Long term follow up of bidirectional cavopulmonary anastomosis patients: Multi-institutional study

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Background: The bidirectional cavopulmonary shunt is a step towards the Fontan operation in palliation of patients with single-ventricle heart. The Fontan procedure is performed with children between three and five years of age. In Egypt, there is a delayed age of children undergoing Fontan procedure due to long waiting lists and budget restraints on pediatric cardiac surgeries.

Aim of the work: To assess long term follow up of patients with bidirectional cavopulmonary shunt and to determine the clinical and hemodynamic effects of delayed Fontan procedure.

Methods
A total of 125 patients with bidirectional cavopulmonary shunts from three centers: Cairo university, Ain Shams university and Egypt kids hospital were followed up from January 2012 till July 2014. At follow up, mean age was 7.5 (1.7-16 years) and weight was 23.05 (9-58 Kg). Males were 61.5%, 64% had single ventricle morphology, 76% had additional pulmonary flow and 38.5% had prior palliative cardiac surgery.

Results
The mean age at Cavopulmonary shunt was 2.98 years (0.4 – 12 years). NYHA was class I in 82% and II in 15%, mean oxygen saturation was 81% (60-95). Cardiac catheterization was done in 45%, mean Glenn pressure was 15.5(6-28mmHg) and mean Nakata index was 287 (108-910). Catheter interventions were done in 15%; seven patients had procedures to minimize the extrapulmonary flow: closure of the shunts, collaterals, patent ductus arteriosus and/or device occlusion of the forward flow, while eight patients had balloon and/or stent of pulmonary arteries, superior vena cava (SVC) or pulmonary veins. Three patients had occlusion of venoatrial collaterals and/or left SVC to coronary sinus. The only significant difference was intensive care unit (ICU) stay which was shorter in patients with additional pulmonary flow (P value 0.016), and mean Glenn pressure which was lower in patients with single ventricle (P value less than 0.001). Mean survival was 11.33 years with 4% late mortality.

Conclusion
Cavopulmonary shunt can be a long term palliative procedure for patients with single ventricle morphology in developing countries when Fontan operation cannot be done on time due to economic restraints.