Aetiology and management of non-specific vaginitis

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SUMMARY In a study of 100 women with non-specific vaginitis, characterised by a vaginal discharge which was malodorous and pruritic in most cases and caused dyspareunia and dysuria in some, Gardnerella vaginalis was isolated in 46% of patients. When present, G vaginalis was significantly associated with Mycoplasma hominis and Bacteroides species. Isolation of G vaginalis was unrelated to the presenting symptoms. Treatment with povidone-iodine pessaries for two weeks produced no pronounced benefit, either clinically or microbiologically, compared with a placebo. Nevertheless, 68% of all patients followed reported improvement four weeks after the start of treatment. The findings suggest that G vaginalis is one cause of non-specific vaginitis, which is more likely to be seen in women using oral contraceptives and is usually cured spontaneously.

Introduction

A considerable number of young women complain of vaginal symptoms for which Candida species and Trichomonas vaginalis are not responsible. Gardner and Dukes were the first to suggest that Haemophilus vaginalis (later renamed Corynebacterium vaginalis and now called Gardnerella vaginalis) may be the cause. Since then they have been both supported and opposed in this view. For this study, a symptom-based approach was taken in order to establish a clinical picture for non-specific vaginitis, to determine its relationship to G vaginalis infection, and finally to examine the prognosis by a controlled trial with a broad-spectrum vaginal pessary, povidone-iodine, as the active treatment.

Patients and methods

STUDY POPULATION
Women complaining of vaginal discharge for at least one week were included in the study if neither candidal, trichomonal, or gonococcal infection could be detected. A total of 100 patients was seen by one of us (IMD) during 1978 at a department of genitourinary medicine.

The control group comprised 100 consecutive patients seen in the same department by the same doctor. Details of age, contraceptive method, and obstetric history were recorded. Tests for sexually transmissible disease were carried out as a routine, using standard methods for the diagnosis or exclusion of gonorrhoea, trichomoniasis, and candidosis, together with serological tests for syphilis.

CULTURE TECHNIQUES
A high vaginal swab was taken and sent to the laboratory in Stuart's transport medium. The following culture plates were inoculated: two 5% horse blood agar, one MacConkey agar, and one mycoplasma agar (base and supplement, BBL). The plates were incubated aerobically for 48 hours at 37°C, except for one blood agar plate which was placed in an anaerobic environment. The mycoplasma plates were incubated in an atmosphere of 10% CO₂ in air for five days.

IDENTIFICATION OF ORGANISMS
Organisms were identified according to standard methods. Mycoplasma hominis was identified serologically using "taxodiscs" (BBL). G vaginalis was detected by the inoculation of a plate containing DST agar (Oxoid) to which 5% lysed horse blood and 2% reconstituted Isotivalex (BBL) was added. This was incubated in 10% CO₂ in air at 37°C for five days and examined daily. After 48 hours' incubation at 37°C, G vaginalis appeared as pinpoint grey colonies of typical short Gram-positive rods. These rapidly became Gram-variable on aging or repeated subculture. Identity was confirmed by demonstrating negative catalase, nitrate, and

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Aesclin reactions. Serum peptone water sugars were inoculated and showed acid production in glucose and maltose but not in lactose, mannitol, salicin, or trehalose.

**TREATMENT TRIAL**
A controlled double-blind trial compared povidone-iodine pessaries (Betadine 200 mg) with a placebo of identical appearance, packaged in random-numbered containers, one pessary to be used night and morning for two weeks. Patients were asked to return four weeks after the start of treatment for both clinical and microbiological assessment. All relevant data were recorded on a study form drawn up for this purpose.

Statistical analysis was carried out by means of Yates’s modification of the $\chi^2$ test.

**Results**
The study group of 100 women with non-specific vaginitis had a mean age of 25·6 years (range 18-54 years); 52 were single. Forty-two women had been pregnant, 54 were using oral contraception, and 16 were fitted with an intrauterine contraceptive device (IUCD).

The control group of 100 unselected female patients had a mean age of 26·0 years (range 17-50 years); 82 were single. Forty-three had been pregnant, 39 were using oral contraception, and 18 were fitted with an IUCD. There were no ethnic differences between the two groups.

