Transcatheter closure of Patent ductus arteriosus at Shahid Gangalal National Heart Centre, Kathmandu, Nepal

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ABSTRACT

Background and Aims: In the current era, transcatheter closure of patent ductus arteriosus (PDA) using either coils or device is a well-established procedure. The aim of this study was to assess safety of transcatheter closure of PDA at Shahid Gangalal national heart Centre, Kathmandu, Nepal.

Methods: It was a single centre, retrospective study conducted between March 2007 to March 2017. Cardiac catheterization laboratory records of all consecutive patients who underwent PDA device closure were included. A lateral view Aortic angiogram was performed to determine the morphology and size of the duct. Device type and size was selected as per the aortogram. A second aortic angiogram was performed 5 min after device deployment to determine the success of the closure. Echocardiography was done next day of the procedure to assess success of the closure.

Result: During the study period 126 patients were attempted for transcatheter closure of PDA. Six patient were thought to have unfavorable size or shape, and transcatheter occlusion was not attempted. In one patients attempt was made to close the duct with cook coil which embolized to pulmonary artery. One hundred and nineteen patient PDA was successfully closed. Among the 119 patients 89 were female and 30 were male. The PDA was closed by Amplatzer duct occluder in 99 patients, Life tech PDA occluder in 14 patients, Hyperion PDA occluder in two patients, Post-infarct Muscular VSD Occluder in four patients.

Conclusions: Transcatheter closure of PDA can be done safely with high success rate.

INTRODUCTION

Patent ductus arteriosus (PDA) is common form of congenital heart disease. PDA constitutes 6–11 % of all congenital defects. It is estimated that PDA occurs about 1 in 2500–5000 live births. [1]

Closure of PDA is indicated only in patients with continuous murmur. Transcatheter closure of PDAs has assumed a major role in closure of PDA. [2]Transcatheter closure is currently the preferred method of treatment of PDA. [3]

This study reports the experience at Shahid Gangalal National Heart Centre,Kathmandu, Nepal with percutaneous closure of PDA.

METHOD

It was a retrospective, single centre study, performed at Shahid Gangalal National Heart Centre, Kathmandu, Nepal. Cardiac catheterization laboratory records and Medical records of all consecutive patients who underwent PDA device closure from March 2007 March 2017 were retrospectively reviewed. Demographics of the patients were collected.

PDA device closure was done under universal aseptic condition

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through right femoral venous approach. A lateral view Aortic angiogram was performed to determine the morphology and size of the duct. Device type and size was selected as per the aortogram. A second aortic angiogram was performed 5 min after device deployment to determine the success of the closure. Echocardiography was done next day of the procedure to assess success of the closure.Complications of the procedure were recorded.

The study protocol was approved by institutional review board (IRB) of Shahid Gangalal National Heart Centre, Kathmandu, Nepal.

All the variables were entered into the Statistical Packagefor Social Sciences software, version 20(SPSS Inc., Chicago, IL, USA) for data analysis. Descriptive statisticswere computed and presented as means and standard deviations.

RESULT

During the study period 126 patients were attempted for transcatheter closure of PDA. Six patient were thought to have unfavorable size or shape, and transcatheter occlusion was not attempted. In one patients attempt was made to close the duct with cook coil which embolized to pulmonary artery. One hundred and nineteen patient PDA was successfully closed. Among the 119 patients 89 were female and 30 were male. Age ranged from one year to 69 years. with the mean of 16.6±12.7 years.Size of PDA ranged from 3 mm to 14mm, with the mean of 5.7±2.7mmThe PDA was closed by Amplatzer duct occluder in 99 patients, Life tech PDA occluder in 14 patients, Hyperion PDA occluder in two patients, Amplatzer Post-infarct Muscular VSD Occluder in four patients, as shown in table 1. Hyperion and life tech are like amplatzer duct occluder. Device size 6x8 and 8x10 were the most commonly device size as shown in table 2.Among our subjects, we did not find any complication related to vascular access, hemolysis, and massive blood loss.

There was no evidence of obstruction of the left pulmonary artery or the descending aorta, as confirmed by 2D-Doppler in the following day follow-up. No death occurred in this study.

