



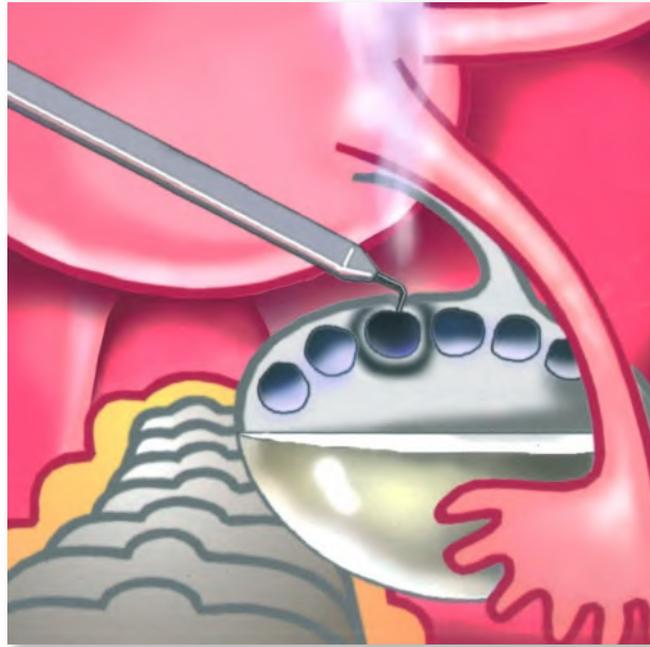
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Clinical & Embryology  
Academy of ART

