# M.Ch.-REPRODUCTIVE MEDICINE AND SURGERY

# THE TAMIL NADU Dr. MGR MEDICAL UNIVERSITY, CHENNAI

# Syllabus – M.Ch. REPRODUCTIVE MEDICINE AND SURGERY

## INTRODUCTION

Infertility affects 10-15% of the population. Recognizing the need to address this problem the WHO has classified infertility as a disease. There have been many major advances in this specialty in the last 40 years. Today, Reproductive Medicine and Surgery is a well-established super specialty of Obstetrics and Gynecology. This super specialty focuses on various aspects of human reproduction, both male and female. Technical features of the specialty include fertility promoting minimally invasive / open surgery and assisted reproductive technology (ART) such as in-vitro fertilization (IVF). Continuous ongoing research developments in infertility, embryology, fertility preservation and stem cell programs have made it a very challenging specialty. Formal super specialty training courses have been established in most Western Countries with both the United Kingdom and Australia having 3 year training programs.

The current syllabus for MS - Obstetrics and Gynecology does not adequately cover advanced infertility issues like assisted reproduction, embryology or minimally invasive surgery. Since most teaching institutes do not have these facilities nearly all post graduates do not have any exposure / experience in advanced infertility treatment like intra uterine insemination, in-vitro fertilization or intracytoplasmic sperm injection (ICSI). Embryology forms a very important part of this subspecialty. Currently there is a paucity of embryology training courses in India and there is great need to have properly qualified personnel.

The practice of reproductive medicine and surgery involves complex ethical issues with which specialists need to be familiar with. Although the ICMR has developed guidelines and the ART bill is likely to be approved and implemented in near future which aims to regulate the field of assisted reproduction in the country. The National Board has a 2 year fellowship program but the training centers are again mainly in private clinics. To fulfill the need for a formal structured training program for gynaecologist, National medical commission initiated M.Ch. in Reproductive Medicine and Surgery.

## AIM

The main purpose of the course is to impart knowledge in all the areas of reproductive medicine and surgery and train the resident in clinical, surgical, endocrinological, diagnostic, laboratorial and technological aspects of infertility and its management. This will help in providing comprehensive and holistic health care for the infertile population as well promotes reproductive health and autonomy. Currently most infertility specialists are hampered by the inability to contribute to the functioning of the embryology laboratory. Students finishing the MCh. Course will be able to function as reproductive medicine and surgery consultants in either teaching hospitals or in the private sector.

## OBJECTIVES

The student should be able to perform the following

1. Complete history of the couple (female and male)
2. Thorough clinical examination of female and male
3. Appropriate diagnostic tests  for female and male
4. Plan treatment
5. Counsel about success rate, complication rate and discuss possible alternative treatment option
6. Advising and preparation of fertility enhancing surgeries
7. Advising and preparation of non-ART treatment
8. Advising and preparation of ART treatment
9. Deal with complex ethical issues around ART treatment

At the end of the course, the student should acquire the following skill sets:

## Clinical skills:

1. Demonstrate the ability to take complete comprehensive history and perform clinical examination for female and male partner and arrive at a clinical diagnosis.

2. Demonstrate the ability to order appropriate investigations and the treatment schedule after counseling.

3. Demonstrate proficiency in all aspects of Assisted Reproductive Technology (ART) including, controlled ovarian stimulation, oocyte retrieval, embryo transfer, luteal support, frozen embryo transfer (FET) and third party reproduction.

4. Demonstrate proficiency in all aspects of non-ART treatment such as ovulation induction and intra uterine insemination (IUI).

5. Demonstrate proficiency in performing fertility enhancing surgeries and give appropriate post-operative advice.

6. Demonstrate proficiency in diagnosing and managing early pregnancy complications such as ectopic pregnancy and heterotrophic pregnancy.

## Laboratory skills:

1. The student should be able to demonstrate proficiency in performing diagnostic andrology examinations such as semen analysis, semen sample processing and DNA fragmentation.

2. The student should be able to demonstrate proficiency in embryological procedures such as assessment of fertilization and oocyte & embryo grading.

3. The student should be able to demonstrate proficiency in therapeutic andrological procedures such as sample preparation for IUI and ART.

