Occult Coronary Artery Dilatation: An Unrecognized Category Of Coronary Involvement

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The authors report no potential conflict of interest related to this study
Introduction

Coronary artery involvement is the major complication of KD

Cut off definition with Z-score ≥ 2.5 is widely used and officially recommended

CA Z-Score Progression or variation overtime is not a criteria for case definition of CA involvement, unless it reaches a Z-score ≥ 2.5
Hypothesis

› There are KD patients with CA involvement that is not accounted for by the current Z-Score $\geq 2.5$ definition

› Important variation in CA Z-score could be related to the transient increased blood supply due to inflammation/myocarditis in the acute KD phase.
Marked Variations in Serial Coronary Artery Diameter Measures in Kawasaki Disease: A New Indicator of Coronary Involvement

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Coronary artery dilation after Kawasaki disease for children within the normal range

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Definition: Occult CAD = occult CA dilatation
Max Z-score < 2.5 & Δ-Z-score > 2 points
Objectives

Study CA diameter changes between onset and convalescence.

Better characterise the population of patients with occult coronary artery dilatations by evaluating the population demographic, inflammatory profile and evolution.
Methods

› Retrospective

› One center, Sainte-Justine UHC

› Inclusion criteria
  - Kawasaki disease diagnosed and followed at our institution
  - January 2000 to November 2010
  - At least 2 echocardiographic studies between Dx and convalescent phase
Methods

› Classification
  - Coronary artery aneurysm (CAA)
    › Patients documented with “aneurysm” on echocardiography report
  - Definite coronary artery dilatation (DCAD)
    › Z-score > 2.5
    › No aneurysm
  - Occult coronary artery dilatation (OCAD)
    › Z-score < 2.5
    › Z-score Δ > 2 for the same CA
  - No coronary artery dilatation (NCAD)
Results

- There were 337 eligible patients
- Age 3.4 [0.2-15] y.o.
- 60% males
- Complete KD 58% / Incomplete KD 42%
- Dx at 7.1 ± 4.6 days of fever
- Delayed Dx in 16%
- CA measurements:
  - performed by trained sonographers for CA measurement
Figure 1 Coronary artery involvement distribution

- DCAD 35%
- OCAD 32%
- NCAD 26%
- CAA 7%

N = 337
# Table 1 Demographics and diagnostic features

<table>
<thead>
<tr>
<th></th>
<th>NCA 26%</th>
<th>OCAD 32%</th>
<th>DCAD 41%</th>
<th>P value</th>
<th>P NCAD / OCAD</th>
<th>P OCAD / DCAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male gender</td>
<td>66 %</td>
<td>64 %</td>
<td>52%</td>
<td>0,12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at diagnosis (yr)</td>
<td>3,2 ± 1,5</td>
<td>4,0 ±1,8</td>
<td>3,1 ± 2,2</td>
<td>0,16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Presentation</td>
<td>42%</td>
<td>71%</td>
<td>56%</td>
<td>&lt;0,01</td>
<td>0,02</td>
<td>0,07</td>
</tr>
<tr>
<td>Day of fever before diagnosis</td>
<td>7,8 ± 5,8</td>
<td>5,6 ±2,6</td>
<td>7,5 ± 5,0</td>
<td>0,22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnosis &gt; 10 days of fever</td>
<td>22%</td>
<td>7%</td>
<td>20%</td>
<td>0,02</td>
<td>0,02</td>
<td>0,03</td>
</tr>
</tbody>
</table>
Table 3 Inflammatory profile at dx

<table>
<thead>
<tr>
<th></th>
<th>NCAD</th>
<th>OCAD</th>
<th>DCAD</th>
<th>P NCAD / OCAD</th>
<th>P OCAD / DCAD</th>
<th>P NCAD / DCAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumin (g/L)</td>
<td>29,2 ±4,5</td>
<td>28,8 ±6,2</td>
<td>27,0 ±6,0</td>
<td>0,35</td>
<td>0,08</td>
<td>0,02</td>
</tr>
<tr>
<td>CRP (mg/L)</td>
<td>98,0 ±63,6</td>
<td>112 ±87</td>
<td>112 ±102</td>
<td>0,23</td>
<td>0,67</td>
<td>0,24</td>
</tr>
<tr>
<td>ESR (mm/h)</td>
<td>49 ±11</td>
<td>49 ±10</td>
<td>46 ±15</td>
<td>0,10</td>
<td>0,63</td>
<td>0,04</td>
</tr>
<tr>
<td>WBC ( x 10^9/L)</td>
<td>13,53 ±5,05</td>
<td>14,70 ±7,8</td>
<td>14,96 ±6,3</td>
<td>0,41</td>
<td>0,31</td>
<td>0,01</td>
</tr>
<tr>
<td>HT</td>
<td>0,327 ±0,024</td>
<td>0,323 ±0,025</td>
<td>0,310 ±0,040</td>
<td>0,08</td>
<td>0,01</td>
<td>&lt; 0,01</td>
</tr>
<tr>
<td>PLT (x10^9/L)</td>
<td>370 ±170</td>
<td>308 ±114</td>
<td>455 ±224</td>
<td>0,97</td>
<td>0,03</td>
<td>0,02</td>
</tr>
</tbody>
</table>
Figure 2 Median Z-score evolution similarity between OCAD & DCAD
### Table 2.2 Coronary artery progress by group

<table>
<thead>
<tr>
<th></th>
<th>NCAD</th>
<th>OCAD</th>
<th>DCAD</th>
<th>P_{OCAD/DCAD}</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time of detection maximal dilation</strong></td>
<td>1 At dx</td>
<td>11 week 1-2</td>
<td>7,5 week 1-2</td>
<td>0,14</td>
</tr>
<tr>
<td><strong>Time of detection maximal dilation without late dx</strong></td>
<td>1 At dx</td>
<td>10,5 week 1-2</td>
<td>6 week 1-2</td>
<td>0,13</td>
</tr>
<tr>
<td><strong>Diagnosis after 10 days of fever (late Dx)</strong></td>
<td>22%</td>
<td>7%</td>
<td>20%</td>
<td>&lt; 0,01</td>
</tr>
<tr>
<td><strong>Treatment resistance (%)</strong></td>
<td>6%</td>
<td>19%</td>
<td>34%</td>
<td>0,7</td>
</tr>
<tr>
<td><strong>Treatment resistance without late dx (%)</strong></td>
<td>4%</td>
<td>21%</td>
<td>36%</td>
<td>0,15</td>
</tr>
</tbody>
</table>
Conclusions

› OCAD intermediate between NCAD and DCAD
  – Most inflammatory parameters

› OCAD population is comparable to DCAD
  – Similar timing of CA involvement
  – Similar regression pattern
  – Similar treatment resistance

› OCAD population had optimal treatment
  – More Complete presentation at diagnosis
  – Less diagnosis after 10 days of fever
Conclusions

› By inference, patients with OCAD may need to be considered similar to those with CA Z-score ≥ 2.5 but without aneurysm

› Such “dilation”, occult or definite, could be a physiological or pathologic vaso-motor reaction of the CA rather than a CA “vasculitis”

› However our hypothesis and its clinical signification and long term morbidity should be assessed in a prospective trial
QUESTIONS?