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Case Report

Sonographic findings of transient marked proximal bowel dilatation in a growth-restricted fetus at 35 weeks' gestation ☆

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ABSTRACT

Etiologies underlying the relatively infrequent third-trimester sonographic depiction of dilated fetal bowel include (functional or mechanical) bowel obstruction, intestinal atresia, volvulus, annular pancreas, intestinal malrotation, intussusception, gastrointestinal duplications, cystic fibrosis-associated meconium ileus, congenital chloride diarrhea, microvillus inclusion disease, intestinal neuronal dysplasia, and meconium plug syndrome. Fetal bowel obstruction may be associated with aneuploidy (mostly Trisomy 21 in association with esophageal or duodenal atresia), and rarely select microduplications or deletions. We present unusual sonographic findings associated with transient marked proximal fetal bowel dilatation in association with concurrent development of oligohydramnios, in a growth-restricted fetus at 35 weeks' gestation. This case supports that upon observation of dilated loops of fetal bowel, while not negating the potential need for delivery secondary to potential bowel compromise, consideration should be given for observation in anticipation of potential spontaneous resolution of this condition, especially among growth-restricted fetuses with decreased amniotic fluid volume in prematurity.

Introduction

The differential diagnosis of etiologies underlying the relatively infrequent third-trimester sonographic depiction of dilated fetal bowel includes (functional or mechanical) bowel obstruction, intestinal atresia, volvulus, annular pancreas, intestinal malrotation, intussusception, gastrointestinal duplications, cystic fibrosis-associated meconium ileus, congenital chloride diarrhea, microvillus inclusion disease, intestinal neuronal dysplasia, and meconium plug syndrome [1–11]. Fetal bowel obstruction may be associated with aneuploidy

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(mostly Trisomy 21 in association with esophageal or duodenal atresia), and rarely select microduplications or deletions, with a detection rate in cases of low risk of aneuploidy of 3.85% by copy number variation sequencing (CNV-seq) in contrast to 7.69% by whole exome sequencing (WES) [12–15]. In addition, conditions associated with dilated loops of fetal bowel include a small subset of conditions in which this finding may be transient, which although prominent when seen, may dissipate with spontaneous resolution [16,17]. We present unusual sonographic findings associated with transient marked proximal fetal bowel dilatation with concurrent development of decreased amniotic fluid volume in a growth-restricted fetus at 35 and 3/7 weeks' gestation.

Case

A 38-year-old P2 was followed during her third pregnancy. She had a previous classical Cesarean delivery of a 907 g infant at 26 weeks' gestation (due to premature rupture of membranes and fetal breech-presentation), followed by a repeat Cesarean delivery at term, of an infant weighing 3175 g. Both infants are well. In her current pregnancy, cell-free fetal DNA screening was negative for aneuploidy and select microdeletions. She was Rubella immune, HIV, HBsAg, and RPR negative, and initial cystic fibrosis (CF) screening was negative. Fetal anatomy at 20 weeks' gestation was within normal limits with no structural abnormalities noted. Her pregnancy continued uneventfully until fetal growth restriction (FGR) was suspected at 30 weeks' gestation, at which time sonography suggested an abdominal circumference (AC) at the 8th centile for gestational age. Enhanced fetal surveillance with twice weekly nonstress fetal testing, biophysical profile (BPP), umbilical artery (UA) Doppler placental vascular resistance parameters [systolic / diastolic (S/D) ratios], and interval assessments of fetal growth, were implemented. At 35 and 3/7 weeks' gestation, she was noted to have a breech-presenting fetus with an amniotic fluid index (AFI) of 11 cm and overall BPP of 8/8. Umbilical artery S/D = 2.3, normal for gestational age. Attention was drawn to a markedly dilated fetal stomach (Fig. 1). In addition, multiple loops of markedly dilated proximal small bowel exhibiting thickened, edematous bowel walls, creating an overall dense "honeycomb" appearance, were noted (Fig. 2).