4. The student should be able to demonstrate proficiency in embryological procedures such as oocyte retrieval, oocyte denudation, insemination for in vitro fertilization (IVF) embryo loading and embryo transfer.

5. The student should be able to demonstrate proficiency in cryopreservation procedures such as semen sample preservation and embryo freezing with slow freeze and / or vitrification.

6. The student should be able to run quality control and quality control program and should be able to trouble shoot in ART lab.

7. The student should be able to plan and set up an IUI / ART lab.

## Teaching skills

1. Demonstrate teaching competence for teaching medical, paramedical and nursing students at undergraduate and post graduate levels. The student should be able to transfer knowledge in a clear and understandable manner. They also need to have ability to guide students through group discussion and help in developing analytical thinking.

## Research skills

1. The student should be able demonstrate basic research methodology skills and should be able to plan, design and conduct academic research (primary research)
2. The student should be able demonstrate ability to search relevant literature, critically evaluate and interpret the results of published studies.
3. The student should be able to demonstrate familiarity with systematic reviews and meta-analysis (secondary research). Further, they should also be familiar with ethical aspects of clinical research.

## Communication and interpersonal skills

1. The student should be able to demonstrate counseling and communication skills for various clinical situations in ART/ non ART treatment.
2. The student should be able to develop professional relationship with patients and provide all the necessary information about management/ treatment.
3. The student should be able to work in a team and coordinate with embryologist and the nursing staff for optimal functioning.
4. The student should be able to present and discuss scientific literature in scientific forums.

# THEORY SYLLABUS

## Part 1 Basic sciences

### Anatomy:

- Male and female genital tract
- Anatomy of CNS, kidney, ureters, bladder,
- Thyroid/adrenal
- Anatomy of sigmoid, Rectum, and perineum.

### Physiology:

- Menstrual cycle / ovulation
- Puberty/Adolescence/Menopause

### Endocrinology:

- Relevant to human reproduction - Pituitary hormones / Thyroid function / Control of reproduction.
- Neuroharmones/ autocrine & paracrine
- Intermediate mediators, growth factors, cytokines, macrophages.
- Steroids hormones/globulin/receptors

### Embryology:

- Cell cycle, gametogenesis, Fertilization & cleavage
- Ultra-structure of sperm and oocytes
- Abnormal fertilization
- Cryobiology

## Genetics:

- Nomenclature / Basic principles
- Abnormal gametogenesis /abnormal fertilisation
- Prenatal diagnosis of chromosomal & genetic disorder
- Preimplantation diagnosis

## Immunology:

- Immunology in reproduction
- Immunology in recurrent loss

## Laboratory orientation:

- Principles / Laboratory equipment – handling and maintenance
- Setting up of ART lab & andrology laboratory
- Laminar flow / incubators.
- Quality assurance and quality control +

## Record keeping:

- Computers/statistics/ medical audit

## Andrology:

- Spermatogenesis, Components, Seminogram/ Sperm function tests.

## Pharmacology:

- Ovulation induction drugs/ Gonadotrophins/ GnRH analogues/ estrogen/ progesterone preparation/ hCG

# Part 2

## Infertility:

- Broad outlines of causes of male and female infertility
- Management of male infertility - medical/surgical/ART including ICSI
- Management of female infertility
- Ovulatory disorders/uterine disorders/tubal factor/endometriosis etc.

## Non ART treatment

- Ovulation induction with oral ovulogens/ gonadotrophin
- Ovarian stimulation and IUI protocols

## Assisted reproductive technology

- Evolution
- Different technologies/ techniques
- In vitro fertilization – Embryo transfers
- Controlled ovarian hyper stimulation
- Monitoring /final induction/egg retrieval
- Post transfer monitoring/ luteal support

## Andrology laboratory

- Semen analysis / sperm function tests/CASA
- Processing sperm for various procedures – intrauterine insemination
- Processing samples – testicular / epididymal for ART

## Embryology laboratory

- Culture media
- Egg identification/Handling
- Insemination
- Fertilisation and cleavage check.
- Embryo transfer technique

