Bacteriological findings in cultures of clinical material from Bartholin’s abscess

M. W. D. WREN

From the Microbiology Department, North Middlesex Hospital, London N18 1QX, UK

SUMMARY Purulent exudate from 28 cases of Bartholin’s abscess were examined for aerobic, anaerobic, and microaerophilic bacteria. Three cases gave no bacterial growth, five cases grew facultative bacteria only, and a further three grew a mixture of facultative and anaerobic bacteria. One case gave a pure growth of a microaerophilic streptococcus. Anaerobic bacteria were the only isolates in 16 cases and Bacteroides species were the most common organisms isolated; they were present as 62.5% of the total anaerobes cultured and accounted for 45.4% of the total bacteria cultured. Escherichia coli was the most common of the facultative organisms, accounting for 18% of the total bacteria. Most infections seemed to be caused by a single organism, anaerobic types predominating.

The bacteriology of Bartholin’s abscess has received little attention in the literature, mainly because this condition rarely presents as a life-threatening infection involving complex therapeutic considerations.

One published study has revealed the importance of careful bacteriological investigation of material aspirated from these abscesses to find their true bacteriological aetiology (Swenson, 1974).

This paper presents the bacteriological findings when purulent exudate from a series of Bartholin’s abscesses was cultured for aerobic, anaerobic, and microaerophilic bacteria (including the gonococcus).

Material and methods

Purulent material from a Bartholin’s abscess was collected onto serum-coated cotton-wool swabs which were placed into screw-capped tubes containing an 8 cm column of Cary Blair transport medium (Cary and Blair, 1964). The swabs were sent to the laboratory through the normal hospital transport system.

Culture of swabs

Swabs were cultured onto columbia agar containing 5% horse blood (CBA) and MacConkey agar both for aerobic incubation. Cultures were made on CBA and brucella agar containing 5% horse blood, 0.5 μg/ml menadione, and 75 μg/ml kanamycin (KBA) for anaerobic incubation. Cultures were also made onto a selective GC medium for detection of Neisseria gonorrhoeae. All media were obtained as prepoured plates from London Analytical and Bacteriological Media Ltd, Salford, Lancs.

Incubation of plates

Anaerobic cultures were incubated in anaerobic jars fitted with a modified catalyst sachet (Baldwin, 1975) and set up in the manner recommended by Watt and Collee (1974) using a gas mixture of 90% hydrogen and 10% carbon dioxide. Plates were examined at 24 and 48 hours and finally after five days’ anaerobic incubation.

Aerobic plates were examined after 24 and 48 hours. The selective GC plates were incubated in an atmosphere of air plus 10% carbon dioxide using a CO2 incubator and examined at 24 and 48 hours.

Identification of organisms

Aerobic and anaerobic organisms were identified to genus level, and to species level wherever possible. Aerobic and facultative organisms were identified using conventional tests as listed by Cowan (1974). Anaerobic isolates were identified using microscopic characteristics (gram stain and phase-contrast), antibiogram patterns, and biochemical characteristics. A fuller description of these methods has been published previously (Wren, 1977; Wren et al., 1977).
Results

Twenty-eight cases of Bartholin's abscess were cultured. Three samples failed to yield any bacterial growth. Of the remaining 25 samples, five contained facultative bacteria only. Nineteen samples grew anaerobic bacteria; in three they were mixed with facultative organisms and were the only isolates in the remaining 16 samples. Anaerobes were cultured in pure growth in 13 of these 16 samples. One sample grew a microaerophilic streptococcus in pure culture (Table 1).

A total of 33 bacteria were cultured, consisting of 8 facultative bacteria, one microaerophile, and 24 anaerobes. These organisms are listed in Table 2.

The most common facultative organism was E. coli (six isolates), four being found in pure culture. The two other strains were a group B streptococcus and an isolate of *Haemophilus influenzae* (also in pure culture). The three samples yielding a facultative-anaerobe mixture grew a total of three facultative organisms and four anaerobes.

The most common anaerobe cultured was *Bacteroides fragilis* (eight isolates), four strains being found in pure culture. This organism accounted for one-third of the anaerobic isolates. In all, *Bacteroides* species accounted for 62.5% of the anaerobes (the remainder being anaerobic cocci) and accounted for 45.4% of the total bacteria cultured. Of the total cultivated bacteria, 72.7% were anaerobes. *N. gonorrhoeae* was not cultured from any of the samples.

