The role of ISUOG guidelines for performance of routine mid-trimester fetal ultrasound scan in predicting congenital Cytomegalovirus infection

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Objective
The aim of this study was to evaluate the role of ISUOG guidelines for the performance of the routine mid-trimester fetal ultrasound (US) scan for the diagnosis of congenital Cytomegalovirus (CMV) infection.

Methods
The study included all patients with primary maternal CMV infection in the first and second trimester referred to our Maternal-Fetal Medicine Division between 2014 and 2018. Ultrasound mid-trimester scans were retrospectively evaluated according to ISUOG guidelines. The following abnormal US findings were considered suggestive of fetal CMV infection: thick placenta, abnormal amniotic fluid, biometry <10th percentile, hyperechogenic bowel, hepatomegaly, ventriculomegaly and any brain anomaly, hydrops. The diagnosis of congenital CMV infection was made by the presence of CMV inclusions or antigens, or both, found in multiple fetal organs in case of pregnancy termination; neonatal infection was confirmed by viral isolation from urine within the first two weeks after birth. Cross-tabs were used to calculate univariate sensitivities, specificities, and positive and negative predictive values of ultrasound for congenital infection.

Results
A total of 258 patients with available follow-up was eligible for our study. Abnormal sonographic findings were found in 10/258 (3.9%) ultrasound scans; of those, 9/10 (90%) fetuses showed documented congenital infection. Conversely, the diagnosis of congenital infection was made in 54/248 (21.9%) of cases showing normal ultrasound. In our population, according to ISUOG guidelines, the sensitivity of routine mid-trimester ultrasound examination in predicting congenital CMV infection was 14.3%; an abnormal sonography was associated with a positive predictive value of 90% in predicting CMV infection.

Conclusion: Ultrasound screening based on ISUOG guidelines is not sensitive in the diagnosis of CMV congenital infection.

Table

<table>
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<tr>
<th>US findings</th>
<th>Uninfected</th>
<th>Infected</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
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<td>Abnormal</td>
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<td>9</td>
<td>14.3</td>
<td>99.5</td>
<td>90</td>
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<tr>
<td>Normal</td>
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<td>54</td>
<td>14.3</td>
<td>99.5</td>
<td>90</td>
<td>78.2</td>
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<tr>
<td>Total</td>
<td>195</td>
<td>63</td>
<td></td>
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</tbody>
</table>

Figure 1. Abnormal ultrasound findings, suggestive of CMV infection.