



ELSEVIER

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/ihj](http://www.elsevier.com/locate/ihj)

## Original Article

# Hybrid intraoperative pulmonary artery stenting in redo congenital cardiac surgeries



Anuradha Sridhar<sup>c,\*</sup>, Raghavan Subramanian<sup>a</sup>,  
Rajasekaran Premsekar<sup>a</sup>, Shanthi Chidambaram<sup>a</sup>, Ravi Agarwal<sup>b</sup>,  
Soman Rema Krishna Manohar<sup>b</sup>, K.M. Cherian<sup>b</sup>

<sup>a</sup>Department of Pediatric Cardiology, Frontier Lifeline and Dr. K. M. Cherian Heart Foundation, Chennai, India

<sup>b</sup>Pediatric Cardiothoracic Surgery, Frontier Lifeline and Dr. K. M. Cherian Heart Foundation, Chennai, India

<sup>c</sup>Consultant Pediatric Cardiologist, Department of Pediatric Cardiology, Frontier Lifeline and Dr. K. M. Cherian Heart Foundation, R 30 C Ambattur Industrial Estate Road, Mogappair, Chennai 600 101, India

## ARTICLE INFO

## Article history:

Received 13 May 2013

Accepted 4 December 2013

Available online 26 December 2013

## Keywords:

Pulmonary artery

Hybrid

Redo surgery

Stent

## ABSTRACT

**Objective:** Reconstruction of branch pulmonary arteries (PAs) can be challenging in redo congenital heart surgeries. Treatment options like percutaneous stent implantation and surgical patch angioplasty may yield suboptimal results. We present our experience with hybrid intraoperative stenting which may be an effective alternative option.

**Methods:** We retrospectively analyzed data of all patients with PA stenosis who underwent intraoperative PA branch stenting in our institution between January 2011 and December 2012.

**Results:** Ten patients [6 females, median age 10 (1.4 to 37) years], underwent hybrid stenting of the PA. Primary cardiac diagnoses were pulmonary atresia with ventricular septal defect (VSD) in three patients, pulmonary atresia with intact ventricular septum in two, Tetralogy of Fallot (TOF) in one, Double outlet right ventricle (DORV) with pulmonary stenosis (PS) in one, complex single ventricle in two and VSD with bilateral branch PA stenosis in one patient. Concomitant surgeries were revision/reconstruction of RV-PA conduit in 4, Fontan completion in 4, repair of TOF with conduit placement in 1 and VSD closure in 1 patient. The left PA was stented in 7, the right in 2 and both in 1, with a total of 11 stents. There were no complications related to stent implantation. Two early postoperative deaths were unrelated to stent implantation. At mean follow-up period of 14.8 (12–26) months, stent position and patency were satisfactory in all survivors. None of them needed repeat dilation or surgical reintervention.

**Conclusion:** Hybrid stenting of branch PA is a safe and effective option for PA reconstruction in redo cardiac surgeries. With meticulous planning, it can be safely performed without fluoroscopy.

Copyright © 2013, Cardiological Society of India. All rights reserved.

\* Corresponding author. Tel.: +91 44 42017575; fax: +91 44 26565150.

E-mail address: [anuradhasridhar9@gmail.com](mailto:anuradhasridhar9@gmail.com) (A. Sridhar).

0019-4832/\$ – see front matter Copyright © 2013, Cardiological Society of India. All rights reserved.