- Blastocyst culture
- Embryo hatching
- Techniques of intracytoplasmic sperm injection (ICSI)
- Cryopreservation
- Principles of cryopreservation
- Semen freezing /oocyte freezing / Embryo freezing
- Slow freeze techniques / Vitrification
- Laboratory issues – pure air maintenance /trouble shooting
- Time lapse
- Pre implantation genetics / noninvasive genetic screening

### Ethical principles in ART

- ICMR Guidelines and ART bill
- Third party reproduction/ Oocyte donation /surrogacy
- Legal issues

### Early pregnancy

- Diagnosis of early pregnancy
- Early pregnancy complications/ ectopic/ heterotrophic pregnancy

### Counseling

- Patient counseling

## CLINICAL POSTINGS FOR M.Ch. STUDENTS

- Reproductive Medicine and Surgery : 25 months
- ART Laboratory : 09 months
- Urology / Andrology : 01 month
- Endocrinology : 15 days
- Genetics : 15 days
- Outside Centre : 01 month (optional)*

* Incase student visits outside center, the period can be deducted from time period allotted for reproductive medicine and surgery

## SKILL TRAINING

- For endoscopy training, pelvi trainer & video monitoring set up: for laparoscopy training / hands eye coordination.
- For training in microsurgical suturing using appropriate instruments on practice model / set up.

## TEACHING METHODOLOGY

1. Grand rounds : Weekly
2. Teaching programme (Biweekly)

    - Seminars.
    - Subject review
    - Case discussions
    - Journal club / Cochrane reviews.
    -

3. Monthly Audit:

    - Medical audits (IVF data/IUI/ Ovulation induction/ operative data).
    - Key performance indicator for clinical/ laboratory/ nursing areas.

4. Endoscopic training:

    - Introductory classes on endoscopic surgeries – basis & advanced.
    - Pelvi trainer & video monitoring set up: for laparoscopy training / hands eye Co ordination.
    - Facility to record endoscopic surgeries for educational /training purposes available.

5. Other teaching / academic activities.

    1. Compulsory attendance and presentation in a national level conference.
    2. Additionally attendance and participation in state level/regional conference encouraged.
    3. Training in biostatistics: Mandatory attendance for Biostatics workshop/ institutional basic research workshop.

    4. Advanced research methodology activities (optional)
    5. Ethics in medical research workshop
    6. Undergraduate and post graduate teaching sessions

# RESEARCH WORK

1. The student should be able to be involved in selecting a research topic, planning and design of the study.
2. The student should execute the planned study, collect and enter the data and be involved in analysis.
3. The student should be able to be appropriately interpret the study results and discuss the findings in a scientific manner.
4. The student should demonstrate proficiency in scientific writing and write a manuscript for scientific journal.
5. The student should demonstrate ability to critique scientific literature / published article.

# LOGBOOK

Log book should be maintained by the student for periodic assessment and for final examination.

Logbook should be maintained for following procedures:

## Endoscopic surgeries

- Diagnostic Laparoscopy
- Diagnostic hysteroscopy
- Operative Laparoscopy
- Operative Hysteroscopy
- Major operative laparoscopy (Myomectomy / Tubal re anastomosis)
- Major gynecological surgery (open myomectomy/ tubal re anastomosis)

## Andrology

- Semen analysis (diagnostic)
- Semen sample processing for IUI /ART

## Assisted reproductive technology

- Oocyte retrieval
- Embryo transfer / Mock transfer
- Sperm retrieval procedure  PESA/ TESA/ TESE/ Testicular biopsy

## Embryology:

- Oocyte pick up
- Insemination for IVF

- Embryo grading
- Embryo loading/ transfer
- Media/ consumables for therapeutic procedures
- Vitrification

## Diagnostic and Out patient based procedures

- Saline infusion sonography (SIS)
- Hystero salphingography (HSG)
- Ultrasound guided cyst aspiration/ others.

The trainee should perform minimum number of following activities:

- Follicle monitoring for OI/IUI: 100
- Follicular monitoring for ART: 50
- Diagnostic Laparoscopy (P/PA): 20
- Diagnostic Hystero scopy (P/PA): 20
- Operative Laparoscopy / Hysteroscopy (PA): 10
- Intra uterine insemination: 100
- Surgical sperm retrieval (PESA ,TESA, etc) (PA) : 10
- Major surgery (PA/A): 10
- Oocyte retrieval (PA): 20
- ET / Mock transfer (PA/P): 20
- Embryo grading (W): 50

(P: Principal operator, PA: Principal operator assisted by senior, A :Assistant , W : witnessed)

## COMPETENCY ASSESSMENT

Competency will be assessed for psychomotor, cognitive and affective domain periodically. The psychomotor (clinical skills) and cognitive (knowledge) domains will be assessed at the beginning of the course, and then after 1, 2 and 3 years.

