

Neonatal Leukemoid Reaction - A Diagnostic Dilemma

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Abstract

Leukemoid reaction is defined as an absolute neutrophil count(ANC) of >30,000/cumm. First described by Holland and Maurer in 1963 leukemoid reaction is associated with infection, anemia, bronchopulmonary dysplasia, use of antenatal steroids, prematurity. Neonatal leukemoid reaction is seen as a neonatal response to hypoxia and can mimic leukemia. In our case the baby was premature and the leukemoid reaction was due to early onset sepsis. Clinicians need to keep sepsis in mind while dealing with neonatal leukemoid reaction.

Introduction

The leukemoid reaction during neonatal period is defined as ANC of >30,000/cumm during first week of life¹. The first cases of neonatal leukemoid reaction were described by Holland and Maurer in 1963 and were associated with infection, anemia, bronchopulmonary dysplasia, use of antenatal Steroids, prematurity, chromosomal abnormalities². Incidence of leukemoid reaction in NICU ranges between 1.3 to 15%. It is also seen as a neonatal response to hypoxia and can mimic leukemia. Neonatal sepsis can present with Hyperleucocytosis(total leucocyte count >100,000/mm³and needs to be distinguished from leukemia and other myeloproliferative disorders^{3,4}. We present a case of neonatal leukemoid reaction due to early onset sepsis in a preterm.

The Case

A 34 week, male preterm delivered via caesarean section with birth weight was admitted in our NICU in view of respiratory distress since birth. Caesarean section was done on account of premature rupture of membranes. The baby had spontaneous cry at birth and developed respiratory distress soon after birth. In view of early onset neonatal sepsis antibiotics were started and child was kept on CPAP. Complete blood count(CBC), Blood culture, C- reactive protein(CRP) were sent. Baby's initial investigations revealed WBC Count of 98,000/cu mm(Polymorphs65%, Lymphocytes25%, Monocytes3%, Band cells5%, Metamyelocytes2%) Hb was 15 gm/dl, platelets were 1.5 lacs/cumm, retic count was 1%, other reports were normal. The complete blood count was repeated on alternate days and showed a decreasing trend. Investigations on 14th day of admission revealed, Hb of 13.6 gm/dl, total leukocyte count of 22,000 cells/ cu mm with a differential count of poly 55%, lymphocytes 40%, monocytes 4%,

eosinophils 1%, platelet count was 1.7lacs/cu mm. CRP was initially positive with a titre of 12mg/dl but a repeat CRP was normal, Blood culture was positive for GBS. Lumbar puncture was normal. Bone marrow biopsy was done to rule out leukemia, but it was normal. Karyotype analysis was normal. Infant continues to do well on follow up.

Discussion

The total WBC count and neutrophil count in neonates younger than 1 week are physiologically higher than those in children and adults and the counts usually range between 9000 to 30000 cu/mm. Leucocytosis can also be seen as a reaction to various infections, inflammatory process and in certain cases a part of normal physiology. This reaction is mediated by several molecules, which are released or upregulated in response to stimulatory events that include growth or survival factors like granulocyte stimulating factors, cytokines like IL-1, IL-3, IL-6, IL-8, TNF etc^{5,6,7}. A higher frequency of leukemoid reaction was reported in extremely low birth weight infants without obvious causes of leucocytosis and in association with longer use of ventilator support and a higher frequency of bronchopulmonary dysplasia.

Infants with Down syndrome frequently have leukocytosis, neutrophilia, differential shift to left and immature forms in the form of blasts are seen in blood during post neonatal period⁸. Congenital leukemia occurs rarely, yet carries high mortality and poses special problems for perinatologists and hematologists. Most of the neonatal cases reported have acute non-lymphocytic leukemia, in contrast to the predominance of acute lymphoblastic leukemia found later in childhood. The clinical signs of leukemia maybe evident at birth with hepatosplenomegaly, petechiae and ecchymosis⁹. In our patient the bone marrow examination was normal thereby ruling out congenital leukemia. The karyotype was also normal hence the possibility of transient myeloproliferative disorder (TMD) seen with patients with Down's syndrome was also ruled out. We considered the possibility of Leucocyte adhesion defect(LAD) as a differential diagnosis in our patient but the umbilical cord fell on the fourth day which ruled out the possibility of LAD. Our patient responded to antibiotics thereby helping us conclude that leukemoid reaction seen on peripheral blood film was due to early onset sepsis.

Conclusion

In neonate the WBC count above 30,000/mm³ is a rare entity and should be thoroughly investigated to rule out possibilities of leukaemia, transient myeloproliferative disorder and leucocyte adhesion defect.

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