A Case Series of Gastrointestinal Abnormalities in Fetuses with Echogenic Bowel Detected During the Antenatal Period

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Abstract

***Objective**: The objective was to evaluate the incidence of gastrointestinal abnormalities amongst those fetuses with antenatally diagnosed echogenic bowel (EB). **Materials and Methods**: A retrospective review of all cases delivered from April 2002 to March 2003 with antenatally diagnosed EB was conducted. This was defined as bowel that appeared as echogenic as (if not greater than) the iliac bone on a real-time image. The postnatal outcomes with regard to gastrointestinal abnormalities, till their discharge, were noted. **Results**: Of the 13,941 patients delivered, there were 70 cases with antenatally diagnosed EB, giving an incidence of 70/13,941 or 0.50%. Of these, 6 defaulted follow-up and 1 had a mid-trimester termination of pregnancy at 21 weeks' gestation for social reasons. Of the remaining 63 cases with EB, 2 were stillbirths at 31 weeks and 35 weeks of gestation, respectively. Three fetuses (3/63 or 4.76%) were diagnosed with gastrointestinal abnormalities. Meconium plug syndrome was diagnosed postnatally in 2 cases, of which, 1 resolved with conservative management while the other required an emergency laparotomy. Intestinal atresia was diagnosed in the postmortem of one of the stillbirths. There was evidence of intrauterine growth retardation (IUGR) in both the stillbirth and the fetus that had required laparotomy. None of the 3 fetuses exhibited clinical features of aneuploidy. **Conclusion**: As the quoted background risk for gastrointestinal pathology is 0.23%, an increased incidence (4.76%) is observed in those fetuses found to have antenatal EB. It is possible that the presence of IUGR is associated with a worse prognosis. Further prospective studies are needed to verify this association.*

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Key words: Bowel obstruction, Intestinal atresia, Intrauterine growth retardation, Meconium plug syndrome

Introduction

Although the presence of fetal echogenic bowel (EB) has been largely regarded as benign, it has been viewed as a soft marker for various congenital anomalies. To date, no studies have been conclusive and the importance of antenatal EB amongst the low-risk population has remained confusing.[1] Several researchers have highlighted opposing views. Some have described associations with a high prevalence of aneuploidy, intra-uterine infections and even cystic fibrosis.[2,3] Others are of the opinion that, if it stands isolated, this marker does not necessarily herald an abnormal outcome if the karyotype is normal.[4]

In the presence of co-existing gastrointestinal findings, e.g., dilated bowel loops and ascites, the link between the EB and bowel pathology appears to be stronger and more convincing.[5,6] In the absence of these markers, its value in the prediction of abnormal bowel outcome is unknown. Interestingly, the neonatologists in our centre have observed that there are a significant number of neonates with gastrointestinal abnormalities who were initially diagnosed to have an isolated EB on antenatal scans.

Therefore, this study aims to evaluate the incidence of gastrointestinal abnormalities amongst those fetuses with antenatally diagnosed EB in our centre.

Materials and Methods

The study population consisted of fetuses with ultrasonographic findings of an isolated EB on a second trimester scan. It was derived from 13,941 deliveries over a 12-month period from April 2002 to March 2003 inclusive. EB, subjected to the sonographers assessment, was defined as bowel that appeared as echogenic as (if not greater than) the iliac bone on a real-time image. Inclusion criteria for this study included at least a screening scan in the second trimester, a viable fetus at the time of scanning and a complete neonatal follow-up till their discharge. All fetuses had at least a serial biometric scan to assess growth. A review of the postnatal outcomes with regard to

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gastrointestinal abnormalities, till their discharge, were then conducted.

Results

Seventy cases of isolated EB were identified, giving an incidence of 70/13,941 or 0.50%. Of these, 6 defaulted subsequent follow-up and 1 had a mid-trimester termination of pregnancy for social reasons. Of the remaining 63 cases, 2 were stillbirths at 31 and 35 weeks of gestation, respectively. Fifty cases delivered vaginally and 11 had a caesarean section for obstetrical reasons. Three of these fetuses were diagnosed with gastrointestinal abnormalities in the postnatal period (3/63 or 4.76%) (Fig. 1).

