

Curriculum

FNB Fellowship



Fetal Radiology

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I. INTRODUCTION

In the past few decades there has been phenomenal development in Fetal Radiology & Imaging consequent to technological advances in ultrasound and MRI and advent of genetic testing. There is a growing need for formal education and training in this field of radiology

II. GOALS & OBJECTIVES OF THE PROGRAM

1. Programme Goal

DNB Fetal Radiology Fellowship curriculum is designed to provide an opportunity for Radiologists with an organized, comprehensive and supervised education in fetal radiology. This shall also provide an opportunity for selected Radiologists to further develop their fetal imaging and interventions skills with competency in prenatal diagnosis, counseling and management of various fetal anomalies integrating the various modalities of radiological and allied investigations.

2. Programme Objectives

The fellowship course in fetal radiology is targeted at developing experts in Fetal Imaging with abilities to perform a complete range of diagnostic imaging and interventional procedures in this field. On completion of the course, the candidate shall be capable of delivering the highest quality of patient care by making an early and accurate diagnosis and guiding subsequent management, become clinically competent and be able to pursue both clinical and experimental research in this field.

III. TEACHING AND TRAINING ACTIVITIES

1. Academic Training:

Journal Club	2 per month
Seminar	2 per month

Clinical Case Discussion	2 per week
Pathology Meeting	1 per week
Research Review	1 per 3 months
Clinico-Radiological Meeting	1 per week
Formal Lectures	2 per month

2. Rotational Postings:

Ultrasound including post processing:	9 months
Doppler including fetal echo and Neurosonogram:	6 months
MRI:	2 month
Clinical fetal medicine:	1 month
Fetal intervention including Genetic counselling:	4 months
Elective posting:	2 months

IV. SYLLABUS

1. Ultrasound in Obstetrics

- a. Ultrasound techniques and ultrasound physics
- b. Embryology of fetus
- c. Anatomy of Fetus and Female genital system
- d. Physiology of conception/ ovulation/ implantation/ Embryogenesis/ fetal development/ uteroplacental, placentofetal, internal fetal vascular dynamics.
- e. Biochemistry and aneuploidy markers, pregnancy induced hypertension markers, preeclampsia markers, miscarriage markers.
- f. Incidence, epidemiology and Pathology pertaining to various fetal anomalies
- g. Basic obstetric ultrasound like Introduction to Dating of pregnancy at different gestations, Biometry, First trimester diagnosis and screening, Cervical screening, Fetal wellbeing, Placental localization and grading and Amniotic fluid index
- h. Advanced obstetric ultrasound:
 - Ultrasound at 5-7weeks,

- Ultrasound at 7-10 weeks,
 - First Trimester Aneuploidies Scan,
 - 11-14 weeks Early Morphology Scan,
 - First Trimester Screening for Preeclampsia and FGR,
 - TIFFA scan (targeted imaging for fetal aneuploidy)
 - Second Trimester Anomalies Scan,
 - Fetal Echocardiography,
 - Fetal Neurosonography,
 - Cervical Elastography
 - 3D and 4D Fetal Evaluation,
 - Fetal Growth Evaluation and Ultrasound Based Delivery Decisions.
 - Imaging of Fetal Hydrops.
 - Imaging of Multiple Pregnancy - imaging protocols, complications, Doppler, scoring of staging in TTS, TRAP, etc.
 - Imaging of Placenta, Membranes and amniotic fluid
- i. Doppler- Normal and abnormal forms at various gestational age and interpretation. Doppler of uterine arteries, umbilical artery, middle cerebral artery, aortic isthmus, ductus venous, umbilical vein, placental vasculature.
 - j. TVS: TVS in early pregnancy, 1st trimester and 2nd trimester, ectopic gestation, gestational trophoblastic neoplasia,
 - k. TVS in Infertility - Diagnostic TVS -2D,3D, elastography, Therapeutic TVS, Oocyte aspiration, Guided FNAC, BIOPSY, Aspiration of abscess
 - l. Cervical incompetence evaluation

2. Prenatal Diagnosis, Interventional Procedures, and Therapy of Various Abnormalities of Above Systems:

- a. Noninvasive screening
- b. Invasive screening: Chorionic villus sampling (CVS), amniocentesis, amnioreduction, amnioinfusion, Cordocentesis, fetal reduction, laser coagulation etc.
- c. Prenatal/Fetal therapy: the candidate should be familiar with Blood product transfusion, Transplacental medication, Laser or radiofrequency ablation of vascular anastomoses, Shunt placement, Extensive fetal surgery, etc.