<http://dx.doi.org/10.1016/j.ihj.2013.12.018>

## 1. Introduction

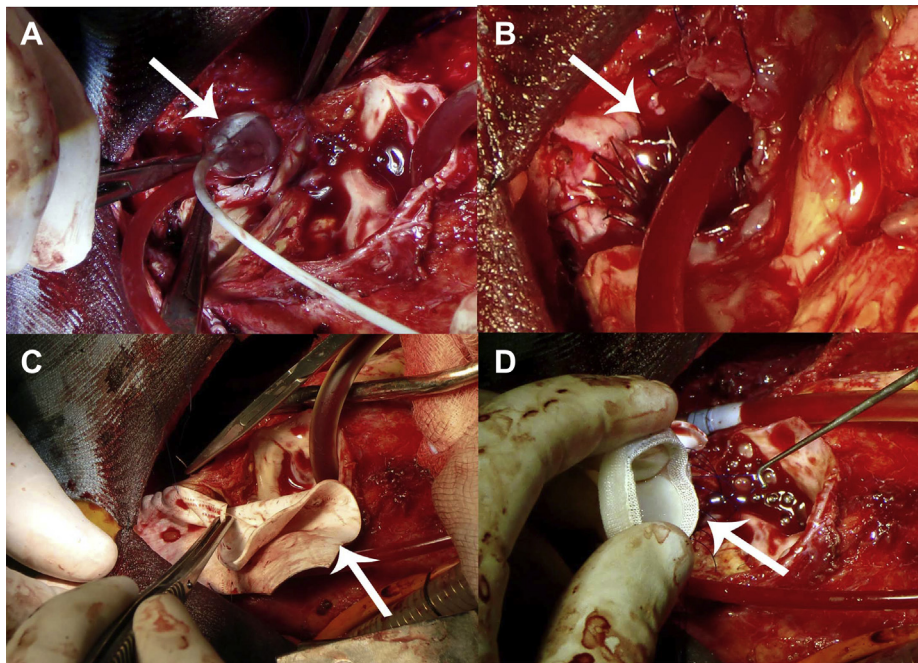
Branch pulmonary artery (PA) stenosis could be congenital occurring either as an isolated anomaly or in association with other congenital heart defects. It can also occur following a previous attempt at surgical repair. PA reconstruction in these patients could be accomplished by surgical patch angioplasty, transcatheter stenting or hybrid intraoperative stent implantation.<sup>1</sup> In cases of complex congenital heart disease (CHD) requiring redo surgeries, surgical patch angioplasty may be difficult and yield suboptimal results. Transcatheter stenting may also be difficult in these patients due to complex anatomy and difficult vascular access.

The limited data available on the outcome of intraoperative stent implantation in redo surgeries is that of developed countries only.<sup>2-22</sup> We present our experience in successfully performing hybrid stenting in redo congenital cardiac surgeries without using fluoroscopy in a series of ten patients during a two year period.

## 2. Technique

Intraoperative stenting procedures were performed by pediatric cardiac surgeons in collaboration with pediatric interventional cardiologists. All procedures were performed under hypothermic cardiopulmonary bypass and none of the patients required circulatory arrest. Preoperatively, either

conventional angiography or computerized tomographic (CT) pulmonary angiography was done to define the size, area, and length of PA stenosis. The size of stent and delivery balloon were determined based on calibrated measurements from preoperative angiographic images, where the branch PA ostium & the distal bifurcation site were used as reference points. In addition, diameter of the stenosed segment of the branch pulmonary artery was reconfirmed intra operatively by the surgeon using a Hegar dilator that could be introduced into the PA. Only balloon-expandable stents were used. A guide wire was advanced by the surgeon under direct visualization into the PA branch, and the stent/balloon was positioned in the branch PA by the surgeon over this guide wire. The balloon was inflated to the maximum recommended pressure by the interventional cardiologist. Intraoperative fluoroscopy was not used. It was difficult to assess the uniform dilatation of the stent and the balloon in the operating room without the aid of fluoroscopy. Following inflation, surgeons assess the full expansion of the stent by inspection and gentle palpation of stent and by passing an appropriate sized Hegar dilator through the stented vessel. The proximal end of the stent was flared mildly by rotating a large size Hegar dilator and sutured to the PA to prevent stent migration [Fig. 1]. At the end of surgery, intraoperative transesophageal echocardiography was also utilized to confirm appropriate stent position. In the immediate postoperative period and at discharge, chest X-ray and color Doppler echocardiography were done to assess the stent position, size and gradients in the PAs. Doppler gradients can be highly fallacious especially



**Fig. 1** – Intraoperative images of patient number 2 – [A] showing deployment of the stent mounted on high pressure balloon (arrow) in the Right pulmonary artery. [B] shows stents with flared proximal ends seen in the origin of both branch pulmonary arteries. Apart from suturing the proximal end of the stents to the pulmonary artery, the two stents were tied together across the confluence posteriorly (arrow) to prevent migration and obstruction. Suturing of on lay patch (arrow) after excision of the stenosed right ventricle to pulmonary artery (RV-PA) conduit [C] was followed by implantation of bioprosthetic valve (arrow) in the pulmonary position [D].

Download English Version:

<https://daneshyari.com/en/article/2928265>

Download Persian Version:

<https://daneshyari.com/article/2928265>

[Daneshyari.com](https://daneshyari.com)