Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow

Post-Graduate Teaching Programme

Department of Radiodiagnosis

1. Course Offered:

One Year Certificate course in Neuro-radiology

2. Introduction of the department of Courses:

Sanjay Gandhi Postgraduate Institute of Medical Sciences was established in late eighties by the State of Uttar Pradesh to create a centre of excellence for the providing medical care, education and research of high order. It is chartered to function as University under State Act.

The Institute provides extensive investigative facilities. Its department of Radiodiagnosis is equipped with 64 Slice Multi-detector CT Scan, 3 Tesla MRI Computerized Radiography, DSA and Automatic Positioning GI Table, besides several routine and Mobile X-ray units and Ultrasound equipments.

The institute fulfils the objective of creating a centre of excellence for providing tertiary medical care and teaching and research of the highest order. At the same time there is also great need of producing dependable super specialist also in diagnostic radiology, who can act as a key figure for that super speciality radiology such Neuro-radiology, Cardiovascular Radiology and GI radiology. An expert in these radiological superspecialities will contribute in having problem oriented approach, better and uniform patient care and will avoid errors in the interpretation of various radiological procedures and will have better research capabilities.

With the unique facilities already created and the excellent infrastructure of the Institute, the department of Radiodiagnosis can offer teaching raining programme of the highest level and conduct need oriented research.

The training programme shall aim to provide sound knowledge of the diagnostic & investigative aspects of Neuro-radiology along with brief knowledge of applied clinical sciences & basic sciences and training in all the procedures related to Neuro-radiology with particular emphasis on Computerized Tomography/MRI/Neuroangiography/Interventional Neuro radiology/Conventional & Computed Radiography of skull & spine with all other Neuro-radiological procedures like myelography, CT Cisternography, ultrasound applicable of neonatal Neuro-radiology etc. The candidate will also have a brief review of other diagnostic modalities. e.g. radionuclide imaging, EEG, CSF analysis etc.

In addition to the sufficient exposure in radiology department the candidate will also have the opportunity to be in the clinical department of

Colour Coding

Global	GREEN
Regional	BLUE
National	ORANGE
Local (State)	PINK

Neurology/Neurosurgery for a brief period to have a closely interrelated view point of clinical approach. In addition the candidate will also have the knowledge of basic physics/principles of diagnostic imaging equipments. The candidate will have the relevant knowledge of the allied basic sciences. The over all aim of the programme is to have a dependable superspecialist who can integrate the allied sciences and act as the key figure in the Neuro-radiological imaging field.

Faculty Associated:

A) Dr. Zafar Neyaz, MD, Professor, Radiodiagnosis.
Speciality: CT, MRI Volumetric Studies.

B) Dr. Vivek Singh, DNB, Additional Professor, Radiodiagnosis.
Speciality : Interventional Neuroradiology

C) Dr Namita Mohindra MD, Additional Professor, Radiodiagnosis.
Speciality: CT, MRI.

3. **Eligibility Criteria: M.D. (Radiodiagnosis) or M.D. (Radiology) or DNB**

4. Selection Procedure:
All India open entrance examination as required by the Institute similar to Senior Resident entrance examination.

Duration of the course – 1 year

5. Syllabus Neuro-radiology:

(a) Basic Sciences:

Anatomy:

Embryology of CNS, Anatomy of CNS, Head and Neck Circulation, Cross Sectional & Sagittal Anatomy of CNS in relation to CT & MRI & US.

Physiology:

CSF, Cerebral Circulation, Blood Brain Barrier, Physiology of Stroke, hypoxia, Ischaemia relevant to CNS

Pathology:

Cerebral Haemorrhage, Cerebral edema, Raised ICP Brain tumor Aneurysms, AV Malformation, Inflammatory Lesions of Brain, Ischemia, Infarct, Stroke, Trauma, Spinal Tumor, AV Malformation Inflammatory lesion of Spinal Cord Meninges & Vertebral Pathology.

Physics & Computer Sciences:

Image intensifier, TV, Biplane Angiosystem, Steroscopic Magnification, DSA, Conventional & Computed Tomography, Spiral CT, CT Angiography, CT 3D Recon, Computerised

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Radiography, ultrasound basic principles & it's application to Neuro-radiology, Especially Neonates, MRI/MRS.

(b) Clinical Sciences:
Neurology:

Role of Radiology in clinical Neurological diseases and correlation of clinical information with the radiological results. Problem oriented approach with a view point to select the most appropriate radiological investigation of choice in order of preference.