Differential diagnosis was considered to include: potential (functional or mechanical) bowel obstruction, intestinal atresia, volvulus, intussusception, intestinal malrotation, cystic fibrosis-associated meconium ileus, congenital chloride diarrhea, and meconium plug syndrome. Immediate consultation with Pediatric surgery was obtained and given the concern for an acute fetal bowel obstruction, which might necessitate immediate neonatal surgical management including (but not limited to) intestinal malrotation, volvulus, or intussusception, the patient was admitted for observation with repeat sonographic evaluation and continued management. On admission, the patient was normotensive with no abnormal physical or laboratory findings and subsequently extended (full-gene) cystic fibrosis carrier screen, and TORCH infections were negative. Intramuscular antepartum corticosteroids to decrease potential prematurity-associated neonatal morbidities were administered. The fetal heart rate remained reassuring. Four days later, at repeat sonographic assessment, the fetal stomach appeared normal in size (Fig. 3) with complete spontaneous resolution of the previously markedly dilated loops of the small bowel (Fig. 4). Concurrently, decreased amniotic fluid volume (Figs. 3 and 4) had developed with AFI of 5.3 cm, and maximum vertical pocket of 2.3 cm.

Given suspected fetal growth restriction in conjunction with decreased amniotic fluid volume, repeat Cesarean delivery was performed at 36 weeks' gestation through a trans-

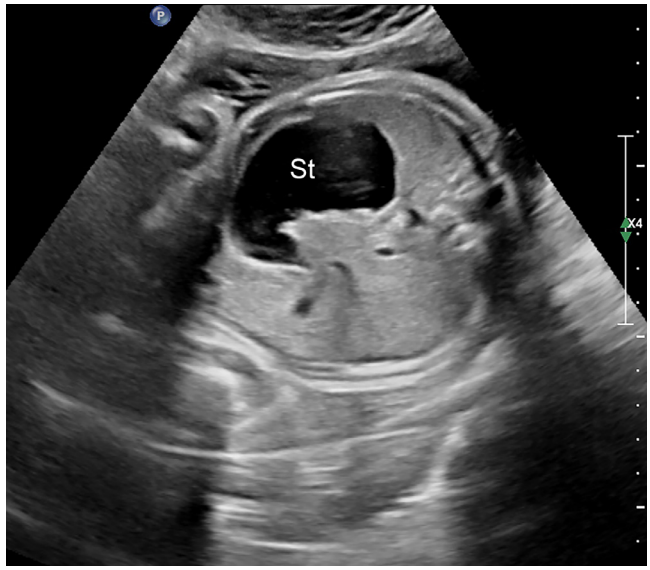

Fig. 1 – Axial sonographic image at 35 at 4/7 weeks' gestation. Note markedly distended fetal stomach (St).

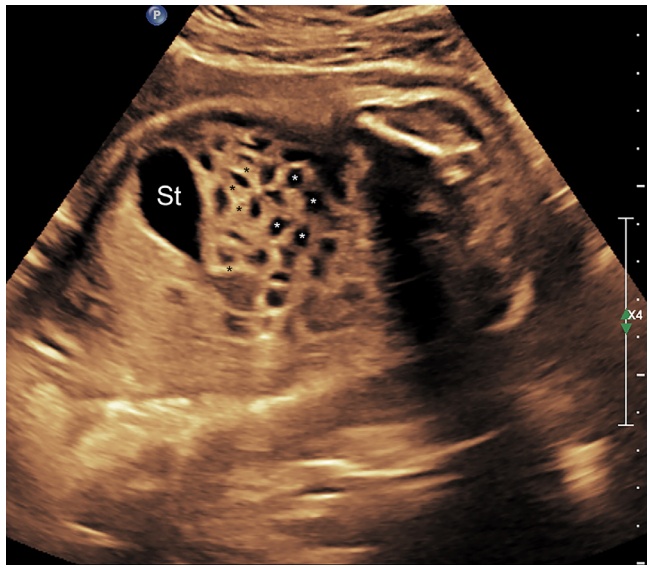

Fig. 2 – Sagittal sonographic image at 35 and 4/7 weeks' gestation. Note markedly dilated loops of fetal proximal small bowel (marked with white asterisks), creating a dense "honeycomb" appearance of the bowel. Note the thick, edematous bowel walls (marked with black asterisks).

