

# D.M.-PEADIATRIC NEUROLOGY

# **THE TAMIL NADU Dr. MGR MEDICAL UNIVERSITY,** **CHENNAI**

## **Syllabus - D.M. PEDIATRIC NEUROLOGY**

### **Goals and objectives common to pediatric neurology training**

- Introduce the candidate to a wide variety of neurologic disorders with emphasis on those encountered in the field of pediatric neurology
- Teach the art of detailed and accurate history taking and neurological examination for the recognition of neurologic disorders
- Teach the most current pathophysiological explanations for neurologic disorders
- Teach the utility and appropriate use of specialty procedures (including MRI, CT, EEG, evoked potentials, sleep studies, EMG/NCS and CSF evaluations) in the evaluation and management of neurologic diseases
- Teach current concepts of therapy including mechanisms of drug action and available surgical intervention
- Expose candidates to neurological illness in systemic disorders
- Assume an increasing level of responsibility for planning and executing evaluation and treatment of neurologic disease under appropriate supervision
- To be involved in teaching fundamental neurologic examination to medical students and other rotating residents
- Learn to prioritize clinical responsibilities, provide timely service, and seek appropriate consultation and support
- Develop all necessary skills required for the independent practice of neurologic care

### **Goals to be achieved year wise**

#### **First year**

- Become familiar with the principles of neurologic localization
- Evaluation of patients with altered level of consciousness and basics of neurologic critical care

- Differentiation of structural and metabolic neurologic disease
- Neurologic presentation of systemic diseases

### **Rotation will be as follows:**

- Introduction to Pediatric Neurology 4 months
- Adult Neurology 2 months
- Paediatric critical care 2 months
- Neuropathology 1 month
- Paediatric Neuro surgery 1 month
- Neonatology 1 month
- Child Psychiatry 1 month

## **Second year**

Gain competency in the neurologic examination of infants and children

- Understand the principles of normal and abnormal development
- Plan appropriate diagnostic evaluations and subsequent therapy for children with common and serious neurologic disorders
- Become experienced in the evaluation and management of premature and term infants in the neonatal intensive care with neurologic problems
- Become familiar with principles of neurologic rehabilitation
- Gain outpatient exposure to multiple neurologic subspecialties
- Develop competence in long term outpatient management of neurologic disorders
- Electrophysiology training

### **Rotation will be as follows**

- Pediatric Neurology 9 month
- EEG & EP 1 month
- EMG 1 month
- Physical Medicine & Rehabilitation 1month
- Neuro Radiology 15 days

## **Third year**

- Focussed exposure and learning in subspecialty areas of paediatric neurology

### **Rotation will be as follows:**

- Pediatric Neurology 9 months
- Child Psychiatry 1 month

- Developmental Paediatrics 15 days
- Medical Genetics 15 days
- Training in a Pediatric Neurology centre elsewhere in the country 1 month

## **Syllabus**

### **1. Pediatric Neurology history taking and examination**

- a. Neurologic examination of older child
- b. Neurologic examination of infants and toddlers
- c. Neurologic examination of term and preterm infants

### **2. Development of the infant and young child**

- a. Anatomy of neurodevelopment
- b. Physiology of neurodevelopment
- c. Variations of the normal development
- d. Approach to a child with developmental delay

### **3. Neonatal neurology**

- a. Neonatal seizures
- b. Hypoxic encephalopathy
- c. Neonatal brain injury
- d. Injury to the developing preterm brain
- e. Neonatal metabolic encephalopathy
- f. Role of EEG, ultrasonography, neuroradiology

### **4. Disorders of brain development**

- a. Disorders of neural tube development
- b. Disorders of forebrain development
- c. Disorders of cerebellar and brainstem development
- d. Disorders of brain size
- e. Malformations of Cortical development
- f. Hydrocephalus and arachnoid cysts
- g. Congenital anomalies of skull
- h. Prenatal diagnosis of structural brain anomalies

