

Outcomes of early-onset fetal growth restriction defined by the International Delphi consensus

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Abstract

[Objective] Impaired fetal growth is associated with an increased risk of perinatal mortality and morbidity. In Japan, fetal growth restriction (FGR) is defined solely by low estimated fetal weight (below -1.5 standard deviation (SD)). International Society of Ultrasound in Obstetrics and Gynecology issued the new criteria of FGR in 2016 based on international Delphi consensus. This criteria classifies FGR into early FGR (before 32 weeks) and late FGR (at or after 32 weeks), and doppler study is included in the criteria; fetus with low estimated weight without abnormal blood flow is classified as small for gestational age (SGA).

[Design] Retrospective cohort study.

[Method] This study included 155 singleton pregnancies who were born before 32 gestational weeks at our hospital between 2013 and 2021 and followed up by neonatologist for over one year. Infants with structural anomaly were excluded. Based on the new criteria, we classified infants into FGR, SGA, and AGA (Appropriate for gestational age) retrospectively. Perinatal outcomes and infant growth at one year in FGR or SGA group were compared with those in AGA group. This study has been approved by the research ethics committee of our institution.

[Results] 155 infants were categorized into FGR (n= 64, 41%), SGA (n= 11, 7.1%), and AGA (n= 80, 52%). Median [range] of the gestational age at delivery was 28[22-31], 29[22-31], and 27[22-31] weeks for each group. FGR group had a higher rate of cesarean section (94% vs 78%, p=0.001), hypertensive disorders of pregnancy (HDP)(47% vs 8.5%, p<0.0001), preeclampsia (26% vs. 6%, p<0.0001), and lower umbilical arterial blood pH (7.33 vs 7.37, p<0.0001), compared with AGA group. Furthermore, when the infants' growth at one year in FGR group were compared with AGA group, FGR group had lower weight (-1.44 SD vs -0.85 SD, p=0.0005) , height (-1.86 SD vs -0.85 SD, p=0.01) and BMI (30.2 %tile vs 47.4 %tile, p=0.004). There was no differences in perinatal outcomes and infants' growth at one year between SGA group and AGA group.

[Conclusion] When the infants born before 32 gestational weeks were classified by the new FGR criteria, FGR group, but not SGA group, had poor prognosis related to HDP.

Objectives

- Delphi criteria was made to identify cases with poor perinatal prognosis compared with conventional fetal growth restriction (FGR) criteria.
- There is only a few report of the association between Delphi criteria and the infant growth.

Method

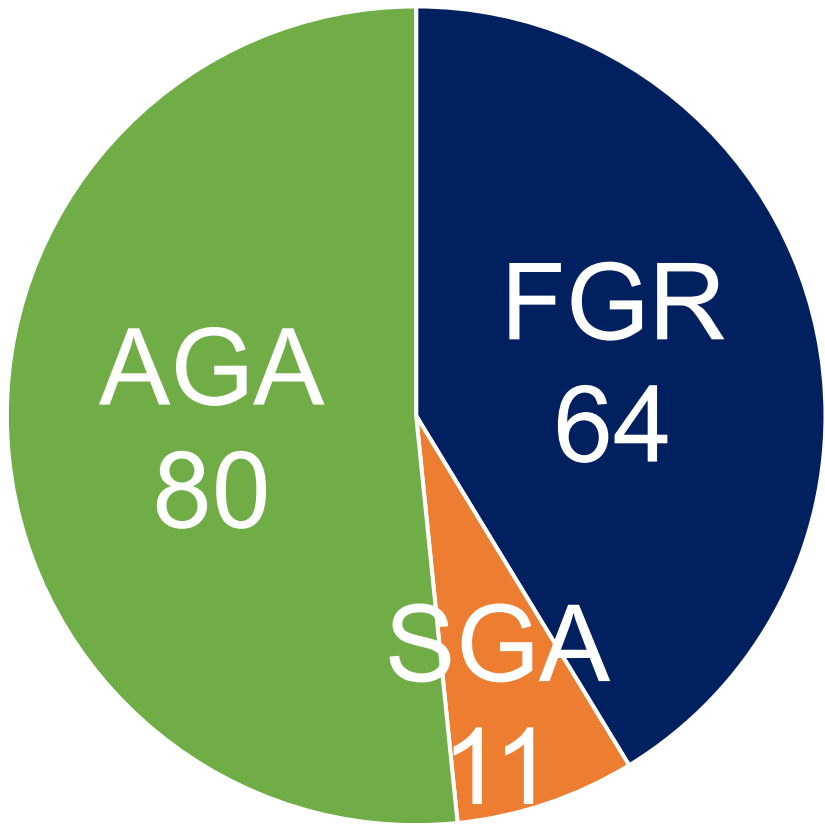
Subject	155 singletons born before 32 gestational weeks cared at Keio University Hospital
Study Period	January,1, 2013 ~ December,31, 2021
Study	Retrospective cohort study
Exclusion criteria	Infants with structural abnormalities
Method	Based on the Delphi criteria, we classified infants into FGR, small for gestational age (SGA), and appropriate for gestational age (AGA)
	Perinatal outcomes and infant growth of FGR and SGA group were compared with AGA group
Statistical analysis	Mann-Whitney U test. P-value of less than 0.05 were considered as statistically significant

