Treatment Options for Pediatric Patent Ductus Arteriosus

Systematic Review and Meta-analysis

Jennifer Y. Lam, MD; Steven R. Lopushinsky, MD; Irene W. Y. Ma, MD, PhD; Frank Dicke, MD, MBA; and Mary E. Brindle, MD, MPH

CHEST 2015; 148(3):784-793

e-Appendix 1.

PRISMA 2009 Checklist

<table>
<thead>
<tr>
<th>Section/topic</th>
<th>#</th>
<th>Checklist Item</th>
<th>Reported on page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE</td>
<td>1</td>
<td>Identify the report as a systematic review, meta-analysis, or both.</td>
<td>1</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>2</td>
<td>Provide a structured summary including, as applicable: background, objectives, data sources, study eligibility criteria, participants, and interventions, study appraisal and synthesis methods, results, limitations, conclusions and implications of key findings; systematic review registration number.</td>
<td>2-3</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
<td>Describe the rationale for the review in the context of what is already known.</td>
<td>4</td>
</tr>
<tr>
<td>Objectives</td>
<td>4</td>
<td>Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).</td>
<td>4</td>
</tr>
<tr>
<td>METHODS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol and registration</td>
<td>5</td>
<td>Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.</td>
<td>4</td>
</tr>
<tr>
<td>Eligibility criteria</td>
<td>6</td>
<td>Specify study characteristics (e.g., PICO, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.</td>
<td>4-5</td>
</tr>
<tr>
<td>Information sources</td>
<td>7</td>
<td>Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.</td>
<td>5</td>
</tr>
<tr>
<td>Search</td>
<td>8</td>
<td>Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.</td>
<td>5</td>
</tr>
<tr>
<td>Study selection</td>
<td>9</td>
<td>State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).</td>
<td>5</td>
</tr>
<tr>
<td>Data collection process</td>
<td>10</td>
<td>Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.</td>
<td>6</td>
</tr>
<tr>
<td>Data items</td>
<td>11</td>
<td>List and define all variables for which data were sought (e.g., PICO, funding sources) and any assumptions and simplifications made.</td>
<td>6</td>
</tr>
<tr>
<td>Risk of bias in individual studies</td>
<td>12</td>
<td>Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.</td>
<td>6</td>
</tr>
<tr>
<td>Summary measures</td>
<td>13</td>
<td>State the principal summary measures (e.g., risk ratio, difference in means).</td>
<td>6</td>
</tr>
<tr>
<td>Synthesis of results</td>
<td>14</td>
<td>Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.</td>
<td>6</td>
</tr>
</tbody>
</table>
# PRISMA 2009 Checklist

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<tr>
<td>Risk of bias across studies</td>
<td>15</td>
<td>Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).</td>
<td>6</td>
</tr>
<tr>
<td>Additional analyses</td>
<td>16</td>
<td>Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done. Indicate which were pre-specified.</td>
<td></td>
</tr>
<tr>
<td><strong>RESULTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study selection</td>
<td>17</td>
<td>Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.</td>
<td>7</td>
</tr>
<tr>
<td>Study characteristics</td>
<td>18</td>
<td>For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.</td>
<td>7</td>
</tr>
<tr>
<td>Risk of bias within studies</td>
<td>19</td>
<td>Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).</td>
<td>8</td>
</tr>
<tr>
<td>Results of individual studies</td>
<td>20</td>
<td>For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group; (b) effect estimates and confidence intervals, ideally with a forest plot.</td>
<td>8-11</td>
</tr>
<tr>
<td>Synthesis of results</td>
<td>21</td>
<td>Present results of each meta-analysis done, including confidence intervals and measures of consistency.</td>
<td>8-9</td>
</tr>
<tr>
<td>Risk of bias across studies</td>
<td>22</td>
<td>Present results of any assessment of risk of bias across studies (see item 15).</td>
<td>8</td>
</tr>
<tr>
<td>Additional analysis</td>
<td>23</td>
<td>Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see item 16]).</td>
<td></td>
</tr>
<tr>
<td><strong>DISCUSSION</strong></td>
<td></td>
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<tr>
<td>Summary of evidence</td>
<td>24</td>
<td>Summarize the main findings including the strength of evidence for each main outcome, consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).</td>
<td>11</td>
</tr>
<tr>
<td>Limitations</td>
<td>25</td>
<td>Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).</td>
<td>13</td>
</tr>
<tr>
<td>Conclusion</td>
<td>26</td>
<td>Provide a general interpretation of the results in the context of other evidence, and implications for future research.</td>
<td>13-14</td>
</tr>
<tr>
<td><strong>FUNDING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>27</td>
<td>Describe sources of funding for the systematic review and other support (e.g., supply of data), role of funders for the systematic review.</td>
<td>1</td>
</tr>
</tbody>
</table>


