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Paradoxical DAT in a Term Newborn with Physiological Jaundice

Abiram Sivanandam

Rowan University

Tomas Rotschild

Virtua Health - Our Lady of Lourdes

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Paradoxical DAT in a term newborn with physiological jaundice

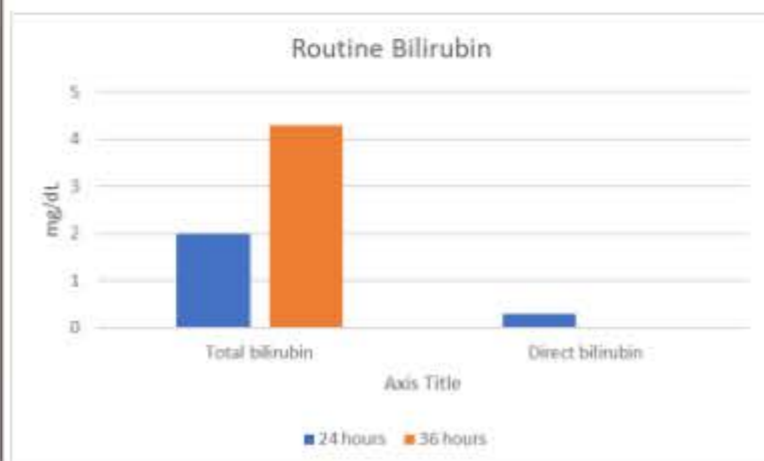
Abstract

The Direct Antigen Test (DAT) is used to find out if a new-born has maternally produced antibodies against the newborn's red blood cells. We discuss the case of a term newborn male with an O+ blood type born to a mother whose blood type is A+. As a part of routine screening, DAT of umbilical cord blood was obtained which resulted positive. While the neonate had jaundice, the overall clinical picture pointed more towards neonatal physiological jaundice, rather than a potential hemolytic anemia which is expected from a positive DAT. This discrepancy prompted us to review literature to explain our findings. We discuss several distinct, previously reported cases, including drug induced antibody anemia due to administration of prophylactic cefotetan, the Hook Effect, the effects of Wharton's jelly on a DAT, and maternal immune responses to paternal antigens found on a neonate's RBCs.

Case Description

- Term newborn male with uncomplicated vaginal birth
- Routine DAT returned positive; Confirmatory elution testing returned negative
- Maternal antibody screening was negative
- Maternal screening was unremarkable except for GBS. She received prophylactic penicillin prior to delivery

Laboratory Results



Hgb: 23.2g/dL
Hct: 68.4%
Retic: 3.5%

Discussion

- DAT indicates alloantibodies to RBC antigens, thus suggesting hemolytic disease of newborn
- Confirmatory elution identifies the antibody target. Negative results indicate low affinity to RBC antigens
- Similar cases described with DAT +, elution - results were of drug-induced AIHA in adults. Mothers who receive prophylactic medications can produce IgG autoantibodies to RBC-hapten combinations which can cross the placenta
- Wharton's Jelly has been described as a known but rare contaminant in cord blood which causes false positive DATs
- The Hook Effect is common in pregnancy but causes false negative effects in sandwich-type assays such as DAT due to high concentrations of antigen
- Paternal-specific antigens expressed on newborn RBCs can induce IgG antibody production against these RBCs which can result in a positive DAT result. However, this is extremely uncommon.
- Minor blood group antigens which are uncategorized can contribute to a positive DAT but can lack clinical evidence of hemolysis due to low antibody affinity

Conclusion

- DAT false positives must always be considered
- Cord blood contaminants can produce erroneous DAT results
- Drug-induced AIHA requires clinical context to confirm laboratory results
- Confirmatory elution testing does not always result in definitive results

Future Direction

- Maternal antibody testing
- Blood sampling directly from newborn
- Follow up of newborn for post-discharge hyperbilirubinemia
- Observation if no clinical indications

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