Vol: 9/2022

# i-Ceat RESONANCE



## Laparoscopic Drilling in PCOS

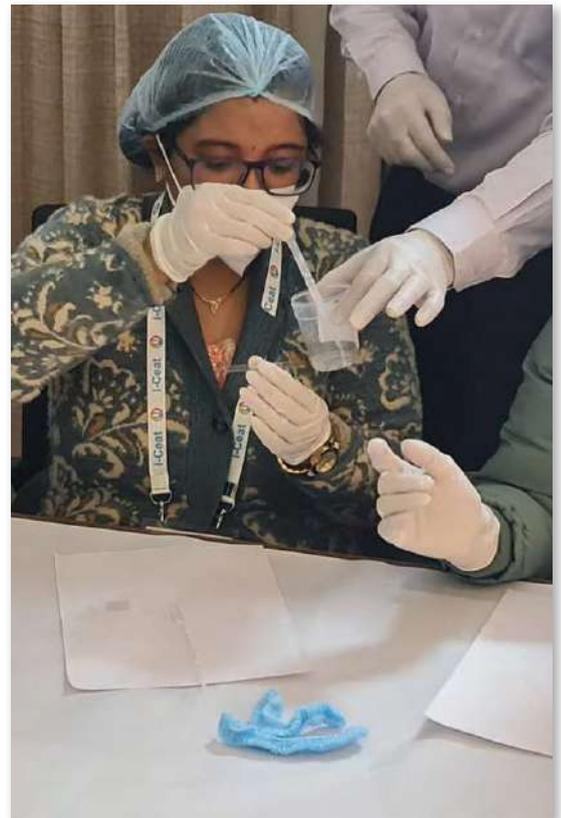


*The beautiful thing about learning is  
that no one can take it away from you.*

— B.B. King

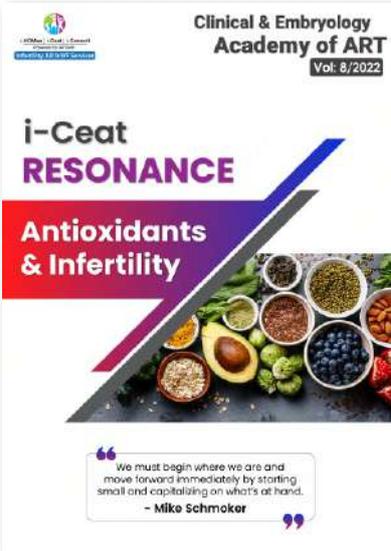
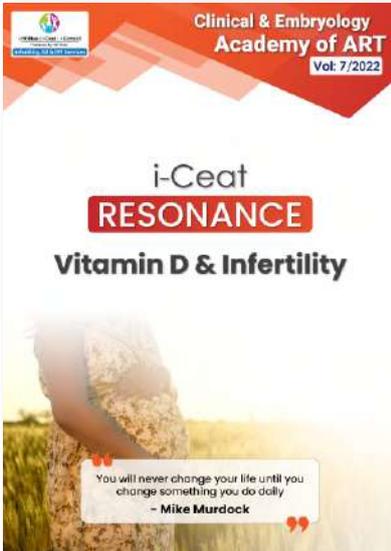
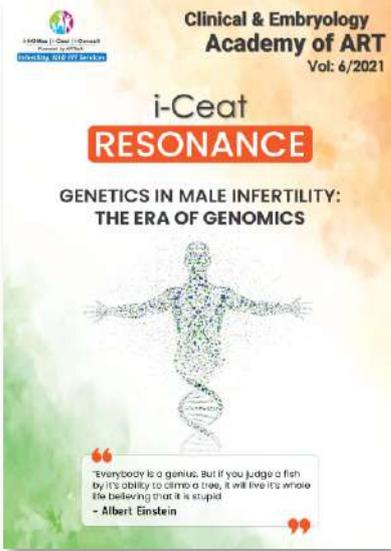
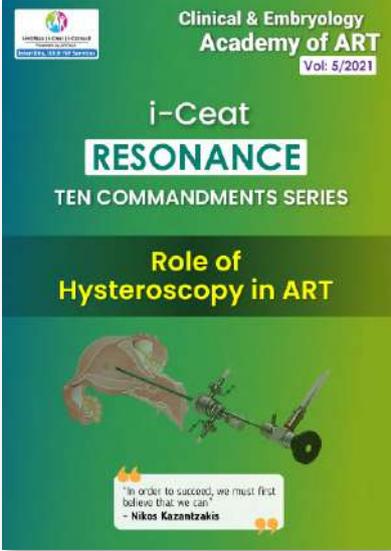
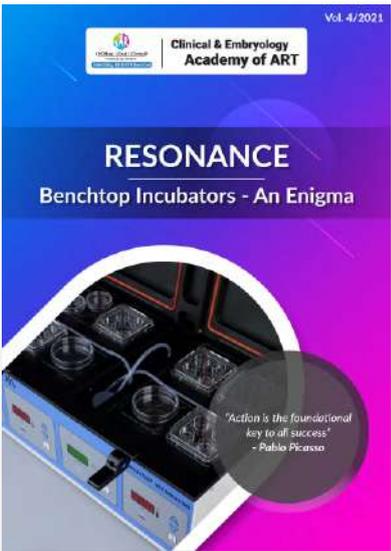
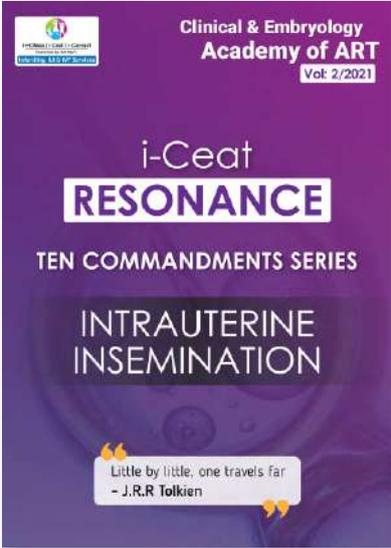
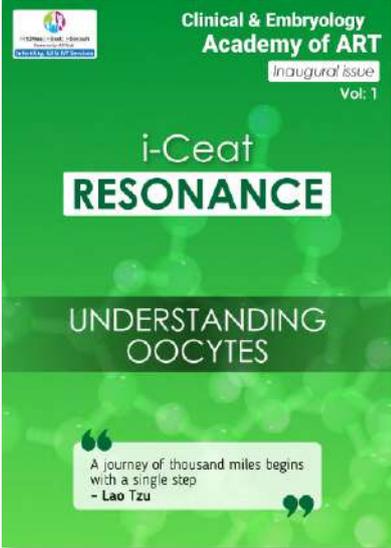


# Hands-On Training



# Resonance

## Previous Volumes



# Preface

We are extremely glad to share with you that our academy is launching **the ninth** volume of our bulletin, the “**i-Ceat Resonance**”. Our scientific team at the academy has a global vision to reach out to every single clinician and embryologist who gets intrigued by the miraculous field of infertility.

