**SREE CHITRA TIRUNAL INSTITUTE**

**FOR MEDICAL SCIENCES AND TECHNOLOGY**

# Course curriculum for Post-Doctoral fellowship in Pediatric Cardiac Surgery


**TRIVANDRUM – 695 011**

**KERALA INDIA**

Phone +91-471-2443152, 2524269, 2524150

Email: regoffice@sctimst.ac.in

Website: http://www.sctimst.ac.in

Contents:

## I. Aims and Objectives

**Aim:**

The Postdoctoral fellowship in Pediatric Cardiac Surgery is a 1-year fellowship programme in Pediatric Cardiac Surgery. The training Aims at providing sufficient exposure in Caongenital Cardiac Surgery. On completion of the 1-year fellowship programme, he/she will have through knowledge of the speciality and be able to perform simple congenital cardiac procedures independently. He or she will also develop sufficient knowledge and skill for all complex congenital procedures.

**Objectives:**

1. Acquire knowledge of Cardiac, Thoracic and Vascular anatomy.
2. Acquire knowledge of the Congenital Cardiovascular physiology and pathology.
3. Develop Clinical Skills to diagnose and analyse congenital cardiac disorders.
4. Develop familiarity with diagnostic and laboratory investigations and procedures essential for all congenital cardiac procedures.
5. Understanding of the incidence, prevalence, and natural history of cardiac disorders in pediatric patients.
6. Adequate proficiency in Pre-operative management of patients.
7. Develop surgical skills to be able to provide comprehensive and good quality surgical care in Congenital cardiac surgery.
8. Understand the importance of Audit of surgical procedures.
9. Develop research skill and attitude.
10. Exhibit professionalism, Proper attitude and ethical concern.

## II. Syllabus

**PDF Pediatric Cardiac Surgery**

## 1. CONGENITAL CARDIAC SURGERY

### Fundamentals

Surgical Anatomy of the heart, Cardiac surgical anatomy and physiology, cardiac Embryology, Cardiac Surgical Pharmacology, Pathology of Cardiac Surgery, Cardiac Surgical Imaging, Risk Stratification and Co morbidity, Statistical Treatment of Surgical Outcome Data.

### Preoperative/Intraoperative Care

Preoperative Evaluation for Cardiac Surgery, Cardiac Anesthesia, transfusion Therapy and Blood Conservation, Deep Hypothermic Circulatory Arrest, Myocardial protection, Postoperative Care of Cardiac Surgery Patients, Cardiopulmonary Resuscitation.

Temporary Mechanical Circulatory Support, Late Complications of Cardiac Surgery.

### Cardiopulmonary bypass

History, Equipment, Physiology and pathology, Hematology, Clinical applications, Cardiopulmonary bypass in neonates, infants and children.

### Pathophysiology

Congenital heart disease, Left to right shunt physiology, Right to left Shunt Physiology, Admixture Physiology, Parallel circulation Physiology, Single ventricle physiology, HLHS, Valvular heart disease, Rheumatic fever, Congestive Heart failure.

### Immunobiology of Heart and Heart-lung transplantation

**Embryology and development of cardiovascular system and nomenclature**

Development of the heart, septation of the heart, development and resorption of the conus, development of conotruncal malformation, development of the coronary system, development of the pulmonary veins, the embroyology of the vascular arches,nomenclature system in congenital cardiac surgery

**Congenital cardiac conditions**

Atrial Septal Defect and Partial Anomalous Pulmonary Venous Connection, Total Anomalous Pulmonary Venous Connection, Cor Triatriatum, Unroofed Coronary Sinus Syndrome, Atrioventricular Septal Defect, Ventricular Septal Defect, Congenital Sinus of Valsalva Aneurysm , Aortico-Left Ventricular Tunnel, Patent Ductus Arteriosus, Ventricular Septal Defect with Pulmonary Stenosis or Atresia, Pulmonary Stenosis or Atresia and Intact Ventricular Septum, Tricuspid Atresia and Management of Single-Ventricle Physiology, Ebstein Anomaly, Truncus Arteriosus, Aortopulmonary Window, Origin of Right or Left Pulmonary Artery from Ascending Aorta, Anomalies of the Coronary Arteries, Congenital Aortic Stenosis, Coarctation of the Aorta and Interrupted Aortic Arch, Aortic Atresia and Other Forms of Hypoplastic Left Heart Physiology, Congenital Mitral Valve Disease, Vascular Ring and Sling, Complete Transposition of the Great Arteries, Double Outlet Right or Left Ventricle, Congenitally Corrected Transposition of the Great Arteries and Other forms of Atrioventricular Discordant Connection. Double Inlet Ventricle and Atretic Atrioventricular Valve. Anatomically Corrected Malposition of the Great Arteries, Atrial Isomerism, Critical Care.