Neurosurgery:

Pre & Post operative follow up of the Neurosurgery patients with provisional clinic radiological diagnosis correlation of clinical information with radiological investigation results, problem oriented approach to select the most appropriate radiological investigation of the choice, Emergency treatment & knowledge of outline of management of acutely ill patients during and after investigative procedures.

(c) Neuro-radiology:
Conventional:

Interpretation of plain x-ray of skull, various special views and their interpretation. Craniovertebral anomalies. Intracranial clacification, raised I.C.T., Preposteorative chest radiology.

Angiography:

Knowledge of Angiographic Catheters and Accessories. Biplane Angio with DSA, Stereoscopic magnification, Automatic processing. Performing independently the flush aortography and selective catheterization of head and neck vessels. Experience in Vascular Interventional Techniques related to Neuro-radiology. 3D Rotational Angiography, Neuro Sonography & Transcranial Doppler. Cranial and neck vessels angiography.
Knowledge of Craniofacial vascular malformations.
All Interventional Neuroradiological procedures like catheter angiography of subclavians, brachiocephalic, carotids , vertebral and intracranial vasculature.
Spinal angiograms

Other Specialized Procedure:

Neonatal Ultrasound:

Knowledge of neonatal brain, ultrasound probes and physics along with capable of performing & interpreting ultrasound applicable to Neonatal brain.

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Computerised Tomography:

Plain CT/Dyanamic/Contrast CT/CT Cisternography/ Sagittal & Coronal Reconstruction, Crossectional & Sagittal Anatomy in relation to CT & Corelation of CT findings/ Spiral CT, CT Angiography, 3D CT Imaging with other investigative procedures.

All Interventional Neuroradiological procedures like catheter angiography of subclavians, brachiocephalic, carotids , vertebral and intracranial vasculature.

Magnetic Resonance Imaging (MRI):

- Crossectional & Sagittal Anatomy in relation to MRI application of MRI to Neuro-radiological diagnosis.
- Introduction to MRS and Functional MRI studies.
- CSF flow studies.

(6) **Training Programme:**

Seminars in basic sciences and clinical sciences, (Anatomy Physicology, Pharmacology, Neurology, Neurosurgery)

CT	-	1 month
Neuroangiography	-	5 months
MRI, Neonatal US	-	4 months
Nuclear Med.	-	7 days
Neurology	-	7 days
Neurosurgery	-	15 days
Apex Trauma Center, SGPGIM (for conventional & trauma Neuro-radiology)	-	1 month

Note- posting may be changed as per department requirement.

Academic/Teaching:

1. Seminars to be presented by candidate (1) month.
2. Journal club once a forth night.
3. Neuro-radiology conference once a week
4. Candidate will participate in research/training programme of the department.
5. Publication of 1 research papers in national / international journals.
6. Project work along with faculty associated.
7. Should participate in teaching/seminars of junior and senior residents.

(7) **Evaluation:**

Evaluation Scheme:

Exam pattern is same as adopted for other PDCC courses – by the institute.

(8) **Book (Text Books) Basic Requirements:**

1. Text book of Radiology by Sutton.
2. Diagnostic Neuro-radiology by Taveras & Wood
3. Modern Neuro-radiology by ewton & Potts.

4. MRI of the central nervous system by Bradley, Atlas, Brandt Zavadsky, Norman.
5. Spine Nervous system by Modic.
6. Fundamental physics of Radiology by Meredith.
7. Cranial computed tomography by William Houghton.
8. MRI physics for radiologists _ Horowitz.
9. Pediatric neuro-radiology, Wolpert/Barnes.
10. MRI of the spine Modic, Masaryk, Ross.
11. Diagnostic Neuro-radiology by Osborn.
12. Neuro-radiology Vol Iv Rosenberg.

(9) Journals Recommended:

1. Radiology
2. American Journal of Roentgenology
3. Radiological Clinics of North America
4. American Journal of Neuro-radiology.
5. journal of Computed Assisted Tomography
6. CT (Journal of Computed Tomography)
7. Seminars in CT & MRI
8. Neuroradiology
9. Journal of Neuro-radiology
10. Investigative Radiology
11. Interventional Neuroradiology.

E learning resources

1. www.RSNA.org
2. www.RCR.AC.UK
3. www.sor.org
4. www.neuroangio.org

Resources available in SGPGI

5. Clinical Key which gives access to various Radiology journals https://www.clinicalkey.com
6. BMJ
7. Uptodate
8. Ermed.in

SGPGI Library SGPGI (record of books and journals till 2020) may be seen on following ip address : 172.25.0.53. Radiology books 803,, 31 foreign journals and 1 Indian journal.

Board of Studies:

1. First dated - 27.07.1998
2. Second dated –
3. Third dated : 17.06.2013

Course started from: Year : 2002