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Case Report

Fetal umbilical vein varix: antenatal diagnosis and perinatal outcomes

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ABSTRACT

Fetal intra-abdominal umbilical vein varix (FIUVV) is an uncommon fetal vascular abnormality characterized by focal dilatation of the extrahepatic intra-abdominal umbilical vein. A 29-year-old gravida 2 para 1 woman with one previous lower-segment caesarean section was diagnosed with an isolated FIUVV at 28 weeks of gestation during routine ultrasonography. The varix measured 12.3 mm and showed normal venous flow without thrombus. First-trimester screening and the detailed anomaly scan were normal. Serial weekly ultrasonography demonstrated progressive enlargement of the varix to 15.2 mm at 34 weeks, with subsequent development of turbulent flow and progressive fetal growth restriction, while umbilical artery, middle cerebral artery, and ductus venosus Doppler indices remained within normal limits. In view of the progressive enlargement, turbulent flow, fetal growth restriction, and previous caesarean delivery, an elective caesarean section was performed at 34 weeks+5 days. A live female neonate weighing 2295 g was delivered and had an uneventful neonatal course. This case highlights the importance of confirming FIUVV with color Doppler, assessing for associated fetal abnormalities, monitoring fetal growth and changes in the varix, and individualizing delivery planning when concerning sonographic features develop.

Keywords: Fetal intra-abdominal umbilical vein varix, Umbilical vein varix, Fetal growth restriction, Color Doppler, Antenatal surveillance, Case report

INTRODUCTION

Fetal intra-abdominal umbilical vein varix (FIUVV) is a focal dilatation of the intra-abdominal portion of the umbilical vein and is usually diagnosed during the second or third trimester by ultrasonography. The reported incidence is approximately 0.4–1.1 per 1000 pregnancies.¹

Several sonographic definitions have been described, including an umbilical vein diameter greater than 9 mm, more than two standard deviations above the mean for gestational age, or approximately 1.5 times the diameter of the adjacent non-dilated segment. Color Doppler demonstrating venous flow is important for confirming the vascular nature of the lesion and distinguishing it from other cystic abdominal lesions.²

Historically, FIUVV was associated with fetal demise, hydrops, thrombosis and chromosomal or structural abnormalities. Early reports, however, included heterogeneous populations in which associated abnormalities were not consistently excluded. Subsequent studies have shown that prognosis is substantially more favorable when the lesion is isolated.^{3,4} Detailed anatomic assessment, evaluation of the fetal cardiovascular system, serial assessment of fetal growth, and Doppler evaluation of the varix for enlargement, turbulent flow and thrombus are commonly incorporated into surveillance.^{5,6}

More recent evidence further refines risk assessment. In a 2024 systematic review and nested cohort study involving 513 isolated FIUVV cases, the pooled risk of intrauterine fetal death was 0.4% and the pooled risk of fetal growth restriction was 5.2%; in the authors' cohort, FGR occurred

in 16.3%, while no IUFD occurred. The authors concluded that isolated FIUVV was not associated with increased IUFD risk up to 39 weeks, while growth assessment remained relevant.⁷

A 2026 survey of 45 maternal–fetal medicine and obstetric ultrasound specialists also demonstrated substantial variation in diagnostic thresholds, surveillance schedules and delivery timing, emphasizing that management continues to be individualized according to lesion characteristics and associated fetal findings.⁸

CASE REPORT

A 29-year-old gravida 2 para 1 woman with one previous lower-segment caesarean section presented for routine antenatal care. Her pregnancy had been uncomplicated until 28 weeks of gestation. The first-trimester scan and combined aneuploidy screening were normal.



Figure 1: Intraoperative photograph showing the delivered neonate and the umbilical cord.



Figure 2: Gross intraoperative appearance of the umbilical cord.

The anomaly scan demonstrated no structural fetal abnormalities. At 28 weeks, ultrasonography demonstrated a focal dilatation of the intra-abdominal umbilical vein measuring 12.3 mm, consistent with FIUVV.

