

# Fetal Hyperechogenic Bowel and Early Necrotizing Enterocolitis in Three Intrauterine Growth Restricted, Extremely Low Birth Weight Infants

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## Abstract

**Objective:** To discuss the relationship between fetal hyperechogenic bowel, absence of end diastolic flow in umbilical artery with Doppler ultrasound and necrotizing enterocolitis in extremely low birth weight and intrauterine growth restriction infants during early neonatal period.

**Case:** We presented 3 cases with intrauterine growth-restricted, extremely low birth weight who had absence of end diastolic flow in umbilical artery and hyperechogenic bowel before delivery and developed necrotizing enterocolitis during the early postnatal period.

**Conclusion:** Hyperechogenic bowel in cases with severe intrauterine growth restriction can be an important finding along with absent or reversed end diastolic flow to make a necrotizing enterocolitis in early neonatal period.

**Keywords:** Necrotizing enterocolitis, hyperechogenic bowel, extremely low birth weight.

## *İleri derecede düşük doğum ağırlıklı, intrauterin büyüme kısıtlılığı olan üç olguda fetal hiperekojenik barsak ve erken nekrotizan enterokolit*

**Amaç:** Fetal hiperekojenik barsak ve perinatal izlemde umbilikal arter diastol sonu akımı kaybı ya da ters akım varlığı ile erken neonatal nekrotizan enterokolit ilişkisini, ileri derecede düşük doğum ağırlığı ve intrauterin büyüme kısıtlılığı bulunan olgular dolayısıyla tartışmak.

**Olgu:** İkinci trimesterde fetal hiperekojenik barsak tanısı alan ve perinatal izleminde Doppler ultrasonografide umbilikal arter diastol sonu akımı kaybı ya da ters akım varlığı saptanan gestasyonal haftaları 28 ile 30 hafta, doğum ağırlıkları ise 760 ile 930 g arasında olan ve postnatal yaşamlarının ilk gününde nekrotizan enterokolit gelişen üç olgu sunulmuştur.

**Sonuç:** Prenatal izlemde fetal hiperekojenik barsak ve Doppler ultrasonografi ile umbilikal arter diastol sonu akımı kaybı ya da ters akım bulguları, şiddetli intrauterin büyüme kısıtlılığı ile birlikte preterm bebekte yaşamı tehdit eden bir durumdur. Bu bebeklerde, kronik hipoksiye ikincil olarak gelişen nekrotizan enterokolitin, genelde görülme zamanının aksine yaşamın ilk gününde ortaya çıkabileceğini vurgulamak istedik.

**Anahtar Sözcükler:** Nekrotizan enterokolit, hiperekojenik barsak, ileri derecede düşük doğum ağırlığı.

## Introduction

Necrotizing enterocolitis (NEC) is a common acute abdominal condition seen in the neonatal period and most commonly manifests within the second week of life in preterm infants. At the same

time the presentations of NEC can be various and are closely related with the gestational age and haemodynamic disturbances of the fetal umbilical artery. In severe intrauterine growth restriction, as a result of these haemodynamic disturbances, the blood flow changes persist in the postnatal life.<sup>[1,2]</sup>

We presented 3 cases with extremely low birth weight who had absence of end diastolic flow in umbilical artery (AREDF) and hyperechogenic bowel (HEB) before delivery and later developed early necrotizing enterocolitis postnatally.<sup>[3,4]</sup> We think that hyperechogenic bowel in cases with severe intrauterine growth restriction can be an important finding for some complications in postnatally. This finding with AREDF can make a necrotizing enterocolitis at early neonatal period.

## Case Report

### Case 1

Prenatal follow up was done at Baskent University Hospital Perinatology Unit. Absent or reversed end diastolic flow in the umbilical artery as well as hyperechogenic bowel were demonstrated at the 28th week of gestation and the patient was followed up closely. This female infant with IUGR was admitted to Baskent University Hospital Neonatal Intensive Care Unit (NICU) had an extremely low birth weight which was 760 g at the 29th gestational week after delivered by cesarean section because of fetal distress. Later on admission to NICU, surfactant was given because of respiratory distress syndrome (RDS). The infant had abdominal distention and discoloration at abdominal skin without feeding in the first hours. Radiographic grade II NEC was diagnosed in postnatal 2. day then antibiotics and total parenteral nutrition were given. She could not to be fed until the 29th day of life. After then enteral feeding was increased step by step. She was discharged from the NICU at the 81 st day of life.

### Case 2

The second case was not followed up at Baskent University Hospital prenatally but was referred to Baskent University Hospital Perinatology Unit because of severe preeclampsia, IUGR, AREDF and evidence of hyperechogenic bowel. An emergency cesarean section was performed and the male infant weighing 930g at the 28th week was born. Then he was admitted to Baskent University Hospital Neonatal Intensive Care Unit after delivery with extremely low birth weight. He also had surfactant therapy just after admission to NICU because of RDS. He had abdominal distention and discoloration at abdominal skin without feeding in the first day.

