20th World Congress in Fetal Medicine

The clinical characteristics of severe early-onset hemolitic disease of fetus and newborn

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Objective

To summarize the clinical characteristics of severe early-onset hemolitic disease of fetus and newborn (HDFN) in China; to, analyze the factors affecting the efficacy of IUT and explore the effectiveness of serial IUT combined with immunotherapy to treat severe early-onset HDFN.

Methods

Retrospective cohort analysis of 97 cases of severe HDFN between 2013 and 2022. Time-to-event survival analysis for repeated events was used to evaluate risk of subsequent IUT. The decreasing trends of Hb and Hct after serial IUT in different clinical situations were described. The details of IUT, delivery and other data were compared to evaluate the efficacy of immunotherapy combined with serial IUT in the treatment of severe early-onset HDFN. The incidence of various neonatal complications after serial IUT was summarized and compared according to whether they were severe early-onset HDFN or not.

Results

The incidence of severe early-onset HDFN in Chinese is high, which is characterized by high antibody titer, multiple antibodies positive, fetal hydrops (HF) ($P < 0.05$). The causes of severe early-onset HDFN were Rh alloimmunization (89.47%), MNS alloimmunization (7.89%), and platelet alloimmunization (2.63%) related antibodies. In terms of IUT, severe early-onset HDFN had the characteristics of earlier gestational week at the first IUT, lower Hb and Hct before the first IUT, less amount of first IUT, and more times of IUT than non-early-onset severe HDFN ($P < 0.05$). The survival rate and birth weight of severe early-onset HDFN after IUT were lower than those of non-early onset severe HDFN ($P < 0.05$). Severe early-onset HDFN, HF, earlier gestational week at the first IUT and stale blood product were associated with shorter IUT interval. The factors associated with long IUT interval included high Hb after IUT and combined immunotherapy. Severe early-onset HDFN, HF and early gestational age at the first IUT were risk factors associated with adverse pregnancy outcomes after IUT. The effect of IUT in severe HDFN caused by different maternal-fetal alloimmune antibodies is different. The first gestational week of IUT was delayed 7 days in severe early-onset HDFN by using immunotherapy. Compared with the previous pregnancy, the survival rate of severe early-onset HDFN after intervention were improved. Neonatal complications after serial IUT from high to low were ABO blood group disorder (27.59%), iron overload (16.00%), thrombocytopenia (14.94%), intrahepatic cholestasis(10.34%) and so on. Compared with non-early-onset severe HDFN, the incidence of ABO blood group disorder and thrombocytopenia in neonates with severe early-onset HDFN after IUT was higher ($P<0.05$).

Conclusion

The incidence of severe early-onset HDFN in Chinese is high, which is characterized by high antibody titer, multiple antibodies positive, early gestational age of the first IUT, more IUT times and high occurrence of HF. Severe early-onset HDFN, HF, early gestational age of the first IUT and stale blood products are related to short IUT interval. Hb and Hct decreased rapidly after the first three IUT of severe early-onset HDFN. Hb and Hct decreased rapidly after IUT in HF. The effect of IUT in severe HDFN caused by different maternal-fetal alloimmune antibodies is different. Combined immunotherapy may prolong IUT interval, and delay the first gestational week of IUT in severe early-onset HDFN by about 7 days. The common complications of newborns after serial IUT are ABO blood group disorder (27.59%), iron overload (16.00%) and thrombocytopenia (14.94%). The incidence of ABO blood group disorder and thrombocytopenia in neonates with severe early-onset HDFN is higher than that of neonates with non-early-onset severe HDFN.