3. Fetal MRI - Physics, techniques and interpretation of fetal MRI.

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4. **Genetics in Obstetrics** - Protocol based history, reports analysis, risk analysis, counselling, discussion about complications, cost, etc.
 5. **PC - PNDT Act:** Thorough knowledge of PC - PNDT act and its amendments from time to time. VIII. PNDT compliance learning (form A, F, G, D, register, signages and following non-disclosure of fetal sex).
 6. **Others:**
 - a. Protocols and various national & international guidelines for various ultrasound scans.
 - b. Principles of radiation and ultrasound safety
 - c. Principles of drug and environment fetal teratogenicity
 - d. Artificial intelligence in fetal evaluation
 - e. Personal development and management skills – Communication, team building and appraisal skills.

V. COMPETENCIES

After completion of 2 years fellowship the candidate should have developed following competencies:

1. Have knowledge of basic ultrasound physics, knobology, and how to apply different system settings.
2. Able to perform Early pregnancy scans, 1st trimester anomaly scan, 2nd trimester TIFFA scan, growth and Doppler scan, fetal echo, Fetal neurosonogram, 3D, 4D scanning, STIC imaging and post processing etc.
3. Able to plan and interpret Fetal MRI
4. Able to perform fetal invasive procedures - CVS, amniocentesis, etc.
5. Able to provide Genetic counselling
6. Risk calculation and interpretation in aneuploidy and PIH
7. PNDT compliance.
8. Able to do under guidance, Procedures like amnioreduction, amnioinfusion, intra-amniotic drug infusion, laser coagulation, microwave ablation, fetal reduction, therapeutic drainages and catheter insertions.
9. To Guide Obstetricians in guided OT procedures using sonography like MTP, PPH salvage procedures, IUCD removals, oocyte retrieval etc.

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10. Use charts for calculating percentiles and their interpretation.
 11. Present papers in conferences, by collecting case files, and learn to publish data in journals.

VI. 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.

VII. RECOMMENDED TEXT BOOKS AND JOURNALS:

1. **Text books:**
 - a. Callen's ultrasonography in Obstetrics and Gynaecology.
 - b. Diagnostic Ultrasound, 5th Edition, Authors: Carol Rumack, Deborah Levine
 - c. MRI of fetal and maternal diseases in pregnancy - Gabriele Masselli
 - d. Fetal Echocardiography – Lindsay Allen

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- e. Text book of foetal abnormalities – Peter Twining
 - f. Donalds School Text Book of Ultrasound in Obstetrics and Ultrasound
 - g. Doppler ultrasound in Obstetrics and Gynaecology – Joshua A Copel

2. Journals:

- a. Ultrasound in Obstetrics and Gynecology – Wiley online library
- b. Journal of fetal medicine – Springer
- c. Donald school journal of ultrasound in obstetrics and gynecology
- d. Maternal fetal medicine journal- Chinese Medical Association (CMA)
- e. Fetal diagnosis and therapy- karger Publishers
- f. International journal of infertility and fetal medicine
- g. Seminars in fetal and neonatal medicine journal- Elsevier
- h. Journal of maternal-fetal medicine and neonatal medicine –scimago journal
- i. Indian journal of maternal-fetal and neonatal medicine - Red Flower Publication Pvt. Ltd.
- j. American journal of Obstetrics and Gynecology - Elsevier (USA)
- k. International journal of pregnancy and child birth
- l. Journal of maternal-fetal investigation- French society of ultrasound in medicine and biology
- m. Research publications – The fetal medicine foundation
- n. Fetal ultrasound – Mayo Clinic
- o. Journal of medical ultrasound



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