**Cardiovascular Engineering**

Concept of flow, pressure gradient, heart as pump, prosthetic heart valves, extracorporeal circulation, biocompatibility, materials in cardiovascular application, medical physics, electronics in transucers, clinical monitoring and medical imaging.

**Biostatistics**

Methodology and design of clinical research, Statistical Inference, Biostatistics for clinical Research-sample size, statistical approach, statistical significance, sensitivity, specificity, Univariate and multivariate analysis, acturial survival.

**Surgery for Cardiac Arrhythmias**

Cardiac Rhythm Disturbance, Interventional Therapy for Atrial and Ventricular Arrhythmias, Surgical Treatment of Atrial Fibrillation, Surgical Implantation of Pacemakers and Automatic Defibrillators.

**Other Cardiac Conditions and Operations**

Adult Congenital Heart Disease, Pericardial Disease, Cardiac Neoplasms, Hypertrophic Obstructive Cardiomyopathy, Heart Failure.

**Critical Care**

**Transplant and Circulatory Support**

Heart Transplantation, Mechanical Circulatory Support & Total Artificial Heart, Nontransplant Surgical Options for Heart Failure, Tissue Engineering for Cardiac Valve Surgery, Stem Cell-Induced Regeneration of Myocardium.

**Texts and Journals**

**Textbooks:**

- Cardiac Surgery: morphology diagnostic criteria, natural history, techniques, results, and indications. Kirklin JW, Barrat-Boyes BG. Churchill-Livingstone
- Surgery of the Chest. Sabiston, David C, Spencer. Saunders

- Surgery for Congenital Heart Defects. Stark J, De Leval M. Saunders
- Cardiopulmonary Bypass, Principles and Practice- Glenn P Gravelee
- General Thoracic Surgery- Thomas W Shields
- Vascular Surgery-Rutherford
- Comprehensive Surgical Management of Congenital Heart Diseases-Richard Jonas.

**Journals:**

- Annals of Thoracic Surgery
- Journal of Thoracic and Cardiovascular Surgery
- European Journal of Cardio-Thoracic Surgery
- Indian Journal of Thoracic and Cardiovascular Surgery
- Annals of Paediatric Cardiology
- World journal of Paediatric and Congenital Heart Surgery
- Asian annals
- Circulation
- JACC
- Journal of Heart Valve disease

## III. Program schedule and structure

Duration: 1 year

- Preliminary evaluation in out-patient department.
- pre-operative evaluation and preparation of the patient.
- Assist simple and complex procedures.
- Perform simple therapeutic procedure, Intercostal drainage, sternotomy and sternal closure, removal of intracardiac lines under supervision, removal of pacing wires.
- Perform simple procedures in Theatre: Sternotomy, sternal closure, thoracotomy, Initiation of cardiopulmonary by-pass, weaning from cardiopulmonary by-pass, atrial septal defect closure.
- Perform ASD closure, VSD closure, Intra cardiac repair for TOF and BDG shunt under supervision.
- Intensive care duty under supervision of consultant.
- Training in Echocardiography in Department of Cardiology – 2 weeks
- Observation of diagnostic and therapeutic procedures in Cath Lab – 2 weeks
- Academic presentation focusing on symposium and journal presentations and clinical case discussion.
- Teaching Junior residents.
- The fellow is expected to perform research and submit the research topic with first 4 weeks of joining. He is expected to finish his research and submit before the end of the academic year.