### **5. Neurogenetics**

- a. Introduction to genetics
- b. Chromosomal abnormalities

## **6. Neurometabolic disorders**

- a. Classification, evaluation and approach to a child
- b. Aminoacidemias and organic acidemias
- c. Inborn errors of urea synthesis
- d. Disorders of carbohydrate metabolism
- e. Disorders of glycosylation
- f. Lysosomal storage disorders
- g. Mitochondrial diseases
- h. Peroxisomal disorders
- i. Neurotransmitter-related disorders

## **7. Phakomatoses and allied conditions**

- a. Classification and recognition
- b. Manifestation and genetics of each disorder

## **8. Degenerative disorders primarily of gray matter**

- a. Approach and evaluation
- b. Channelopathies

## **9. Global developmental delay**

- a. Assessment of intelligence quotient
- b. Causes and evaluation, prevention and antenatal counselling
- c. Cognitive and motor regression
- d. Developmental language disorders
- e. Dyslexia
- f. Attention deficit hyperactivity disorder
- g. Autistic spectrum disorders
- h. Neuropsychopharmacology

## **10. Pediatric Epilepsy**

- a. Neurophysiology and genetics of epilepsy
- b. Febrile seizures
- c. Classification, evaluation and management of epilepsy
- d. Status epilepticus
- e. Ketogenic diet
- f. Epilepsy surgery
- g. Behavioural, cognitive and social aspects of childhood epilepsy

## **11. Nonepileptiform paroxysmal disorders and disorders of sleep**

- a. Headaches in children
- b. Breath hold spells and reflex anoxic seizures
- c. Syncope and other paroxysmal events
- d. Sleep-wake disorders

## **12. Disorders of balance and movement**

- a. Hereditary ataxias
- b. Movement disorders
- c. Cerebral palsy
- d. Tics and Tourettes syndrome

## **13. White matter disorders**

- a. Genetic and metabolic disorders of the white matter
- b. Acquired disorders affecting the white matter

## **14. Brain injury and disorders of consciousness**

- a. Impairment of consciousness and coma
- b. Traumatic brain injury in children
- c. Non-accidental head trauma
- d. Hypoxic ischemic encephalopathy in infants and older children
- e. Disorders of intracranial pressure
- f. Spinal cord injury

## **15. Infections of the nervous system**

- a. Bacterial infections of the nervous system
- b. Viral infections of the nervous system
- c. Fungal, rickettsial and parasitic infections of the nervous system

## **16. Brain and spinal cord tumors**

- a. Features, classification, evaluation and management
- b. Paraneoplastic syndromes

## **17. Vascular disorders of the nervous system**

- a. Arterial and venous thrombosis
- b. Intracranial bleed
- c. Neurologic manifestations of rheumatic disorders

## **18. Neuromuscular disorders**

- a. Normal muscle and neuromuscular junction
- b. Anterior and cranial motor neuron disease
- c. Peripheral neuropathies
- d. Inflammatory neuropathies
- e. Diseases of the neuromuscular junction
- f. Muscular dystrophies
- g. Congenital myopathies
- h. Metabolic myopathies
- i. Inflammatory myopathies
- j. Channelopathies – myotonic disorders and periodic paralysis

## **19. Systemic and autonomic nervous system disease**

- a. Endocrine disorders of the hypothalamus and pituitary
- b. Disorders of the autonomic nervous system
- c. Disorders of micturition and defecation
- d. Poisoning and drug- induced neurologic diseases
- e. Neurologic disorders in children with heart disease
- f. Neurologic disorders in children with renal disease
- g. Neurologic disorders associated with gastrointestinal and nutritional disease
- h. Neurologic complications in children with hemato oncological disease
- i. Neurologic complication of immunisation

## **20. Rehabilitation in Pediatric Neurology**

- a. Principles of physiotherapy and occupational therapy
- b. Assistive devices and treatment of spasticity
- c. Pain management and palliative care

