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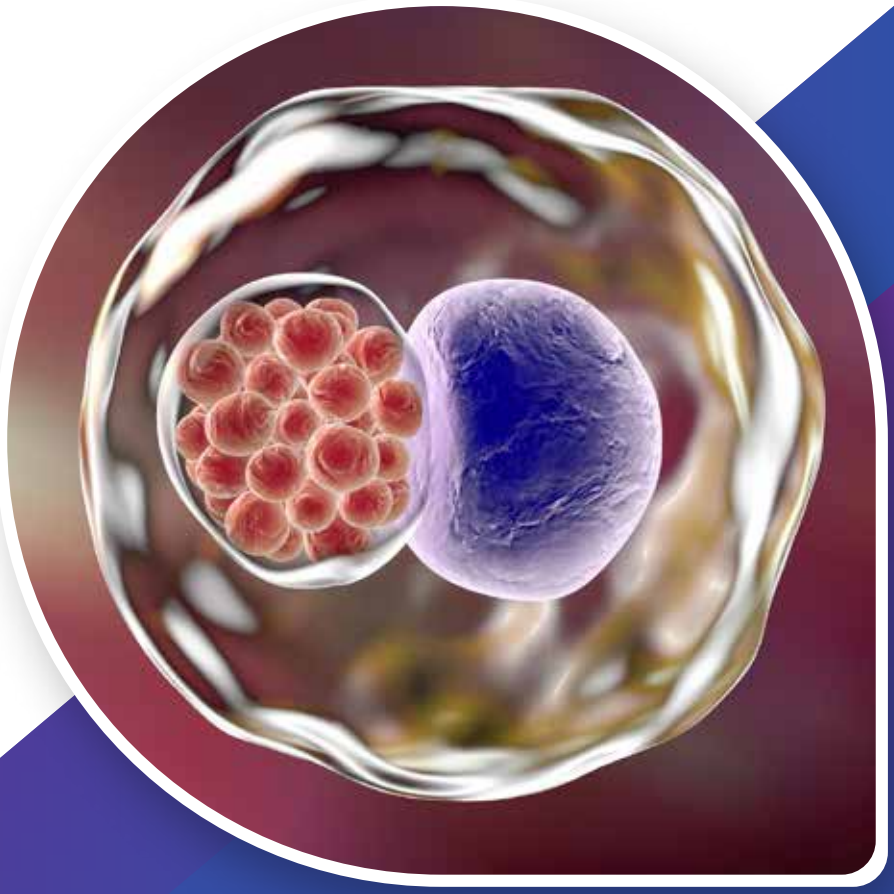

Chlamydia & Infertility

You keep putting one foot in front of the other, and then one day you look back and you've climbed a mountain.

-Tom Hiddleston

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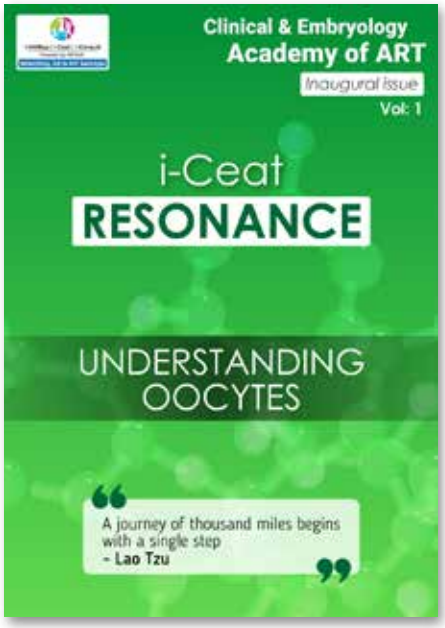

