A CASE OF SEVERE ANAEMIA IN A NEONATE

Samantha Lennard, ACT Pathology
3 week old baby presented to ED with loose stools
Specimens showed macroscopic agglutination which disappeared on warming – initial MCHC 725
FBC and film results:
- Marked anaemia with Hb 41
- Marked reticulocytosis
- WCC and platelets normal
Investigations

- **Group and screen:**
  - Agglutination necessitated pre-warm of specimen to obtain a blood group
  - B RhD positive
  - IAT Antibody screen negative
  - DAT negative using polyspecific and monospecific antisera
  - 1 unit of red cells transfused.

- Post transfusion Hb tested, otherwise no further testing requested.

- HbEPP performed on original specimen-NAD
And again......

Two weeks later:

- Baby again presented with Hb of 59, still macroscopic agglutination
- Group and screen this time showed a weak reaction in IAT screen
- Anti-M detected
- DAT still negative
- Maternal history demonstrated a weak Anti-M during the pregnancy.
- Maternal sample tested and confirmed Anti-M (also prophylactic Anti-D).
- M- unit transfused.
Cold agglutinin studies on both mother and baby using M+ and M- cells (cord and adult) clearly demonstrated high titre Anti-M at 4 deg and room temperature. Titre negative when using M- cells.

Direct cold agglutination traditionally suggests an IgM antibody.

However likely maternally derived = IgG.

DTT testing suggests also IgG.

Anti-M usually IgM, but will often have IgG component. Even if solely IgG, M antigen is found in sufficient density on red cells that direct agglutination may be observed.
Anti-M causing HDN?

- An unusual, but not unknown, cause of HDN
- This baby’s bilirubin only mildly elevated throughout
- Baby’s cord DAT negative
- After birth, discharged with “physiological jaundice”
- DAT has remained negative through duration of illness.
Meanwhile...

- ? PCH. Donath Landsteiner performed on maternal sample-negative
- Viral studies negative
- Baby transferred to POW
- Returned to Canberra. Repeat FBC 7 days after second Tx shows dropping Hb (?
  continued haemolysis, ? iatrogenic).
- Films sent to POW for review. Likely diagnosis of PCH based on clinical features and morphological findings.
- Baby given IVlg- indication “auto immune haemolysis of unknown cause”.
- Hb has stabilised.
- Recent sample now demonstrates a weakly positive DAT with IgG specificity.
### Results over time

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<tr>
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<th>23/8</th>
<th>26/8</th>
<th>8/9</th>
<th>10/9</th>
<th>15/9</th>
<th>18/9</th>
<th>8/10</th>
<th>14/10</th>
<th>21/10</th>
<th>3/11</th>
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<tbody>
<tr>
<td>Hb</td>
<td>41</td>
<td>109</td>
<td>107</td>
<td>59</td>
<td>106</td>
<td>87</td>
<td>80</td>
<td>87</td>
<td>106</td>
<td>101</td>
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<td>Retic%</td>
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<td>2.31</td>
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2 Doses, given 24/9 and 26/9
Paroxysmal Cold Haemoglobinuria

- Case studies report variability in DAT positivity - usually complement specificity
- Haemoglobinuria not noted in this case (specific exam not performed)
- Mildly elevated bilirubin: extensive intravascular haemolysis precludes metabolism of haemoglobin - cyclic nature of haemolysis
- Very occasional erythrophagocytosis noted on blood films
- No serological or bacteriological evidence of infection
- D-L antibody not demonstrated.
- Urine not submitted for analysis
- Frequency in infants?
This was a baby after all.....

- Possibility of an inherited red cell defect causing anaemia
- Apparent self-limiting/transient nature of the anaemia lessens likelihood
- No relevant history in parents
- Studies to be performed post TX.
“Rosenbach Test.-While in hospital the child was encouraged to go outside lightly clad in the hope that a paroxysm might be induced; none occurred, probably owing to an improvement in the weather conditions. It was therefore decided to induce an attack artificially by a modified Rosenbach test in order to confirm the diagnosis.

Blood was taken from an arm; haemoglobin was not present in the serum, and urine passed at the same time contained no abnormal constituents. The same arm was immersed in water at about 5-10' C. for 10 minutes, no movement being allowed. Venous return was not obstructed. At the end of this period the arm was lifted from the bath.

It was noted that the skin had become a mottled blue-and white. Blood was immediately taken from the arm and a sample of urine obtained. The serum of this blood contained 380 mg. of haemoglobin per 100 ml.; methaemalbumin was present. The urine was of normal colour and contained haemosiderin, but no haemoglobin could be detected. The benzidine test was negative. Two hours later the blood serum still contained 250 mg. of haemoglobin per 100 ml. A specimen of urine obtained at this time was the colour of burgundy and contained haemoglobin and haemosiderin, the benzidine test being positive. No red blood cells were seen on microscopical examination.”


Hoppe, H., Wtte, A (1960) Hemolytic disease of a newborn infant of a mother with paroxysmal cold hemoglobinuria Vox sanguinis