TRICHOMONAS VAGINALIS INFECTIONS IN THE MALE*

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Trichomonas vaginalis infections in the male have received scant attention. Baumeister and Hollinger (1941), after an intensive search of world medical literature, discovered records of only 145 cases of infection in the male urethra by T. vaginalis. Liston and Lees (1940) reported that they could not find a single paper on the subject in any medical journal published in Great Britain, and Freed (1945) claimed that his two cases of T. vaginalis urethritis were the first to be reported in South African medical literature. American and Continental observers have given the subject more attention, but the results recorded differ considerably. This lack of interest is the more remarkable because the modes of transmission of T. vaginalis to the female have been extensively investigated without any really satisfactory conclusions. Although the vaginitis caused by the organism is not in any way a major disease, the vaginal discharge, irritation, and dyspareunia often associated with it frequently require prolonged medical treatment. The coital origin of many of these infections is receiving more recognition but there is still little unanimity regarding trichomonas infections in the male. If, as appears probable, many patients with trichomonas vaginitis are infected and reinfected by coitus, then the study of the infected male becomes a matter of considerable importance, for, as a recent annotation (Lancet, 1953) aptly commented,

Human trichomoniasis is one of those unspectacular conditions which, although troublesome and often intractable, causes neither death nor acute illness... and hence has escaped the attention it really deserves.

Present Study

In an attempt to ascertain the incidence and clinical manifestations of T. vaginalis in man, an investigation was carried out on patients attending two large venereal diseases clinics. These patients were suffering from gonorrhoea, urethritis, or balanitis. It is appreciated that they tend to form a selected group in that their relative promiscuity exposed them to an increased risk of infection. The possibility of a symptomless vector state was also investigated. Although recent work (Lanceley and McEntegart, 1953) has demonstrated the pathogenicity of T. vaginalis for the male urethra, it was felt that a symptomless infection of the urethra, prostate, or subpreputial sac might occur. For this purpose, a number of married men who were attending for non-venereal complaints were examined; it was not possible to examine the wives of these patients. Finally, as it was not known whether the normal subpreputial sac could harbour T. vaginalis, subpreputial washings from a number of patients who admitted frequent promiscuous sexual intercourse, but were without signs of any infection, were investigated.

Methods of Examination.—At first, routine microscopic examination with 1/6" objective and 10 ocular was performed on wet unstained specimens. Later, following a study of experimentally infected volunteers (Lanceley and McEntegart, 1953), the examination of urethral scrapings rather than of the urethral exudates was commenced. Patients whose urines were hazy and contained many fine light threads—a finding highly suggestive of trichomonad infection—were examined repeatedly, and very often the trichomonad was eventually discovered. For purposes of brevity, this type of urine is referred to as "typical". The examination of smears stained by Leishman's method, as recommended by Liston and Liston (1939), or by Seller's Negri stain, as described by Allison (1943), proved unsatisfactory, and this method of investigation was used in only a limited number of specimens. Investigation by cultural methods was not employed routinely owing to certain technical difficulties.

Altogether, 735 patients were examined, and these could be classified as follows:

(1) 310 with non-gonococcal urethritis;
(2) 285 with gonorrhoea;
(3) 40 with balanitis;
(4) 40 'normal' married men.
(5) 60 promiscuous males (subpreputial washings).

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These groups and the incidence of positive results are summarized in Table I, which shows that trichomonad infections were found in eighteen of 310 patients (5.8 per cent.) with urethritis, in two of 285 patients (0.7 per cent.) with gonorrhoea, and in five of forty patients (12.5 per cent.) with balanitis. One trichomonad infection of the urethra was found in the series of forty 'normal' married men. No trichomonads were found in the sixty subpreputial washings.

**Clinical Features.**—Table II presents the clinical details of the patients suffering from non-gonococcal urethritis in whom *T. vaginalis* were found.

"Incubation period", number of days between sexual intercourse and the onset of urethritis as noted by the patient; a question mark denotes that the incubation period could not be calculated.

"Typical", characteristic appearance of urine in patients with a heavy trichomonad urethral infection.