Table 1. Delphi criteria

Gestational age<32weeks(Early FGR)	Gestational age≥32weeks(Late FGR)
At least one out of three of the following	• EFBW or AC<3%tile or
• EFBW or AC<3%tile	At least two out of three of the following
• Umbilical artery absent end-diastolic flow	1. EFBW or AC<10%tile
• EFBW or AC<10%tile combined with	2. EFBW or AC crossing centiles
1. Umbilical cord artery PI>95%tile	>2 quartiles on growth centiles
2. Uterine artery PI>95%tile	3. CPR*<5%tile or Umbilical cord artery PI>95%tile
Small for gestational age (SGA)	
EFBW or AC<10%tile (Excluded with FGR)	
*Cerebroplacental ratio	

Result

Figure 1. Classification with Delphi criteria



- n=155
- FGR (n= 64, 41%)
 - SGA (n= 11, 7.1%)
 - AGA (n= 80, 52%)

Table 2. Perinatal and neonatal outcomes

	FGR (n=64)	SGA (n=11)	AGA (n=80)
Age (year)	34 (22-50)	36 (28-40)	34 (16-43)
BMI before pregnancy (kg/m ²)	21.1 (17.3-35.9)	20.4 (16.7-22.7)	20.3 (16.2-37.5)
Primipara	45 (70%)	9 (81.8%)	51 (63.8%)
Caesarean section	60 (93.8%)*	8 (72.7%)	62 (77.5%)
Hypertension disorder of pregnancy (HDP)	30 (46.9%)*	0 (0%)	6 (7.5%)
Preeclampsia	16 (25.0%)*	0 (0%)	5 (6.3%)
Gestational Diabetes Mellitus	8 (12.5%)	1 (9.1%)	12 (15%)
Gestational week of delivery	27 (22-31)	26 (22-31)	27 (22-31)
Birth weight (g)	928* (300-1807)	1287 (475-1670)	1061 (438-2114)
Apgar score 1min	4 (1-9)	5 (2-8)	5 (0-8)
Apgar score 5min	7 (2-9)	7 (3-9)	7 (1-9)
Umbilical artery pH	7.33* (6.92-7.46)	7.37 (7.02-7.49)	7.37 (6.91-7.50)

Number (%) or median (range) was shown. * p<0.05

Result

Table 3. Growth at one year of age

	FGR (n=64)	SGA (n=11)	AGA (n=80)
Weight (SD)	-1.58* (-5.97- -0.89)	-0.76 (-2.28- 0.65)	-0.78 (-4.79-1.65)
Height (SD)	-1.77* (-4.88- 1.08)	-1.16 (-3.75- 0.28)	-1.22 (-4.04- 4.3)
BMI (%tile)	28.5* (0.2-97.2)	72.7 (5.1-98.5)	48.6 (1.5-98.1)

SD: standard deviation, Median (range) was shown. * p<0.05

Conclusion

- We classified the infant born before 32 gestational weeks and analyzed prenatal outcomes and infant growth.
- When the infants born before 32 gestational week were classified by the new Delphi criteria, FGR group had poor prognosis related to HDP but not SGA group.
- Comparing the growth at one year of age, infant of FGR group defined by the Delphi criteria were smaller than AGA group.

Reference

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I have no COI with regard to our presentation.