

Fetal umbilical-portal anastomosis and abdominal circumference <10th percentile

Kaymak D, Madazli R

Istanbul University-Cerrahpasa, Cerrahpasa Medical School, Istanbul, Turkey

Objective

To evaluate the types of fetal umbilical-portal anastomosis in fetuses with appropriate for gestational age (AGA) and abdominal circumference (AC) below the 10th percentile. And also to explore the significance of umbilical-portal anastomosis type on perinatal outcome and newborn centile in fetuses with AC below the 10th percentile.

Methods

This was a prospective observational study including 82 AGA fetuses and 47 fetuses with AC below the 10th percentile between 34 and 40 weeks of gestation. Fetuses with AC below the 10th percentile were confirmed with newborn weight percentile. Pregnancies with fetal structural and genetic anomalies, polyhydramnios, and gestational diabetes were excluded from the study. A transverse plan of fetal upper abdomen was obtained to assess the umbilical-portal anastomosis type by two-dimensional ultrasound. Types of umbilical-portal anastomosis were categorized according to the connection in the main portal vein and portal sinus: T-shaped, end-to-end anastomosis, X-shaped, side-to-side anastomosis, and H-shaped, parallel anastomosis. Percentile of AC, estimated fetal weight (EFW), fetal doppler parameters, newborn weight were recorded. Gestational age at delivery, neonatal intensive care admission (NICU) and fetal distress requiring an urgent delivery were recorded.

Results

Incidence of T-shaped, X-shaped and H-shaped anastomosis were 51.2%, 35.4% and 13.4% in AGA fetuses, 23.4%, 61.7% and 14.9% in fetuses with an AC below the 10th percentile, respectively. X-shaped anastomosis is more common in fetuses with AC below the 10th percentile compared to AGA fetuses. ($p < 0.01$). NICU admission and newborn weight below the 3rd percentile were significantly higher in X-shaped anastomosis compared to T and H-shaped anastomosis in fetuses with AC below the 10th percentile ($p < 0.05$).

Conclusion

Fetal weight depends on many different factors. Normal intrahepatic portal system morphological variants may have an impact on fetal weight. We believe that the type of umbilical-portal anastomosis affects neonatal outcomes in fetuses with growth restriction or small for gestational age.

Table 1: Comparison of the shape of umbilical-portal anastomosis and obstetric characteristics of the groups.

	AGA (n=82)	AC below 10 th percentile (n=47)	P value
Gestational age	37.9±1.3	37.2±1.1	0.005*
Birthweight	3105±389	2341±284	< 0.001*
Newborn percentile	58.1±23.9	4.9±2.6	< 0.001*
NICU admission	9 (11)	11(23.4)	0.03**
The shape of umbilical-portal anastomosis			0.006**
T shaped	42(51.2)	11(23.4)	
X shaped	29(35.4)	29(61.7)	
H shaped	11(13.4)	7(14.9)	

Data are expressed as mean ± standard deviation or n (%) where appropriate
AGA: Appropriate gestational age, AC: Abdominal circumference, NICU: Neonatal intensive care unit

*Mann-Whitney U-test, **Pearson χ^2 test.

Table 2: Obstetric characteristics according to the shape of umbilical-portal anastomosis in the AGA group.

	T-shaped (n=42)	X-shaped (n=29)	H-shaped (n=11)	P value
Gestational age	38.1±1.2	37.6±1.5	38.1±0.9	0.345
Birthweight	3153±355	3052±472	3090±257	0.559
Newborn percentile	58.85±24.6	58.2±24.5	54.7±21.9	0.880
NICU admission	2(4.8)	3 (10.3)	-	0.058
Urgent delivery	-	4(8.5)	1(5.6)	0.676

Data are expressed as mean ± standard deviation or n (%) where appropriate
AGA: Appropriate gestational age, NICU: Neonatal intensive care unit

Table 3: Obstetric characteristics according to the shape of umbilical-portal anastomosis in the AC below 10th percentile group.

	T-shaped (n=11)	X-shaped (n=29)	H-shaped (n=7)	P value
AC percentile	2.1±1.8	1.38±1.8	1.8±1.7	0.116
AC<3rd percentile	8(72.7)	25(86.2)	5(71.4)	0.495
EFW percentile	6.7 ±1.9	5.5 ±2.5	6±2.4	0.196
EFW<3rd percentile	1(9.1)	7(24.1)	-	0.227
Presence of oligohidramnios	1(9.1)	11(37.9)	3(42.9)	0.173
Gestational age	37.7±0.6	37.2±1.3	37.2±1.1	0.353
Birthweight	2488±191	2280±313	2365±208	0.038
Newborn percentile	6.3.7±2.3	4.1±2.6	5.8±2.4	0.018*
BW< 3rd percentile	-	11(37.9)	1(14.3)	0.008**
NICU admission	-	10(34.5)	1(14.3)	0.05**
Urgent delivery	1(9.1)	10(34.5)	2(28.6)	0.276

Data are expressed as mean ± standard deviation or n (%) where appropriate
EFW: Estimated fetal weight, BW: Birthweight, AC: Abdominal circumference, NICU: Neonatal intensive care unit

*Mann-Whitney U-test, **Pearson χ^2 test.