

Elucidating the Role of Maternal Diabetes as an Independent Risk Factor for Shoulder Dystocia Despite Careful Ultrasound Evaluation of Fetal Growth.



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Introduction

Shoulder dystocia (SD) remains largely unpredictable despite extensive research. Maternal diabetes is a recognized risk factor, but it is unclear whether it directly increases the risk or whether its effect is mediated through fetal size. With modern US assessment of growth and overgrowth markers, the independent contribution of Maternal diabetes warrants re-evaluation.

Methods

We conducted a retrospective analysis of term, singleton vaginal births at OUH, UK, between 2016 and 2023. Shoulder dystocia cases were classified as mild or moderate–severe. US parameters at 35–37 weeks were evaluated for their ability to predict shoulder dystocia (SD). The best-performing US parameters (EFW, AC, ACGV, HC/AC) were then re-evaluated with the addition of maternal diabetes in order to assess the additional contribution of maternal diabetes as risk factor. In a separate model, we assessed whether diabetes contributed independently after adjusting for birthweight.

Results

There were 31,843 births; SD was recorded in 781 (2.5%); 291 (0.9% of the cohort) had moderate–severe SD. Diabetes was present in 1,360 (4.3%); 94% had gestational diabetes (GDM). Of US parameters, the AUC was best with AC >95th centile. The ORs for moderate-severe SD remained significant after adjustment for diabetes, but the AUCs altered little. Birthweight was a stronger predictor (AUC 0.8), but diabetes also added little to the AUC (0.81).

Conclusion

The screening performance of different ultrasound parameters varies, but all are notably inferior to actual birthweight. Although diabetes remains a significant risk factor for shoulder dystocia, fetal size is much more important.

Shoulder dystocia was defined as moderate-severe (msSD) if there was at least one of the following:

- internal maneuvers
- head-to-body delivery interval > 4 minutes
- intrapartum death
- NICU admission
- 5 min Apgar < 7

US markers tested:

- EFW > 95thc
- AC > 95thc
- ACGV > 90thc
- HC/AC ratio ≤0.95

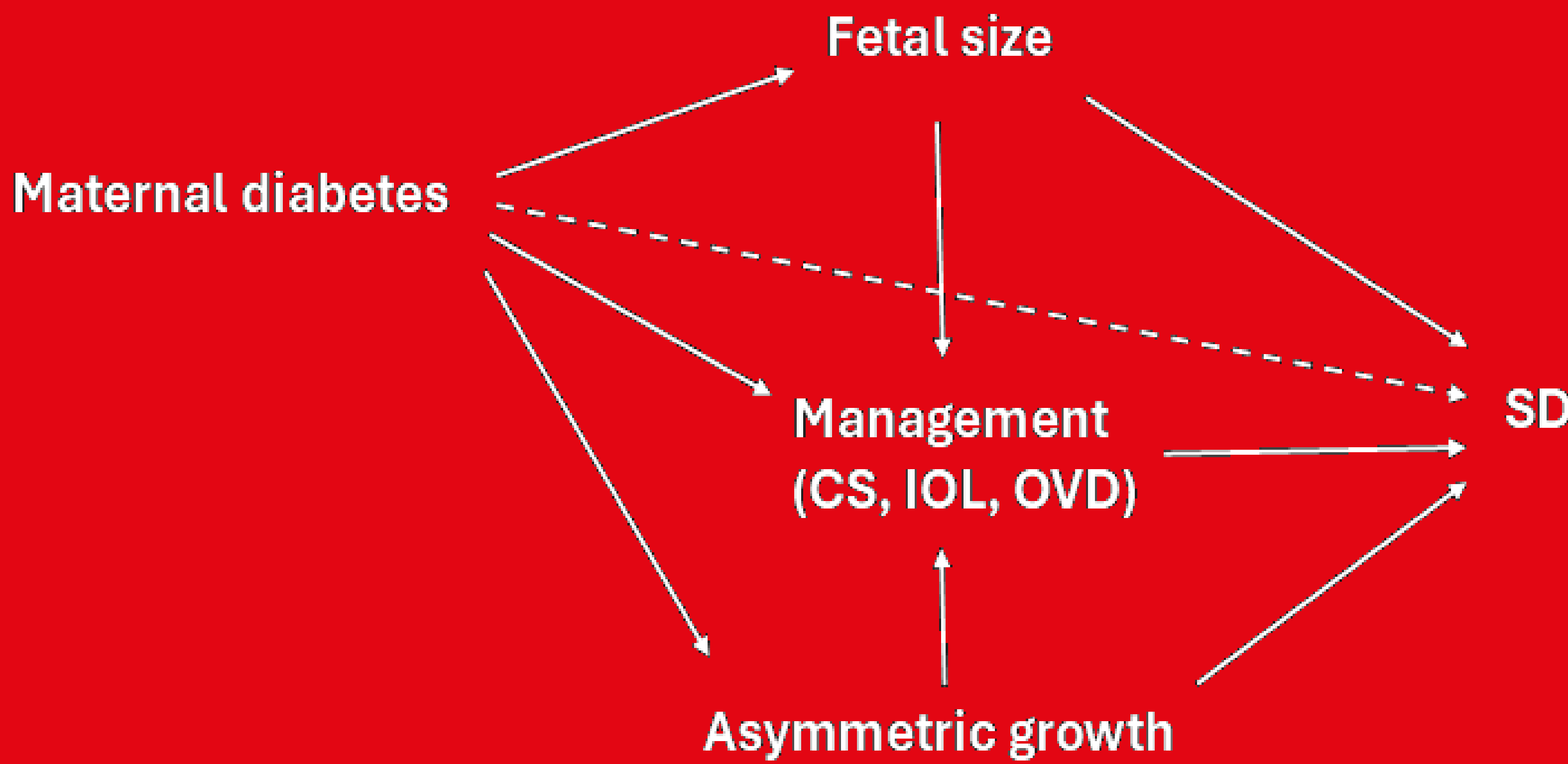


Figure 1. DAG illustrating direct and indirect links between DM and SD

Predictor	US predictors alone			US Adjusted for DM	
	sensitivity	AUC	OR (95% CI)	AUC	aOR (95% CI)
EFW≥95 th	6.5	0.53	5.9 (4.3-7.9)	0.55	1.8 (1.2-2.9)
AC≥95 th	35	0.62	4.0 (3.4-4.7)	0.65	1.7 (1.2-2.7)
ACGV≥90 th	17.3	0.56	3.1 (2.5-3.7)	0.58	1.9 (1.3-2.9)
HC/AC≤0.9	24.6	0.58	3.2 (2.7-3.7)	0.61	1.9 (1.3-2.9)

Table 1. Ultrasound predictors of SD: unadjusted vs adjusted for DM