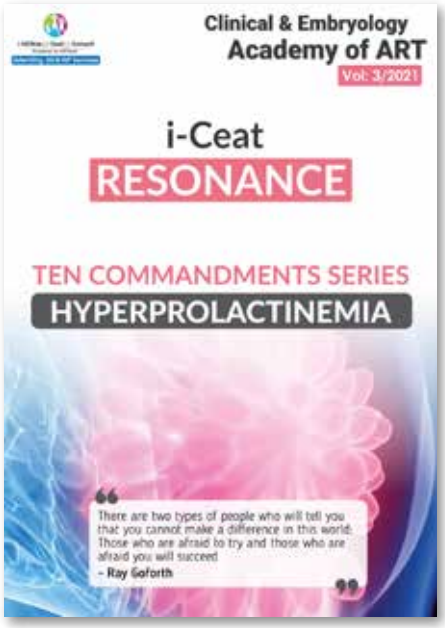

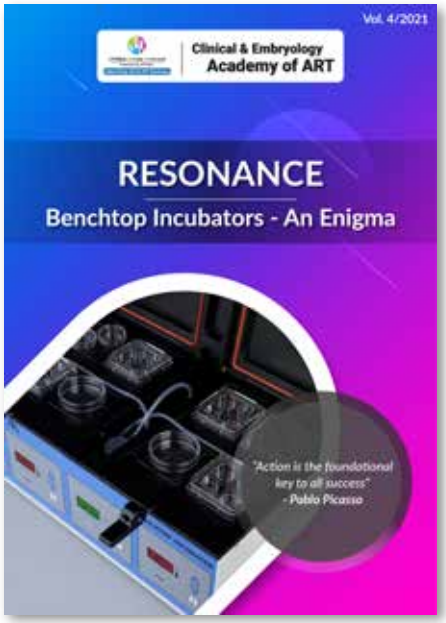

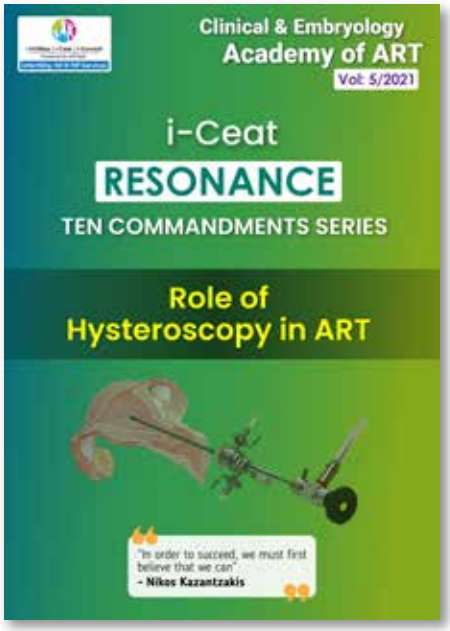

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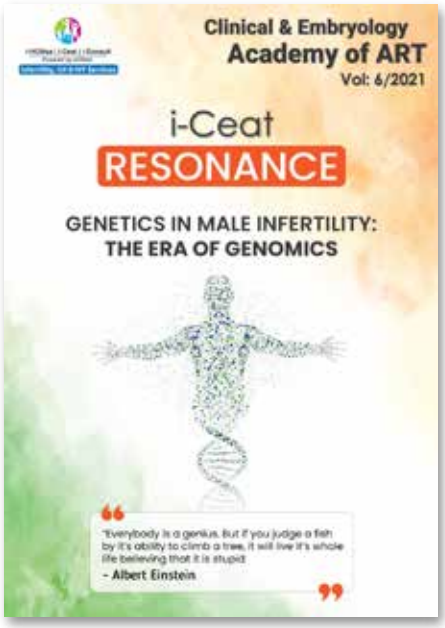