"Days *T. vaginalis* found", period during which active trichomonads were actually observed.

"Days urethritis persisted under observation", length of time signs of urethritis observed during patient's attendance at clinic.

Table III contains clinical details of patients suffering from gonorrhoea and found to have a *T. vaginalis* infection.

Table IV contains details of five patients suffering from balanitis who were found to be infected subpreputially with *T. vaginalis*.

### Table I

**Classification of Patients by Clinical Condition**

<table>
<thead>
<tr>
<th>Group</th>
<th>Clinical Diagnosis</th>
<th>No. Examined</th>
<th>T.V. Present No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Urethritis (non-gonococcal)</td>
<td>310</td>
<td>18</td>
<td>5.8</td>
</tr>
<tr>
<td>2</td>
<td>Gonorrhoea</td>
<td>285</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>3</td>
<td>Balanitis</td>
<td>40</td>
<td>5</td>
<td>12.5</td>
</tr>
<tr>
<td>4</td>
<td>'Normal' married patients</td>
<td>40</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>5</td>
<td>Subpreputial washings from promiscuous males</td>
<td>60</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table II

**Findings in Eighteen Patients with Non-Gonococcal Urethritis in Whom *T. vaginalis* Could Be Demonstrated**

<table>
<thead>
<tr>
<th>No.</th>
<th>Age</th>
<th>Incubation Period (days)</th>
<th>Type of Urethral Discharge</th>
<th>Type of Urine</th>
<th><em>T. vaginalis</em> Present</th>
<th>Days <em>T. vaginalis</em> Found</th>
<th>Days Urethritis persisted under Observation</th>
<th>Whether Circumcised</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27</td>
<td>4</td>
<td>Slight white mucoid</td>
<td>Typical</td>
<td>× × ×</td>
<td>17</td>
<td>25</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>27</td>
<td>6</td>
<td>MUco-purulent</td>
<td>Typical</td>
<td>× × ×</td>
<td>15</td>
<td>24</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>2</td>
<td>Purulent</td>
<td>Typical</td>
<td>× × ×</td>
<td>11</td>
<td>11</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>41</td>
<td>14</td>
<td>Purulent</td>
<td>Hazy</td>
<td>× × ×</td>
<td>1</td>
<td>5</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>42</td>
<td>171</td>
<td>White mucoid</td>
<td>Typical</td>
<td>× × ×</td>
<td>20</td>
<td>45</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>10</td>
<td>White mucoid</td>
<td>Hazy</td>
<td>× × ×</td>
<td>3</td>
<td>27</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>51</td>
<td>208</td>
<td>Purulent</td>
<td>Slight haze</td>
<td>× × ×</td>
<td>19</td>
<td>19</td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td>42</td>
<td>60</td>
<td>White mucoid</td>
<td>Typical</td>
<td>× × ×</td>
<td>34</td>
<td>55</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>57</td>
<td>12</td>
<td>MUco-purulent</td>
<td>Typical</td>
<td>× × ×</td>
<td>3</td>
<td>7</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>41</td>
<td>14</td>
<td>MUco-purulent</td>
<td>Typical</td>
<td>× × ×</td>
<td>21</td>
<td>21</td>
<td>No</td>
</tr>
<tr>
<td>11</td>
<td>34</td>
<td>?</td>
<td>MUco-purulent</td>
<td>Typical</td>
<td>× × ×</td>
<td>14</td>
<td>14</td>
<td>No</td>
</tr>
<tr>
<td>12</td>
<td>43</td>
<td>?</td>
<td>Watery</td>
<td>Hazy</td>
<td>× × ×</td>
<td>7</td>
<td>7</td>
<td>No</td>
</tr>
<tr>
<td>13</td>
<td>45</td>
<td>60</td>
<td>Mucoid</td>
<td>Typical</td>
<td>× × ×</td>
<td>16</td>
<td>16</td>
<td>No</td>
</tr>
<tr>
<td>14</td>
<td>29</td>
<td>5</td>
<td>Mucoid</td>
<td>Typical</td>
<td>× × ×</td>
<td>1</td>
<td>9</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>36</td>
<td>30</td>
<td>Profuse mucoid</td>
<td>Typical</td>
<td>× × ×</td>
<td>4</td>
<td>30</td>
<td>No</td>
</tr>
<tr>
<td>16</td>
<td>31</td>
<td>14</td>
<td>Slight mucoid</td>
<td>Clear with threads</td>
<td>× × ×</td>
<td>4</td>
<td>4</td>
<td>No</td>
</tr>
<tr>
<td>17</td>
<td>45</td>
<td>3</td>
<td>Slight mucoid</td>
<td>Clear</td>
<td>× × ×</td>
<td>1</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>18</td>
<td>25</td>
<td>6</td>
<td>MUco-purulent</td>
<td>Typical</td>
<td>× × ×</td>
<td>10</td>
<td>16</td>
<td>No</td>
</tr>
</tbody>
</table>