## **21. Neuroinformatics**

- a. Use of media in service, education, and research

## **22. Clinical Epidemiology and Community Pediatrics**

- a. Research methodology and biostatistics
- b. National community programmes

## **23. Adult Neurology**

- a. Full clinical examination of an adult neurological patient
- b. Services for adults with physical and learning difficulties and chronic neurological diseases
- c. Acute stroke in adults - differential diagnosis of stroke, aetiology and investigation of acute stroke in young and older adults, secondary prevention of stroke, principles of anti-platelet, anti-coagulant therapy in Transient ischaemic attack, indications for thrombolytic treatment of acute stroke in adults , important anterior and posterior circulation TIA and stroke
- d. Seizures - paroxysmal episodes in adults including syncope and non-epileptic attack disorder, long-term natural history ( into adulthood ) of epilepsy syndromes presenting in childhood, investigations and treatment of epilepsy in adults, including status epilepticus, seizure treatment and anticonvulsants selection in pregnancy and for women of child bearing potential
- e. Headache - headaches/facial pain syndromes
- f. Demyelinating disease - Multiple Sclerosis (MS), Acute disseminated encephalomyelitis (ADEM), role of steroids, symptomatic therapies and disease modifying therapies
- g. Weakness - Use of cholinesterase inhibitors, thymectomy and immunological treatment of myasthenia gravis, diagnosis and management of acute and chronic inflammatory demyelinating polyneuropathies (AIDP, CISP), diagnosis and treatment of inherited and acquired muscle disease, differentiate between upper motor neurone (UMN) and lower motor neurone weakness, recognise the presence and significance of mixed UMN and LMN signs, apparent weakness due to ataxia, recognise and localise lesions to the cerebral hemispheres, brainstem or spinal cord ( including cord compression and syrinx), recognise and localise disorders of root / plexus and peripheral nerves including entrapment neuropathies, be able to plan the appropriate investigation of a patient presenting with weakness
- h. Movement disorder - pharmacological treatment of Parkinson's disease and other movement disorders, investigation of movement disorders, identify correctly dystonic, myoclonic and choreiform movement disorder phenotypes, recognise the clinical features of idiopathic Parkinson, Juvenile Huntingdon and Wilson diseases
- i. Cognitive deficits - major aetiologies and presentations of dementia, assessment instruments and indications for referral for formal neuropsychometric assessment, understand the localising value of focal cognitive deficits, perform a qualitative and quantitative mini mental state

examination. MMSE, recognise and assess the contribution of effective states ( especially depression) to cognitive impairment

- j. Neurodegenerative disease – differential diagnosis of psychomotor regression presenting in adolescence
- k. Paraneoplastic disease - Adult paraneoplastic syndromes including ataxias, neuropathies, ganglionopathies, and myopathies
- 1. Neurometabolic disease - Recognise adult presentations of mitochondrial and metabolic disease.

## **24. Ethical issues in child neurology**

## **25. Determination of brain death and issues related to organ transplantation.**

### **List of skills and diagnostic procedures**

- Blood sampling – capillary, venous and arterial
- Insertion of peripheral and central lines
- Pediatric ventilation
- Care of a comatose child
- Pediatric ventilation
- Lumbar puncture, subdural tap, ventricular tap
- Muscle biopsy
- Nerve biopsy
- Skin biopsy
- Electroencephalography
- Nerve conduction studies and electromyography
- Evoked potentials
- Neurometabolic diagnostic procedures
- Brain Death Certification.

### **Research & Education**

- Framing of a research question, designing and conducting a study, analysis and interpretation of data and paper writing
- Preparing seminars, lectures
- Tutorials and clinics for juniors

## Communication

- Develop professional interpersonal relationships with colleagues in department and other specialities
- Learn appropriate communication skills with families and children

## ELIGIBILITY CRITERIA:

A candidate must possess M.D Paediatrics or its equivalent.

## LOG BOOK

The postgraduate student of a postgraduate degree course in super specialities shall maintain log book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The logbook shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of logbook to be done by the Head of department as per 52<sup>nd</sup> SAB.

The evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills and attitude.

