Guidelines

for

Competency Based Training Programme

in

DrNB- Interventional Radiology

2020

NATIONAL BOARD OF EXAMINATIONS IN MEDICAL SCIENCES

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I. Programme Goals and Objectives:

A. Programme Goals

- To make them understand & implement the knowledge regarding the role of various interventional techniques, helpful in the management of different clinical conditions. At the end of his/her training, he/she should becapable to take up a career in teaching institution or in Interventional Radiology center or in research.
- Aimed at imparting training in both interventional radiology so that the candidate is fully competent to practice, teach and do research in the discipline of interventional radiology. Candidate should be well versed with medical ethics and consumer protection act and other legal aspects pertaining to clinical practice.
- To orient and train student in applied aspects of imaging techniques relevant to intervention.
- Training will be oriented for technical aspects of clinical radiology, management of various ailments and post treatment follow up in the patients.
- Ultimate goal will be to provide quality education for the postgraduates and quality Interventional Radiological care for different sections of the society.

B. Programme Objectives

Upon completion of his training, the DrNB in Interventional Radiology candidate should be:

- Familiar with the signs, symptoms, etiology, pathogenesis, natural history and management of vascular & non-vascular disorders amenable to diagnosis and/or treatment by percutaneous methods guided by imaging.
- Able to obtain clinical history, carry out relevant physical examination and communicate effectively with patients and relatives about the diseases and procedures as required.
- Have knowledge and training to comply with legal and ethical standards in carrying out clinical, procedural and post procedural patient care.
- Be knowledgeable about consent and other legal requirements of performing and recording details of clinical examination, evaluation and intra- as well as post-procedural care.
- Able to perform and interpret non-invasive and invasive imaging evaluation of diseases of the vascular systems, and of other regions amenable to IR therapy
- Knowledgeable about the management protocols of these disorders, including drug therapy and non - IR therapeutic alternatives.
- Aware of indications and contraindications for vascular and nonvascular interventional radiologic procedures.

- Experienced in pre-procedural clinical evaluation of patients and providing post procedural follow-up care

- Able to perform and interpret invasive vascular and non-vascular interventional procedures to the standards required and established by professional bodies and accepted by the practitioners.

- Knowledgeable about IR technology and hardware available for various procedures and anatomical areas

- Knowledgeable about new and evolving interventional techniques & technology

- Have in depth knowledge and training in the physical aspects of imaging, hazards of radiation and measures of protection.

- Able to interpret research publications and evaluate their value and relevance to the practice of IR. Understand research methodology and its principles. Carry out effectively a scholarship role in VIR.

- Able to carry out the role of a team leader and member in the VIR team with a thorough understanding of the role of each team member.

- Able to manage the available resources effectively to optimize healthcare delivery in Interventional Radiology.

- Able to perform the role of an effective member of healthcare teams with skills to effectively consult and interact in interdisciplinary teams.

- Able to give effective professional and legal opinions on diseases and procedures in Interventional Radiology.

- Practice ethical medicine and be an advocate for the patient.

II. Teaching and Training Activities

The fundamental components of the teaching programme should include:

- Case presentations & discussion- once a week
- Seminar – Once a week
- Journal club- Once a week
- Ward round - daily / as and when required
- Faculty lecture teaching- once a month
- Clinical Audit-Once a Month
- A poster and /or 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.

A. **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.

B. **Symposia:** Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of three 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.

C. **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.

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

E. **Journal Clubs**: This would be a weekly academic exercise. A journal article from a reputed international or national journal will be selected by candidate in consultation with faculty. The candidate would summarize and discuss the scientific article critically. A faculty member will 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.

F. **Research**: The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. 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

1. Suggested Broad Outline

A. Patient Safety & Occupational Hazards

- Selection & evaluation of patients before IR procedure
- Identify high risk factors for procedure and anesthesia
- Importance of consent taking before procedure
- Radiation dose management and basics of radiation protection
- ALARA and its application in IR
- Patient education and follow up

B. Physics related to IR procedures

- Basic DSA physics.
- Types of DSA equipment
- Various advanced application of DSA such as 3D rotational angiography, Xper CT etc.
- Ways to limit fluoroscopy time and radiation dose during a procedure.