**Legend:**

- **U** = Urethral scraping.
- **P** = Prostatic secretion.
- **Sub-Prep.** = Subpreputial sac.
- **Typical** = Urine characteristic of heavy *T. vaginalis* urethritis.
- × = present.
- = not present.
- / = not examined.
- ? = unknown.
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Table III
FINDINGS IN TWO PATIENTS WITH GONORRHOEA IN WHOM T. VAGINALIS COULD BE DEMONSTRATED

<table>
<thead>
<tr>
<th>No.</th>
<th>Age</th>
<th>Incubation Period (days)</th>
<th>Type of Urethral Discharge</th>
<th>Type of Urine</th>
<th>T. vaginalis Present</th>
<th>Days T. vaginalis Found</th>
<th>Days Urethritis Persisted under Observation</th>
<th>Whether Circumcised</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>32</td>
<td>4</td>
<td>Purulent</td>
<td>Hazy</td>
<td>×</td>
<td>2</td>
<td>14</td>
<td>No</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td>2</td>
<td>Purulent</td>
<td>Hazy</td>
<td>×</td>
<td>1</td>
<td>5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table IV
FINDINGS IN FIVE PATIENTS (COMPLETELY UNCIRCUMCISED) WITH BALANITIS IN WHOM T. VAGINALIS COULD BE DEMONSTRATED

<table>
<thead>
<tr>
<th>No.</th>
<th>Age</th>
<th>Incubation Period (days)</th>
<th>Type of Balanitis</th>
<th>T. vaginalis Present</th>
<th>Days T. vaginalis Found</th>
<th>Days Balanitis persisted under Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>24</td>
<td>8</td>
<td>Purulent</td>
<td>×</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>3</td>
<td>Ulcerative</td>
<td>×</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>34</td>
<td>14</td>
<td>Ulcerative</td>
<td>×</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>24</td>
<td>21</td>
<td>19</td>
<td>Purulent</td>
<td>×</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>25</td>
<td>32</td>
<td>19</td>
<td>Excoriative</td>
<td>—</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussion

Incidence.—Trichomonad infection in the non-gonococcal urethritis series is low compared with the recently published figures of Frühwald (1950, 47·2 per cent.), Valina (1950, 28 per cent.), and Grimmer (1950, 21 per cent.). The resemblance of the organisms, especially in their immobile and atypical forms, to other cellular elements might well be the cause of these conflicting reports. Furthermore, a belief in the existence of an encysted or resting phase would tend to produce higher figures for the incidence. In this investigation, identification of the protozoa depended on the unequivocal presence of a motile or flagellated organism morphologically indistinguishable from T. vaginalis. The existence of a resting or encysted stage was not accepted. It is certain that fewer infections with T. vaginalis would have been discovered without examination of urethral scrapings and a knowledge of the characteristic appearance (referred to as "typical") of the urine in heavy T. vaginalis infections of the urethra. For example, in Case 15, the presence of a typical urine led to repeated examinations over a period of 27 days until the protozoon was eventually demonstrated. The lack of indications of the presence of T. vaginalis in patients suffering from mild urethritis, and the consequent omission of intensive investigation, possibly resulted in the failure to prove the trichomonad origin of a number of these infections.

