The presence and quantity of placental Maternal Vascular Malperfusion lesions in the prediction of adverse outcomes

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Introduction

Placenta insufficiency, identified by the presence and quantity of Placental Maternal Vascular Malperfusion (MVM) lesions, is thought to be the underlying communal cause of various pregnancy-related complications associated with adverse outcomes.

Materials & methods

Retrospective cohort study of 272 singleton pregnancies that gave birth at a Dutch tertiary hospital between 2017 and 2018 with available placental pathology analysed according to the Amsterdam criteria. Study groups were based on amount of MVM lesions:
- no MVM lesions present (n=124)
- 1 to 2 MVM lesions present (n=124)
- 3 to 5 MVM lesions present (n=24)

Results

• New definition of Placenta Syndrome (PS) that was highest associated with MVM lesions, consisted of the composite: PIH, PE, HELLP Syndrome, IUGR and SGA (AUC 0.72, 95% CI 0.65-0.78) (see Figure 1).
• In the group with 3 to 5 MVM lesions, the incidence of pregnancies complicated by PS was highest: 29.8% vs. 68.5% vs. 95.8%, p=<0.001. Similarly, this group had higher incidences of pregnancy complications separately, a lower mean birthweight, a longer hospital stay, higher incidence of NICU admission, adverse neonatal outcomes and postnatal death.
• After adjustment for gestational age, smoking, and other placental lesions, every additional MVM lesion corresponded with a threefold increased odds for the occurrence of PS and a fourfold increased odds for the occurrence of postnatal death (see Table 1).

Conclusion

The amount of MVM lesions is highly associated with the occurrence of adverse pregnancy and neonatal outcomes, conferring a threefold increased odds of PS and a fourfold increased odds of postnatal death for every additional MVM lesion.

Figure 1: Incidence of adverse pregnancy outcomes according to the study groups.

Table 1: Multivariate regression model for the prediction of adverse outcomes by the presence and quantification of MVM lesions.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Placenta Syndrome1 aOR (95% CI)</th>
<th>Adverse neonatal outcome2 aOR (95% CI)</th>
<th>Postnatal death2 aOR (95% CI)</th>
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<tbody>
<tr>
<td>MVM (yes or no)</td>
<td>6.81*** [3.76-12.33]</td>
<td>1.08 [0.58 – 2.03]</td>
<td>6.47 [0.33 – 127.68]</td>
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<tr>
<td>Number of MVM lesions (0 to 5)</td>
<td>3.00*** [2.10-4.29]</td>
<td>0.95 [0.66 – 1.37]</td>
<td>4.19 [1.39 – 12.68]</td>
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*** = p<0.001, * = p<0.001
1 Odds Ratio adjusted for gestational age, smoking, acute placental inflammation and Chronic Villitis of Unknown Etiology.
2 Odds Ratio adjusted for gestational age, birth weight, placental inflammation and Chronic Villitis of Unknown Etiology.

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