**SYMPTOMS**
Patients were admitted to the study group on the basis of complaint of vaginal discharge shown not to be associated with trichomoniasis, candidosis, or gonorrhoea. Additional symptoms were an offensive smell (68%) and irritation (55%); dyspareunia was noted by 35% and dysuria by 23%. The existence of a discharge was confirmed in all cases, and increased redness of the vagina was recorded in 68%. Microscopy showed polymorphonuclear leucocytes in the cervical secretions in 89%.

**CULTURE**
The most frequently isolated organisms in both groups of patients are shown in table I. Only *G. vaginalis* and *M. hominis* were isolated more frequently in the study group; this was statistically significant ($\chi^2 = 14·13$ and $8·04$ respectively; *P* < 0·001 and <0·01 respectively). In addition, *Bacteroides*, an organism of equal incidence in the control group, was found in combination with *G. vaginalis* in 15 patients with vaginitis compared with five controls ($\chi^2 = 4·5; ~ P = 0·05$). Therefore not only *G. vaginalis* but also *M. hominis* and *Bacteroides* species were significantly associated with non-specific vaginitis.

**CORRELATION WITH SYMPTOMS AND ORAL CONTRACEPTION**
The possibility that *G. vaginalis* is responsible for the more severe forms of non-specific vaginitis was examined by looking for a correlation with more severe associated symptoms. From the results, it was apparent that no such relationship existed (table II).

Host factors which might relate to morbidity were also examined (table III). Patients with *G. vaginalis* vaginitis were much more likely to be taking oral contraceptives ($\chi^2 = 9·90; ~ P < 0·01$) than patients harbouring *G. vaginalis* in the control group. In the vaginitis group generally the relationship with oral contraception was less significant but still present ($\chi^2 = 3·94; ~ P < 0·05$).

**TABLE I** Organisms most frequently isolated and established pathogens. (The percentage of patients harbouring *G. vaginalis* is shown in brackets)

<table>
<thead>
<tr>
<th>Organism</th>
<th>Patients with non-specific vaginitis (n = 100)</th>
<th>Controls (n = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Gardnerella vaginalis</em></td>
<td>46</td>
<td>20</td>
</tr>
<tr>
<td><em>Mycoplasm hominis</em></td>
<td>44 (64)</td>
<td>24 (33)</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>27 (30)</td>
<td>29 (7)</td>
</tr>
<tr>
<td><em>Bacteroides species</em></td>
<td>18 (83)</td>
<td>18 (28)</td>
</tr>
<tr>
<td><em>Herpes simplex virus</em></td>
<td>4 (23)</td>
<td>2 (0)</td>
</tr>
<tr>
<td><em>Neisseria gonorrhoeae</em></td>
<td>9 (44)</td>
<td></td>
</tr>
<tr>
<td><em>Trichomonas vaginalis</em></td>
<td>14 (14)</td>
<td></td>
</tr>
<tr>
<td>Yeasts (mostly <em>Candida albicans</em>)</td>
<td>26 (15)</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE II** Relationship between common symptoms and isolation of *G. vaginalis*. (Percentages are shown in brackets.)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Isolation of <em>G. vaginalis</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive (n = 46)</td>
</tr>
<tr>
<td>Offensive discharge</td>
<td>30 (65)</td>
</tr>
<tr>
<td>Pruritus vulvae</td>
<td>26 (56)</td>
</tr>
<tr>
<td>Offensive discharge or pruritus vulvae or both</td>
<td>39 (85)</td>
</tr>
</tbody>
</table>

**TABLE III** Host factors and non-specific vaginitis. (The percentage of patients harbouring *G. vaginalis* is shown in brackets.)