C. Technical aspects relevant to IR (basic knowledge of hardware)

- Sheaths, wires, catheters
- Micro guidewire and Micro catheters
- Balloons, stents, stent grafts
- Embolizing agents
- Other products: stroke intervention, IVC filters, sclerosants, DE Beads
- Basic techniques: Seldinger, Pigtail etc.

D. Pharamacology relevant to IR

- Local anesthetic agents: Lignocaine, Bupivacaine etc.
- Heparin / Heparin induced toxicity
- Other anticoagulants including newer agents
- Anti-platelet agents
- Thrombolytic agents
- Contrast agents and their effects
- Emergency/ important drugs: Adrenaline, Nor Adrenaline, Atropine, Steroids,Anti histamines, Dopamine, Labetalol, Nitroglycerine, Abciximab, Tirofiban, rtPA, Urokinase, Nimodipne and other drugs used in ICU
- Common antibiotics – doses, adv effects used in peri-procedure period

- Drugs used for sedation/ analgesia for short procedures: Midazolam, Fentanyl, Tramodol etc.
- Common antihypertensives and antidiabetics and their implications in IR procedures

E. Anatomy and Pathology relevant to IR procedures

- Anatomy of important parts of body in brief with emphasis on arterial and venous anatomy and nerve supply or other important applied aspects relevant to IR
- Pathology of various vascular and non-vascular disorders managed by IR
  a) CNS: Aneurysms, AVMs, DAVFs, Venous thrombosis
  b) H & N: Parangaliomas, JNF, Thyroid lesions etc
  c) Chest: common SOLs, Bronchial and Vascular anatomy relevant to endobronchial/ vascular interventions
  d) Abdomen: Liver anatomy with emphasis on vascular concepts and Liver transplant evaluation, Renal anatomy and transplant anatomy etc
  e) Other: Osteoid osteoma , Vascular malformations etc

F. Evaluation and management of disorders managed by IR (division as above)

- Epidemiology
- Clinical features
- Pathology
- Imaging Features
- Management options (surgical/ endovascular/ medical)

G. Specific Endovascular training modules

i) Section A: Non-Vascular Interventions in the Chest, Gastrointestinal Tract and Hepatobiliary Systems

- Image-Guided Biopsy (Excluding MSK)
- Image-Guided Aspiration and Drainage of Collections and Abscesses
- Gastrointestinal Interventions
- Enteral Tube Placement (Gastrostomy, Gastro-jejunostomy, jejunostomy, Caecostomy)
- Gastrointestinal Stenting
- Hepato-Pancreatico-Biliary (HPB) Intervention

ii) **Section B: Intervention of the Genito-Urinary Tract and Renal Transplants**

- Pelvicalyceal and Ureteric Obstruction
- Renal Stone Disease
- Renal Masses and Perirenal Collections
- Genito-Urinary Interventions
- Prostatitis (Abscess)
- Renal Transplant Interventions

iii) **Section C: Interventional Radiology of the Musculoskeletal System**

- Image-Guided Biopsy
- Percutaneous Ablation of Bone and Soft Tissue Lesions
- Intra-Articular Injections Under Image Guidance
- Percutaneous Osteoplasty
- Spinal Intervention
- Interventions in Vertebral Body Compression Fractures (VBCF)
- Spinal Procedures for Disc, Nerves and Facet Joints

iv) **Section D: Interventional Oncology**

- Fundamental Interventional oncology
- Vascular Interventional Oncology
- Non-Vascular Interventional Oncology

v) **Section E: Vascular Diagnosis and Intervention**

- Arterial Disease
- Peripheral Arterial Disease
- Aortic and Upper Extremity Arterial Disease
- Aortic Dissection and Aneurysmal Disease
- Supra-aortic Arterial Disease
- Vascular Malformations
- Vascular Trauma
- Visceral Arterial Disease
- Arterial Problems in Obstetrics and Gynecology
- Prostate Artery Embolization (PAE)
- Priapism

vi) **Section F: Venous Disorders**

- Venous Thrombosis and Insufficiency
- Pulmonary Thromboembolic Disease
- Disease of the Superior and Inferior Vena Cava
- Portal and Hepatic Venous Interventions
- Portal Venous Disease and Trans jugular Intrahepatic Portosystemic Shunt (TIPS)
- and Balloon-Occluded Retrograde Trans venous Obliteration (BRTO)
- Hepatic Venous Disease and Budd-Chiari syndrome
- Gonadal Venous Interventions
- Hemodialysis Access
- Central Venous Access
- Venous Sampling

vii) **Section G: Important Neuro-interventional procedures**

- Carotid stenting
- ECA territory embolizations
- Brain aneurysm management
- Other brain vascular malformations
- Stroke management