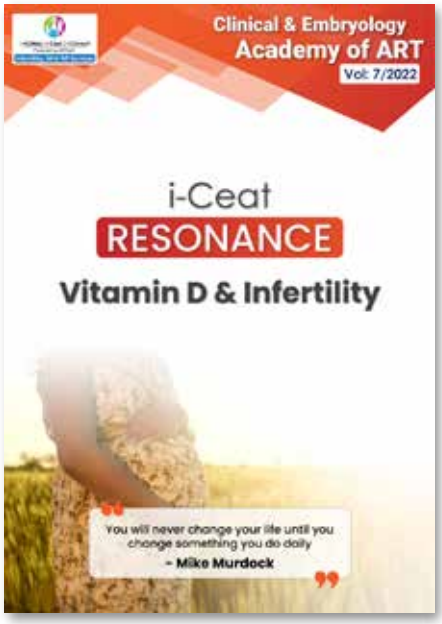

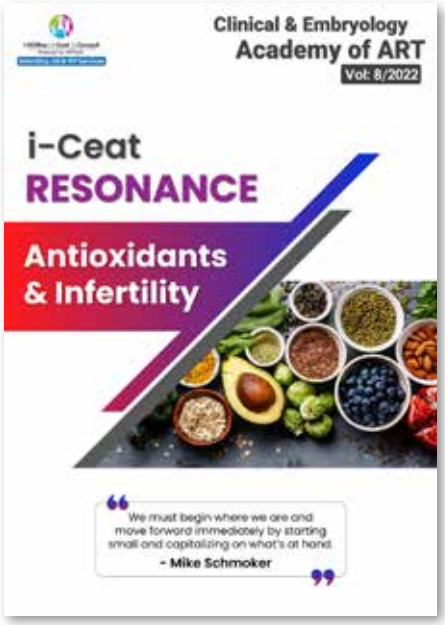

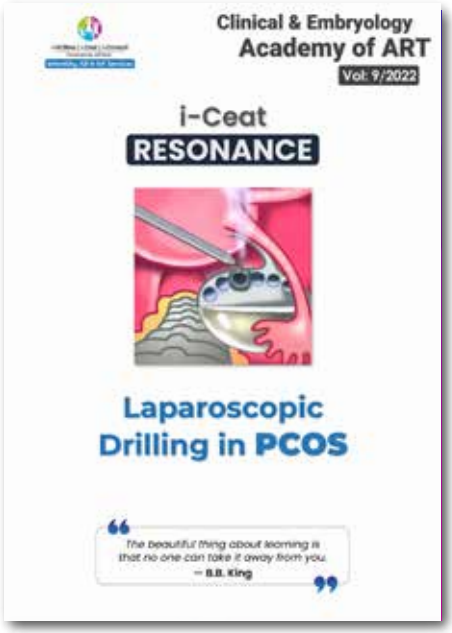

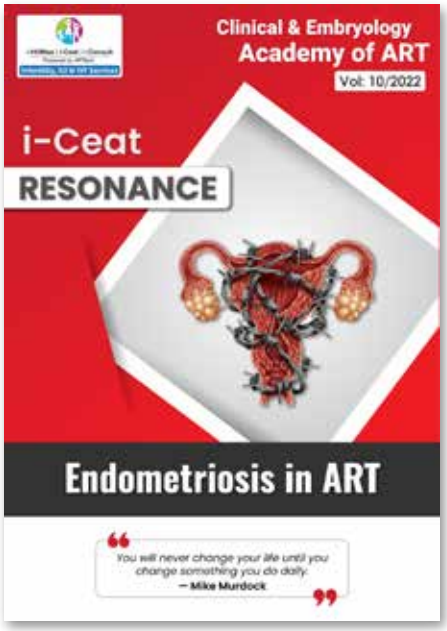

Hands-On Training

Preface

At the outset, I would like to congratulate our family on the launch of the **eleventh volume** of our bulletin the Resonance. We are paving a new path to address the concerns of our students and to meet up to their expectations. We are slogging every day and evolving from the fundamental to the contemporary side. Through these bulletins, we want to assist our candidates to kill two birds with a single stone: improving their academic writing skills and broadening their horizon of knowledge.

We here, releasing this volume entirely based on Chlamydia infection and its impact on female and male infertility, along with its remedy. As clinicians, we have a fair idea of its effect on tubal patency, this article will brush your knowledge up and introduce you to newer guidelines related to it.

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> *"We must begin where we are and move forward immediately by starting small and capitalizing on what's at hand."*
>
> **– Mike Schmoker**

Chlamydia & Infertility

CHLAMYDIA AND INFERTILITY

1. Introduction

Chlamydia trachomatis infection of the genital tract is the **most common sexually transmitted infection** and has a worldwide distribution. The consequences of infection have an adverse effect on the reproductive health of women and are a common cause of infertility. Recent evidence also suggests an adverse effect on male reproduction. There is a need to standardise the approach in managing the impact of C. trachomatis infection on reproductive health.

2. Prevalence

The **World Health Organization** estimates that in 2012, 131 million new cases of chlamydia occurred among adults and adolescents aged 15–49 years worldwide, with a global incidence rate of 38/1000 females and 33/1000 males which makes the estimated prevalence of **4.2% in females** and **2.7% for male.**

3. Pathophysiology

- Chlamydia trachomatis is an **obligate intracellular parasite** bacterium that can infect both genital and non genital sites including the cervix, rectum and eyes. **(Fig.1)**
- Chlamydia trachomatis has a **biphasic life cycle** comprising a metabolically active **noninfectious reticulate body (RB) and an infectious environmentally resistant elementary body (EB).** The RB replicates by binary fission within the confines of the inclusion and differentiates into EBs at the end of the infectious replication cycle, while the EBs are closely followed by releasing from the cell to initiate new infection via cytolysis or endocytosis. **(Fig.2)**
- Various factors such as antibiotic treatment, host immunological response, or nutrient starvation disturb the C. trachomatis developmental cycle, and under such conditions, the EBs can convert to enlarged noninfectious aberrant bodies (ABs). **This so-called "viable but non-cultivable growth stage" is associated with chronic and repeat infections that can lead to serious complications in women, including obstructive infertility, ectopic pregnancy, and preterm birth.**
- **Lactobacillus-dominated vaginal microbiota** is considered a marker of health status for healthy women owing to its ability to produce lactic acid and multiple bacteriostatic and bactericidal compounds to protect against extraneous pathogenic bacteria.
- The vaginal microbiota varies greatly among individuals due to **host intrinsic factors** such as age, diet, ethnicity, menstrual cycle, and external factors such as geographic location and genital diseases.