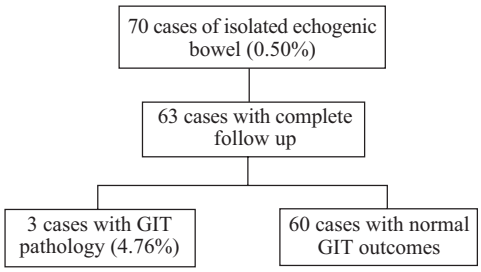

Fig. 1. Cases of echogenic bowel in the study population grouped by gastrointestinal tract (GIT) outcomes.

Of the above 3 cases (Table I), the first was a case of intrauterine death that was delivered via an emergency caesarean section for failed induction of labour at 35 weeks' gestation. Postmortem had identified a macerated male fetus with intestinal atresia and possible unrelated asphyxia as the mode of death. The second case was that of a preterm fetus which was delivered vaginally at 34 weeks' gestation. Meconium plug syndrome was diagnosed after it had presented with signs and symptoms associated with bowel obstruction on the first day of life. Decompressive laparotomy was required after it had failed to respond to conservative measures and was subsequently discharged well. In the last case, meconium plug syndrome was again diagnosed in a term fetus that had undergone a caesarean section for breech presentation and a decreased amniotic index. Unlike the previous case, the condition soon responded to conservative measures of daily rectal washouts and the baby was discharged well.

All 3 affected mothers had refused the option of antenatal karyotyping, but none of the delivered fetuses exhibited any clinical features of aneuploidy. The first 2 cases displayed evidence of intrauterine growth retardation (IUGR), manifesting as a reduction in the growth velocity of the abdominal circumference on serial biometric scans during the antenatal period (Fig. 2). No further Doppler studies had been performed in them. Fetal growth was normal in the rest of the study population. In all 3 cases, the degree of bowel echogenicity was assessed to be similar to that of the iliac bone.

Discussion

The prenatal diagnosis of bowel abnormalities has been recognised to be difficult owing to the changing appearance of the bowel throughout the pregnancy.[7] A large study involving a total of 15,090 fetuses was conducted in Washington University Prenatal Diagnosis Center between March 1988 and July 1992. They were scanned in an attempt to correlate the ultrasonographic findings with postnatal outcome in cases of fetal bowel pathologic disorders. In that study, Corteville et al[8] had reported that bowel abnormalities might manifest in diverse ultrasonographic findings, making accurate prediction of these lesions difficult. In their series, the observed population background risk for gastrointestinal pathology was 34/15,090 or 0.23%. Comparatively, we noticed an increased incidence of bowel pathology (4.76%) in those fetuses diagnosed antenatally with isolated EB in our series. This figure is consistent with that of 3.03% found in the study by Corteville et al whereby 1 out of the 33 fetuses with isolated EB had a gastrointestinal abnormality. A slightly higher figure of 6.33% has been reported in another study.[9]

In one study involving 15 fetuses with EB and IUGR, it

TABLE I: CASES WITH GIT ABNORMALITIES

Case	Age	Parity	A/N risks	IUGR	Gestation at delivery (wks)	Delivery	BW (g)	Apgar		Pathology	Mx
1*	29	G3P1	Nil	Present	35	LSCS	1450	-	-	Intestinal atresia	-
2	35	G2P1	Nil	Present	34	NVD	1755	9	9	Meconium plug syndrome	Sx
3	35	G1P0	Nil	Absent	38	LSCS	2490	9	9	Meconium plug syndrome	Cons.