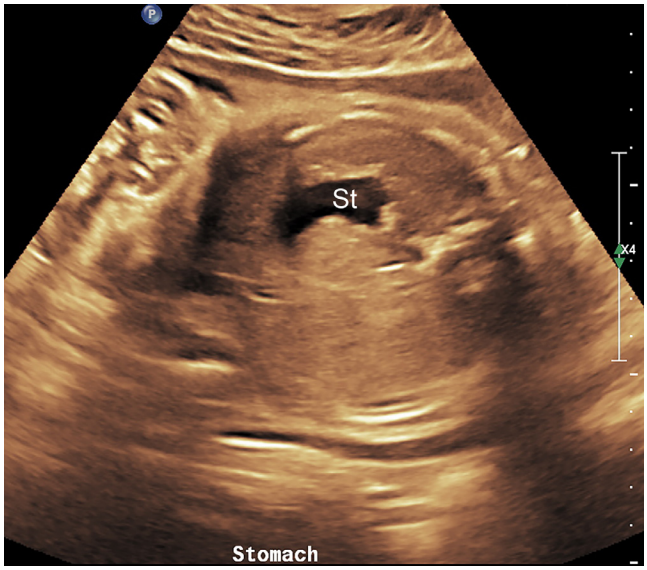

Fig. 3 – Axial sonography at 36 weeks' gestation. Note resolution of previously depicted markedly dilated fetal stomach (St). Note the concurrent development of oligohydramnios.

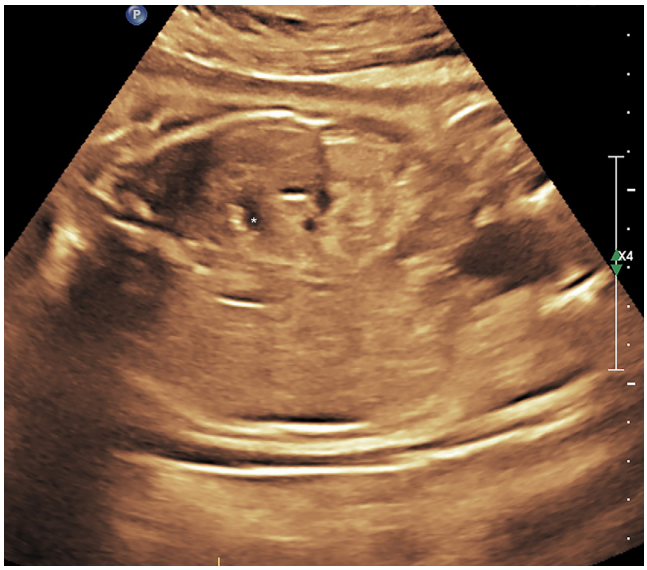

Fig. 4 – Sagittal sonographic image at 36 weeks' gestation. Note complete spontaneous resolution of previously depicted dilated loops of fetal small bowel. The previously distended fetal stomach is marked with a white asterisk (*).

verse lower uterine segment incision. Birth weight was 2150 g (8th centile for gestational age), Apgar scores of 8 and 9 were assigned at 1 and 5 minutes, respectively, umbilical artery pH = 7.2, and base excess = -2.8. The infant was observed in the neonatal intensive care unit, (NICU) and followed by Pediatric surgery. A nastrogastric tube was placed for decompression, and the infant was kept NPO until bowel patency was proven. A frontal radiograph of the chest and abdomen on Day 1 of life was interpreted as normal (Fig. 5). The infant spontaneously passed meconium within the first 24 hours of life and a follow-up frontal radiograph of the chest and abdomen on Day 2 of life after removal of the nasogastric tube, was also normal (Fig. 6). The patient's postoperative course was unremarkable and she was discharged on Day 3 following surgery. The infant was discharged on Day 7 of life and subsequent neonatal follow-up is planned.

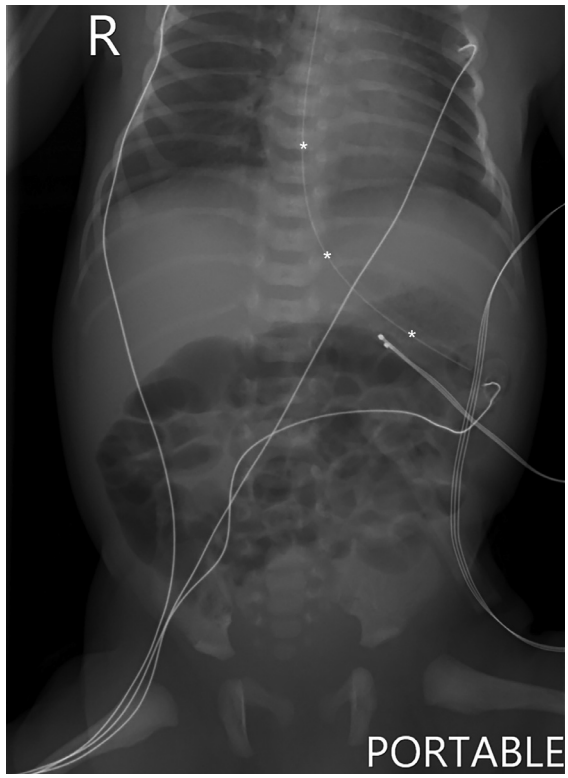

Fig. 5 – Frontal radiograph of the chest and abdomen on Day 1 of life. Note normal findings and the prophylaxis nasogastric tube (marked with white asterisks) placed for decompression.