Fig. 1: chlamydia trachomatis infection in the human body

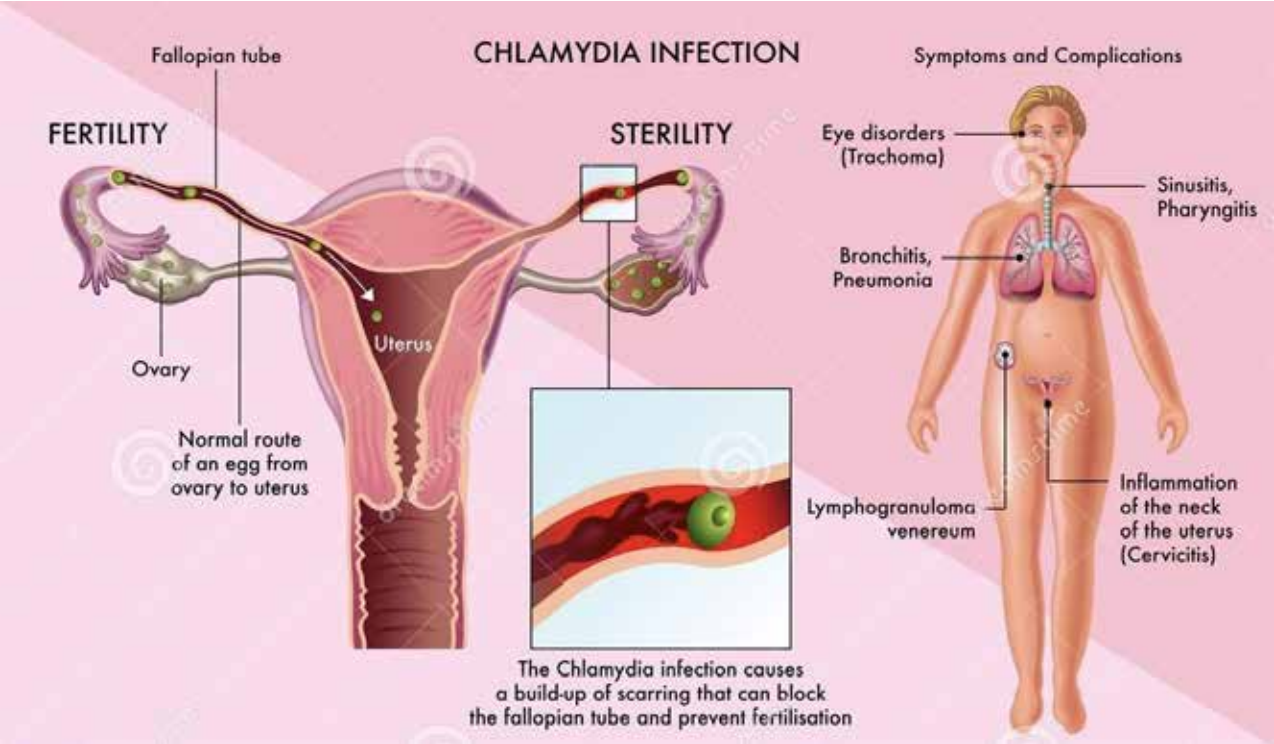
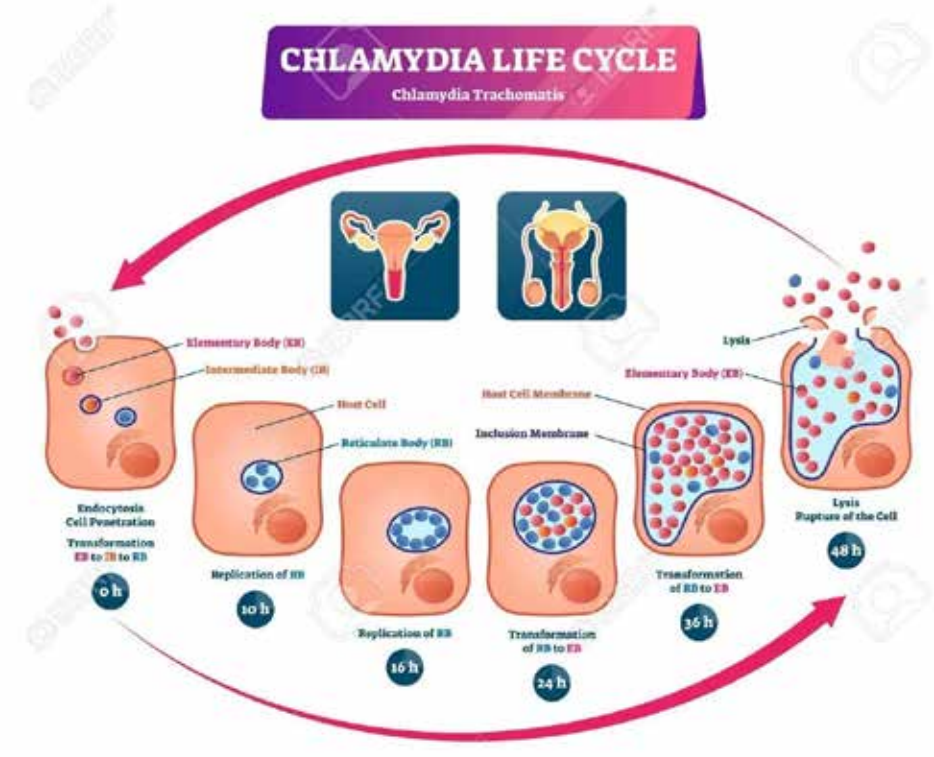