We want to make knowledge accessible and affordable to all, regardless of the financial background and geographical distances. To accomplish its basic goal of providing a basic to advanced understanding of ART technologies including its nuances. Today, we are all set to present to you a new academic bulletin that will assist you in decision making on ovarian drilling.

PCOS is a quite common medical disorder every fertility specialist is dealing with on a daily basis. Various guidelines prioritise different treatment options for couples having sub-fertility as a result of PCOS. This article will discuss the benefits and drawbacks of laparoscopic drilling over other methods.

Last but not least, I would like to acknowledge our participants and their enthusiasm because without them it would have been next to impossible for us to stand out from the crowd and would like to wish you all the best for your future endeavours.

## Guest Editor

**Dr Priya Gupta**

MBBS MD FMAS DMAS (WHL)  
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## Series Editor

**Dr Aakriti Shukla**

MBBS MS MRCOG  
National Faculty i-Ceat, India



*The mind is not a vessel to be filled  
but a fire to be ignited.*

**– Plutarch**





# **Laparoscopic Drilling in PCOS**

# PATIENT SELECTION FOR LAPAROSCOPY DRILLING IN PCOS PATIENT

## Introduction

Since its introduction in 1984, **Laparoscopic ovarian drilling (LOD)** has evolved into a safe and effective surgical treatment for anovulatory, infertile women with **Polycystic ovary syndrome (PCOS)**, **unresponsive to clomiphene citrate**. It is as effective as gonadotropins in terms of pregnancy and live birth rates, but without the risks of ovarian hyperstimulation syndrome and multiple pregnancies and its beneficial effects can last for up to 9 years.



## Mechanism of action

- » The most plausible mechanism one is the destruction of ovarian follicles and stroma resulting in a decrease in androgen and inhibin levels and a secondary rise in follicle-stimulating hormone (FSH) levels.
- » Production of inflammatory growth factors like insulin-like growth factor-1, in response to thermal injury, further potentiates the actions of FSH on folliculogenesis.
- » Increased blood flow to the ovary provoked by surgery, facilitates increased delivery of gonadotropins.

## Indications

- » The main indication for LOD is **Clomiphene citrate (CC)**-resistant PCOS - as **second-line** therapy for anovulatory infertile PCOS cases; specifically, as an alternative to gonadotropins.
- » The Royal College of Obstetricians and Gynaecologists, American College of Obstetricians and Gynaecologists, Society of Obstetricians and Gynaecologists, Canada and the recent PCOS consensus working group - All recommend its use in highly selected cases, particularly in those with **hypersecretion of luteinizing hormone (LH)**, **normal body mass index**, **those needing a laparoscopic assessment of the pelvis** or who live too far away from the hospital for the intensive monitoring required during gonadotropin therapy.

### Special Note:

A recent Cochrane systematic review of 9 RCTs and 16 trials concluded that there was no evidence of a significant difference in rates of **clinical pregnancy (39.7 v/s. 40.5%)** or **live birth (34 v/s 38%)** in women with clomiphene-resistant PCOS undergoing LOD compared to other medical treatments. This implies that LOD is a valid, **but not the sole option for CC-resistant PCOS**. The evidence for improvement in biochemical hyperandrogenism translating into a comparable improvement in clinical hyperandrogenism is not clear; hence LOD should not be offered for non-fertility indications like amelioration of acne or hirsutism or for regularization of the menstrual cycle.

## Surgical technique

- » Standardization of the surgical techniques is lacking. Reproductive outcomes are comparable with laser and diathermy.
- » Electrocautery, using an insulated unipolar needle electrode with a non-insulated distal end measuring 1-2 cm, is the most commonly used method, although few authors have reported similar ovulation and pregnancy rates with bipolar energy.
- » The number of punctures is empirically chosen depending on the ovarian size. Most surgeons perform **four punctures per ovary, each for 4 seconds at 40 W (rule of 4), delivering 640 J of energy per ovary (the lowest effective dose recommended)**.
- » On average, 20-30% of anovulatory PCOS women fail to respond to LOD; possibly due to inadequate destruction of ovarian stroma or inherent resistance of the ovaries

## Other Surgical techniques

Some other techniques for making pcos ovaries sensitive to drugs and gonadotropins are there. In ultrasound guided transvaginal methods, puncturing of an ovary is done under the guidance of images created by an USG probe inserted into the vagina. However, **Laparoscopic Ovarian Drilling gives better results than all other alternative procedures like:**

- » Transvaginal hydro laproscopic drilling
- » Ultrasound-guided transvaginal ovarian needle drilling
- » Transvaginal ultrasound-guided follicular aspiration

## Reproductive outcomes and endocrinal changes after laparoscopic ovarian drilling

The clinical and endocrine response to LOD is governed by a dose-response relationship. Drilling damages the thick theca layer which converts estrogen hormone to androgen. The destruction of this tissue leads to drop in androgen level in patients with PCOS.

