

Undetected small for gestational age and risk factors contributing to a missed diagnosis: A retrospective cohort study in a large satellite birthing unit in Australia.

Background

In Queensland, 8.7% of pregnancies are complicated by a baby who is small for gestational age (SGA)¹. Differentiating between SGA and fetal growth restriction (FGR) presents an obstetric challenge. Whilst many pregnancies complicated by SGA will go on to deliver healthy term neonates, a small proportion of SGA and FGR fetus’ are at extreme risk during the antenatal period. Fetal growth ultrasound is the cornerstone of diagnosis however has a sensitivity reported as low at 20% when performed in women with risk factors². This study aims to evaluate the exact number of cases of SGA that are undetected on ultrasound and extrapolate the risk factors (such as ethnicity or Body Mass Index) that contribute to lower detection rates.

Methods

A retrospective cohort study was conducted of all singleton term births (37–42 weeks) at Logan General Hospital between January 2020 and December 2022. SGA was defined as birthweight ≤10th centile. Maternal characteristics, antenatal risk factors, model of care, and ultrasound findings were analysed. Univariable and multivariable logistic regression identified associations with undetected SGA. The project was approved by Metro South Human Research Ethics Committee (HREC/2023/QMS/91498).

Results

Of 10,308 term births during the study period, 989 were classified as SGA. Compared to national data, the study cohort had higher rates of non-Caucasian ethnicity, smoking, minimal antenatal care, and previous SGA.¹. Among the 989 cases, 75.7% had identifiable antenatal risk factors. Of these, 733 had at least one third-trimester ultrasound, and 316 were correctly identified as SGA, resulting in an overall antenatal detection rate of 43%. An additional 3 cases were detected in women not suspected clinically but who underwent ultrasound for other reasons. Among those <3rd centile, 79% were suspected clinically and 74% detected by ultrasound, but 53 cases of undetected FGR remained. There were three stillbirths in the cohort, including one undiagnosed FGR confirmed on autopsy. Table 1 analyses the crude and adjusted odds ratio of undetected small for gestational age based on antenatal risk factors and sociodemographic variables.

Statistical significance is observed among BMI >30 and diabetes in pregnancy. Remaining in lower risk models of care despite having pregnancy risk factors had significantly higher odds ratio of having undetected SGA when compared to obstetric high risk. No significant association between a previous pregnancy complicated by SGA and having undetected SGA in the current pregnancy was found. There was trends towards higher odds of undetected SGA among women who had reduced antenatal care frequency, IVF, smoking, higher parity and hypertension in pregnancy however these did not reach statistical significance.

Conclusion

Antenatal ultrasound detection of SGA in this study was low at 43%. Risk factors such as high BMI, diabetes and remaining in low risk models of care were associated with higher risk of SGA remaining undetected despite the use of ultrasound for screening for SGA.

Table 2: Prevalence of undetected SGA among suspected according to sociodemographic variables (N=749)

Characteristics	p	OR (95%CI) crude	OR (95%CI) adjusted
BMI categories	0.005		
< 18.5		1.55 (0.91 - 2.62)	1.73 (0.98 - 3.05)
18.5 – 24.9		1.00	1.00
25.0 – 29.9		1.26 (0.88 - 1.81)	1.42 (0.95 - 2.12)
≥ 30.0		1.97 (1.33 - 2.91)	2.06 (1.32 - 3.19)
IVF	0.11		
No		1.00	1.00
Yes		2.25 (0.80 - 6.30)	3.44 (1.10 - 10.78)
Antenatal care frequency	0.64		
≥50%		1.00	1.00
<50%		0.90 (0.57 - 1.42)	1.30 (0.74 - 2.27)
Smoke	0.17		
No		1.00	1.00
Yes		1.25 (0.91 - 1.72)	1.49 (1.01 - 2.21)
Hypertension during pregnancy	0.93		
No		1.00	1.00
Yes		0.97 (0.56 - 1.69)	1.10 (0.61 - 1.99)
Diabetes during pregnancy	0.016		
No		1.00	1.00
Yes		1.59 (1.13 - 2.25)	2.40 (1.59 - 3.63)
Previous SGA	0.37		
No		1.00	1.00
Yes		0.79 (0.54 - 1.16)	0.81 (0.53 - 1.24)
N/A		1.01 (0.72 - 1.41)	1.01 (0.94 - 4.56)
Model of care	<0.001		
Obstetric high risk		1.00	1.00
Midwifery Group Practice (all risk)		1.36 (0.92 - 1.99)	1.89 (1.20 - 2.97)
Midwife led care		3.46 (2.40 - 4.99)	4.96 (3.29 - 7.48)
GP shared care		2.51 (1.18 - 5.35)	3.48 (1.57 - 7.73)
No antenatal care		1.00 (0.26 - 3.81)	1.15 (0.28 - 4.83)

References

1. Australian Institute of Health and Welfare. Australia’s Mothers and Babies. In: Government A, ed2024.

2. Sovio U, White IR, Dacey A, Pasupathy D, Smith GCS. Screening for fetal growth restriction with universal third trimester ultrasonography in nulliparous women in the Pregnancy Outcome Prediction (POP) study: a prospective cohort study. *Lancet*. Nov 21 2015;386(10008):2089-2097. doi: 10.1016/S0140-6736(15)00131-2.