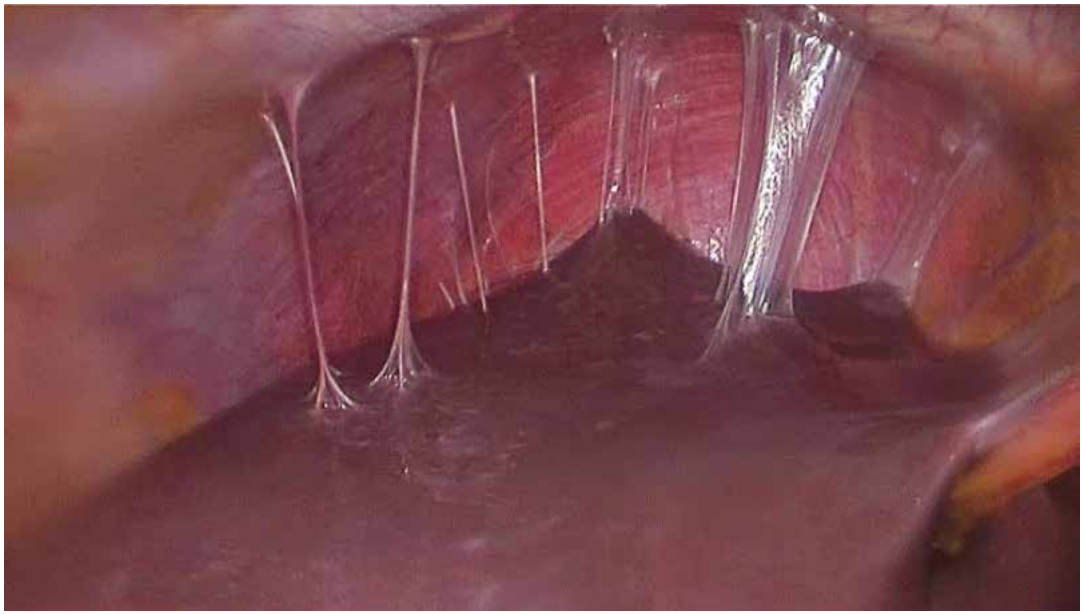
Fig. 2: biphasic life cycle of chlamydia trachomatis



Fitz Hugh Curtis syndrome

- Rare disorder, almost exclusively occurs in women.
- Characterized by inflammation of the stomach (peritoneum) and the tissues surrounding the liver (perihepatitis). Diaphragm may also be affected.
- Common symptoms include severe pain in the upper right area (quadrant) of the abdomen, fever, chills, headaches, and malaise.
- Diagnosis: laparoscopic visualisation.(Fig 3)
- Apart from chlamydia, this condition can develop with N. Gonorrhea infection.

Fig. 3: Laparoscopic view of Fitz Hugh Curtis syndrome.



