

- Annexe 2 -

Proposition & Structure of the Congenital Cardiac Surgery Training Curriculum

This module is aimed at trainees seeking a career in surgery for congenital heart disease. It is divided into four areas:

1. Knowledge
2. Clinical skills
3. Technical skills and procedures
4. Professional skills

The standard to be achieved is graded from 1 – 4 as outlined at the beginning of each section. It is recognised that because of the rarity and complexity of some conditions, that even at the end of this part of training, the trainee will not be fully competent in all areas. It is anticipated that skills will continue to be developed after appointment to a staff position under mentorship by a senior colleague.

The Contents

Objective

This module is aimed at the trainee who has completed training in the generality of cardiothoracic surgery and wishes to specialise in congenital heart disease. Following completion of this module the trainee will be fully competent in the clinical and operative management of uncomplicated congenital heart disease. It is expected that subsequent professional development in the post CCT period will provide competence in all aspects of congenital heart disease, including complex problems.

KNOWLEDGE

What the 4 point scale means for Knowledge

1. Knows of
2. Knows basic concepts
3. Knows generally
4. Knows both specifically and broadly

BASIC KNOWLEDGE

Physiology

4 Relevant general physiology of childhood

4 Fetal circulation and circulatory changes at birth

4 Haemodynamics: physiology and measurement including shunt calculations

- 4 Physiology of pulmonary vasculature
- 4 Myocardial cellular physiology in immature myocardium
- 4 Electrophysiology, including conduction disorders
- 4 Haemostasis, thrombosis and bleeding
- 4 Acid base balance
- 4 Pulmonary physiology, ventilation and gas exchange
- 4 Metabolic response to trauma
- 4 Vascular biology and reactivity
- 4 Physiology of Cardiopulmonary Bypass including low flow and circulatory arrest.
- 4 Ph and alpha stat CPB management

Anatomy

- 4 Embryology of the heart
- 4 Anatomy of the heart, pericardium and great vessels
- 4 Pulmonary anatomy
- 4 Coronary anatomy and variants
- 4 Anatomy of the peripheral vascular system and vascular conduits including aortopulmonary shunts
- 4 Sequential cardiac analysis and terminology of cardiac malformations

Pathology

- 4 Inflammation and wound healing
- 4 Systemic Inflammatory Response Syndrome
- 4 Effect of growth and pregnancy

Pharmacology

- 4 Drugs used in the treatment of congenital heart disease
- 4 Inotropes
- 4 Anti-arrhythmic drugs
- 4 Haemostatic drugs
- 4 Anti-platelet, anticoagulant and thrombolytic drugs
- 4 Analgesics
- 4 Antibiotics

4 Anaesthetic agents, local and general

4 Hypotensive agents (systemic and pulmonary).

Microbiology

4 Organisms involved in cardio-respiratory infection

4 Organisms involved in wound infection

4 Antibiotic usage and prophylaxis

4 Antisepsis

CLINICAL KNOWLEDGE

General

4 Diagnosis, investigation and treatment of congenital heart disease

4 Results of surgery - common complications and management.

4 Late complications of surgery for congenital heart disease

4 Role of interventional cardiology.

4 Role of mechanical assist (IABP, VAD and ECMO)

4 Indications for referral for transplantation

4 Risk assessment and stratification

4 Cardiopulmonary resuscitation

4 Cardiac arrhythmias

4 Renal dysfunction

4 Multi-organ failure

4 Cardiac rehabilitation

4 Blood transfusion and blood products

4 Wound infection and sternal disruption

4 Types of cardiac prosthesis and indications for use

Specific Knowledge

The anatomy, pathophysiology natural history and management of the following conditions or procedures:

4 Patent ductus arteriosus

4 Aortopulmonary window

4 Atrial septal defect

4 Ventricular septal defect

4 Coarctation

- 4 PA banding
- 4 Aortopulmonary and venous shunts
- 4 Transposition of the great arteries - switch procedure
- 3 Congenitally corrected TGA
- 4 Single ventricle/univentricular heart
- 4 Tetralogy of Fallot/Pulmonary atresia plus VSD
- 4 Pulmonary atresia and intact septum
- 4 Hypoplastic left heart and Norwood procedure
- 4 Truncus arteriosus
- 4 Double outlet right ventricle
- 4 Pulmonary atresia plus VSD and MAPCAs
- 4 Partial and complete atrioventricular septal defects
- 4 Anomalies of the pulmonary venous drainage (partial and total)
- 4 Anomalies of systemic venous drainage
- 4 Congenital aortic valve disease (including supra-valve stenosis)
- 4 LV outflow tract obstruction
- 4 Sinus of valsalva aneurysm
- 4 Congenital mitral valve disease
- 4 Congenital tricuspid valve disease (including Ebsteins abnormality)
- 4 Anomalies of the coronary arteries (including ALCAPA)
- 4 Vascular rings
- 3 Cardiac tumours
- 4 Pericardial disease
- 4 Extra cardiac conduits
- 4 Interrupted aortic arch
- 4 Extra Corporeal Membrane Oxygenation and VAD
- 4 Transplantation for congenital heart disease

CLINICAL SKILLS

What the 4 point scale means for Clinical Skills

1. Has observed
2. Can do with assistance
3. Can do whole but may need assistance
4. Competent to do whole without assistance, including managing complications

HISTORY AND EXAMINATION

4 Cardiovascular system and general history and examination of child or adult with congenital heart disease

DATA INTERPRETATION

4 Routine haematology and biochemical investigations

4 Chest radiograph and ECG

3 Cardiac catheterisation data including interpretation of haemodynamic data, shunt and resistance calculations

3 Echocardiography in congenital heart disease, including 2D, doppler and TOE

PATIENT MANAGEMENT

- 4 Principles of paediatric intensive care
- 4 Management of adults and children following congenital heart surgery
- 4 Management of complications of surgery
- 4 Cardiopulmonary resuscitation
- 4 Diagnosis and treatment of cardiac arrhythmias
- 4 Blood transfusion and blood products
- 4 Wound infection and sternal disruption

TECHNICAL SKILLS AND PROCEDURES

What the 4 point scale means for Technical Skills and Procedures

1. Has observed
2. Can do with assistance
3. Can do whole but may need assistance
4. Competent to do whole without assistance, including managing complications

OPERATIVE MANAGEMENT

- 4 Sternotomy - open and close, including re-sternotomy
- 4 Thoracotomy - open and close
- 4 Preparation for and management of cardiopulmonary bypass including partial bypass
- 4 Approaches for ECMO, cannulation and management.

Surgical management of the following common uncomplicated conditions:

- 4 Patent ductus arteriosus
- 4 Atrial septal defect
- 4 Ventricular septal defect
- 4 Coarctation
- 3 Aortopulmonary window
- 4 Vascular ring
- 4 Aortopulmonary and venous shunts
- 4 PA banding

Surgical management of the following conditions requiring advanced procedures:

- 3 Partial atrioventricular septal defect
- 2 Aortic and mitral valve surgery including Ross procedure
- 3 Open aortic valvotomy
- 3 Open pulmonary valvotomy
- 2 Triangular valve surgery including Ebstein's

- 2 Tetralogy of Fallot/Pulmonary atresia plus VSD
- 2 Fontan procedures
- 2 Extra cardiac conduits and their replacement
- 2 Complete atrioventricular septal defect

Surgical management of the following conditions requiring complex procedures:

- 2 Interrupted aortic arch
- 1 Total anomalous pulmonary venous drainage
- 2 Transposition of the great arteries (switch procedure)
- 1 Rastelli procedure
- 1 Norwood procedure
- 1 Truncus arteriosus repair
- 1 Double outlet right ventricle
- 1 Pulmonary atresia plus VSD and MAPCAs

PROFESSIONAL SKILLS

Professional skills are either **satisfactory** or **referred**

Clinical decision making

Ability to communicate with patient, parents and relatives

Understands consent process for children and can discuss risk /benefit with the patient or the parents

Collaborates with colleagues and has good team skills

Demonstrates ability to prioritise and manage service

Effective time management and personal skills

Demonstrates ability to access knowledge and shows willingness to learn

Recognises own abilities and limitations

Understands research methods and has ability to analyse scientific publications

Research/ academic activities

Recognition and application of child protection and handling issues and relevant legislation