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## Background

- Fetal growth restriction (FGR) is a leading risk factor for stillbirth.
- Stillbirth risk appears increased at night.
- Sleep disordered breathing (SDB) causes upper airway obstruction and maternal hypoxia, so may contribute to hypoxic events in vulnerable fetuses at night.

## Objective

- To evaluate whether sleep, and/ or SDB are associated with acute fetal heart rate (FHR) changes in fetuses affected by preterm FGR compared to gestation matched appropriately grown controls.

## Methods

- Prospective case control study at a tertiary hospital and co-located sleep unit.
- An overnight sleep study with concurrent cardiotocography was performed in women with preterm FGR (<34+6 weeks) and gestation and BMI matched controls.
- Frequency of overnight FHR events was compared between FGR and controls, and between those with and without SDB (respiratory disturbance index (RDI)  $\geq 5$ ).

## Results

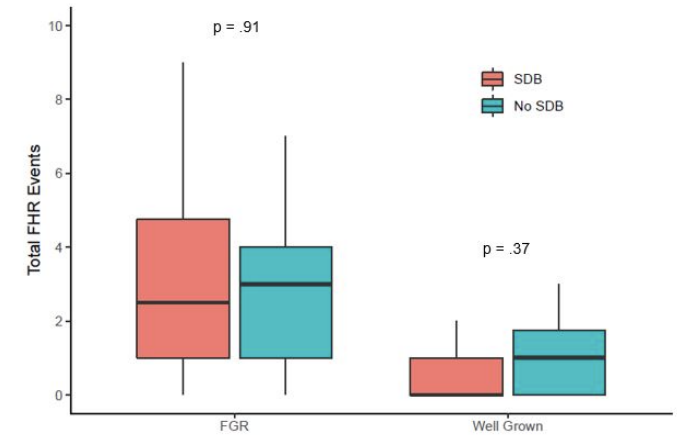
- 29 women with preterm FGR and 29 matched controls completed the study.
- The median EFW at recruitment was 1<sup>st</sup> percentile for cases and 60<sup>th</sup> percentile for controls ( $p < 0.001$ ).
- The most common FHR events were *bradycardia* and *prolonged decelerations*; FHR events were more common among cases than controls (3.0/ night; 1-4 vs 1.0/ night; 0-1.0,  $p < 0.001$ ; Table 1).
- Sleep disordered breathing was common but did not differ between cases and controls (48% vs 38%  $p = 0.55$ ). Most SDB was mild.
- Sleep disordered breathing was not associated with overnight FHR events (Figure 1) or neonatal outcomes.
- Women with preterm FGR were more likely than controls to be supine at sleep onset and to sleep supine ( $p = 0.03$ ).

Table 1: CTG events and supine sleep for FGR fetuses and controls

	FGR (n=29)	Controls (n=29)	P value
CTG events per night	3 (1.0, 4.0)	1.0 (0.0, 1.0)	<0.001
- during sleep	1.0 (0.01, 3.0)	0.0 (0.0, 1.0)	0.005
- when awake	0.0 (0.0, 1.0)	0.0 (0.0, 0.0)	0.02
CTG events per hour	0.5 (0.1, 0.7)	0.1 (0.0, 0.2)	<0.001
% of total sleep time spent supine	32.9 (23, 49.9)	18.3 (6.4, 31.5)	0.03

(Values given as Mdn (IQR))

Figure 1: FHR events for FGR fetuses and controls according to sleep disordered breathing status



## Conclusion

Acute FHR changes during maternal sleep are more common in preterm FGR fetuses than gestation matched controls.

Mild sleep disordered breathing is common and seems well tolerated, even amongst highly vulnerable fetuses.

It is possible more severe SDB may contribute to adverse perinatal events in preterm FGR; this warrants further study.