4. Risk factors for chlamydia infection

The predictors of this infection among females and males are:

- Multiple partners
- Adolescent age
- Promiscuous sexual behaviour
- Alcohol consumption
- History of sexually transmitted infection

Special note:

Younger or adolescent age is shown consistently to be associated with increased risk of chlamydial infection among the sexually active population and there are a number of reasons behind this vulnaribilty:

- A certain aspects of physical development that make this group more vulnerable to sexually transmitted infections, including the **persistence of columnar epithelium** on the cervix, which supports the growth of C trachomatis, and changes in vaginal flora and mucus production.

- **The older women may have acquired partial immunity** after initial or serial infections in the past. Differences in the prevalence of infection between adolescents and adults are also often attributed to differences in **sexual behaviours.**

5. Signs and symptoms and clinical course in patients

Asymptomatic in almost 50% cases.

- **Non specific urethritis** (The role of C. trachomatis in the development of urethritis, epididymitis and orchitis in men is widely accepted).

How does it affect fertility in male:

- Infection of the testes and the prostrate is implicated in the deterioration of sperm (decrease sperm motility, increase proportion of sperm abnormalities, significant **reduction in sperm density,** sperm morphology and viability and increased likelihood of **leucocytospermia**) affecting fertility.

- Chlamydial infection may also affect the male fertility by directly damaging the sperm as sperm parameters, proportion of DNA fragmentation and acrosome reaction capacity are impaired. However, the role of C. trachomatis in male infertility is not yet proven.

Chlamydial infection in women:

- Genital C. trachomatis infection is a leading cause of bacterial sexually transmitted disease and mainly manifest as **mucopurulent cervicitis** with a watery or purulent discharge and **easily induced bleeding with a swab.**

- It has been seen that the natural course of untreated C. trachomatis lower genital tract infections in women get cleared spontaneously in around 30–50% women in the first 2–3 years.

A. Cervicitis and pelvic inflammatory disease:

Many studies indicated a risk for tubal infertility after chlamydia infection in the range up to 4.6% and a risk of PID after chlamydia infection is up to 30% and a risk of developing infertility after PID is approximately 10–20%.

B. Persistence infection:

It depends on women immune status, drugs, sexual promiscuity etc.

C. Tubal factor infertility and ectopic pregnancy:

For tubal tissue damage to occur, prolonged exposure to chlamydia is considered a major predisposing factor, **either by chronic persistent infection or by frequent reinfections.** It has been hypothesized that this prolonged or repeated exposure of the host to the micro-organism evokes a chronic low-grade auto-immune response which leads to chronic inflammation and subsequent tissue damage.

The risk of developing tubal infertility after PID is estimated at 10–20%, and from this it can be concluded that the risk to test-positive women of developing tubal infertility ranges between 0.1 and 6%.

6. Investigations

Various test and their sensitivity and specificity in assessing genital chlamydia infection are as follow:

Test	Sensitivity(%)	Specificity(%)	Detection limit (no. of microorganisms)
NAAT	90-95	>99	1-10
DFA	80-85	>99	10-500
EIA	60-85	99	500-1000
DNA-probe	75-85	>99	500-1000
Cell culture	50-85	100	5-100
POC	25-55	>90	>10000

NAAT: Nucleic Acid Amplification Test.
DFA: Direct Fluorescence Assay.
EIA: Enzyme Immuno Assay. .
DNA Probe-DNA-based: hybrid capture assay
POC: Point of care test(Biorapid Chlamydia Ag test)

NAAT is most sensitive (90–95%) and highly specific, followed by the new generation DNA-probe assays which are more or less equally sensitive (up to 85%), followed by culture (up to 80%).

Test for infertility setting:

- Chlamydia IgG antibody testing (CAT) in serum is applied in reproductive medicine in the fertility work-up on a large scale, but it has no place in early diagnosis of chlamydia infections.
- Among women with clinical signs and symptoms of mild to moderate PID, antibodies to C. trachomatis were shown to be associated with reduced pregnancy rates.

- In fertility clinics CAT was introduced as a screening test for tubal infertility after it had become evident that an association exists between chlamydia IgG antibodies in serum and tubal pathology.

- The most accurate tests for CAT have a sensitivity of 60% for tubal pathology, whereas their specificity is 85 –90%. **It does mean we can not entirely rely on this test for ensuring tubal patency.**

7. Role of Screening

- **There are no randomized trials that show effectiveness of opportunistic chlamydia screening on PID-incidence in non-pregnant womem.**

- In a randomized study comparing prophylaxis against chlamydia, gonorrhoea and bacterial vaginosis versus a screen-and-treat strategy, antibiotic prophylaxis was concluded to be at least as effective as a screen-and-treat policy in minimising post-abortion infections and to be more cost-effective.

