Rule-in and rule-out of pre-eclampsia using a novel, whole-blood, point-of-care placental growth factor test

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Background

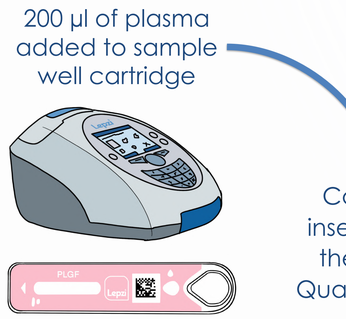
- Preeclampsia is a hypertensive multisystem disorder driven by placenta dysfunction.
- Diagnosis is a challenge because the clinical signs are nonspecific and women with severe disease can remain asymptomatic.
- Early detection and prompt intervention is critical to prevent adverse maternal and neonatal outcomes.
- Abnormally low concentrations of placenta growth factor (PLGF) can be detected prior to the onset of clinical symptoms; PLGF-based tests have been recommended for assessment of suspected preterm pre-eclampsia

Aima

To evaluate the performance of the Lepzi® Quanti PLGF Test to rule in and rule out disease in pregnant women suspected with preeclampsia.

Study Design

- Retrospective analysis of samples collected from suspected preeclamptic women at two London obstetric tertiary referral centres



- Statistical analysis was performed with STAT 11 for PLGF results matched to known maternal and perinatal outcomes.

Results

- 243 pregnant participants were included, 126 participants received PLGF testing before 34 weeks' gestation.
- The Lepzi Quanti PLGF had excellent test performance to diagnose preeclampsia within 7 days (AUROC 0.88, 95% C1 0.79-0.96) and 28 days (AUROC 0.91, 95% 0.83-0.98), at <34 weeks' gestation.
- PLGF ≥ 129 pg/ml had high predictive performance to rule out preeclampsia developing within 7 days of sampling (NPV 96.9%; 95% 91.2-99.4) < 34 weeks: (NPV 97.0%; 95 84.2-99.9) 34-37 weeks
- PLGF 2 129 pg/ml had high predictive performance to rule out preeclampsia developing within 28 days of sampling (NPV 93.8%; 95 CI 87.0, 97.71 < 34 weeks, (NPV 93.9%; 95 CI 79.8, 99.3) 34-37 weeks

Test	Rule-in within 7 days of sampling Threshold <12 pg/ml	Rule-out within 7 days of sampling Threshold ≥129 pg/ml	Rule-in within 28 days of sampling Threshold <12 pg/ml	Rule-out within 28 days of sampling Threshold ≥129 pg/ml
<34 weeks (N= 126)				
PPV	35.3 (14.2-61.7)	31.0 (15.3-50.8)	88.2 (63.6-98.5)	72.4 (52.8-87.3)
NPV	94.5 (88.4-98.0)	96.9 (91.2-99.4)	89.0 (81.6-94.2)	93.8 (87.0-97.7)
Sensitivity	50.0 (21.1-78.9)	75.0 (42.8-94.5)	55.6 (35.3-74.5)	77.8 (57.7-91.4)
Specificity	90.4 (83.4-95.1)	82.5 (74.2-88.9)	98.0 (92.9-99.8)	91.9 (84.7-96.4)
34-37 Weeks (N= 126)				
PPV	25.0 (9.8-46.7)	13.0 (4.9-26.3)	37.5 (18.8-59.4)	30.4 (17.7-45.8)
NPV	98.2 (90.3-100.0)	97.0 (84.2-99.9)	87.3 (75.5-94.7)	93.9 (79.8-99.3)
Sensitivity	85.7 (42.1-99.6)	85.7 (42.1-99.6)	56.3 (29.9-80.2)	87.5 (61.7-98.4)
Specificity	75.0 (63.4-84.5)	44.4 (32.7-56.6)	76.2 (63.8-86.0)	49.2 (36.4-62.1)
≥37 Weeks (N= 117)				
PPV	35.3 (14.2-61.7)	22.2 (8.6-42.3)	41.2 (18.4-67.1)	25.9 (11.1-46.3)
NPV	90.0 (68.3-98.8)	80.0 (44.4-97.5)	90.0 (68.3-98.8)	80.0 (44.4-97.5)
Sensitivity	75.0 (34.9-96.8)	75.0 (34.9-96.8)	77.8 (40.0-97.2)	77.8 (40.0-97.2)
Specificity	62.1 (42.3-79.3)	27.6 (12.7-47.2)	64.3 (44.1-81.4)	28.6 (13.2-48.7)

