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TEACHING FILES (GRAND ROUNDS)

ASYMPTOMATIC CONGENITAL PARVOVIRUS INFECTION IN A NEONATE BORN TO AN ASYMPTOMATIC MOTHER WITH PARVOVIRUS INFECTION IN THE THIRD TRIMESTER - MANAGEMENT ISSUES

Zahabiya Nalwalla[1], Ramsha Ansari[2], Tsering Yangchen Dirkhipa[2], Forum Shah[3], Amol Pawar , Ira Shah[2].

[1]Perinatal Infectious Diseases Clinic, Department of Pediatric Infectious Diseases, B J Wadia Hospital for Children and Nowrosjee Wadia Maternity Hospital,, Mumbai, India,
[2]Perinatal Infectious Diseases Clinic, Department of Pediatric Infectious Diseases, B J Wadia Hospital for Children and Nowrosjee Wadia Maternity Hospital, Mumbai, India,
[3]Department of Neonatology, Nowrosjee Wadia Maternity Hospital, Mumbai, India,
[4]Perinatal Infectious Diseases Clinic, Department of Obstetrics and Gynaecology, Nowrosjee Wadia Hospital, Mumbai, India.

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Clinical Problem:

A 29 year old primigravida (G1P1L0A0) was admitted to the hospital following a spontaneous rupture of membrane at 38 weeks of gestation. Antenatal ultrasound (USG) scan at 30+5 weeks of gestation showing mild ventriculomegaly and maternal TORCH screening showing Parvovirus B19 IgM positive and Cytomegalovirus, Rubella, Toxoplasma and Herpes Simplex Virus IgG positive. The NT-NB (nuchal translucency & nasal bone) and anomaly scan at 18 weeks of gestation were normal. She underwent spontaneous normal vaginal delivery and delivered a male child with birth weight of 2.85 kg and average for gestational age. The baby cried at birth and had an APGAR score of 8 at 1 minute and 9 at 5 minutes. On inspection, his oral, anal and nasal canals were patent, there was no evidence of cleft lip and cleft palate and he had bilaterally descended testes. On his first day of life, his hemoglobin was 20.9 g/dL, total leucocyte count was 26,110 cells/mm3 (67.2% neutrophils), platelet was 328000 cells/mm^3 and reticulocyte count was 6.23%. The neonate's Parvovirus Polymerase chain reaction (PCR) was positive and TORCH PCR was negative. USG skull was normal. The baby was on room air, hemodynamically stable and accepted feeds well

Should this child be treated for congenital parvovirus infection?

Discussion:

Parvovirus B19 is a non-enveloped virus belonging to the Erythrovirus genus of the Parvoviridae family containing single-stranded DNA.[1] It is pathogenic in humans and is usually transmitted through respiratory secretions, blood transfusions, contact or transplacental transmission from mother to baby.[2] A newly exposed pregnant woman can transmit the infection perinatally to her child in approximately 17-33% of cases.[3] Approximately 30-50% of pregnant women with an acute B19 infection are asymptomatic whereas symptomatic disease occurs for a brief duration where symptoms are managed.[4] Parvovirus B19 infection occurs globally with a higher prevalence in developing countries, commonly occurring in school-aged children.[1,2] Around 50-75% of women of reproductive age have immunity against B19 virus.[1] The incubation period of this virus lies between 4-14 days after exposure.[2] Although the B19 infection is usually asymptomatic, it can also present with prodromal symptoms like fever, headache and myalgia.[2] The most classic sign of B19 infection is Erythema infectiosum, characterised by a rash over the cheeks and sparing the central face, giving a "slapped cheek" appearance, which is commonly seen in children.[2] Peripheral arthropathy can occur in 50% of infected individuals and usually is the only clinical symptom in pregnant women.[1,2] Aplastic crisis can rarely occur especially in patients with underlying conditions such as decreased red cell production, increased red cell destruction, human immunodeficiency virus or other immunodeficiencies.[1] It is hypothesized to occur as erythrocyte progenitor cells are increased in chronic anaemia, leading to increased viral replication.[2] Rarely, acute myocarditis, thrombocytopenia and neurological manifestations like meningoencephalitis and stroke can occur.[5] Congenital Parvovirus B19 infections usually tend to resolve spontaneously.[6] Our patient's baby had a normal haemoglobin and reticulocyte count after birth. However, some cases can present with profound anaemia, non-immune foetal hydrops, foetal organ damage or foetal loss.[6] Foetal damage is mainly due to foetal anaemia as the virus suppresses foetal erythropoiesis in its early stages in erythroid

Address for Correspondance: Dr. Ramsha Ansari, Flat No. 1, Noor Jahan CHS Ltd, 322 S. G. Barve Marg, Kurla West, Mumbai – 400070, India.
Email: ramsha97ansari@gmail.com

precursors.[3] Severe anaemia can lead to high-output cardiac failure, spontaneous foetal loss in the second trimester or non-immune hydrops foetalis (NIHF).[6] Our patient had a spontaneous rupture of membrane leading to delivery near term. Foetal B19 infection is the most common cause of NIHF, which causes fluid accumulation in various body compartments.[6] Foetal anaemia or foetal viral myocarditis leading to cardiac failure are speculated to be the causes of NIHF in B19 infections.[6] Screening for B19 infection is done when antenatal scans detect intrauterine growth restriction, polyhydramnios, hydrops foetalis, foetal anomalies or increased nuchal translucency.[2] In our patient, mild ventriculomegaly was seen in her scan which prompted TORCH screening to be done. Testing is recommended in a pregnant woman with exposure to the virus or if she presents with symptoms of the B19 infection.[5] Parvovirus B19-specific antibodies are tested to check for immunity, namely B19 IgG (immunoglobulin G) and IgM (immunoglobulin M).[2] Serology testing in a foetus is rarely done due to its immature immune system, thus making virological analysis reliable.[5] Molecular-based study like PCR performed either on foetal cord blood or amniotic fluid is done to diagnose parvovirus B19 infection in foetuses.[6] B19 DNA can be detected after birth by neonatal cord blood or dried blood spot samples as well, however, the accuracy decreases if the infection is diagnosed in the early stages of pregnancy.[7] In our case, neonatal blood was positive for Parvovirus B19 PCR. In seropositive pregnant women, serial ultrasound monitoring for foetal anaemia is done by assessing the peak systolic velocity of the middle cerebral artery.[2] Infants with foetal anaemia or hydrops foetalis should undergo cordocentesis to assess for foetal haemoglobin and reticulocyte count.[8] Upon detection of anaemia, intrauterine transfusions of packed red blood cells are given into the umbilical vein.[8] Intra-peritoneal transfusions of B19 IgG-rich immunoglobulin were found to resolve foetal anaemia and hydrops.[9] Infants without any evidence of foetal anaemia are not further tested.[4] Several cases of infants infected with parvovirus B19, were given intravenous immunoglobulins postnatally and it was reported that it reduced viral load and stabilised anaemia.[10] Infants with any complications of parvovirus B19 infection should have a paediatric review and follow-up.[4] Our patient was not treated and just advised regular follow up.

Compliance with Ethical Standards
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