Figure 1. Probability of neonatal hypotonia in relation to maternal magnesium levels.

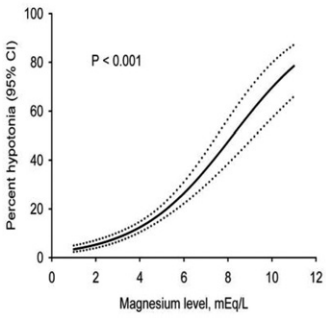
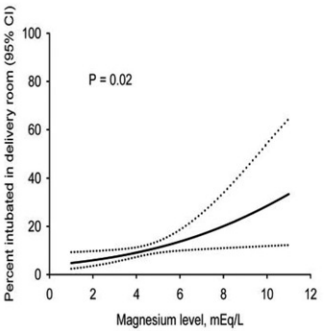


Figure 2. Probability of intubation of the infant in the delivery room in relation to maternal magnesium levels.



CONCLUSION: The concentration of magnesium in maternal blood is directly related to hypotonia in the newborn infant as well as the need for intubation of the infant at birth.

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391 The development of clinically significant hemolytic disease of the fetus and newborn due to anti-C combined with one or more additional red blood cell antibody

Kara Markham[1], Karen Rossi[2], David Krugh[2], Richard Oshaughnessy[2]
[1]Ohio State University, hilliard, Ontario, [2]Ohio State University, Columbus, Ohio

OBJECTIVE: The hemolytic effect of anti-c is felt to closely mirror that of anti-RhD, resulting in the potential development of hemolytic disease of the fetus and newborn (HDFN) in affected pregnancies. As anti-RhD has recently been shown to confer an increased risk of HDFN when combined with other red blood cell antibodies, the purpose of this study was to evaluate for a similar effect with antibody combinations involving anti-c.

STUDY DESIGN: The Ohio State University Medical Center Maternal Alloimmunization Program maintains an IRB-approved, computerized database of all pregnancies complicated by red blood cell alloimmunization. For the purpose of this study, significant HDFN was defined as a requirement for intrauterine transfusion (IUT), birth or cord hemoglobin of <10 g/dL, or the need for neonatal exchange transfusion.

RESULTS: In total, 51 patients were identified as having a combination of anti-c and at least one additional red blood cell antibody. Such pregnancies were approximately four times more likely to develop significant complications of HDFN ($p<0.001$) and twice as likely to require invasive management with IUT ($p=.0445$) when compared to patients with anti-c alone. The most frequently encountered antibody combination was anti-c + anti-E. When each antibody combination was considered separately, only the combination of anti-c + anti-Jka + anti-S showed a statistically significant increased risk of HDFN compared to anti-c alone.

CONCLUSION: The presence of multiple red blood cell antibodies appears to confer an increased risk of clinically significant HDFN in the presence of antibodies to the c antigen. This should be considered when managing pregnancies affected by such antibody combinations.

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392 Clinically significant hemolytic disease of the fetus and newborn due to anti-K combined with one or more additional red blood cell antibody

Kara Markham[1], Rossi Karen[2], Oshaughnessy Richard[3]
[1]Ohio State University, hilliard, Ohio, [2]The Ohio State University, Obstetrics and Gynecology Fetal Therapy Program, Columbus, Ohio, [3]The Ohio State University, Obstetrics and Gynecology, Columbus, Ohio

OBJECTIVE: Alloimmunization to the Kell family of red blood cell antigens is an important cause of morbidity and mortality in obstetrics. The process leading to fetal anemia in such cases is novel in that both hemolysis of existing red blood cells and suppression of ongoing erythropoiesis are proposed to contribute to the development of hemolytic disease of the fetus and newborn (HDFN). The purpose of this study is to outline our experience with pregnancy outcomes in women who have anti-K antibodies in combination with other red blood cell antibodies.

STUDY DESIGN: The Ohio State University Medical Center Maternal Alloimmunization Program maintains an IRB-approved, computerized database of all pregnancies complicated by red blood cell alloimmunization. For the purpose of this study, significant HDFN was defined as a requirement for intrauterine transfusion, birth or cord hemoglobin of <10 g/dL, or the need for neonatal exchange transfusion.

RESULTS: Fifty-eight patients were identified as having a combination of anti-K and at least one additional red blood cell antibody. Pregnancies complicated by alloimmunization to the Kell antigen as well as an additional red blood cell antigen were nearly three times more likely to develop significant HDFN than those affected by anti-K alone ($p=.0451$). While the most frequently encountered antibody combination was anti-K and anti-Fya, the only specific antibody combination associated with a clinically significant increase in the occurrence of HDFN was anti-K + anti-D ($p=.0019$).

CONCLUSION: The presence of multiple red blood cell antibodies appears to increase the occurrence of clinically significant HDFN in the presence of anti-K. Clinicians should have a heightened awareness of the potential for severe disease in such pregnancies and should monitor these patients closely in an effort to improve obstetrical and neonatal outcomes.

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393 Prevalence and progression of recipient twin cardiomyopathy in early stage twin-twin transfusion syndrome (TTTS)

Mounira Habli[1], Erik Michelfelder[1], David Wall[1], William Polzin[1], Foong.Yen Lim[2], David Lewis[3], Timothy Crombleholme[1]
[1]Cincinnati Children's Hospital, Cincinnati, Ohio, [2]Cincinnati Children's Hospital Medical Center, Fetal Care Center, Cincinnati, Ohio, [3]University of Cincinnati, Cincinnati, Ohio

OBJECTIVE: Management of TTTS in early stages (I, II) is controversial. We describe the prevalence, severity, and incidence of progression of recipient twin (RT) cardiomyopathy (CM) in early Quintero Stage I and II TTTS.

STUDY DESIGN: Among 451 TTTS evaluated between 2004-2009, 124 (27%) cases of stages I and II were reviewed. The cases were "upstaged" to Cincinnati IIIA, IIIB, or IIIC if mild, moderate, or severe recipient cardiomyopathy (RTCM) was detected on echocardiography (ECHO), respectively. Progression of RTCM was defined by worsening of cardiomyopathy in subsequent ECHO or failure to respond to amnioreduction (AR). Outcome data included progression of RTCM, treatment, and survival at birth. Data were compared by Chi-square, Fisher's exact, or T- test as appropriate.

RESULTS: There were 77/124 (62%) stage I and 47/124 (38%) stage II cases. 65% (81/124) were upstaged to Cincinnati IIIA (26/81), IIIB (23/81) and IIIC (32/81). Treatment included observation in 11 (9%), AR in 26 (20%), AR followed by laser procedure (SFLP) in 43 (35%), SFLP in 43 (35%), and cord coagulation (RFA) in 1. 43/80 (54%) cases treated by observation or AR initially progressed at a mean of 1.4 ± 1.5 weeks. The incidence of progression increased significantly if RTCM was more advanced initially: 9/27 (33%) Stage I, 8/15 (53%) Stage II, 8/16 (50%) IIIA, 10/10 (100%) IIIB, and 8/12 (67%) IIIC ($p < 0.01$). Overall fetal survival was 82% (174/212) in 106 cases with outcome data.

CONCLUSION: Echocardiography demonstrates a high incidence of RTCM in early stage TTTS. Progression is more likely for RT with more advanced CM.

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