Discussion

Many studies in the literature have suggested that infections associated with the female genital tract commonly involve anaerobic bacteria. This study shows that localised infections presenting as Bartholin's abscess are no exception.

Since anaerobic bacteria form a considerable part of the normal vaginal microflora their involvement in such localised infections is hardly surprising. What is of interest, however, is that from such a mixed indigenous population only one organism seems to be involved in the infection since in 19 of the abscesses in this study a heavy pure growth of a single organism was obtained on culture. This evidence, together with the fact that three samples were sterile, seems to suggest that these cultures do not reflect contamination of the clinical material with the heavy mixed bacterial population found in the normal vaginal flora.

In this study *E. coli* was found to be the most common of the facultative species together with two other species (a group B streptococcus and *H. influenzae*), revealing that both common and uncommon organisms may be found in this condition. Only one sample grew a microaerophilic streptococcus, a very common organism in the vaginal microflora. No samples grew *N. gonorrhoeae* despite cultural conditions known to be satisfactory for this organism. In contrast, however, *N. gonorrhoeae* was isolated in 3 of 51 samples in the study by Parker and Jones (1966).

Three samples in the present study were sterile after five days' incubation. Stokes (1955; 1974) has suggested that *Mycoplasma* species may be the causative agents of Bartholin’s abscess, and it is possible that these organisms may have been responsible for the three 'sterile' samples here. The use of specific media for these organisms was not included in the culture regime, but *Mycoplasma* species have been isolated on columbia blood agar previously in this laboratory so that presumably if present they would have appeared on the anaerobic blood agar plates.

Anaerobic bacteria were found in all but six samples showing a bacterial growth and were clearly the predominant organisms in this study. *B. fragilis*, a well established human pathogen, was cultured as the most frequent anaerobe. *Bacteroides* species were also the most frequent of the bacterial species cultured. This finding is at variance with that of Parker and Jones (1966), who found anaerobic cocci.

### Table 1 Culture results

<table>
<thead>
<tr>
<th>No. of samples</th>
<th>Total 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No growth</td>
<td>3</td>
</tr>
<tr>
<td>Facultative bacteria only</td>
<td>5 (5)</td>
</tr>
<tr>
<td>Facultative anaerobic mixture</td>
<td>3</td>
</tr>
<tr>
<td>Microaerophiles only</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Anaerobic bacteria only</td>
<td>16 (13)</td>
</tr>
</tbody>
</table>

Figures in parentheses indicate number of cultures yielding a pure growth of a single organism.

### Table 2 Bacterial strains cultured

<table>
<thead>
<tr>
<th>Bacterial strains</th>
<th>No. Isolated</th>
<th>No. in pure culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaerobes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>B. fragilis</em></td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td><em>B. melaninogenicus</em></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><em>Bacteroides spp.</em></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Peptococcus spp.</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Peptostreptococcus spp.</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Facultatives:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Group B streptococcus</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Microaerophilic streptococcus</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total bacteria cultured</td>
<td>33</td>
<td>19</td>
</tr>
</tbody>
</table>
in approximately two-thirds of cases and *Bacteroides* species in only 13%. However, these workers were using broth techniques only for primary anaerobic isolation, a method now known to give misleading results.

Pearson and Anderson (1970), in their study of seven patients with Bartholin's abscess, said that their patients had 'multiple bacteroidal infections'. Moreover, these workers postulated that *Bacteroides* species in persistent cervical infections may be the origin of adnexal and Bartholin's infections as well as of postoperative infections of the uterus. This paper agrees with the findings of these workers concerning the frequency of *Bacteroides* species in this condition.

Swenson (1974) found anaerobic bacteria to be the cause of 10 of 15 cases in his study of female genital tract infections, and once again *Bacteroides* species were overall the most common organisms found.

The importance of finding the causative organism is shown, even in such localised infections, by the few reports of serious sequelae such as Bacteroides bacteraemia (Goodman, 1974) and synergistic gangrene of the surrounding tissues (Roberts and Hester, 1972; Gorbach and Bartlett, 1974).

It is important, therefore, that cultures of material from Bartholin's abscess should be examined both aerobically and anaerobically as well as for organisms favouring a carbon dioxide atmosphere such as the gonococcus. Cultural results presented in this study seem to suggest that many of these infections involve a single organism which may be one of a number of well recognised pathogens. Anaerobic bacteria are cultured more frequently, probably due to the large numbers of these organisms residing in the microbial flora of the surrounding anatomical areas.

**References**


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M W Wren

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