For more information, visit: [www.prisma-statement.org](http://www.prisma-statement.org).
e-Appendix 2 – Search Strategy

1. patent ductus arteriosus/
2. (PDA or patent ductus).tw.
3. 1 or 2
4. exp heart catheterization/
5. exp interventional cardiovascular procedure/
6. coil embolization/
7. clip/
8. *surgery/
9. exp ligation/
10. (Transcatheter* or occlusion* or coil* or clip or clips or radiologic* or intervention* or device* or surgery or ligation* or suture or suturing).tw.
11. 4 or 5 or 6 or 7 or 8 or 9 or 10
12. 3 and 11
13. exp pediatrics/
14. adolescent/
15. child/
16. infant/
17. 14 or 15 or 16
18. (Child or children* or adolescen* or teen* or infant* or pediatric* or paediatric*).tw.
19. 13 or 17 or 18
20. 12 and 19
21. limit 20 to animal studies
22. limit 20 to (human and animal studies)
23. 21 not 22
24. 20 not 23
25. limit 24 to (editorial or letter)
26. 24 not 25
27. (((Random$ or factorial$ or crossover$ or cross over$ or placebo$ or doubl$) adj blind$) or singl$ anj blind$ or assign$ or allocat$ or volunteer$).tw.
28. (Crossover-procedure or double-blind procedure or randomized controlled trial or single-blind procedure).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]
29. 27 or 28
30. 26 and 29

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### e-Appendix 3.

**Reviewer Initials:**

**Date of data abstraction:**

**Study ID:**

**First Author:**

**Date of Publication:**

**Country (or countries):**

**Dates of Data collection:**

**Possible Data Duplication/overlap:**

## Design of Study

- **Case Control Study:**
- **Cross Sectional Study:**
- **Cohort:**
  - Prospective
  - Retrospective
  - Not Mentioned
- **Trials:**
  - Randomized
  - Non-randomized

## Subjects

**Number of Subjects:**

**Age range of subjects:**

## Other comorbidities

- Chromosomal anomalies
- Cardiac anomalies
- Other

## Surgery Arm

**Total # Patients in Surgery arm:**

**Age of patients in surgery arm:**

**Sizes of PDA:**

**Type of Surgery (numbers):**

- Thoracoscopy
- Thoracotomy
- Type of Surgeon (if specified)

## Interventional Arm

**Total # Patients in interventional arm:**

**Age of patients in interventional arm:**

**Sizes of PDA:**

**Type of Device for occlusion:**

- Umbrella
- Coils:
  - Single
  - Double
  - Other
- Other type of occluder(s): #

## Outcomes

- **Cost:**
  - Surgery
  - Intervention
- **Recurrence:**
  - Y/N
  - Surgery
  - Intervention
- **Reoperation:**
  - Y/N
  - Surgery
  - Intervention
- **Incomplete occlusion/Residual PDA:**
  - Y/N
  - Surgery
  - Intervention

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<table>
<thead>
<tr>
<th>Condition</th>
<th>Y/N</th>
<th>Surgery</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Length of hospitalization</td>
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<tr>
<td>Infection</td>
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<tr>
<td>Chylothorax</td>
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<tr>
<td>Recurrent laryngeal nerve injury</td>
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<tr>
<td>Coil embolism migration</td>
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<td></td>
<td>fracture</td>
</tr>
</tbody>
</table>