Curriculum

FNB Fellowship

Reproductive Medicine

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I. PROGRAMME OBJECTIVES

The practice of reproductive medicine involves the following major sub group of patients

A. Infertile couple with female factor

- Anovulation (WHO type 1, 2, 3, 4)
- Tubal factor: tubal obstruction, peri-tubal adhesions and hydrosalpinx.
- Uterine cavity abnormality both congenital and acquired (fibroid, adenomyoma, polyps, synechia, septum and other uterine malformations).
- Endometriosis.
- Endocrine abnormality (hyperprolactinemia, hyperandrogenism, thyroid dysfunction, congenital adrenal hyperplasia etc)

B. Infertile couple with male factor

- Erectile & Ejaculatory dysfunction.
- Obstructive azoospermia.
- Non- obstructive Azoospermia.
- Other sperm Abnormality (OATs).
- Endocrine abnormalities (hypogonadotrophic hypogonadism).

C. Couple with decreased gamete reserves to be offered donor gamete or donor embryo program

D. Third Party Reproduction and its ethical and legal issues (ICMR guidelines)

- Oocyte donation
- Embryo donation
- Sperm donation
- Surrogacy

II. TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching programme should include:

1. Case presentations & discussion- once a week
2. Seminar – Once a week
3. Journal club- Once a week

4. Grand round presentation (by rotation departments and subspecialties)- once a week
5. Faculty lecture teaching- once a month
6. Clinical Audit-Once a Month
7. A poster and have one oral presentation at least once during their training period in a recognized conference.

The rounds should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan) interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

Theoretical: The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.

Symposia: Trainees would be required to present a minimum of 12 topics based on the curriculum in a period of two years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.

Clinical: The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

Bedside: The trainee would work up cases, learn management of cases by discussion with faculty of the department.

Journal Clubs: This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The

contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.

Research: The student would carry out the research project and write an original research paper/article. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

III. SYLLABUS

Basic Sciences

1. Anatomy: Comprehensive knowledge of the regional anatomy of the pelvis which includes female and male reproductive organs. Detailed knowledge of gross anatomy of hypothalamus, pituitary and adrenal glands. Comprehensive knowledge of the histology of the genital tract and endocrine glands related to reproduction. Detailed knowledge of cell structure in relation to function.
2. Physiology: Comprehensive knowledge of human physiology with particular reference to the female and male reproductive system.
3. Genetics and molecular biology: Detailed knowledge of sexual differentiation and common inherited disorders. Knowledge of the principles of inheritance of chromosomal and genetic disorders. Detailed knowledge of chromosomal abnormalities involve in reproduction.
4. Embryology: Comprehensive knowledge of gametogenesis, fertilization and early embryo development. Comprehensive knowledge of development of the reproductive organs and abnormalities associated with it. Knowledge of common fetal malformations.
5. Pathology: Detailed knowledge of the cytopathology and histology of the female and male reproductive tract.
6. Biochemistry: Knowledge of the metabolism and function of neurotransmitters, receptors, autocrine and paracrine factors.
7. Biophysics: Knowledge of the physical principles and biological effects on reproductive organs of heat, sound and electromagnetic radiation, understanding of the principles of laser, isotopes, X rays, ultrasound and magnetic resonance imaging.
8. Immunology: Detailed Knowledge of immune mechanisms and of the principles of reproductive immunology.

9. Pharmacology: Comprehensive knowledge of the properties, pharmacodynamics, actions, interactions and hazards of pharmacological agents which are used in reproductive medicine and particularly the compounds which could have a deleterious effect on the reproductive tract and adverse epigenetic influence.

Clinical Sciences

1. Infertility: Comprehensive knowledge of epidemiology, causes, investigations and management of female and male infertility.
2. Endocrinology: Comprehensive knowledge of gynaecological and andrological endocrinology including its applications in reproductive medicine.
3. Reproductive Genetics: Detailed knowledge of genetic disorders related to female and male reproduction (infertility, recurrent abortions, etc).
4. Pediatric and adolescence: Detailed knowledge of normal and abnormal sexual development and of specific disorders affecting young females and males and adolescents
5. Disorders of menstruation: Comprehensive knowledge of normal menstruation and of the pathophysiology of menstrual disorders, their investigations and management
6. Andrology: Comprehensive knowledge of normal and abnormal spermatogenesis, as well as of testicular, epididymal and accessory sex glands patho-physiology. Comprehensive knowledge of erection and ejaculation, as well as their physiopathology. Detailed knowledge of endocrine changes in spermatogenesis, seminogram and sperm function tests.
7. Andrology laboratory: Semen analysis, processing of semen for various procedures – intrauterine insemination ,IVF/ICSI, processing samples of testicular / epidydymal sperms for ICSI.
8. Assisted reproductive technology: Evolution of different technologies in ART. Controlled ovarian stimulation, oocyte retrieval and embryo transfer techniques. Comprehensive knowledge of endocrine therapy, especially ovarian stimulation and its complications. Comprehensive knowledge of the ART: insemination, IVF, ICSI. Comprehensive knowledge of gamete and embryo donation. Comprehensive knowledge of pre-implantation genetic diagnostic techniques
9. Embryology laboratory: Culture media, oocyte identification, insemination, fertilization and cleavage check, blastocyst culture, embryo hatching, techniques of intra-cytoplasmic sperm injection, cryopreservation and its principles. Semen