<table>
<thead>
<tr>
<th>Host factors</th>
<th>Patients with non-specific vaginitis (46)</th>
<th>Controls (20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral contraception</td>
<td>54 (27)</td>
<td>39 (4)</td>
</tr>
<tr>
<td>Past pregnancy</td>
<td>42 (25)</td>
<td>43 (9)</td>
</tr>
</tbody>
</table>
TREATMENT TRIAL
The results of the treatment trial are summarised in table IV. In terms of clinical improvement assessed at four weeks, povidone-iodine pessaries were not significantly better than a placebo ($\chi^2 = 2.38; P > 0.05$). In fact, 58% of placebo-treated patients reported improvement, and this tendency to spontaneous cure was supported by the microbiological findings; *G. vaginalis* was reported improvement, weeks, 34 were better, two patients reported no change, isolated at follow up, seven (64%) cure and the other a yeast infection.

<table>
<thead>
<tr>
<th>Findings at 4 weeks</th>
<th>Povidone-iodine</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Improved</td>
<td>35 (76)</td>
<td>22 (58)</td>
</tr>
<tr>
<td>Not improved</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Microbiological</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>G. vaginalis</em> +</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td><em>G. vaginalis</em> -</td>
<td>16 (76)</td>
<td>10 (62.5)</td>
</tr>
</tbody>
</table>

+ Present; – absent

Discussion
This study has produced a clear clinical picture of non-specific vaginitis: a whitish discharge with an offensive odour associated with pruritus vulvae, dyspareunia, and dysuria, in descending order of frequency. Moreover, a placebo-controlled trial showed that more than half the cases resolved spontaneously, both clinically and bacteriologically. Thus, it seems that specific treatment is not required in most cases of non-specific vaginitis and that if symptoms persist povidone-iodine may have some beneficial effect. Assessment at four weeks after diagnosis ensured that patients had completed a full menstrual cycle by the time they were re-examined, and thus the effects of menstruation were shared by all. The favourable outcome in the placebo-treated group suggested a possible beneficial effect from menstruation.

Nevertheless, the aetiology remains obscure. Since Gardner and Dukes first implicated *H. vaginalis* in 1955, subsequent opinions have been almost equally divided on the pathogenic role of the organism. In our experience, it did not occur more frequently in the two common forms of infective vaginitis (trichomoniasis and yeast infection) than in the control group as a whole (table I), which suggests that it is not an opportunistic invader of the morbid vagina. Ingham et al.\(^1\) have suggested that anaerobes may enhance the pathogenicity of *G. vaginalis* by interfering with phagocytosis, which gives importance to its presence in 15 out of 18 patients from whom *Bacteroides* species were isolated. *M. hominis* alone may be responsible for some cases of non-specific vaginitis.\(^1\) Pfeifer et al.\(^5\) found no relationship between non-specific vaginitis and *Ureaplasma urealyticum* or, for that matter, *Chlamydia trachomatis*.

Our findings in non-specific vaginitis point to *G. vaginalis* as being a co-pathogen, together with *M. hominis* or *Bacteroides* species or both. Exactly what circumstances favour growth of these organisms in vivo has not been established. The strong association with the presence of *Bacteroides* species, themselves no more frequent in non-specific vaginitis than in our controls, raises the possibility of anaerobic foci in the environment.

We also examined host factors and confirmed the relationship with oral contraceptives reported by McCormack et al.\(^9\) but not that with previous pregnancy. Oral contraception was associated not only with a greater likelihood of non-specific vaginitis but also with a much greater likelihood that the presence of *G. vaginalis* would be associated with vaginal symptoms. Thus, the hormonal effects of oral contraceptives on vaginal epithelium may possibly promote the pathogenic potential of *G. vaginalis* probably by enhancing its growth rate.

From our study, *G. vaginalis* vaginitis seems likely to develop in a single woman who is taking an oral contraceptive, and cyclical changes in the vagina may well promote spontaneous resolution. These events may be mediated cytologically, a view supported by microscopic examination of the discharge showing cellular overgrowth by organisms, the ‘clue cell’ described by Gardner and Dukes.\(^1\) An anaerobic environment may possibly be promoted by collections of cellular debris within the vagina. Although hormonal factors controlling maturation of vaginal epithelium may play a part, it seems reasonable that behavioural factors affecting vaginal hygiene could also be important in the development of non-specific vaginitis.

We would like to acknowledge Napp Laboratories Ltd for kindly supplying all the treatment used in this study, and thank the staff of the Medical Microbiology Department and the sister and staff of the Martha Clinic, West London Hospital.

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References


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