

## **1. Fellowship in Pediatric Endocrinology**

### **1. Information related course**

The Pediatric Endocrinology speciality clinic was established in the Department of Pediatrics in 2016 and since then, children with endocrine problems have been managed effectively. The Pediatric Endocrinology clinic has a good outpatient load with referral from Pimpri Chinchwad, as well as peripheral areas nearby, thus providing enough exposure to the trainees .

Objective

The objective of this course is to provide the necessary training and clinical exposure to the candidate so that he/she can develop and manage a pediatric endocrine set up independently/ work as a consultant in pediatric endocrinology.

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#### **1. Course Highlights**

- Level of the programme – Fellowship in Pediatric Endocrinology
- Duration of programme – 1 year
- Eligibility for the course - MD in Paediatrics / DNB Pediatrics
- Admission – Eligibility – cum- Entrance Exam and Interview at Institute - Dr D Y Patil Medical College, Hospital and Research Centre, Pimpri, Pune.
- Intake capacity - 01 students per year
- Exam pattern - post completion of the course
- Course Co-ordinator – Dr Supriya Gupte, Honorary Consultant and Pediatric Endocrinologist

#### **2. Course design:**

The trainee will spend a year in clinical pediatric and adolescent endocrinology / diabetes and pediatric endocrine research and laboratory training. He/she will complete at least one paper acceptable for publication in a peer reviewed journal, and participate in the teaching programs in the department (case presentations, seminar, journal club, radiology/nuclear medicine meetings and pathology/mortality/research project presentation/combined endocrinology surgery meeting).

He/she will be responsible for caring for all inpatient in pediatric endocrinology and diabetes admissions, as well as pediatric endocrinology interdepartmental consultations and emergencies. Diabetes education of patients as well as nurses will also be his/her responsibility.

### **COMPETENCIES TO BE ACHIEVED DURING TRAINING**

#### **I. Clinical skills:**

1. Detailed history and examination of all Patients with pediatric endocrine disorders
2. Anthropometry assessment and interpretation based on age and gender specific normative data
3. Growth chart plotting and interpretation
4. Assessment of Bone age
5. Performing Hormonal provocative tests effectively and interpreting them.
6. Having knowledge regarding pre-requisites for sampling, appropriate timing for sample collection and correct sample processing as per requirement of specific hormonal assays.

7. Management of diabetes
  - A. Patient and nurses education for effective management of diabetes in children.
    - i. Administering insulin injections using syringe / insulin pens
    - ii. Self monitoring of blood glucose and maintaining a sugar diary
    - iii. Provide Dietary advice and Carbohydrate count
    - iv. Sick day management and management of hypoglycemia
  - B. The candidate will be trained in Insulin dose adjustment in patients
  - C. Advising necessary investigations and interpreting them.
  - D. Management of Diabetic ketoacidosis in the Intensive care setting.
8. In patient management of pediatric endocrine disorders.

**II. Teaching Skills:**

Competency to teach basics of pediatric endocrinology to undergraduates/postgraduates and nurses training in inpatient management of disorders such as diabetes.

**III. Research Skills:**

The trainee will achieve competency in carrying out research studies, writing a paper (case reports/ original research/ review articles) and statistical analysis of data. During the training, the candidate must present at least 1 paper/poster, carry out a research project and publish at least 1 article.

**3. TEACHING METHODS:**

- I. Pediatric OPDs – Every Monday and Thursday
- II. Bedside Teaching daily
- III. Teaching:
  1. Case Discussion twice a week
  2. Seminar once a week
  3. Journal club once a week
  4. Project work discussion once a week
  5. Interpretation of lab reports once a week

Teaching and learning	150 hours	(10 CREDIT POINTS)
Assignment/Seminar/ Group discussion/Tutorial	90 hours	(6 credits)
Practical/Demonstration/ Hands on Experience /Lab work	360 hours	(12 credits)
Field work/clinical work		
Research work	360 hours	( 12 credits)
Total Credits	- 40 credits	

**6. SYLLABUS**

**1. Principles of hormone measurement**

Principles of RIA/IRMA/ELISA. Definition of sensitivity, specificity, inter and intraassay CV. When to accept or reject an assay -preliminary knowledge.

## **2. Principles of hormone action**

Categories (and examples) of hormones, type of receptors, second messengers - broad categories with some examples, particularly relevant to disease.