### Complications

- » One of the main shortcomings of LOD is **iatrogenic adhesions** due to bleeding from the ovarian surface or premature contact between the ovary and the bowel after cauterization. Adhesion rates ranged from 0 to 100%, involving higher risks with laser probably owing to lesser thermal penetration (2-4 mm) by the cone-shaped lesions of laser drilling compared with cylinder-shaped lesions (8 mm) of monopolar electrocoagulation. **Ovary should be raised before application of energy and saline washed after the procedure to decrease the temperature thereby reducing the risk of injury.**
- » Another potential risk is **POI (premature ovarian insufficiency)**, especially if the ovarian blood supply is damaged inadvertently or if a large number of punctures are made, leading to excessive destruction of the ovarian follicular pool or production of anti-ovarian antibodies. Coagulation **should not be done** within 8-10 mm of the ovarian hilum. Unilateral drilling, use of the harmonic scalpel, use of bipolar energy or <5 perforations with monopolar energy are associated with lesser risk of adhesions and damage but with equivalent reproductive outcomes.

### Pregnancy outcomes after laparoscopic ovarian drilling

- » Multiple pregnancy rate varies from 0% to 10%, but is significantly lower than gonadotropins, thus making LOD an attractive option for CC-resistant PCOS.
- » No difference in the incidence of OHSS and miscarriage rates is seen between LOD and other medical treatments. LOD does not seem to improve the risk of GDM, and higher incidence of GDM.
- » Pregnancy-induced hypertension has been reported after LOD.

### Complications

- » Laparoscopic ovarian drilling is more cost-effective than gonadotropins as single-treatment results in several mono-ovulatory cycles thus allowing multiple attempts at conception whereas one course of gonadotropin therapy yields a single ovulatory cycle with the inherent need for intensive monitoring. The higher incidence of multiple pregnancies incurs extra costs in those who conceive with FSH.

## What next after laparoscopic ovarian drilling failure?

- » **Laparoscopic ovarian drilling failure is defined** as failure to ovulate within 6–8 weeks, recurrence of anovulatory status after an initial response or failure to conceive despite regular ovulation for 12 months. Since LOD improves the responsiveness of the polycystic ovaries to subsequent OI agents, reintroduction of drug treatments (first CC and then gonadotrophins) and possibly IVF can be considered in those who do not spontaneously become pregnant within 6 months after LOD once ovulation has been re-established or after 3 months when ovulation has not been detected.
- » **Despite its advantages, LOD is neither the first-line therapy in PCOS nor the treatment of choice in CC-resistant PCOS owing to the advent of a multitude of safe and efficacious oral alternatives and wider acceptance of relatively safe low-dose step-up regimen of gonadotropin therapy.** Rather, it should be reserved to well-chosen anovulatory CC-resistant PCOS cases—Those with young age, raised LH levels, exaggerated response to gonadotropins, noncompliance or non-feasibility with frequent, intensive monitoring or needing a laparoscopic assessment of the pelvis. Importantly, reproductive specialists should remember that it is only an alternative, not the ultimate in the management of PCOS.
- » Moderate-quality evidence shows that LOD probably reduces the number of multiple pregnancies. Low-quality evidence suggests that there may be little or no difference between the treatments for the likelihood of clinical pregnancy, and there is uncertainty about the effect of LOD compared with ovulation induction alone on miscarriage. LOD may result in less OHSS. The quality of evidence is insufficient to justify a conclusion on live birth, clinical Pregnancies or miscarriage rate for the analysis of unilateral LOD versus bilateral LOD. There were no data available on multiple Pregnancies.