## COMPETENCY ASSESSMENT:

### Overall :

|                                                                                                                    |                   |
|--------------------------------------------------------------------------------------------------------------------|-------------------|
| 1. Communication/commitment/ contribution/ compassion towards the patients and innovation                          | - 10 marks        |
| 2. Implementation of newly learnt techniques                                                                       | - 10 marks        |
| 3. Documentation of casesheets/discharge Summary/review                                                            | - 10 marks        |
| 4. Number of cases presented in clinical meetings/ journal clubs/ seminar/ papers presented in conference          | - 10 marks        |
| 5. No. of medals/ certificates won in the conference / quiz competitions and other academic meetings with details. | - 10marks         |
| <b>Total</b>                                                                                                       | <b>- 50 marks</b> |

|              |   |          |   |             |
|--------------|---|----------|---|-------------|
| Assessment I | - | February | - | First year  |
| II           | - | August   | - | First year  |
| III          | - | February | - | Second year |
| IV           | - | August   | - | Second year |
| V            | - | February | - | Third year  |
| VI           | - | May      | - | Third year  |

### **VIVA INCLUDING COMPETENCY ASSESSMENT - 100 MARKS(50+50)**

## **THEORY SCHEME:**

Paper I - Basic Sciences (Consisting of Neuro Anatomy, Neuro - Physiology, Neuro Chemistry, Neuro pathology, Neuro Pharmacology, Neuro Microbiology, Parasitology, Immunology, Epidemiology and Genetics.)

Paper II - Clinical Neurology, Neuro Psychiatry, Neuro Psychology.

Paper III - Neuro Radiology, Electro Physiology, Neuro Otology, Neuro Ophthalmology and investigatory procedures.

Paper IV - Recent Advances in Neurology.

Theory Mark Distribution:      2 Essays                      - 2 X 15 = 30 Marks  
                                                  10 Short Notes        - 10 X 7 = 70 marks

## **PRACTICAL SCHEME:**

| Particulars | Time for the candidate to examine the cases | Time for examiners to question the candidates | Maximum Marks |
|-------------|---------------------------------------------|-----------------------------------------------|---------------|
| Long Case   | 1 case X 45 minutes                         | 45 minutes                                    | 100           |
| Short Case  | 2 Cases X 15 minutes                        | 30 minutes                                    | 100           |
| Ward rounds | 3 patients X 5 minutes                      | 15 minutes                                    | 100           |
| OSCE        | 5 Stations X 3 minutes                      | 15 minutes                                    | 50            |
| viva voce   |                                             | 15 minutes                                    | 100           |
| Log Book    |                                             |                                               | 50            |

## **List of books**

1. Swaiman's Pediatric Neurology - Principles and practice
2. Pediatric Epilepsy Diagnosis & therapy - John M Pellock
3. A clinical guide to epilepsy syndromes and their treatment - CP Panayiotopoulos
4. Vander Knaap Magnetic Resonance of myelination and myelin disorders
5. Diagnostic Imaging - Anne G Osborne
6. Pediatric Neuro Radiology- Paolo Tortori Donati
7. Neurology of hereditary metabolic disease of children - Gilles Lyon
8. A clinical guide to inherited metabolic diseases - J.T.R Clarke
9. Neurology of the newborn - Volpe
10. Technique of Neurological examination - De Meyer
11. Clinical methods - Hutchison
12. Neurological differential diagnosis - John Patten
13. De Jong's The neurological examination
14. Neuromuscular disorders of infancy, childhood and adolescence: a clinician approach - Royden Jones
15. Muscles testing and function - Florence Peterson Kendall
16. Electromyography and neuromuscular disorders: clinical - electrophysiologic correlations - David Preston & Shapiro
17. Clinical Neurophysiology - Misra & Kalita
18. Current practice of clinical electroencephalography - John Ebersole & Timothy Pedley
19. Atlas of EEG patterns - John Sterne & Jerome Engel
20. Epidemiology (Biostatistics) - Leon Gordis
21. Medical statistics - Sundaram, Dwivedi & Srinivas
22. Evidence based medicine - Prof. Kameshwar Prasad
23. The Harriet Lane handbook
24. Clinical Neuroanatomy - Richard Snell
25. Human Embryology - IB Singh/ Langman
26. Ganong's review of medical physiology

## **Other books**

1. Cerebral palsy - Miller
2. Localization in clinical Neurology - Paul Brazis
3. Epilepsy - Engel
4. Electroencephalography : Basic principles, applications and related fields - Neidermeyer