

Diagnostic Cardiac Catheterization for Congenital Heart Disease in Nepal

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ABSTRACT

Accurate preoperative anatomic and functional diagnosis is of vital importance for surgical repair of congenital heart disease. The diagnostic accuracy of echocardiography alone in congenital heart disease is satisfactory but interventional catheterization is still required to derive the adequate information before surgical repair. This is a retrospective review of our early results with cardiac catheterization for congenital heart disease in Shahid Gangalal National Heart Center (SGNHC), Nepal.

Keywords: *Cardiac Catheterization, Congenital Heart Disease*

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INTRODUCTION

Accurate preoperative anatomic and functional diagnosis is of vital importance for surgical repair of congenital heart disease (CHD)¹. Cardiac catheterization and angiocardiography made it possible to derive adequate information for cardiac repair. Cardiac catheterization carries a risk especially in infants and in neonates. Recent technical advances in echocardiography provide the adequate information, even in the complex lesions, needed for cardiac surgery in many patients without invasive catheterization². So question arise whether catheterization is necessary before cardiac surgery in our setting where both echocardiography as well as catheterization are in the developing stages. This is a retrospective review of our early results with cardiac catheterization for congenital heart disease in SGNHC, Nepal.

PATIENTS AND METHODS

All children with CHD who underwent diagnostic cardiac catheterization between August 2003 and February 2010 were included and data was analyzed retrospectively. The need for cardiac catheterization was primarily determined by a cardiologist or suggested by a cardiac surgeon. Patient were initially evaluated by complete history, physical examination, chest X-ray, ECG and

detailed echocardiographic examination. Before the procedure, a detailed explanation of purpose, route and possible complications were discussed with the patient party. Both written and informed consent were taken.

Most of the cases were done under general anesthesia. Local anesthesia was used in older patients. Complete hemodynamic assessment with pressures, pulmonary vascular resistance, oxygen saturations and blood gas analysis as well as angiographic assessment were performed.

RESULTS

During August 2003 to February 2010, we performed 1143 diagnostic paediatric cardiac catheterizations. Age ranges were from few weeks to 16 years. The most common indications for diagnostic catheterization was delineation of pulmonary artery anatomy, origin and course of coronaries, presence of significant sized MAP-CAs in tetralogy of fallot (TOF) in 405 (35.43%) and hemodynamic assessment for operability in patient with ventricular septal defect with severe pulmonary hypertension in 229 (20.03%). Other indications includes atrial septal defect with severe pulmonary artery hypertension (PAH) 154 (13.47%), PDA with severe PAH 47 (4.11%), primary pulmonary hypertension 35

Table: Diagnosis of the patients who underwent diagnostic catheterization:

Diagnosis	Number of patients	Percentage
TOF	405	35.43
VSD with severe PAH	229	20.03
ASD with severe PAH	154	13.47
PDA with severe PAH	47	4.11
Tricuspid atresia	29	2.54
Truncus arteriosus	7	0.67
TGA	41	3.58
Ebstein's anomaly	3	0.26
AV canal defect with severe PAH	24	2.11
DORV	65	5.69
TOF with pulmonary atresia	26	2.27
Congenitally corrected TGA	8	0.67
Coarctation of aorta	19	1.66
Primary pulmonary hypertension	35	3.06
Others	51	4.46

Six (0.53%) patients died immediately after procedure, 11 (0.96%) developed acute limb ischemia due to thrombosis at puncture site.

Among the 405 TOF patients, right sided aortic arch was found in 142 (35.06%), anomalous coronaries in 119 (29.38%), significant sized MAPCAs in 222 (54.81%), inadequate PA size for intracardiac repair was found in 123 (30.37%),

(3.06%), tricuspid atresia 29 (2.54%), truncus arteriosus 7 (0.67%), transposition of great arteries 41 (3.58%), Ebstein's anomaly 3 (0.26%), AV canal defect with severe PAH 24 (2.11%), DORV 65 (5.69%), TOF with pulmonary atresia 26 (2.27%), congenitally corrected TGA 8 (0.67%), two or more shunt anomalies 43 (3.77%), coarctation of aorta 19 (1.66%), total anomalous pulmonary venous drainage 6 (0.58%) and double outlet left ventricle 2 (0.17%).

DISCUSSION

Congenital heart disease is the single most important major congenital defect with prevalence of 8-10 per 1000 and is responsible for much mortality and morbidity in infants and children³. Cardiac catheterization has proved its value as a major tool in the diagnosis of congenital cardiac defects⁴.

Some literatures demonstrated no advantage of cardiac catheterization over echocardiography in simple shunt lesions such as ASD, VSD and PDA^{2,5}. However, there is controversy over whether cardiac catheterization is routinely indicated for preoperative diagnosis of more complex lesions.

Echocardiography alone may be insufficient to obtain the anatomic and functional information needed for surgical repair in complex congenital heart disease and may require preoperative catheterization. We performed diagnostic cardiac catheterization in 1143 patients with congenital cardiac defects with low periprocedural mortality rate.

Indications for catheterization were mainly delineation of pulmonary artery anatomy in patients with TOF, calculations of Qp/Qs and PVR in patients with left to right shunts with severe PAH to check for operability and delineation of anatomy in other complex CHD. These indications are not different from those reported by others. Catheterization is commonly indicated for hemodynamic assessment as it is not yet possible to measure accurately pulmonary artery pressure, Qp/Qs and PVR by echo.

In conclusion, though diagnostic accuracy of echocardiography for safe cardiac surgery is increasing, cardiac catheterization is necessary to delineate pulmonary artery size, coronary anatomy, presence of significant MAPCAs and hemodynamic assessment for operability.

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