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Headline finding

Lower first-trimester PAPP-A identified twin pregnancies at increased risk of birthweight ≤ 10 th centile in one or both twins.

Why this matters

Twin pregnancies carry a higher burden of fetal smallness and low birthweight.

We examined whether routine first-trimester markers (PAPP-A, free β -hCG, mean arterial pressure and uterine artery PI) could identify pregnancies at risk for low birthweight in one or both twins.

How often did low birthweight occur?

14.8%

BW ≤ 10 th
in one twin

9.8%

BW ≤ 10 th
in both twins

3.8%

BW ≤ 3 rd
in one twin

1.5%

BW ≤ 3 rd
in both twins

No studied parameter predicted BW ≤ 3 rd centile.

Predictive performance

AUC 0.60

Risk flag

Cut-off < 1.408
Sensitivity 81.4%
Specificity 44.6%
NPV 93.3%

AUC 0.61

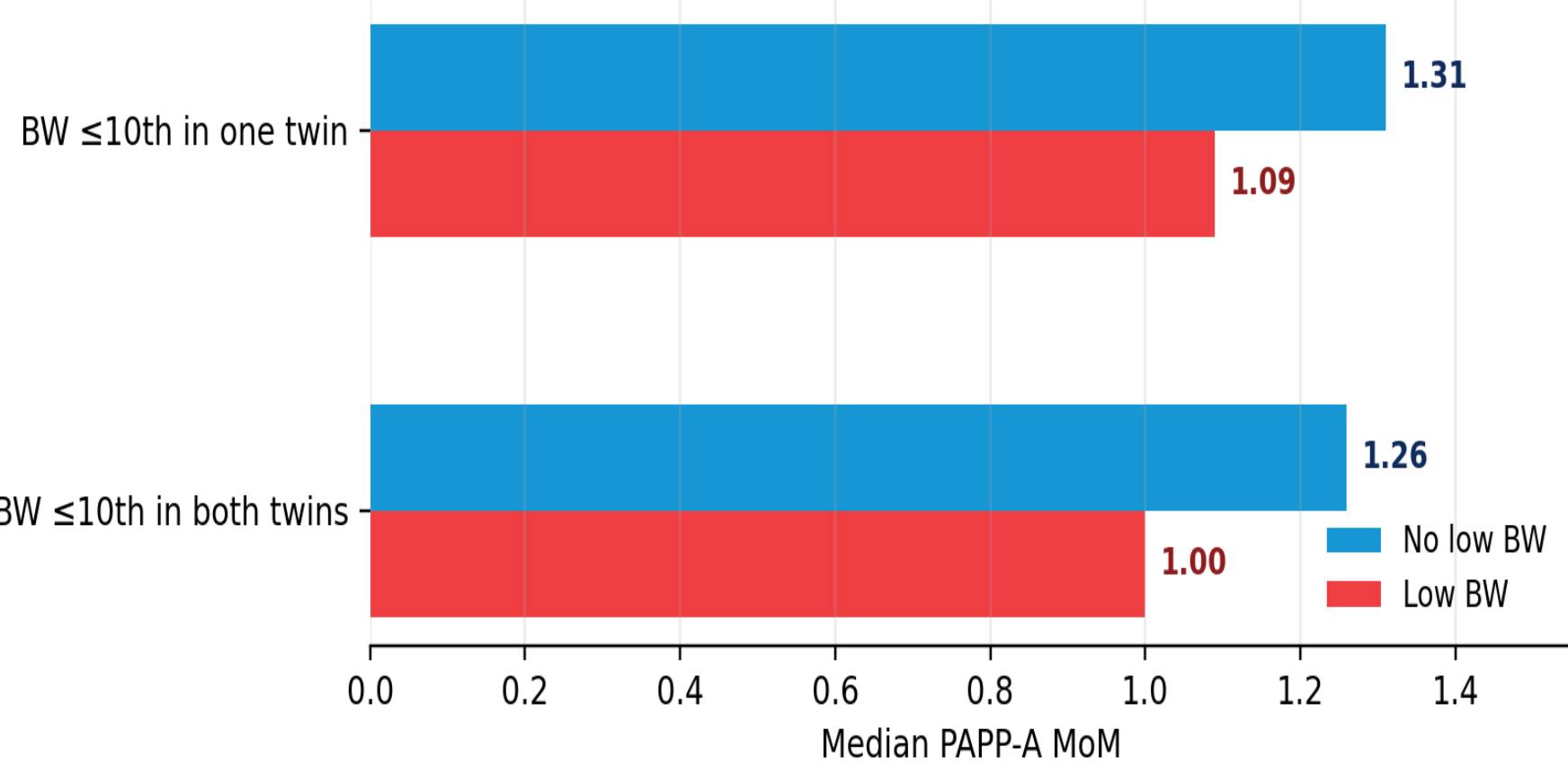
Clinical use

Cut-off < 1.056
Sensitivity 61.5%
Specificity 65.1%
NPV 94.0%

PAPP-A performed significantly, but only modestly, as a stand-alone predictor.