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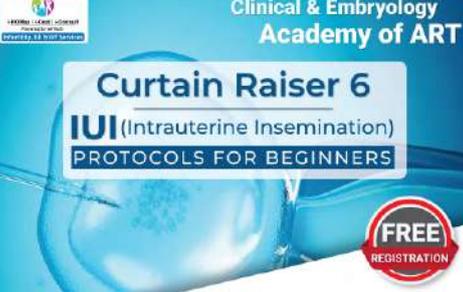
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**CURTAIN RAISER 7**  
Physics of Ultrasound for IUI & IVF

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**CURTAIN RAISER 8**  
Gonadotropin's in ART

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**Curtain Raiser 9**  
Luteal Phase Defect

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**AZOOSPERMIA**

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**MALE INFERTILITY**  
Tips & Tricks

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**CURTAIN RAISER 12**  
**IUI**  
Tips & Tricks

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Adjuvants in IUI, IVF & Embryology

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Interpretation, Tips & Tricks

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**Curtain Raiser 15**  
Hormonal Evaluation in Infertility

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## Curtain Raiser 16

### Ovarian Reserve Assessment



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## Curtain Raiser 17

### Endometriosis: IUI and IVF



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## Curtain Raiser 18

### Male Sexual Dysfunction



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## Curtain Raiser 19

### Selecting the best sperm for IUI and IVF



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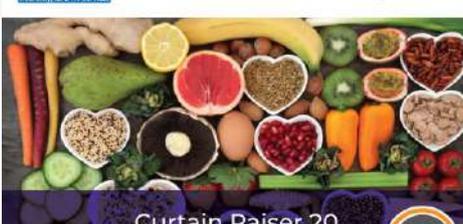
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## Curtain Raiser 20

### Antioxidants in ART



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## Curtain Raiser 21

### PCOS in ART



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## Curtain Raiser 22

### ART ACT 2021



**FREE REGISTRATION**

**SUNDAY**  
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## Curtain Raiser 23

### THIN ENDOMETRIUM



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## Curtain Raiser 24

### Best Incubators for an IVF Laboratory



**FREE REGISTRATION**

**SUNDAY**  
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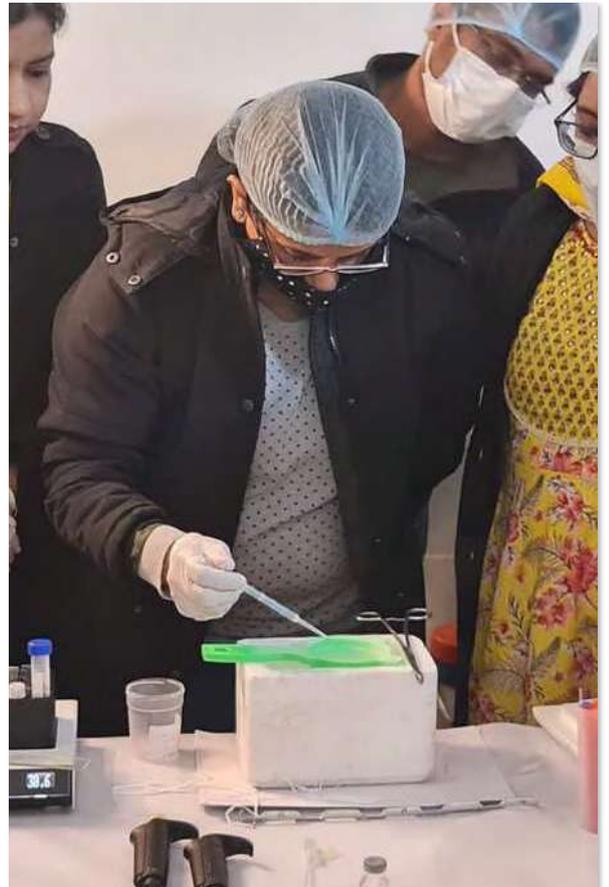
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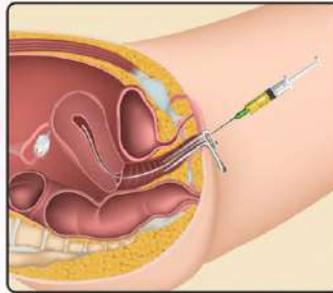
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Embryology, Embryo  
Culture, ICSI, Cryobiology,  
QA/QC



## Course 2

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



## Course 3

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



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