2. **Practicals**

i) **Physics**

- Effectiveness of Lead Apron and other protective devices
- Physics of DSA / Angiography and Fluoroscopic techniques
- Quality control in a DSA / interventional radiology lab.

ii) **Practical Training In DSA/ Interventional Radiology (IR) Lab**

- Basic table movements and DSA/ Fluoroscopic controls
- Radiographic views used in various interventions
- Contrast agents being used for procedures
- Post processing and use of other advanced angiographic techniques

iii) **Anatomy**

- Relevant gross and angiographic anatomy for various IR procedures

IV. Posting

The postgraduate student should be posted in all sections so that there is adequate exposure to aspects of interventional radiology. The proposed duration of postings is as under.

- OPD/ Ward — 4-6 months
- USS/ Doppler — 4-6 months
- CT / MRI — 4-6 months
- DSA Lab — 18-24 months
- External attachment to another IR institute (optional) — 01 month

Suggested Schedule for Rotation of Residents

1st Year	Ward	Ward	USS	CT	DSA/ IR	DSA/ IR
	OPD	OPD	Doppler	MRI	DSA/ IR	DSA/IR
2nd Year	Ward	USS	DSA/ IR	CT	DSA/ IR	DSA/ IR
	OPD	Doppler	DSA/ IR	MRI	DSA/ IR	DSA/ IR
3rd Year	Ward	DSA/ IR	DSA/ IR	CT	DSA/ IR	DSA/ IR
	OPD	DSA/ IR	DSA/ IR	MRI	DSA/ IR	DSA/ IR

Interventional Radiological Procedure which the candidates should know

S.No.	Name of Procedure	As Observer	As first assistant	Independently under supervision
	Radiodiagnosis			
1	Image guided FNAC/ Biopsy	20	30	50
2	Pigtail/other drainages	10	20	30
3	Diagnostic Angiograms	20	20	30
4	Non-vascular interventions (PTBD/ PCN/ RFA)	20	30	50
5	Neuro-interventions	20	50	20

6	Peripheral Vascular interventions (limb angioplasty/ stenting,BAE, TIPSS/ DIPSS, Embolizations etc)	20	30	50

V. Competencies

A. General Principles

Acquisition of practical competencies being the keystone of postgraduate medical education, postgraduate training is skill oriented. Learning in postgraduate program is essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

B. Teaching Sessions

In addition to conducting and reporting of routine and special investigation in the area of posting under direct supervision, formal teaching session to be held on working days. These include seminars in physics and interventional radiology, journal clubs, case presentations; Interdepartmental meets, Film reading session.

C. Teaching Schedule

The suggested departmental teaching schedule is as follows:

- Seminar
- Film Reading
- Case presentation
- Inter department meet
- Journal club
- Statistical meetings: Weekly/monthly
- Mortality meetings
- Interdepartmental Meetings
- Film Reading / Physics Seminar

Note

- All sessions will be co-ordinate by the faculty members.
- All the teaching sessions to be assessed by the consultants at the end of session and graded
- Attendance of the Residents at various sessions should be at least75%

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.

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

- Personal profile of the candidate
- Educational qualification/Professional data
- Record of case histories
- Procedures learnt
- Record of case Demonstration/Presentations

VII. Recommended Text Books and Journals:

1. Reference Books

- Abrams textbook of angiography and interventional radiology
- Diagnostic Neuro angiography by Anne Osborne
- Vascular & Interventional Radiology: the requisites Kaufmann & Lee

2. Journals

- Seminars in Interventional radiology
- Journal of vascular and interventional radiology (JVIR)
- Cardiovascular and interventional radiology
- Journal of Neuro-interventional Surgery (JNIS) for Neuro intervention
- RSNA journals – dedicated articles/ sections for interventions
- AJNR (American Journal of Neuro Radiology)

Specific subspecialty journal articles pertaining to dedicated topics of intervention