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Spontaneous preterm birth prediction using 3D ultrasound assessment of previous advanced labour Caesarean scar

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Objectives: To evaluate the performance of a multiparameter test including 3D ultrasound scar features to predict spontaneous preterm birth (SPTB) in women with previous advanced labour Caesarean delivery.

Methods: This single-centre prospective study at University College London Hospital, UK (2019–2023) assessed cervical length (CL) and Caesarean scar characteristics at 14–24 weeks' gestation via transvaginal ultrasound in pregnant women with previous Caesarean delivery at ≥ 8 cm dilatation. 3D ultrasound volumes were analysed using a validated method. PTB preventive interventions (cervical cerclage and/or progesterone) were indicated on clinical history and/or short CL (< 25 mm). Primary and secondary outcomes were prediction of SPTB < 37 weeks and development of short CL, respectively. We constructed predictive models using multivariable logistic regression analysis with calculation of the area under the receiver operating characteristics curve (AUC) and sensitivity at a fixed false-positive rate of 25%.

Results: The SPTB rate was 8% (13/166); 21% (35/166) women received preventive interventions. Caesarean scar was seen in 88% of cases with a niche (an indentation at scar site ≥ 2 mm) present in 43%. The median scar distance from the internal cervical os (IO) was 3.5mm (range 0.7 to 9.4mm) below the IO in the SPTB group, versus 3.2mm (range 0.0 to 6.3mm) above the IO in the term birth group ($p = 0.005$). Prediction of SPTB and short CL were improved by including clinical history, 2D niche assessment (length, depth, width) and scar distance to IO (AUC 0.85, 95% CI 0.72, 0.96 and AUC 0.84, 95% CI 0.73, 0.93 respectively). The addition of 3D scar features (niche and cervical volume) only marginally improved the sensitivity.

Conclusions: Pregnant women at risk of developing short CL or SPTB after Caesarean delivery could be predicted using clinical information with scar ultrasound features. Integrating 3D scar features did not appear to improve the model performance.

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Prognostic value of maternal N-terminal pro-B-type natriuretic peptide for prediction of adverse maternal outcomes in women with pre-eclampsia

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Objectives: N-terminal pro-B-type natriuretic peptide (NT-proBNP), a marker for cardiac volume overload and cardiac insufficiency, has been found to be increased in pregnancies affected by pre-eclampsia. This study aimed to evaluate the prognostic value of maternal serum NT-proBNP for the prediction

of adverse maternal outcomes in women with established diagnosis of pre-eclampsia.

Methods: This was a retrospective cohort study including singleton pregnancies with a diagnosis of pre-eclampsia who underwent assessment of serum NT-proBNP at the Medical University of Vienna between 2018 and 2023. The primary outcome was the association of NT-proBNP with adverse maternal composite outcome. Composite adverse maternal outcome was defined as ICU admission, death, lung edema, liver dysfunction, renal insufficiency, hemorrhage, placental abruption, neurological complications and HELLP syndrome.

Results: 137 singleton pregnancies diagnosed with pre-eclampsia who underwent sampling of NT-proBNP were included. Maternal adverse outcomes were observed in 63 (46%) patients. There were no significant differences in baseline characteristics between cases with or without adverse maternal events ($p > 0.005$ for all). Median gestational age (GA) at sampling was 33.86 (IQR 26–37, [95% CI 32–35]) and 33.14 weeks (IQR 33.14, [95% CI 31–35]), respectively ($p = 0.9483$). Median GA at delivery was 35.86 (IQR 30–38, [95% CI 34–37]) and 36.14 (IQR 33–38, [95% CI 35–37]) weeks. Overall median NT-proBNP was 69.9 pg/mL (IQR 33–166, [95% CI 54–90]). NT-proBNP was significantly higher in the group with maternal adverse outcome (median 115 pg/mL, IQR 44–348, [95% CI 70–174]) compared to women without adverse outcomes (median 55.65 pg/mL, IQR 29–119, [95% CI 46–70], $p = 0.0018$).

Conclusions: In pre-eclamptic patients, higher serum NT-proBNP values were associated with maternal adverse outcome. The cardiovascular parameter could be a useful tool for surveillance as well as prediction of adverse maternal outcomes in pregnancies complicated by pre-eclampsia.

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Hemodynamic changes in uteroplacental and fetal circulation after administration of pravastatin and L-arginine in second trimester of pregnancy

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Objectives: The aim of our study was to investigate the effects of pravastatin / L-arginine therapy on uteroplacental and fetal circulation administered to patients with increased uterine artery resistance in second trimester of pregnancy.

Methods: In this prospective study 21 patient with increased uterine artery resistance mean Pulsatility index above 95% for gestational age in second trimester of pregnancy were included. Upon detection of increased resistance in uterine arteries, 40mg Pravastatin and 1500mg Larginine were administered to pregnant patients from second trimester to delivery. Patients were followed up to delivery and uterine artery pulsatility (PI) and resistance index (Ri) were measured every 2–4 weeks. Umbilical artery, cerebral artery, aorta and renal artery pulsatility indices were also measured in regular intervals. Delivery was performed when cardiotocography showed imminent hyoxia or at term.

Results: Median patient's age was 33 (24–42) years. Median gestational age at detection of increased resistance was 19 (16–24) weeks. Mean uterine artery Ri at the inclusion of the study was 0.79 ± 0.08 . Mean uterine artery Pi was 2.13 ± 0.63 . Diastolic notching was present in all patients. Improvement in uterine artery circulation was registered after 3 weeks. Increased uterine artery resistance was registered until delivery. In fetal circulation umbilical artery PI remained in normal value range until delivery. Median cerebral artery, aortal and renal PI remained also in normal range until delivery. Mean gestational age at delivery was 36 weeks. Mean neonatal weight was $2,428 \pm 1,037$ g. Caesarean section rate was