



## US probe pressure on the maternal abdominal wall and the effect on fetal MCA Doppler ultrasonography

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### Objective

Doppler ultrasonography (Doppler US) of umbilical and fetal vessels is useful for monitoring fetal well-being, fetal anemia, intrauterine growth retardation (IUGR) and other perinatal outcomes. Alteration of MCA flow has been associated with IUGR, intracranial anomalies, maternal-fetal hemorrhage and twin-to-twin transfusion. The aim of the study was to evaluate the effect on middle cerebral artery (MCA) resistivity index (RI), pulsatility index (PI), and peak systolic velocity (PSV) of increased pressure exerted on the maternal abdominal wall during routine ultrasound.

### Methods

A prospective study was conducted, in which we included 40 pregnant women between 24+0 and 41+3 gestational weeks (GW), with singleton pregnancies without any associated pathologies, undergoing routine US examination. We recorded the flow velocity waveforms in the MCA, and we measured the RI, PI, PSV and the applied pressure on to the maternal abdominal wall that was needed for a proper evaluation of MCA. We then repeated the same measurements at two different higher-pressure levels with the same proper visualisation of the targeted vessel.

### Results

We found significant differences for the PI and RI levels with increase in abdominal pressure (median PI 1.46, 1.58 and 1.92 respectively; median RI 0.74, 0.78, and 0.85 respectively,  $p < 0.05$ ), for both PI and RI. At the same time, we found no significant differences for PSV in the studied group in relationship with increase in abdominal pressure (median PSV 39.56, 40.10 and 39.70 respectively,  $p > 0.05$ ).

### Conclusion

In conclusion, the applied abdominal pressure by the examiner's hand, during routine US scan in pregnancy, can modify the MCA Doppler parameters, thus influencing the diagnostic accuracy in a series of pregnancy associated pathologies, such as chronic fetal distress (CFD), intrauterine growth restriction (IUGR) and fetal anemia.