What changed in low-BW pregnancies?

PAPP-A MoM was lower when low birthweight affected one or both twins.



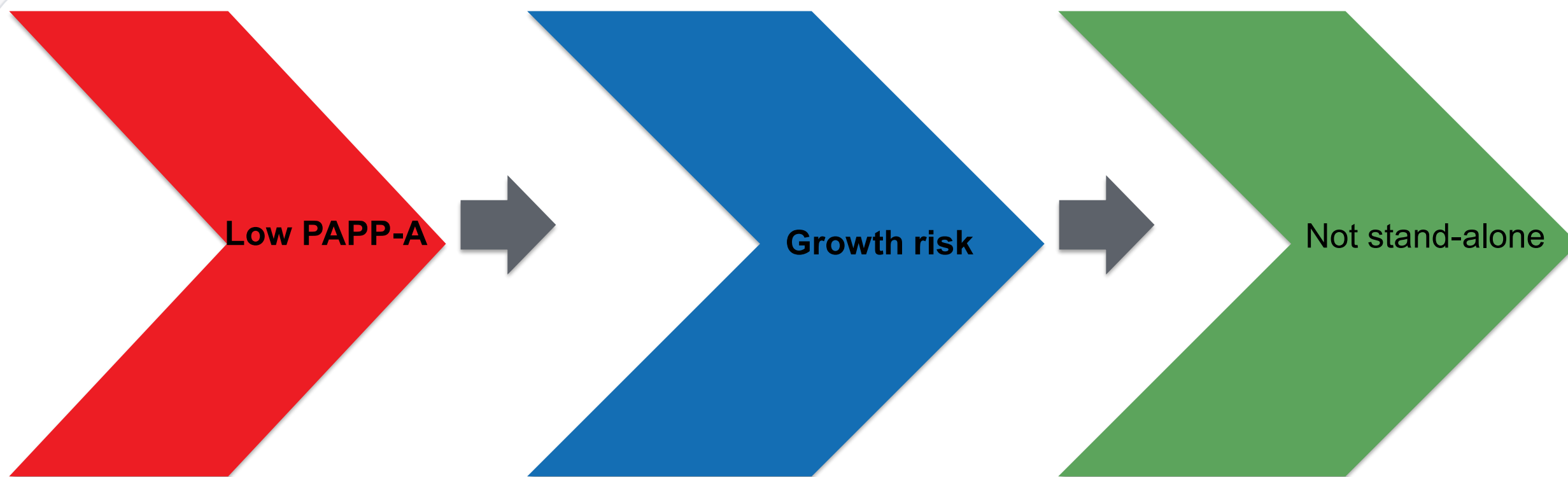
BW ≤ 10 th in one twin: $p = 0.002$

BW ≤ 10 th in both twins: $p = 0.024$

Free β -hCG was lower in univariable analysis for BW ≤ 10 th in one twin but did not remain an independent predictor.

Clinical meaning

How should this influence clinical practice?



Low PAPP-A can help flag twin pregnancies for heightened growth surveillance but it should be integrated with ultrasound follow-up and broader clinical assessment rather than used in isolation.

What to say in discussion

- PAPP-A behaved as an early placental signal in twins.
- MAP and uterine artery PI were not predictive in this cohort.
- Future twin-specific models should test combined algorithms including PAPP-A, PIGF and ultrasound metrics.

KEY MESSAGE

PAPP-A is the only first-trimester marker in this study that independently predicted low birthweight ≤ 10 th centile in twin pregnancies.

SIGNIFICANT SIGNAL • MODEST DISCRIMINATION

AT A GLANCE

14.8%

one twin ≤ 10 th centile

9.8%

both twins ≤ 10 th centile

0.92

OR per 0.1 MoM for one twin

0.94

OR per 0.1 MoM for both twins

TAKE-HOME CONCLUSION

Low PAPP-A levels were associated with low birthweight in one and in both twins.

This makes PAPP-A a useful early risk marker but not a sufficient screening tool on its own. Twin-specific, externally validated prediction models remain needed.

Core cohort profile

87.3%

Dichorionic

58.3%

IVF conception

35.6

Mean maternal age (years)