- A disadvantage of universal prophylaxis is that infected women remain unnoticed and cannot be offered the benefits of partner notification and treatment. Therefore, **a third strategy has been proposed, involving prophylaxis at the time of abortion followed by screening for gonorrhea and chlamydia in suspected cases to ensure adequate follow-up of treatment results and partner notification.**

8. Treatment

Uncomplicated Genital Chlamydia

For people with uncomplicated genital chlamydia, the WHO STI guideline (2016) suggests one of the following options:

Uncomplicated Chlamydia	Chlamydia with PID	Chlamydia with complicated infection
» Azithromycin 1 g orally as a single oral dose » Doxycycline 100 mg orally twice a day for 7 days **Alternatives:** » Tetracycline 500 mg orally four times a day for 7 days » Erythromycin 500 mg orally twice a day for 7 days » Ofloxacin 200–400 mg orally twice a day for 7 days. **Precautions:** » Avoid sexual contact with partner for at least one week. » Partner tracing and treatment » Test of cure	» Out patient treatment » Ceftriaxone 250 mg intramuscular (IM) or cefoxitin 2 g (IM) as a single dose with concurrent probenicid 1 g orally in single dose plus doxycycline 100 mg orally (BD) with or without metronidazole 500 mg orally (BD) for two weeks » The CDC has recommended ofloxacin 400 mg orally (BD) or levofloxacin 500 mg orally once a day (OD) with or without metronidazole 500 mg orally (OD) for two weeks.	**If patient come is pregnant, immuno-compromised, fever not responding to first line drug, turbo-ovarian abcess.** » Intravenous ceftriaxone 2g daily » Intravenous doxycycline 100mg BD (oral if tolerated) **Followed by:** » Oral doxycycline 100 mg BD for 14 days » Oral metronidazole 400 mg BD for 14 days. **or** » Intravenous clindamycin 900mg TID » Intravenous gentamicin* 2mg/kg loading dose followed by 1.5mg/kg TID **Followed by:** » Oral Clindamycin 450mg QID to complete 14 days OR oral Doxycycline 100mg BD to complete 14 days » Oral Metronidazole 400mg BD to complete 14 days **Alternative Inpatient Regimens:** » Intravenous Ofloxacin 400mg BD for 14 days » Intravenous Metronidazole 500mg TID for 14 days. or Intravenous Ciprofloxacin 200mg

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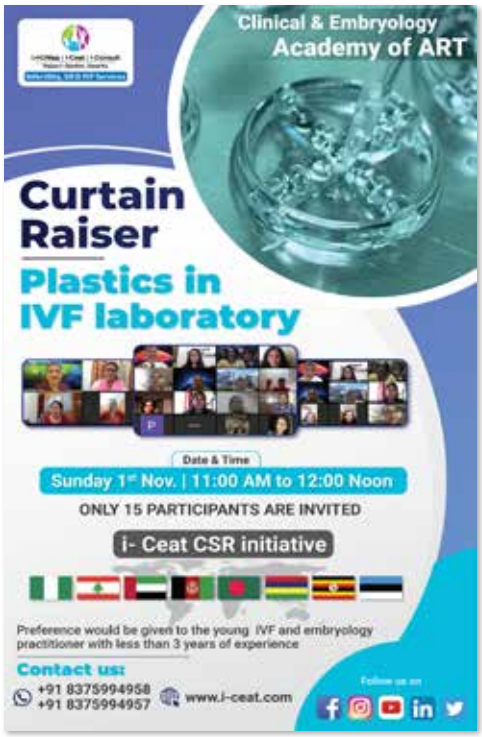