Grade II NEC was diagnosed by X-ray. Antibiotics and total parenteral nutrition (TPN) were given. He had cholestasis due to TPN. Eventually, enteral feeding could be started at the 23 th day of life. He was discharged from the NICU at 59 th day of life.

### Case 3

Third patient's mother was not followed up at Baskent University Hospital prenatally but was referred to Baskent University Hospital Perinatology Unit because of oligohydramnios, severe IUGR, AREDF and hyperechogenic bowel (HEB is shown by Figure 1). Late decelerations were demonstrated by non-stress test and a male infant with extremely low birth weight was delivered by an emergency cesarean section. The gestational age at birth was 30 weeks and the birth weight was 850 g. The infant was admitted to Baskent University Hospital Neonatal Intensive Care Unit. He did not have RDS but he had abdominal distention and discoloration at abdominal skin without feeding in the first day. Grade II NEC was diagnosed by X-ray. Antibiotics and total parenteral nutrition were started, Eventually enteral feeding was started at the 24th day. He was discharged from the NICU at the 50 th day of life.

## Discussion

Fetal hyperechogenic bowel (HEB) reveals to increased echogenicity or brightness of the fetal bowel noted on second trimester sonographic examination.<sup>[3,4]</sup> Hyperechogenic bowel can be found in 0.1-1.8 % of pregnancies as a normal variant in fetuses during the second or third trimester, it has also been described as a prenatal marker for cystic fibrosis, chromosomal aneuploidy and numerous other pathologies such as small bowel obstruction, Hirschsprung's disease, bowel atresia, intra-amniotic hemorrhage and oligohydramnios.<sup>[3,4]</sup> Some researches refer that in the second trimester HEB is the marker of subsequent suboptimal fetal growth. Intrauterine growth restriction (IUGR) has been expected to complicate 4% to 18% of pregnancies with HEB.<sup>[5,6]</sup> Strocker et al.<sup>[7]</sup> examined 131 consecutive pregnancies with fetal HEB and determined that 9 (6.9%) had growth restriction. The association of echogenic bowel with IUGR may be



**Figure 1.** HEB as shown by ultrasonography for Case 3.

caused in part by ischemia from redistribution of blood flow away from the gut.<sup>[2]</sup> Our three cases were severe IUGR infants and HEB was demonstrated at the second trimester of pregnancy.

Other less common associations are cytomegalovirus, toxoplasmosis, parvovirus. The association of second trimester HEB with metabolic diseases was reported recently.<sup>[8]</sup> Nyberg et al.<sup>[3]</sup> investigated the clinical outcomes of 95 second-trimester fetuses with HEB prospectively. They reported that adverse outcomes occurred in 45 of the 95 fetuses (47%) with echogenic bowel compared with eight of the 110 fetuses (7.27%) in the control group, adverse outcomes included chromosomal abnormalities, intrauterine growth retardation, fetal demise, or other fetal anomalies.

Some studies also reveal that absence or reversal of end diastolic flow (AREDF) in the umbilical artery is associated with poor outcome and high incidence of necrotizing enterocolitis (NEC).<sup>[9,10]</sup> Pregnancies complicated by abnormal umbilical artery Doppler blood flow patterns often result in the neonate being born both preterm and growth-restricted and this situation is at high risk of enteral intolerance, NEC and mortality for newborn infants.<sup>[10]</sup> Necrotizing enterocolitis is a common acute abdominal condition seen in the neonatal period and most commonly manifests within the second week of life. At the same time the presentations of NEC can be various and are closely related with the gestational age and haemodynamic disturbances of the fetal umbilical artery. In severe intrauterine growth restriction, as a result of these

haemodynamic disturbances, the blood flow changes persist in the postnatal life. Malcolm et al.<sup>[9]</sup> found corrected mortality rate 37 % in fetus with AREDF and one case died because of fulminant NEC at 42 days. Our 3 cases with HEB had oligohydramnios and IUGR. All of them had absent end diastolic flow in umbilical artery prenatally. We could not be able to feed our cases for at least 3 weeks because of grade II NEC which might end up with intestinal perforation. Feeding could be started after 3 weeks and no complications occurred.

Marianne et al.<sup>[11]</sup> evaluated 65 pregnant women between 24 and 34 weeks' gestation with pregnancy-induced hypertension prospectively. Fetuses with AREDF were delivered at earlier gestational ages. They had a higher incidence of gastrointestinal complications, bronchopulmonary dysplasia, intraventricular hemorrhage and vascular hypotension than those without AREDF. The presence of AREDF was also associated with a mortality rate of 30%, whereas in fetuses without AREDF there was no mortality.

We think that hyperechogenic bowel in cases with severe intrauterine growth restriction can be an important finding for some complications in postnatally. This finding with AREDF can make a necrotizing enterocolitis at early neonatal period.

## Conclusion

We think that HEB and severe IUGR with AREDF together can be an important findings. These findings can make a necrotizing enterocolitis at early neonatal period.

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