Color Doppler demonstrated normal venous flow without thrombus. At the same assessment, fetal biometry showed approximately two weeks of growth lag. The patient

underwent weekly fetal surveillance with ultrasonography and

Doppler velocimetry. The varix progressively enlarged, reaching 15.2 mm at 34 weeks. Color Doppler subsequently demonstrated turbulent flow within the dilated venous segment. Doppler assessment of the ductus venosus, middle cerebral artery and umbilical artery remained within normal limits throughout follow-up. Fetal echocardiography was normal. In view of progressive fetal growth restriction, increasing size of the varix, development of turbulent flow, and the history of previous caesarean delivery, the multidisciplinary team decided to proceed with delivery at 34 weeks+5 days.

A lower-segment caesarean section was performed, resulting in the birth of a live female infant weighing 2295g. The neonate had an uneventful postnatal course without clinically evident congenital anomalies or vascular complications.



Figure 3: Antenatal ultrasonographic image obtained during evaluation of the fetal abdomen.

DISCUSSION

FIUVV most commonly affects the extrahepatic intra-abdominal portion of the umbilical vein. This segment is relatively unsupported compared with the intrahepatic portion, which may contribute to focal venous dilatation. On ultrasound, the lesion may appear cystic or fusiform, but demonstration of venous flow on color Doppler is central to diagnosis.^{1,2}

The major clinical distinction is between isolated and non-isolated FIUVV. In the systematic review by di Pasquo et al, additional ultrasound anomalies were present in approximately 19% of cases, and the adverse outcomes were concentrated in the non-isolated group. This supports detailed anatomical assessment and appropriate evaluation for associated abnormalities at diagnosis.⁶

The natural history of isolated FIUVV appears more reassuring than early case reports suggested. The 2024 systematic review and nested cohort by Koorn et al. included 513 isolated cases and found a pooled IUFD risk of 0.4% and FGR risk of 5.2%. In their own cohort of 43

isolated cases, no IUFD occurred, although 16.3% met their definition of FGR and 23.3% had birthweight below the 10th centile. These findings support serial growth assessment while avoiding the assumption that isolated FIUVV alone mandates early delivery.⁷

The present case is clinically relevant because the lesion was not static. The varix enlarged from 12.3 mm at 28 weeks to 15.2 mm at 34 weeks, with development of turbulent flow and progressive fetal growth restriction. Turbulent flow may reflect altered local venous haemodynamics and has been described as a feature that can influence surveillance and delivery decisions, although the available evidence is observational and does not establish a specific diameter or flow threshold that independently predicts fetal demise.^{5,7,8}

An important feature in this case was that the umbilical artery, middle cerebral artery and ductus venosus Doppler indices remained normal. Thus, the decision to deliver at 34 weeks+5 days was based on the overall trajectory-progressive varix enlargement, turbulent flow, fetal growth restriction and the obstetric context-rather than on an isolated abnormal fetal Doppler parameter. The favorable neonatal outcome illustrates the potential value of individualized management, but this single case cannot establish an optimal gestational age for delivery.^{7,8}

Current practice remains heterogeneous. The 2026 survey by Fraenkel Merzbach et al. found that 9 mm was the most frequently used diagnostic diameter, but specialists differed considerably in diagnostic criteria, surveillance frequency and delivery timing. Most respondents incorporated detailed anatomic assessment and fetal echocardiography, while surveillance and delivery decisions were adjusted according to perceived risk.⁸

Accordingly, a reasonable clinical framework is to confirm the diagnosis with color Doppler, exclude associated structural or chromosomal abnormalities when clinically indicated, assess fetal growth serially, and monitor the varix for enlargement, turbulent flow and thrombus. When FIUVV is isolated and surveillance remains reassuring, current evidence does not support routine preterm delivery solely because of the diagnosis. When additional abnormalities, progressive growth restriction, thrombus, persistent concerning flow changes or other evidence of fetal compromise develops, delivery should be individualized according to gestational age and the complete fetal and maternal assessment.^{5,7,8}

CONCLUSION

FIUVV is an uncommon prenatal vascular abnormality whose significance depends on associated fetal findings and its evolution during pregnancy. This case demonstrates progressive enlargement of an initially isolated varix, development of turbulent flow and fetal growth restriction despite otherwise reassuring fetal Doppler studies. Careful sonographic characterization, assessment for associated abnormalities, serial evaluation of fetal growth and the varix, and individualized delivery planning remain central to management.

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