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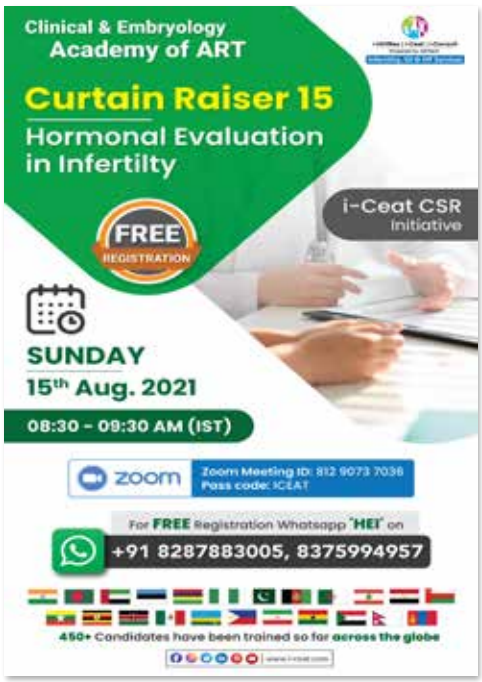
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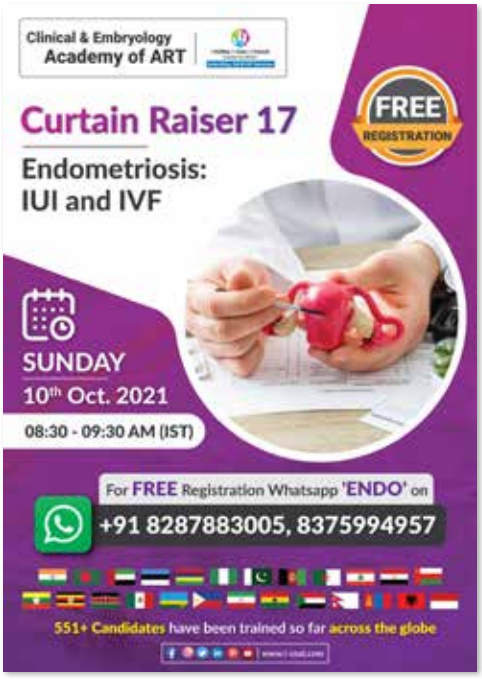
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Clinical & Embryology
Academy of ART
Curtain
Raiser 22
ART ACT
2021
i-Ceat CSR Initiative
FREE
REGISTRATION
SUNDAY
9th Jan. 2022
08:15 - 09:30 AM (IST)
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Clinical & Embryology
Academy of ART
Curtain Raiser 23
THIN ENDOMETRIUM
FREE
REGISTRATION
SUNDAY
16th Jan. 2022
09:30 - 10:30 AM (IST)
i-Ceat CSR Initiative
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Clinical & Embryology
Academy of ART
Curtain Raiser 24
Best Incubators for
an IVF Laboratory
SUNDAY
23rd Jan. 2022
09:30 - 10:30 AM (IST)
FREE
REGISTRATION
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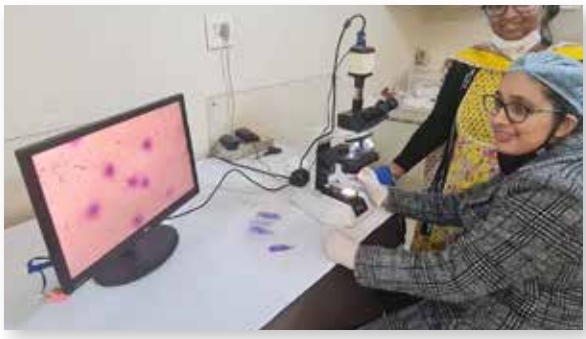
Hands-On Training



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Clinical & Embryology Academy of ART

Edition 10 | 27th Feb. 2022

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- ✓ E-Learning
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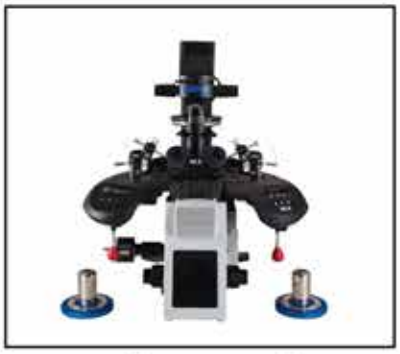
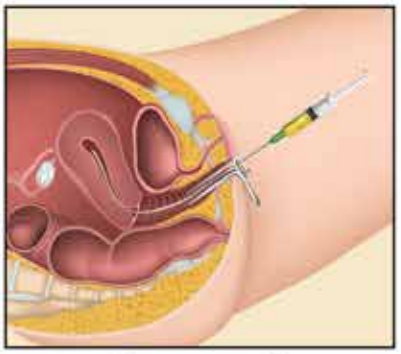
Extensive Hands-on Training



Course 1

IVF Lab Set-Up, Procurement & Clinical Embryology, Embryo Culture, ICSI, Cryobiology, QA/QC



Course 2

Basic and Advanced Clinical Andrology, IUI, Reproductive Ultrasound & QA/QC

Course 3

Ovulation Induction, IVF, OPU-ET, Reproductive Ultrasound and QA/QC

625+ Candidates have been trained from more than **21 Countries!**

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