.

Investigations:
- Increased WBC count more than 15,000 is seen in 90%.[15]
- Raised ESR
- Raised CRP
- USG is the first line radiological investigation. It appears as a solid cystic mass. It may be bilateral or unilateral. Pyosalpinx is seen as an elongated tube, *dilated fluid filled mass* with *partial septa* and thick walls. Incomplete septa within the tubes is a sensitive marker of tubal inflammation. *Cog wheel* sign occurs due to thick endosalpingeal folds. *Ovary has edema*. Eventually, *tubes and ovaries get fused* and lie in the Pouch of Douglas POD. There may be *complex free fluid in the POD with echoes*.
- CT Scan may be used to identify the pathology. Thick walled fluid filled mass with internal septa may be seen. Anterior to TO mass the *mesosalpinx may be thickened*. Pararectal fat infiltration may be seen. Ureter may be involved. *Ovarian vein entering the mass is diagnostic.* There may be *mild thickening of the uterosacral ligament*.

Differential diagnosis: appendicular mass, diverticulitis, endometrioma

The reproductive outcome for women with tubo ovarian abscess depends on whether surgical intervention is required or not and whether intraabdominal rupture occurs.

Management of tubo-ovarian abscess
- Hospitalization: Inpatient observation recommended. Patient may need to be in ICU or HDU
- Monitor the vitals pulse, BP, respiratory rate, input and output.
- CBC and CRP should be done daily.
- Antibiotic regimen to be started.

Indication for surgery:

- Signs of *rupture*
- Evidence of *hemodynamic instability* (systemic sepsis)
- Presence of large tubo-ovarian abscess *more than 8 cm*.[15]
- Poor response to medical management intravenous antibiotics in 24 hours (and certainly after 48 hours)[15]

The most common indication for surgery or image guided drainage is failure to improve clinically or evidence of a persistence of abscess on interval imaging.

Image guided draining may prevent need for surgery.

If in sepsis, patient needs to be stabilized and then operated.

Poor prognostic factors include age above 40 years, more than 5 cm size, high white blood cell count and history of smoking.

85% resolve with antibiotic therapy alone If the size of the abscess is 4 to 6 cm.[16]

40% of those 10 cm or larger respond.

15% of women with PID and tubo ovarian abscess will experience spontaneous rupture of abscess which can be life threating and require emergency surgery.

Surgery may be by laparoscopy or midline laparotomy to drain abscess , irrigate and we may need to leave a drain. Surgery is difficult as edema is present, tissues are fragile and bowel may be adherent.

Q2. What are the CDC guidelines for diagnosis of acute PID. Describe tubal pathology in genital tuberculosis.

(DNB 2021) (20 marks)

Q3. Clinical features of genital tuberculosis in young women of reproductive age group. Recent advances in laboratory diagnosis of genital TB. Indications of surgery in women having genital tuberculosis.

(DNB 2021, June 2018) (20 marks)

Ans. Female genital tuberculosis (FGTB) is a chronic infectious disease of female genital tract due to *Mycobacterium tuberculosis*.[17]

Spread: Genital TB usually spreads by *hematogenous* or *lymphatic route* and sometimes *direct spread from adjacent organs* e.g. bowel or lymph node.

Most common mode of spread/transmission: hematogenous spread from lungs.

Incidence in India: 1 to 19 % in different regions of India.

Incidence of infertility in women with FGTB is 6 to 25 percent in India[18] (CDC, WHO)

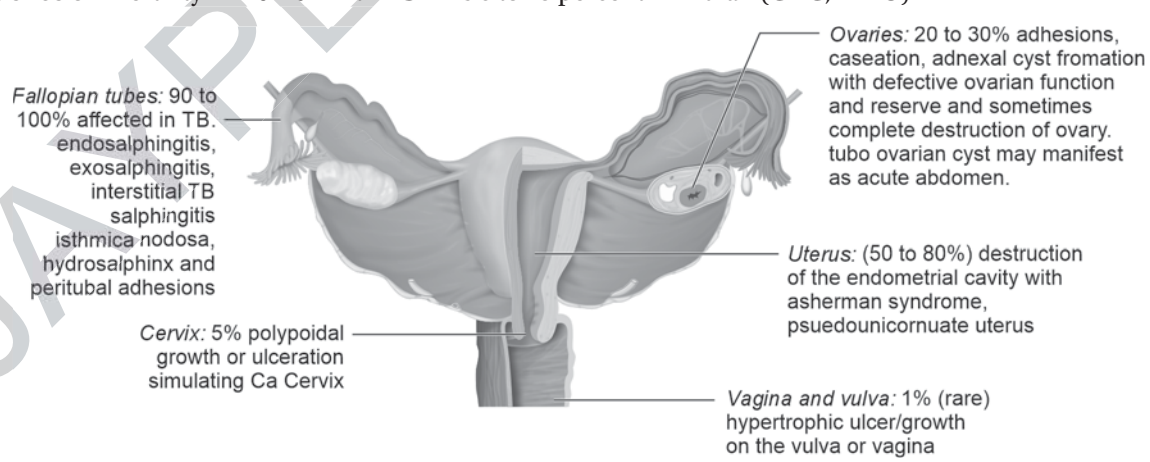


Fig. 5: Incidence and presentations of TB in various parts of the genital system.

Solved Papers Obstetrics & Gynecology for PG Students

Salient Features

- **Students can gain insight into the pattern of questions, the frequency of certain topics appearing in examinations, and the level of detail required in answers**
- **Each question is accompanied by detailed answers, providing explanations that are supported by standard textbooks and guidelines, ensuring accuracy and depth in understanding**
- **Questions are organized by topic and number of marks allotted to the topic allowing for targeted study beneficial for last-minute revisions**
- **It provides a blend of theory with practical applications useful for practical examinations.**

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