Table 1. Demographics

Variable	No	%
Male	30	25.2
Female	89	74.8
Device type		
Amplatzer duct occluder I	99	83.1
Hyperion	2	1.6
Post-infarct Muscular VSD Occluder	4	3.2
Lifetech	14	11.7

Table 2: Device size

Device size	
4x6	15
6x8	37
8x10	37
10x12	19
12x14	5
14x16	1
20x22	1
Post-infarct Muscular VSD Occluder 16	1
Post-infarct Muscular VSD Occluder 18	1
Post-infarct Muscular VSD Occluder 20	1
Post-infarct Muscular VSD Occluder 22	1

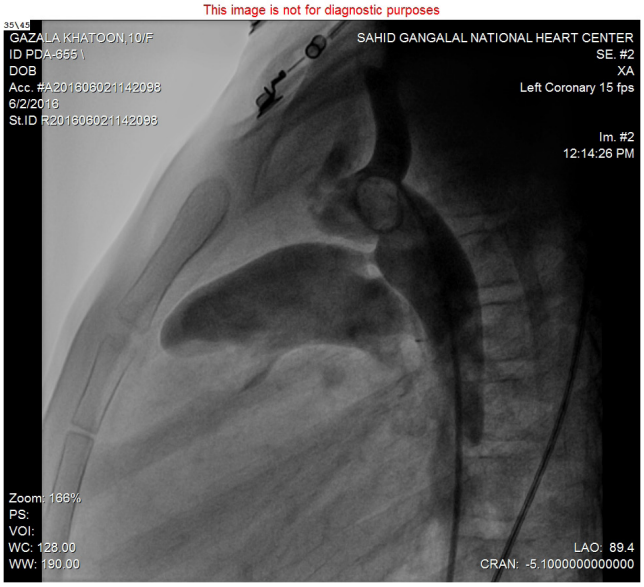

Fig 1. PDA in Lateral Aortogram

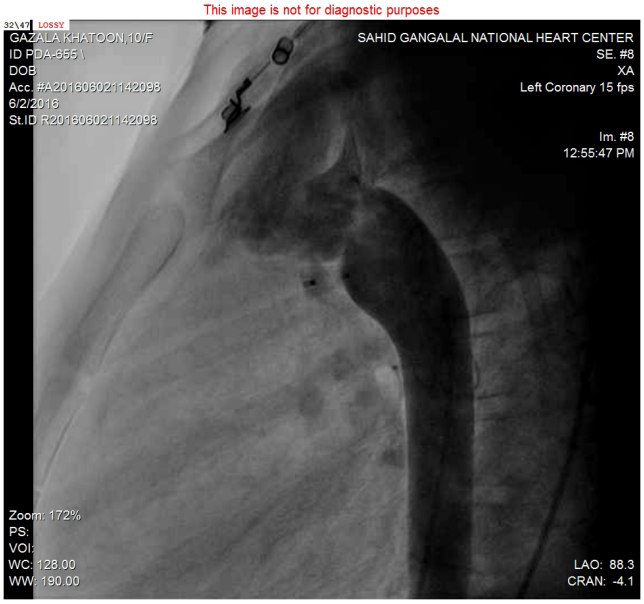

Fig 2. PDA closed with ADO 6x8 device.

DISCUSSION

Transcatheter device closure of patent ductus arteriosus is a standard and well established technique. [4]Coils and devices are used to close PDA. Amplatzer duct occluder is safe and commonly used device worldwide to close PDA. The success rate of Amplatzer duct occluder is high with minimal, either major or minor, complications. [5]We were using this device as The transcatheter occlusion of large persistent PDA using Amplatzer prosthesis has shown to be highly effective procedure in large series. [6]

The results of our study of percutaneous PDA closure with the Amplatzer duct occluder, with an occlusion rate of 100% at 24 hours, concurs with results reported in other studies. [7,8,9]Our success rate is similar to Egyptian study, there success rate is 98.4%.[10]Overall PDA closure rate was 94% and major adverse events were 1.5 %.[11,12]

In our study, there is no protrusion of the occlusion device into the aorta or obstruction to the LPA which are common complications of transcatheter closure of PDA our result is similar to study in Egyptian study.[10]

There are many advantages of PDA device closure compared to surgical ligation which include, less invasive, without surgical scar, short hospital course, low morbidity and comparable success rate. However, the surgical ligation is still necessary for large PDA especially in small infants.

Our study has certain limitations. Being a retrospective study, it is based on hospital database, so we could not comment on pre and post procedural clinical status of the patient. We cannot report the type of the PDA. Further, change in symptoms, and follow up study could not be included in the study.

CONCLUSIONS

In our experience, high success rate with low complications and residual shunts suggest that transcatheter closure of PDA is effective and safe with good outcome in most cases.

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