Streptococcus milleri and second trimester abortion

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SUMMARY Review of 214 fetal necropsies performed in the department of pathology, University of Aberdeen, showed 40 cases of chorioamnionitis or intrauterine pneumonia, five of which were associated with Streptococcus milleri. In two cases there was good evidence to implicate S milleri as the cause of infected abortion while in the other cases its pathogenic role was less clear.

Patients and methods

Two hundred and fourteen fetuses submitted for necropsy at the department of pathology, University of Aberdeen, between January 1 1983 and April 30 1986 were reviewed. Forty showed histological evidence of chorioamnionitis or intrauterine pneumonia, and five were culture positive for S milleri.

Necropsies were performed within 48 hours of death and cadavers were stored at 4°C until post mortem examinations could be performed. At necropsy fetuses underwent a macroscopic and microscopic examination with throat or tracheal swabs cultured routinely. High vaginal swabs had been taken 24 hours before delivery, and both maternal and fetal swabs were Gram stained and plated out on defibrinated horse blood agar (Gibco), Gentian violet agar, and MacConkey agar (Oxoid). They were cultured aerobically in a humid 5% carbon dioxide atmosphere and anaerobically at 37°C for 18 to 24 hours. Colonies suspected of being S milleri were identified by the API 20 Strep system (API System SA, Montalieu Vercieu, France).

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Results

The table shows clinical and pathological findings of the patients studied. Three patients (cases 1, 3, and 4) had prolonged rupture of membranes (longer than 24 hours); one had an intrauterine contraceptive device (case 5). Case 3 had a cervical suture inserted in this pregnancy after a cone biopsy in 1975, and case 4 had had a previous septic abortion and two terminations. The maternal ages ranged between 20 and 38 years and abortion occurred between 18 and 23 weeks’ gestation. In all five cases there was no systemic evidence of infection in the mothers.

Histological sections (stained with haematoxylin and eosin) of all five cases exhibited chorioamnionitis and in three cases intrauterine pneumonia. Gram stains of placenta and lungs in case 1 showed intracellular Gram positive cocci in neutrophil polymorphonuclear leucocytes, and S milleri was also isolated from the maternal high vaginal swab taken the day before abortion. Similarly, in case 2 profuse S milleri was isolated from the maternal high vaginal swab the day before the abortion, but no organisms were seen on Gram staining of tissue sections.

Discussion

Ascending infection is only one of several ways in which the placenta and fetus may be infected; it is intimated histologically by chorioamnionitis or membranitis in early infection and vasculitis of the cord and supplicative chorioamnionitis in more advanced disease. It is known that the incidence of intrauterine infection and chorioamnionitis increases with prolonged rupture of membranes and is more common in premature delivery. Whether infection follows spontaneous rupture of membranes or whether heavy vaginal colonisation with a particular organism pre-
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<table>
<thead>
<tr>
<th>Case No</th>
<th>Maternal age (years)</th>
<th>Parity</th>
<th>Gestational age (weeks)</th>
<th>Clinical details</th>
<th>Pathology</th>
<th>Bacteriology</th>
<th>Fetal swab culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>24</td>
<td>7 + 1</td>
<td>19</td>
<td>Spontaneous rupture of membranes for 4 days prior to abortion</td>
<td>Normally formed female fetus with chorioamnionitis and intrauterine pneumonia</td>
<td>Profuse <em>S. milleri</em></td>
<td>Profuse <em>S. milleri</em></td>
</tr>
<tr>
<td>Case 2</td>
<td>21</td>
<td>0 + 1</td>
<td>22</td>
<td>One previous termination, one day PV bleeding prior to abortion</td>
<td>Normally formed female fetus with chorioamnionitis and intrauterine pneumonia</td>
<td>Profuse <em>S. milleri</em></td>
<td>Profuse <em>S. milleri</em></td>
</tr>
<tr>
<td>Case 3</td>
<td>38</td>
<td>4 + 2</td>
<td>23</td>
<td>Cone biopsy 1975, Shirodkar suture of cervix 7 weeks prior to abortion, spontaneous rupture of membranes for 5 days prior to abortion</td>
<td>Normally formed female fetus with chorioamnionitis</td>
<td>No significant growth</td>
<td>Profuse <em>S. milleri</em></td>
</tr>
<tr>
<td>Case 4</td>
<td>20</td>
<td>0 + 3</td>
<td>20</td>
<td>One previous septic abortion and two terminations, spontaneous rupture of membranes 4 days prior to abortion</td>
<td>Normally formed male fetus with purulent chorioamnionitis and vasculitis of the cord</td>
<td>No significant growth</td>
<td>Profuse <em>S. milleri</em>, Peptostreptococcus, and <em>Bacteroides</em> assachrolyticus</td>
</tr>
<tr>
<td>Case 5</td>
<td>26</td>
<td>0 + 0</td>
<td>18</td>
<td>Intrauterine contraceptive device in situ, 9 days bleeding PV and offensive vaginal discharge</td>
<td>Normally formed male fetus, retroplacental haemorrhage, chorioamnionitis, and intrauterine pneumonia</td>
<td>No significant growth</td>
<td>Scanty <em>S. milleri</em> and <em>Gardnerella vaginalis</em></td>
</tr>
</tbody>
</table>

PV = per vagina

disposes to rupture and preterm labour is not known.

Many bacteria isolated from cases of chorioamnionitis are also commensals of the bowel and vagina—for example, *Streptococcus faecalis*, *Escherichia coli*, *Proteus*, *Klebsiella*, *Gardnerella vaginalis*, *Candida albicans*, *Bacteroides*, and Peptostreptococcus species. The latter two anaerobic bacteria are often found in mixed infection, as in case 3.8

*S. milleri* is a known vaginal commensal and is also found in the faeces of 5% of normal puerperal women. It has also been reported as a cause of septicaemia and pneumonia in premature neonates.9 It has not, however, been associated with chorioamnionitis and intrauterine pneumonia in abortion.

There was good evidence to implicate *S. milleri* as a cause of septic abortion in cases 1 and 2. In each case a profuse growth of *S. milleri* was obtained from a maternal high vaginal swab collected prior to abortion and from a swab taken at necropsy from the fetal airways. There was also histological evidence of chorioamnionitis and intrauterine pneumonia with Gram positive cocci identified in the tissues of case 1.

The importance of the isolation of *S. milleri* in cases 3, 4, and 5 is doubtful as high vaginal swab culture was unhelpful and *S. milleri* was isolated with other organisms associated with chorioamnionitis. Nevertheless, these observations suggest that *S. milleri* can act as a pathogen in the female genital tract and cause infected abortion.

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**References**


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