The affective domain (counseling and communication skills) assessment will be mainly done throughout the course by observation by faculty.

The clinical competencies will be assessed in diagnostic procedures & investigations, follicular monitoring for OI/IUI/ART, ART related procedures, fertility enhancing surgeries, male infertility related procedures, early pregnancy management and andrology/embryology.

The candidate will also be assessed for cognitive domain by theory based exam once a year.

**The proforma for competency based assessment is attached for reference.***

# THEORY EXAMINATION

1. Minimum prescribed period of training: 3 Years

2. Minimum prescribed attendance: 80%.

3. Periodic appraisal: Once every year .Yearly appraisal will be done along with competency assessment.

4. Examiners: NMC recognized Professor with at least 6 years' experience in the field of reproductive medicine & surgery

5. Conduct of examination:

Theory – 4 papers (Maximum marks 100 for each paper).

| Theory paper | Topic |
|---|---|
| Paper I | Basic sciences applied to Reproductive Endocrinology/ Assisted Reproductive Technology |
| Paper II | Principles of Embryology/Andrology and ART |
| Paper III | Assisted Reproductive Technologies / Operative Gynaecology/ Genetics |
| Paper IV | Recent advances in Assisted Reproductive Technology/ Embryology, ethical & legal issues. |

Each paper will contain:

1. Essay questions (2) - 2 X 15 = 30 Marks

2. Short Notes (10) - 10 X 7 = 70 Marks

---

Total 100 Marks

---

## PRACTICAL SCHEME:

| Particulars | Time for candidate to examine the cases | Time for examiners to question the candidates | Maximum marks |
|---|---|---|---|
| Long case | 1 case x 60 minutes | 60 minutes | 100 |
| Short case | 2 cases x 15 minutes | 30 minutes | 100 |
| Ward rounds | 4 patients x 5 minutes | 20 minutes | 100 |
| OSCE* | 5 stations x 3 minutes | 15 minutes | 50 |
| Viva voce** | Viva voce & competency assessment | 15 minutes | 100 |
| Log book | | | 50 |
| | | Total | 500 |

* OSCE stations will be based on case scenarios, hormonal assays, ART programming, spotters from endoscopy, drugs and laboratory, research methodology.
**Viva voce will include images (radiological and endoscopy), instruments, consumables & drugs and counseling session.

**Total marks for practical: 500 marks**
**The candidate should pass theory and practical separately.**

# REFERENCE BOOKS

## Suggested books

- Clinical Gynaecologic Endocrinology and Infertility by Leon Speroff
- Reproductive Medicine and surgery by Wallach Zawr
- Structural Abnormalities and Reproductive Failure by Gerards Letttevie
- Hand book of IVF by Trounson
- IVF and Assisted Reproduction by Peter R. Bridden
- Genetics and Assisted Human Conception by A. Van Steirteghem
- Textbook of Assisted Reproductive Technologies– Laboratory and Clinical Perspectives: David K. Gardner, Ariel Weissman, Colin M. Howles, Zeev Shoham
- Vitrification in assisted reproduction- User manual and trouble shooting. By Michael J Tucker & J Mann
- Hysteroscopy – Visual perspectives of Uterine Anatomy, Physiology and Pathology by Michael S. Baggish, Rafael F. Valle, Hubert Guedj
- Novak's Text book of Gynaecology
- TELINDE'S Operative Gynaecology
- The BOURN Hall Guide to Clinical and Laboratory practice

# JOURNALS

1. Human Reproduction
2. Human Reproduction Open
3. Fertility & Sterility
4. Reproductive Biomedicine
5. Journal of Human Reproductive Sciences
6. European Journal of Obstetrics and Gynecology & Reproductive Biology
7. Human Reproduction Update
8. Urologic Clinics of North America
9. Cochrane Library access
10. Andrology