Table 1. Clinical performance of Lepzi® Quanti PLGF Test to **rule-in or rule-out pre-eclampsia** within seven days and twenty eight days of sampling **before 34 weeks**, **between 34-37 weeks**, and **after 37 weeks'** gestation

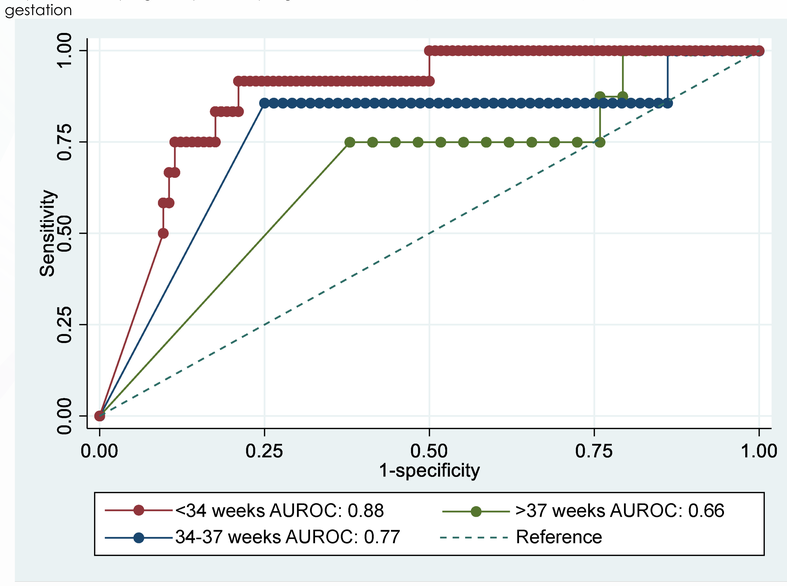


Figure 1: AUROC curves for predictive performance of Lepzi® Quanti PLGF Test within 7 days of sampling

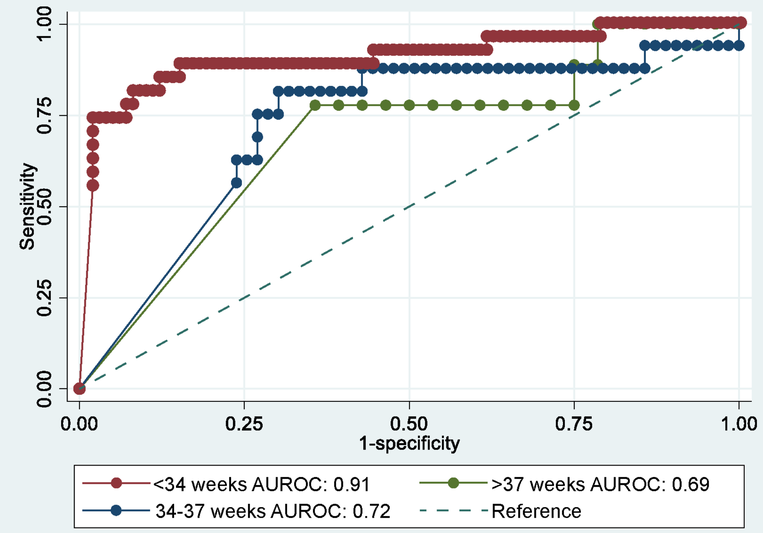


Figure 2: AUROC curves for predictive performance of Lepzi® Quanti PLGF Test within 28 days of sampling

Conclusion

- The high predictive performance (NPV) supports the application of the Lepzi® Quanti PLGF assay as a rule out test.
- The concentration thresholds are comparable to studies performed on NICE recommended assays, DELFIA Xpress PLGF 123 test and Triage PLGF tests.
- Point of care PLGF tests provides substantial scope for enhanced surveillance, risk stratification and prompt intervention.
- The potential impact extends to low and middle-income countries constrained by human resource capacity and weak healthcare systems.

References

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