A/N: antenatal, BW: birth weight, Cons: conservative, GIT: gastrointestinal tract, IUGR: intrauterine growth retardation, LSCS: lower segment caesarean section, Mx: management, NVD: normal vaginal delivery, Sx: surgery

* Stillbirth

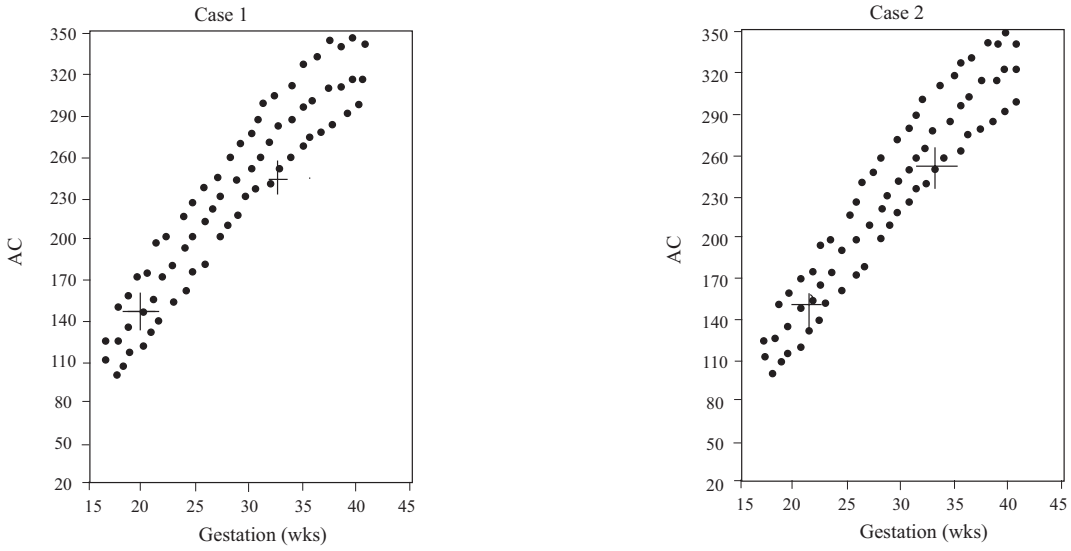

Fig. 2. Abdominal circumference (AC) growth chart of the intrauterine growth restricted fetuses.

was suggested that IUGR does not jeopardise the echogenic gut with regard to the development of neonatal necrotising enterocolitis.[10] In our study, however, it was noted that there had been evidence of IUGR in the 2 affected fetuses with a poorer prognosis, i.e., 1 stillbirth with intestinal atresia and a case of meconium plug syndrome that required surgery. Only the fetus with normal growth assessment had successfully responded to conservative measures. Clinically relevant data on the association of both IUGR and echogenicity on bowel pathology is still currently lacking in literature, but our findings are not surprising since IUGR has been known to be associated with impaired bowel motility and dysfunction in the postnatal period. This may occur as a result of postnatal persistent redistribution of regional blood flow in these fetuses leading to an adverse effect on gut motility, especially in those neonates with prenatal hemodynamic disturbances.[11] Nonetheless, our findings concur with an earlier prospective evaluation of gastrointestinal function in 9 infants found to have EB and co-existing IUGR. As compared to the control group, all these 9 infants had a poorer outcome, manifesting with signs of bowel obstruction requiring rectal washouts and a discontinuation of enteral feeding on 1 or more occasions.[12]

Several researchers have postulated on the relationship between the degree of sonodensity of the gut and its prognostic implications. Slotnik and Abuhamad[13] had attributed the increased incidence of aneuploidy and cystic fibrosis to an increased echogenicity of the bowel. This was based on an ultrasonic grading system in which echogenicity was quantified by linear gain reduction and comparison with fetal iliac crest. Given the fact that the fetal intraluminal content might well be the biophysical correlate of bowel sonographic echogenicity,[13] it is reasonable to believe that the prediction cum prognosis of bowel pathologies could also be related to the degree of echogenicity. However, this requires a standardised grading system to lessen both intra/inter-observer variation by the sonographers.[14] Although our data do not conclusively demonstrate this fact, it is worthy to note that in all our 3 affected cases, the bowel echogenicity was similar to that of the iliac bone.

Conclusion

In our series, an increased incidence of gastrointestinal pathology is observed in those fetuses found to have antenatal EB. Given its pathophysiologic implications, it is possible that co-existing IUGR worsens the prognosis. Further prospective studies are still needed to verify this association. There is also a need to standardised future echogenicity grading and reporting, to minimise inter-observer variation before we can further explore the relationship, if any, to bowel pathologies.

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