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## **Bone marrow derived progenitor stem cell transplantation as a temporary measure before heart or lung transplantation in children**

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**Context:** On a global level, stem cell research has been a major challenge during the last decade. There have been achieved positive results in experimental studies on animals and there have been identified several conditions in adult population where bone marrow derived progenitor stem cell transplantation (BMPST) may play a crucial role. Though, little is known about possible implementation of the BMPST in paediatrics, dilated cardiomyopathy and pulmonary arterial hypertension in particular.

**Objective:** To determine the role of BMPST in management of critically ill paediatric patients followed by assessment of safety and efficacy of the procedure.

**Design, Settings & Participants:** Two patients (9 and 15 years old) with trisomy 21 and severe pulmonary arterial hypertension due to uncorrected large ventricular septal defects were admitted to our department to receive intrapulmonary BMPST procedure. Both patients underwent radionuclide scintigraphy before the procedure, followed by repeated scans 6, 12, 24 and 36 months after BMPST. Latest results show improvement of lungs vascularization. Seven patients (4 months–17 years) with dilated idiopathic cardiomyopathy were admitted for intra myocardial BMPST procedure. All seven patients underwent repeated clinical examination every two months, up to 4 years of age. We observed improvement of left ventricular ejection fraction, decrease of left ventricular end diastolic dimension by echocardiography and cardio-thoracic index at chest X-ray exams, reduction of serum brain natriuretic peptide serum levels and decrease of the stage of heart failure from stage IV to stage I, by NYHA classification. No peri procedural harmful side effects were observed.

**Conclusions:** The results are promising and we suggest that BMPST might be used for the stabilization of the patient to get the time for further symptomatic treatment or serve as a bridge for heart or lung transplantation.

### **Biography**

Aris Lacis is a Cardiac Surgeon and a Professor, MD, PhD graduated from Riga Medical Institute in 1961. He is a General and thoracic surgeon in P. Stradina University Hospital in Riga (1964–1969). He is a thoracic and cardiac surgeon in the Latvian Centre for Cardiovascular Surgery (1969–1994). Since 1994 until 2012, he is the Head of Pediatric Cardiology and Cardiac Surgery Clinic in University Children's Hospital, Riga; and since 2012 he is a consulting Professor of this Clinic. He is the Vice president of Latvian Society for Cardiovascular Surgery. He is the President of Latvian Association for Pediatric Cardiologists and the Author of 395 scientific publications, 3 monographs and 13 patents. He is the Investigator in more than 10 clinical trials including cardio surgical procedures performed under deep hypothermia, hybrid procedures etc. In May 2009 he has used transcatheter intramyocardial delivery techniques for treatment (idiopathic dilated cardiomyopathy); the first 3 months aged patient in the world with autologous bone marrow derived progenitor cells. In November 2010, the first patient with end stage pulmonary hypertension received intrapulmonary implantation autologous stem cells.

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