freezing /embryo freezing/oocyte freezing with slow freeze techniques or vitrification.

10. Comprehensive knowledge of reproductive surgery and competence in common fertility enhancing endoscopic and open surgeries.
11. Ultrasound: Detailed knowledge and competence in ultrasound in all aspects:-

    a) Pelvic ultrasound in women and ability to diagnose pathological conditions of female genital tract
    b) Scrotal ultrasound
    c) Follicle monitoring
    d) Ultrasound guided invasive procedures.

12. Statistics and epidemiology: Detailed knowledge of statistical analysis. Collection of data in reproductive medicine as well as the knowledge of calculating effectiveness of infertility treatments. Detailed knowledge of setting up and interpreting clinical trials. Knowledge of evidence based medicine pertaining to human reproduction as well as the knowledge of meta-analysis or guidelines on diagnosis or management of various conditions given by important medical bodies such as RCOG, ASRM, ESHREE or Cochrane.

13. Psychosomatic: Knowledge of psychosexual and stress related disorders. Detailed knowledge of the psychopathology and management of psychosexual disorders, and the influence of stress conditions such as ejaculation disorders, impotence and vaginismus.

14. Ethics and law: Detailed knowledge of ethical and national legal issues involved in reproductive medicine and ART and the resources required in providing adequate health care in hospital and wider community.

Detailed Syllabus

A. Basic & Applied Sciences:

- Basic Anatomy and physiology of male and female reproductive system
- Applied Pharmacology, Biochemistry and Pathology of the male and female reproductive system
- Physiology : Menstrual cycle / ovulation
- Endocrinology: Relevant to human reproduction – hypothalamic-pituitary-ovarian hormones.

- Ovarian Hormones: Structure, Biosynthesis, Function, Mechanism of Action, and Laboratory Diagnosis. Knowledge of autocrine and paracrine hormones.
- Endocrine disturbances affecting reproduction such as thyroid and adrenal function. Physiologic and Pathophysiologic Alterations of the Neuroendocrine Components of the Reproductive Axis
- Normal puberty and pubertal disorders.
- Polycystic ovary syndrome and other hyperandrogenic states
- Abnormal Uterine Bleeding
- Disorders of Sex Development
- Reproductive Immunology and Its Disorders
- Ultra-sonography in reproductive medicine
- Endoscopic surgery, both Hysteroscopy and Laparoscopy
- Diagnosis of male and female infertility
- Ovulation Induction
- Monitoring of Ovulation
- Intrauterine insemination
- Controlled Ovarian Stimulation
- Embryology :Gametogenesis and fertilization
- Genetics : Nomenclature / Basic principle / Pre-implantation genetic diagnosis
- Laboratory equipment – handling and maintenance, record keeping, quality control and quality assurance
- Andrology: Spermatogenesis.
- Andrology laboratory: Semen analysis and sperm function tests
- Infertility: Broad outlines of causes of male and female infertility. Workup of male and female partner.
- Assisted reproductive technology: Evolution and different technologies
- Processing sperm for various procedures –for intrauterine insemination, IVF, ICSI
- Processing samples of testicular / Epididymal sperms
- Embryology laboratory
- Culture media
- Egg identification
- Insemination
- Normal/abnormal Fertilization and cleavage check.
- Blastocyst culture
- Embryo hatching
- Techniques of intra-cytoplasmic sperm injection
- Cryopreservation

- Principles of cryopreservation
- Semen freezing / oocyte freezing/ embryo freezing
- Slow freeze techniques / vitrification
- Ovum pick up and embryo transfer
- Safety issue in ART including OHSS and multiple pregnancies
- Embryology lab quality control and maintenance
- Exposure to laboratory techniques in ART
- Storage and use of gametes
- Basics of reproductive genetics

B. Genetic history and counseling

C. Pre-implantation genetic diagnosis

D. Pre-implantation genetic screening

E. Endometrial Receptivity assay

F. Ethical principles in ART

After completion of the course, the reproductive medicine specialist will be proficient in the following areas of learning:

1. Operative gynecological open surgery, minimally invasive surgery and microsurgery for pelvic resurrection.
   - Proficient in the practice of microsurgical principles as applied to the treatment of tubal disease especially with regard to distal tubal obstruction, proximal tubal re-canalization and mid tubal obstruction by end to end anastomosis.
   - Proficient in principles and practice of diagnostic and operative laparoscopy for conditions like ovarian cystectomy/ resection and desiccation of endometriosis /myomectomy and repair of tubal blocks and adhesiolysis etc.
   - Proficient in the principles and practice of diagnostic and operative hysteroscopy for conditions causing infertility like removal of foreign body, polyps, IUCD, biopsy, septum resection, adhesiolysis, cannulation of tubal ostium and myomectomy for sub-mucous fibroid.

- A clear understanding of the principles of reconstructive surgery as applied to Mulllerian duct abnormalities – vaginoplasty for vaginal agenesis, or unification of bicornuate uterus.

2. Reproductive endocrinology and its management.
3. Proficient in the etiology, pathophysiology, diagnosis and management of common gynecological problems related to infertility like – fibroids / endometriosis / pelvic infections /ectopic pregnancy and management of high order pregnancy.
4. Expertise in the use of ovulation inducing agents and hormonal control of the menstrual cycle and controlled ovarian stimulation.
5. Follicular recruitment and oocyte retrieval procedure.
6. Understand and be able to manage OHSS.
7. Trans Vaginal Ultrasonography with particular reference to follicular monitoring and early pregnancy scanning.
8. Andrology: Semen analysis and semen preparation
9. Laboratory Technology: Familiarity with ART laboratory equipment, maintenance and trouble shooting.
10. Oocyte identification and grading, embryo grading, micromanipulation, cell culture, freezing techniques etc
11. Medico legal and ethical aspect

A. Third Party Reproduction
a. Oocyte donation
b. Embryo donation
c. Sperm donation
d. Surrogacy
B. Ethical & medico-legal aspects of infertility management- ICMR guidelines

12. Miscellaneous

- Biostatics & Data management.
- Fertility preservation – Social & Onco- fertility.
- Monitoring & treatment of early pregnancy after ART treatment
- Research Methodology
- Medical statistics
- Writing and presenting a paper

Suggested minimal requirements:

- Assist 10 Proximal cornual block
- Perform 05 Tubal re-canalization procedures
- Minimally Invasive Assist 20 diagnostic laparoscopies
- Assist 20 operative laparoscopies
- Perform 10 diagnostic laparoscopies
- Perform 10 operative laparoscopies
- Andrology Assist 20 PESA, TESA, TESE of testis
- Perform 5 PESA, TESA, TESE testis
- IVF Assist 25 Oocyte retrieval
- Perform 10 Oocyte retrieval
- Laboratory Observe 20 semen analysis & 20 sperm preparation
- Perform 10 semen analysis & 10 sperm wash procedures
- Follow up 5 cases of IVF & 5 ICSI retrieval to embryo transfer (written records)

Counseling sessions

Observed 10 sessions & Performed 25 sessions

1. Reproductive anatomy and physiology of the male and the female.
2. Reproductive endocrinology.
3. Gametogenesis.
4. Fertilization in vivo.
5. Implantation and early embryogenesis.
6. Pathology of infertility - Causes of infertility namely the ovarian, tubal, uterine, male factors, pathology that reduces fertility namely endometriosis, fibroid, adenomyosis uterine anomaly, etc.
7. Approach to investigate and diagnose sub-fertility.
8. Clinical decision making and choice of treatment.
9. Pharmacology - Pharmacological effects of the various drugs including the pharmacokinetics and pharmacodyanamics of the commonly used drugs. Prostaglandins and Other Lipid Mediators in Reproductive Medicine
10. Clinical Embryology.

    - Principles and practice of semen analysis and cryopreservation of semen.
    - Cytology of mammalian and human oocyte to identify stages of oocyte maturation accurately.
    - All aspects of embryology including developmental.
    - Cell biological techniques used in cell and tissue culture.

- Molecular biology and genetics of human reproduction.
- Micromanipulation of sperm and oocytes for carrying out ICSI and single-cell biopsies of embryos for preimplantation genetic diagnosis.
- Principles and functioning of all the equipment used in the laboratory.
- In vitro fertilization of oocytes after processing the gametes.
- Principles and practice of embryo freezing.

