Safety and Procedural Success of Transcatheter Closure of Patent Ductus Arteriosus in Adults at Shahid Gangalal National Heart Centre, Kathmandu, Nepal.

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Abstract

Background and Aims: Transcatheter closure of patent ductus arteriosus (PDA) using either coils or device is a well-established procedure. PDA is one of the common congenital heart diseases and it is not uncommon for it to be diagnosed in adulthood. However, only few studies are conducted in our part of the world regarding the safety and procedural success of device closure of PDA in adults. We aim to assess safety and procedural success of transcatheter closure of PDA in adults at Shahid Gangalal National Heart Centre, Kathmandu, Nepal.

Methods: It was a single center, retrospective study. Cardiac catheterization laboratory records of all consecutive adult patients (age ≥ 18 years) who underwent PDA device closure between March 2007 to March 2020 were reviewed. Patients age, gender, device size and device type along with procedural success of the procedure were reviewed. Any complication recorded was reviewed.

Results: During the study period 118 adult patients were attempted for transcatheter closure of PDA. In three cases transcatheter closure was not attempted. In one patients attempt was made to close the duct with cook coil which embolized to pulmonary artery. PDA was successfully closed in 114 patients. Among the 114 patients, 87 were females and 27 were male. Age ranged from 18 to 69 years with mean age was 29.5 years. PDA size ranged from 3mm to 18mm with the mean of 6.9mm. In two patients, residual PDA after surgical closure were closed. Amplatzer duct occluder was the most commonly used device in 89 (78%) patients followed by Memopart PDA device in 11 (9.6%) patients, Amplatzer Muscular VSD occluder in four patients. Device size of “8x10” in 32 patients and “10x12” device in 29 patients, were the most commonly used device size.

Conclusion: Transcatheter closure of PDA in adults can safely be done with high success rate.

Keywords: Adult; PDA; transcatheter closure.

Introduction

Patent ductus arteriosus (PDA) is the persistent communication between the proximal left Pulmonary Artery (PA) and the descending aorta just distal to the left subclavian artery. PDA account for approximately 9-12% of all congenital heart diseases.¹ It is estimated that PDA occurs about 1 in 2500–5000 live births.² It can be associated with a variety of congenital heart disease lesions. However, in the adult it is usually an isolated finding.³ It is not infrequent for PDA to be diagnosed in adulthood on physical examination or as an incidental finding on transthoracic echocardiography (TTE).⁴ Additional problems associated with PDA include pulmonary hypertension, left ventricular volume overload,
Methods

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 adult patients (age ≥ 18 years) who underwent PDA device closure from March 2007 to March 2020 were retrospectively reviewed. Demographics of the patients were collected. PDA size, Device type and size used for transcatheter closure of PDA was recorded. Numbers of successful and unsuccessful cases were recorded. 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 Package for Social Sciences software, version 20 (SPSS Inc., Chicago, IL, USA) for data analysis.

Results

During the study period 118 adult patients were attempted for transcatheter closure of PDA. Two patients were thought to have unfavorable morphology so transcatheter occlusion was not attempted. In one case PDA closure was abandoned due to unavailability of appropriate device size. In one patient attempt was made to close the duct with cook coil which embolized to pulmonary artery. PDA was successfully closed in 114 patients. Among the 114 patients, 87 were females and 27 were male. Age ranged from 18 to 69 years with mean age was 29.5 years. PDA size ranged from 3mm to 18mm with the mean of 6.9 mm. In two patients residual PDA after surgical closure was closed. In one patient PDA device closure was done after the treatment of Infective endocarditis. Amplatzer Duct Occluder I (ADO I) was the most commonly used device 89 (78.0%) for transcatheter closure of PDA followed by Memopart PDA device in 11 (9.6%) patients as shown in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>27</td>
<td>23.7</td>
</tr>
<tr>
<td>Female</td>
<td>87</td>
<td>76.3</td>
</tr>
<tr>
<td>Device type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplatzer duct Occluder (ADO) I</td>
<td>89</td>
<td>78.0</td>
</tr>
<tr>
<td>Hyperion PDA Occluder</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Memopart PDA Occluder</td>
<td>11</td>
<td>9.6</td>
</tr>
<tr>
<td>Lifetech PDA Occluder</td>
<td>7</td>
<td>6.1</td>
</tr>
<tr>
<td>Amplatzer Muscular VSD ocluder</td>
<td>4</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Table 1: Demographic profile and type of device:

PDO, Patent Ductus Arteriosus; VSD, Ventricular Septal Defect

<table>
<thead>
<tr>
<th>Device Size</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADO I type device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4x6</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>6x8</td>
<td>17</td>
<td>14.9</td>
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<td>8x10</td>
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<td>10x12</td>
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<td>25.4</td>
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<tr>
<td>12x14</td>
<td>10</td>
<td>8.7</td>
</tr>
<tr>
<td>14x16</td>
<td>10</td>
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<tr>
<td>20x22</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Amplatzer Muscular VSD Occluder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 mm</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>18 mm</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>20 mm</td>
<td>1</td>
<td>0.8</td>
</tr>
</tbody>
</table>

ADO I, Amplatzer Duct Occluder I

Among our subjects, we did not find any complication related to vascular access or hemolysis. There was no evidence of obstruction to 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.
Conflict of interest: None

Source of funding: None

Conclusion
Our study concluded that transcatheter closure is a safe and effective mode of treatment of PDA in adults. Hence, it should be considered as a treatment of choice in adult PDAs.

References

Nepalese Heart Journal 2020; Vol 17 (2), 43-46


