Streptococcus milleri and second trimester abortion

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

There has been considerable interest in the role of Lancefield group B streptococci in neonatal infection and infected abortion. Group B streptococci are also normal commensals of the female genital tract.1 2 Streptococcus milleri, a Gram positive coccus, is not only carried as a commensal in the vagina and cervix but also in the upper respiratory tract.3 4 It is associated with wound, dental, and sinus infections and more serious disease such as liver, brain, and abdom-
inal abscesses; peritonitis; pyometrium; and endo-
carditis.1 5 6 We report five cases of histologically confirmed chorioamnionitis from which S milleri was isolated.

Patients and methods

Two hundred and fourteen fetuses submitted for nec-
ropsy 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 exam-
ination with throat or tracheal swabs cultured rou-
tinely. 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 aerobic-
ically in a humid 5% carbon dioxide atmosphere and anaerobically at 37°C for 18 to 24 hours. Co-
lonies suspected of being S milleri were identified by the API 20 Strep system (API System SA, Montalieu Vercieu, France).

Accepted for publication 11 September 1986

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’ ges-
tation. 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 intra-
cellular Gram positive cocci in neutrophil polymor-
phonuclear 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 mem-
branitis in early infection and vasculitis of the cord and suppurative chorioamnionitis in more advanced disease. It is known that the incidence of intrauterine infection and chorioamnionitis increases with pro-
longed rupture of membranes and is more common in premature delivery. Whether infection follows sponta-
neous rupture of membranes or whether heavy vaginal colonisation with a particular organism pre-
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Table Obstetric factors and pathological findings in chorioamnionitis associated with Streptococcus milleri

<table>
<thead>
<tr>
<th>Obstetric factors</th>
<th>Pathology</th>
<th>Bacteriology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age (years)</td>
<td>Parity</td>
<td>Gestational age (weeks)</td>
</tr>
<tr>
<td>Case 1 24</td>
<td>7 + 1</td>
<td>19</td>
</tr>
<tr>
<td>Case 2 21</td>
<td>0 + 1</td>
<td>22</td>
</tr>
<tr>
<td>Case 3 38</td>
<td>4 + 2</td>
<td>23</td>
</tr>
<tr>
<td>Case 4 20</td>
<td>0 + 3</td>
<td>20</td>
</tr>
<tr>
<td>Case 5 26</td>
<td>0 + 0</td>
<td>18</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.9 It has also been reported as a cause of septicamia and pneumonia in premature neonates.10 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.

We thank Dr ES Gray and Professor R Postlethwaite for their helpful comments during the preparation of this manuscript.

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J Clin Pathol 1987 40: 292-293
doi: 10.1136/jcp.40.3.292

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