Multisystem inflammatory syndrome in children and adolescents with COVID-19

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Presentation

- Persistent Fever > 39°C
- Abdominal symptoms
- Vasodilated shock
- +/- rash
- Low sodium
- Hyperinflammation
  - CRP > 100
  - Ferritin > 500
  - D-dimers
  - Fibrinogen
  - Neutrophilia/ Lymphopenic
- Cardiac dysfunction
  - Troponin
  - BNP

WHO

Children with features of typical or atypical Kawasaki disease or toxic shock syndrome:

**Fever > 3 days**

**AND** two of the following:

a) Rash or bilateral non-purulent conjunctivitis or oral, hands or feet inflammation signs
b) Hypotension or shock.
c) Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities
d) Evidence of coagulopathy
e) Acute abdominal symptoms

**AND**

Elevated markers of inflammation

**AND**

No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes.

**AND**

Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19

WHO/2019-nCoV/Sci_Brief/Multisystem_Syndrome_Children/2020.1 @DrJonLillie
Treatment
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  • Troponin
  • BNP
• Febrile until immunmodulated (+/- cooling)
• Avoid laparotomy
• 10-30ml/kg fluid then dopamine
• Noradrenaline via femoral line
• Hyperinflammation
  • Antibiotics
  • Immunomodulation
  • Anticoagulation
• Cardiac dysfunction
  • Attention when moving children (?!)
  • Milrinone/ levosimenden
  • ECMO

WHO/2019-nCoV/Sci_Brief/Multisystem_Syndrome_Children/2020.1
Admitted 14th April-5th May (one on 14th March)

Shock group
Age: median 9 years (IQR 6-13)
Male: 71% (15/21)
BAME: 95% (20/21),
BAME: ~40% of London
All processed serology IgG/IgM positive

Majority respond to immunomodulation+norad
## Laboratory values

### Laboratory Data Evelina- median [IQR]

<table>
<thead>
<tr>
<th>Test</th>
<th>Presentation</th>
<th>Peak</th>
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<tbody>
<tr>
<td>White cell count</td>
<td>10.7 (9.6-14)</td>
<td>18.6 (14.2-22.4)</td>
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<tr>
<td>Lymphocyte Count*</td>
<td>1 (0.5-1.3)</td>
<td>0.4 (0.3-0.7)</td>
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<tr>
<td>Platelets*</td>
<td>150 (96 – 172)</td>
<td>129 (82 – 165)</td>
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<tr>
<td>CRP</td>
<td>211 (162 – 306)</td>
<td>307 (187 – 340)</td>
</tr>
<tr>
<td>D-dimers</td>
<td>6.44 (3.7-10.2)</td>
<td>11.2 (6.5 -13.3)</td>
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<tr>
<td>Ferritin (µg/L) (14 -101)</td>
<td>924 (460 – 1534)</td>
<td>1023 (642 – 1834)</td>
</tr>
<tr>
<td>Troponin T (ng/L) (0-13)</td>
<td>45 (25 – 120)</td>
<td>110 (45 -251)</td>
</tr>
<tr>
<td>NT – pro BNP (ng/L) (&lt; 400 normal)</td>
<td>4708 (1542 - 9376)</td>
<td>7377 (3280 – 15670)</td>
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* Minimum value
Echocardiogram: Parasternal short axis. Showing origin and proximal course of left coronary artery. There is aneurysmal dilatation of the left main and left anterior descending coronary artery.
Cardiac involvement—21 patients with shock

- Impaired function: 9
- Pericardial effusion: 2
- Coronary abnormality: 7
- Normal: 1

Details:
- 5 dilatation
- 2 aneurysms

@DrJonLillie
We are learning together

- Paediatricians
- Paediatric intensivists
- Cardiology
- Infectious diseases
- Pharmacists
- Rheumatology
- Haematology
- Radiology
- Adult teams

What is correct treatment?

- Intravenous immunoglobulin
- Methyprednisolone and proton pump inhibitor
- Aspirin
- Low molecular weight heparin
- Biologicals
  - Infliximab
  - Tocilizumab
  - Anakinra
- Vitamin D

Thank you