11. Anesthesia during the ART procedure.
12. Complication of ART procedure.
13. Ovulation induction during IUI and IVF procedures.
14. Ultrasound and other imaging modalities in infertility.
15. Fundamental of the surgical procedures namely laparoscopy, hysteroscopy etc.
16. Pre-conception evaluation and counseling.
17. Administration setting up the ART unit, quality control and assurance, creating protocol for management and organizing and coordinating of clinical meetings.
18. Research and audit.
19. Counseling of the infertile couple Implicative, therapeutic, ethical and social.
20. Teaching.
21. Clinical andrology.

Topics to be included in all subjects:

- Biostatistics, Research Methodology and Clinical Epidemiology
- Ethics
- Medico legal aspects relevant to the discipline
- Health Policy issues as may be applicable to the discipline

IV. COMPETENCIES

1. Ovulation induction protocols. The trainees work in the hospital out-patient unit where they share the responsibility with the consultant in the evaluation of the infertile couple, Participate in the decision marking depending on the couple's need; formulate a plan of action, pre-procedure assessment, counseling, protocol selection, monitoring the patient for response and early detection of side- effect, etc. The trainee receives instruction and is guided by the consultant in acquiring the cognitive and technical skills for the various diagnostic and therapeutic procedures.

2. Ultrasound and other imaging. The trainee acquires special competence in ultrasound imaging both in the pre-procedure evaluation and in the monitoring of the infertile women.

3. Clinical Embryology. Each trainee is required to spend a minimum required time in the IVF laboratory.

4. Surgical training. The trainee is required to participate in the pre-procedure assessment; surgical procedure and the post operative follow up the patients who undergo laparoscopy, hysteroscopy and laparotomy.

5. Research and Audit. The research project should be approved and should demonstrate the basic principles of the research. The trainee is required to participate in the audit of the ART procedure and should obtain knowledge in quality control and assurance.

Objective Structured Assessment of Technical Skill

You have to be competent in the below

- Caesarean section
- Diagnostic hysteroscopy
- Diagnostic laparoscopy
- Hysteroscopic surgery
- Laparoscopic adhesiolysis
- Laparoscopic treatment of endometriosis
- Laparoscopic ovarian cystectomy
- Laparoscopic salpingectomy
- Laparoscopic salpingostomy
- Myomectomy

The academic activities of the programme in the hospital should include:

- Regular academic sessions - 2 sessions per week
- Case discussions - One per week
- Seminars - One per month
- Paper presentation. - one per year
- Audit - 2 per year
- Projects - One in 2 years

- Research - as co-Author - one in 2 years
- Thesis
- Conferences - 2 per year
- CMEs - 4 per year minimum CME's to be attended – 6, maximum – 8
- Workshops. - one per year (2 works shop)

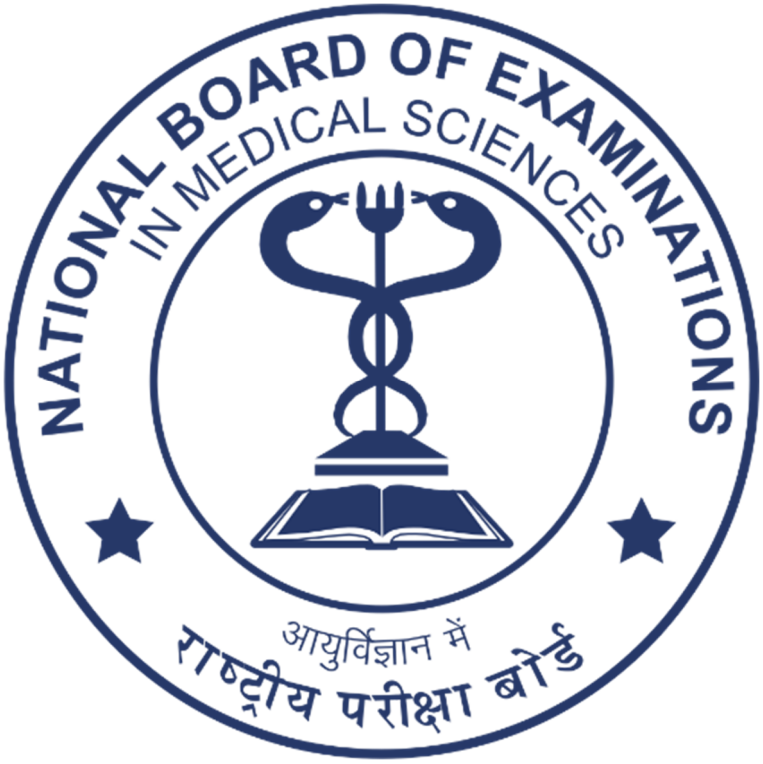
V. LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s) The candidate will maintain the record of all academic activities undertaken by him/her in log book.

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.



आयुर्विज्ञान में राष्ट्रीय परीक्षा बोर्ड

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