## **3. Genetics in pediatric endocrinology**

Definition of and familiarity with Southern, Northern and Western blots, RFLP, PCR, FISH, karyotyping.

Awareness of genetics forms of pediatric endocrine diseases, for example, hypopituitarism /growth hormone deficiency, childhood thyroid disease, genes in sexual differentiation.

## **4. Fetal-neonatal**

Adult consequences of fetal disease

- neonatal hypoglycemia and IDM
- neonatal hypo and hyper calcemia and magnesemia
- neonatal thyrotoxicosis and hypothyroidism

## **5. Growth : short and tall stature**

Normal growth – patterns, control of (including details of hormonal control of growth), measurement, bone age and growth charts

Short stature - causes, diagnosis and management

Tall stature - differential diagnosis, treatment, Marfan, Sotos

Dysmorphic syndromes – Details of Turner, Noonan, Prader Willi, Klinefelter.

Others – Briefly (Down, Russell Silver, Laurence Moon Beidel)

## **6. Skeletal dysplasias**

Achondroplasia, spondyloepiphyseal dysplasia (SED), SEMD, Morquio, hypochondroplasia, metaphysial dysplasia - clinical and radiological features

## **7. Disorders of Growth Hormone (GH) production and action and treatment of GH deficiency.**

Etiology of GHD including genetic causes, cranial irradiation (GHD) and tumours, clinical features. (Detailed knowledge of problems in GH testing). Detailed knowledge of indications for monitoring of GH therapy. Clinical features and diagnosis of Laron dwarfism and gigantism, of tall stature, differential clinical features and diagnosis of gigantism.

## **8. Puberty**

Initiation of normal puberty, physical changes in normal puberty

Delayed puberty, definition, CDGP, hypo and hyper hypogonadotropic

hypogonadism. Kallman, Klinefelter and Turner syndromes in detail, diagnosis and management of primary and secondary amenorrhoea.

Precocious puberty -definition, true puberty, peripheral puberty, precocious thelarche and pubarche, diagnosis and management.

Gynecomastia-causes and treatment.

## **9. Periphebertal hyperandrogenism**

PCOD – pathogenesis, differential diagnosis and management

## **10. Thyroid**

Physiology.

Genetic causes of congenital hypothyroidism

Interpretation of thyroid function tests

Congenital hypothyroidism-newborn screening, etiology, treatment, outcome studies.

Goitre in childhood, thyroiditis

Iodine deficiency disorders- daily requirement, typical syndromes of iodine deficiency

Graves disease-etiology, clinical features, treatment including permanent ablation. Neonatal graves – details of clinical features and treatment

- Thyroid hormone resistance – preliminary knowledge, types and important clinical features.

## **11. Adrenal**

Steroidogenic pathways – names of intermediary, metabolites and enzymes

CAH -21 hydroxylase deficiency – genetics, clinical features, management, long term outcome; prenatal diagnosis and therapy – basic knowledge.

11  $\beta$ OH, 3 $\beta$  HSD, 17OH, 17  $\beta$ HSD – presentation and management

Cushing syndrome-clinical features, peculiarities of different etiologies of Cushing and differences from adults; interpretation of the various screening and definitive tests, imaging, IPSS. Treatment medical, surgical, radiotherapy and outcome. Non-Cushing adenoma, carcinoma, incidentaloma

Hypertension with hypokalemia, and differential diagnosis.

Addisons disease – etiology, clinical features and treatment, polyglandular autoimmune syndromes.

Phaeochromocytoma-clinical features, diagnosis (biochemistry, precautions and interpretation), imaging and treatment.

## **12. Sexual differentiation, Cryptorchidism, Micropenis, Hypospadias**

Normal embryology and hormonal influences.

Genes involved – basic knowledge of current status.

Details of clinical features, diagnosis and treatment

## **13. Pituitary:**

Hypopituitarism

Diabetes insipidus and SIADH, cerebral salt wasting-basic knowledge of osmoregulation., differentiation of central/nephrogenic/primary polydipsia and treatment

Craniopharyngioma -detail knowledge of presentation imaging and management

#### **14. Diabetes mellitus and lipids**

Classification, differences between type 1, type 2 and FCPD.

