



The Cardiac Society of Australia and New Zealand

Guidelines for Paediatric Cardiac Catheterisation

These guidelines were originally developed and have been revised by Dr Robert Justo and members of the Paediatric and Congenital Council.

The guidelines were reviewed by the Continuing Education and Recertification Committee and ratified at the CSANZ Board meeting held on Friday, 25th November 2011.

Paediatric cardiac catheterisation has evolved from a purely diagnostic procedure to one which is increasingly therapeutic in intention. The ability for an operator to perform paediatric interventional cardiac catheterisation successfully and safely requires specific training. There is also the need for specialised equipment and trained catheterisation laboratory staff as well as ancillary paediatric support services to afford the optimal environment for paediatric cardiac catheterisation procedures.

Paediatric cardiac catheterisation may be categorised according to levels varying from simple to complex procedures similar to the classification of surgical procedures for congenital heart disease. It should be recognised that the level of classification not only reflects the expertise of the operator but relates to potential risks and complications arising from the procedure and the ability of the catheterisation laboratory team to manage a complication utilising interventional techniques.

These guidelines have been developed after review of the published data and the recommendations of the directors of all the major paediatric cardiac catheterisation laboratories in Australia and New Zealand. These guidelines are informed by international standards with local geographical and clinical considerations.

Level 1 Procedures

- Diagnostic cardiac catheterisation
- Balloon atrial septostomy in the newborn
- Temporary transvenous pacemaker implantation

Level 2 Procedures

- Pulmonary balloon valvuloplasty beyond neonate
- Closure of uncomplicated patent ductus arteriosus in patients $\geq 10\text{kg}$ where PDA is the principal diagnosis and there is no additional significant haemodynamic lesion i.e. pulmonary hypertension
- Coil embolisation of aortopulmonary collaterals
- Endomyocardial biopsy beyond infancy
- Retrieval of embolised foreign bodies

Level 3 Procedures

- Transeptal atrial needle puncture
- Closure of patent ductus arteriosus in patients < 10kg or the presence of additional significant haemodynamic lesions
- Closure of vascular anomalies other than aortopulmonary collaterals
- Neonatal balloon pulmonary valvuloplasty
- Aortic balloon valvuloplasty beyond neonate
- Percutaneous balloon angioplasty

Level 4 Procedures

- Blade atrial septostomy
- Endomyocardial biopsy in infancy
- Neonatal aortic balloon valvuloplasty
- Mitral balloon valvuloplasty
- Endovascular stent implantation
- Device closure of atrial or ventricular septal defects
- Perforation of atretic valve, atrial septum or other occluded vascular structure with radio frequency catheter technique
- Transcatheter pulmonary valve therapy

Recommendations

1. **Location:** Paediatric cardiac catheterisation should only be undertaken in centres which have appropriate cardiac catheterisation laboratories and personnel for the paediatric age group. These centres should have access to paediatric intensive care and paediatric anaesthesia. The exception for this is balloon atrial septostomy which can be undertaken in neonatal intensive care units with echocardiographic guidance. Whilst on-site paediatric cardiac surgical and perfusion services are not essential for Level 1 and 2 complexity cases, this ideally should be available for Level 3 and essential for Level 4 complexity cases. The paediatric cardiac catheterisation laboratory should perform a minimum of 60 cases a year to maintain proficiency.
2. **Credentialing & Supervision:** The performance of cardiac catheterisation is a necessary component of basic and advanced training in Paediatric Cardiology. This should be undertaken in paediatric cardiac centres that perform at least 150 cases per year and have at least one experienced interventional cardiologist. The trainee must participate in a minimum of 100 cases with at least 50 of these as a primary operator of Level 1 or 2 complexity. Ideally all trainees should have experience with other levels of paediatric cardiac catheterisation.

It is preferable that specialised training in interventional catheterisation be completed before paediatric cardiologists are credentialed for Level 2, 3 and 4 procedures. However the credentialing for all procedures regardless of complexity needs to be assessed individually by the director of the catheterisation laboratory in each institution. It is the ideal that Level 2 procedures would be performed under supervision of a specialist paediatric interventional cardiologist, whilst Level 3 and 4 procedures would be best performed by a specialist paediatric interventional cardiologist.

3. **Audit:** All centres performing paediatric cardiac catheterisation should regularly perform audits of all procedures performed, the outcome of the procedures and the occurrence of any adverse outcomes. All cases should be presented at regular institutional meetings and be open to peer review.

4. **Maintenance of Competence:** To maintain competency in Level 1 paediatric cardiac catheterisations, a cardiologist should perform at least 25 cases per year. The exception for this is bedside balloon atrial septostomy in the newborn with echocardiographic guidance which may be performed by a cardiologist experienced in this procedure but does not perform other cardiac catheterisation procedures, subject to the approval of the Head of the Department in each institution. However, these procedures should be audited as outlined in recommendation 3. Competency in more complex procedures (Level 2, 3 & 4) should be assessed by the director of the cardiac catheterisation laboratory taking into consideration results of departmental audits and the experience of the operator.

Invasive electrophysiological studies performed by paediatric cardiologists, including catheter ablation therapy for arrhythmias in children, involve cardiac catheterisation and transeptal atrial needle puncture. Therefore, these procedures can be accepted as accreditation for competency of Level 1 paediatric cardiac catheterisation and transeptal atrial puncture. However, this document is not intended to cover paediatric electrophysiological training or accreditation.

References

- 1 Ruiz et al, Core Curriculum for the Training of Paediatric Invasive/Interventional Cardiologists: Report of the Society for Cardiac Angiography and Interventions Committee on Paediatric Cardiology Training Standards, Society for Cardiac Angiography and Interventions; 1996; 37: 409-424
- 2 Canadian Cardiovascular Society, Standards for Training in Paediatric Cardiology. Training Standards for Paediatric Cardiac Catheterization and Interventional Cardiology. Can J Cardiol; 1998; 14: 907-910
- 3 Bashore et al, ACC/SCA&I Clinical Expert Consensus Document on Cardiac Catheterization Laboratory Standards, JACC; 2001; 37 no 8; 2170-214
- 4 American Academy of Paediatrics, Section on Cardiology and Cardiac Surgery. Guidelines for Paediatric Cardiovascular Centers. *Pediatrics*.2002; 109: 544-549
- 5 Grazyna Brzezinska-Rajszyz, Warsaw, Poland; Mario Carminati, Mila; Shakeel A Qureshi, London, UK, The Ideal Configuration of the Modern Theatre for Paediatric Cardiac Catheterisation: Recommendations of the Association for European Paediatric Cardiology, *Cardiol Young*; 2003; 13: 582-584
- 6 Beekman III et al, Task Force 3: Training Guidelines for Paediatric Cardiac Catheterisation and Interventional Cardiology. *Journal of the American College of Cardiology* 2005; 46, no 7: 1388-1390