Discussion

Clinicians encountering third-trimester fetal bowel dilatation are often confronted with the dilemma of whether or not these sonographic findings are consistent with an acute fetal intra-abdominal event, which may necessitate surgical management in an attempt to preserve potentially compromised fetal bowel, thus indicating the need for immediate delivery at times despite prematurity [1–5]. In contrast, nonsurgical conditions including (but not limited to): cystic fibrosis-associated meconium ileus, congenital chloride diarrhea, microvillus inclusion disease, intestinal neuronal dysplasia, and meconium plug syndrome are well established and do not merit immediate surgical intervention [6–11]. Prenatal ultrasound findings of transient dilatation of loops of fetal bowel such as our case, have been reported infrequently [16,17].

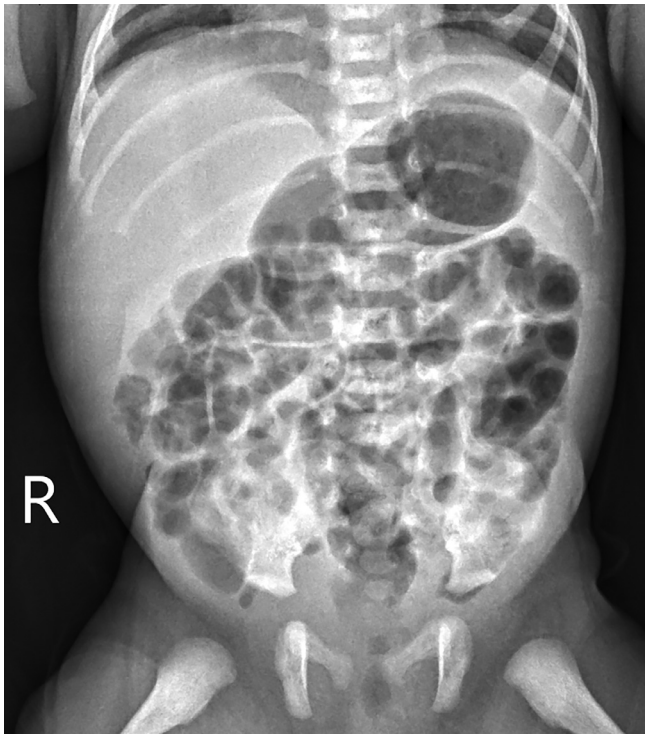

Fig. 6 – Follow-up frontal radiograph of the chest and abdomen on Day 2 of life. Note normal findings following removal of a previously placed nasogastric tube.

Systematic review of the English literature (PubMed, Google Scholar, and Medline, 1966-2024) using the search terms "prenatal ultrasound," "dilated fetal bowel," "fetal growth restriction" and "impaired fetal growth," confirm that prenatal sonographic findings of transient dilated proximal fetal bowel has been rarely noted in association with impaired fetal growth. We speculate that in our case, transient fetal bowel dysfunction with concurrent development of decreased amniotic fluid volume in a growth-restricted fetus may have reflected transient bowel ischemia as suggested by Ghi et al. [16]. This would be similar to the well-established decrease in fetal renal arterial blood supply, decreased glomerular filtration rate (GFR), and decreased urine output resulting in oligohydramnios in association with growth-restricted fetuses, in an effort to conserve oxygen supply to essential organs (central nervous system, heart, and adrenals) [18,19]. The concurrent observation of decreased amniotic fluid volume in association with dilated loops of the fetal bowel in our case supports the concept of transiently impaired splachnic vascular supply to the proximal bowel (superior mesenteric artery) as suggested by Achiron et al. [20] in 4 separate cases of twin gestations (3 of whom were small-for-gestational-age) manifesting nonobstructive dilatation of the fetal bowel. Our case supports that upon observation of dilated loops of fetal bowel (while not negating the potential need for delivery secondary to possible fetal bowel compromise), consideration should be given for continued expectant observation in anticipation of potential spontaneous resolution of this condition, especially among growth-restricted fetuses in prematurity with decreased amniotic fluid volume consistent with redistribution of oxygenated blood to essential organs.

Patient consent

Patient consent has been obtained from the patients for publishing our Care Report.

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