MODY – basic knowledge of differentiating clinical features and management

Type 1-pathogenesis – (basic knowledge) and pathophysiology

Details of clinical features, management, long term follow-up-detail, including complication screening, DKA/hypoglycemia.

Lipids –only basic knowledge relevant to clinically management.

#### **15. Hypoglycemia**

Neonatal hypoglycemia and IDM - details of causes.

Knowledge for disorders of fuel metabolism. Persistent hyperinsulinemic

hypoglycemia of infancy – details of pathogenesis, clinical features management and outcome.

#### **16. Obesity**

Control of appetite and satiety

Definition – clinically relevant knowledge

Management – strategies and some knowledge of outcome

#### **17. Metabolic Bone Disease, Calcium, Phosphorus and Magnesium metabolism**

Hypocalcemia, especially neonatal hypocalcemia etiology, diagnosis and management.

Hypercalcemia, etiology, diagnosis and management.

Calcium sensing receptor disorders and William syndrome

Rickets – complete details of etiology, clinical features, diagnosis and management.

Bone turnover studies, bone physiology – clinically relevant areas only

Osteogenesis Imperfecta, glucocorticoid induced osteoporosis

Fibrous dysplasia and metabolic bone disease of prematurity-full details of pathogenesis and management.

Pediatric DEXA (bone densitometry): interpretation and use.

### **8. Evaluation Method**

#### **ASSESSMENT:**

**Formative assessment** – Logbook assessed and graded periodically for competency in clinical skills, research and academics.

**Summative assessment** – Theory and practical examination at the end of the course

#### **a. Theory Examination – 2 papers (Total 200 Marks)**

- Paper -1 – Pediatric Endocrinology and basics (anatomy, physiology, embryology) - (100marks)
- Paper -2 – Pediatric Endocrinology and Recent Advances - (100 marks)

#### **b. Practical Examination- (Total 200 marks)**

- Case Presentations

- 1 long case – (70 marks)
- 1 short case – (30 marks)
  - Table and Viva-voce – (100 marks)

### **c. Project Work – 100 Marks**

#### **Total Exam Marks – 500 marks**

The theory exam will be conducted before the practical exam.

#### **9. Passing Criteria**

Obtaining a minimum of 50% (100 marks) marks separately in both theory and practical examinations and Project work will be mandatory to pass the fellowship exit examination.

One Poster/Paper Presentation in the conference and Publication of original research paper in index journal in mandatory

#### **2. Duration – 1 Year**

#### **3. Training Facilities –**

1. Pediatric endocrinology OPD with 2 consultant per OPD
2. TIDM clinic with multidisciplinary team
3. Major ward rounds
4. Weekly Webinars including all centers
5. Practice parameters/views and reviews.
6. Journal club

#### **4. Teaching Faculty Details**

- Teaching Faculty Details
  1. Dr. Supriya Gupte  
MD (Pediatrics), Fellowship Pediatric Endocrinology  
Consultant  
MMC Reg No: 2017/10/4974
  2. Dr. Sajili Mehta  
MD, DNB (Pediatrics)  
Fellowship in Pediatric Endocrinology ( MUHS)Consultant  
MMC Reg No: 2012/06/1818

#### **5. Infrastructure**

- Outpatient Clinics for hormonal disorders in children.
- Advanced facilities for management of Diabetes with:
  - Newer insulin therapy
  - Continuous Glucose monitoring system
  - Insulin Pump
  - Growth hormone therapy
  - Treatment of Early puberty – GnRH analogue therapy
  - Hormonal Replacement for Delayed Puberty
  - Treatment of Thyroid disorders
  - Multidisciplinary team for screening & management of Obesity & Type 2 Diabetes

- Joint subspeciality clinics with Pediatric Surgery, Orthopaedics, Neurosurgery.
- State of art Pediatric ICU for management of endocrine emergencies including Diabetic ketoacidosis, adrenal crisis, hypocalcemic seizures and post operative care of pituitary and brain tumors.
- Wards equipped with sufficient nursing and medical staff to manage non-critical children with endocrine disorders
- 3T MRI state of art facility for accurate neuroimaging.
- Excellent backup of central laboratory facilities for hormonal evaluation tests.
- Library facilities providing access to new research around the world.

**6. Fees :** 1,00,000/- (Rupees One Lakh Only)