Incubation Period.—This varied from 2 to 210 days, but estimations were entirely dependent on the patients' own statements. On several occasions deliberate and obvious falsehoods (for reasons unknown) were recited and repeated and it is thus felt that little reliance can be placed on the accuracy of these figures.

Urethral Discharge.—This varied in character considerably, and no specific or diagnostic appearance was noted. In seven patients the discharge was purulent or muco-purulent, in one watery, and in the remainder mucoid and white in colour.

Urine.—In twelve of the eighteen patients, the trichomonad origin of the infection was indicated by the typical appearance of the urine. The urines of the remaining six patients were associated with milder infections and their appearance provided no useful information.

Site of Infection.—Fourteen of the eighteen patients were uncircumcised, and in two of these, the organisms were also recovered from the subpreputial sacs. Trichomonads were recovered from the urethra alone in ten patients; from the urethra and prostate in six patients; from the urethra, prostate, and subpreputial sac in one patient; and from the prostate and subpreputial sac of the remaining patient.
Duration of Infection.—The period when *T. vaginalis* was found was shorter than expected, and varied between 1 and 34 days. These times were based on the number of days the organisms were actually observed in urethral or prostatic secretions and did not take into account their possible presence prior to examination. Thus, two patients (Cases 13 and 15), who had given histories of a urethral discharge of many months' duration, might have been infected with *T. vaginalis* during this period.

Origin and Severity of Infection.—There was little forthcoming from this study to support the belief that chronic urethral infections may result from invasion by *T. vaginalis*. All the facts point to a relatively short period of infection followed by spontaneous cure, and to the conclusion that apparently chronic infections are in reality recurrent re-infections. It was noteworthy that all the eighteen patients, after instructions to refrain from sexual intercourse, were free from *T. vaginalis* within 20 days, even though some gave histories suggestive of lengthy infections.

Prostatic infection by the organism was always mild and of short duration. There was little or no disturbance of the normal constituents of the prostatic fluid and, even with relatively heavy infections, very few pus cells were found. After a few days the pus cells tended to disappear, and the prostatic fluid became completely normal, even though flagellates were present.

Effect of Treatment.—This was difficult to assess, but the impression gained was that the infection tended to clear spontaneously, especially if steps were taken to abolish the urethral discharge. Any drug which achieved this (and those most commonly used were sulphonamides, streptomycin, and aureomycin) appeared at the same time to cause the disappearance of *T. vaginalis*. It was felt that the most important part of the treatment was the avoidance of re-infection by sexual intercourse, and all patients were instructed accordingly. The observance of this precaution was considered to be essential and appeared to be the greatest factor in the cure of patients who complained of urethral discharges of long duration.

Association with Other Infections

Gonococcal Urethritis.—The low incidence of *T. vaginalis* in the 285 patients suffering from gonococcal urethritis, which was not unexpected, was in keeping with the findings of other observers. Liston and Lees (1940) found one case of trichomonad infection in 264 patients suffering from gonorrhoea. It was thought at first that the rarity of this occurrence might have been caused by the failure to identify the parasite in the "packed field" of gonococcal exudates, but subsequent adequate dilution resulted in no higher readings. The pH of twenty gonococcal urethral exudates was estimated and the average approximated to 6·9 compared with pH 6 for a similar sample of non-gonococcal urethral exudates. While not completely unsuitable for *T. vaginalis* a pH of 6·9 is certainly above the optimum for growth of the protozoa *in vitro* and may be a factor in the infrequency of this double infection. Pray (1952) has recently reported that certain bacteria greatly curtail *T. vaginalis* multiplication *in vitro*, while others have a moderately inhibiting effect. The action of the gonococcus was not investigated, but further research might show that it has a marked inhibitory effect on *T. vaginalis*. The duration of *T. vaginalis* infection (1 and 2 days respectively) was extremely short, and in both cases the urethra alone was the site of the infection. No specific treatment was necessary as the infections disappeared with the successful treatment of the gonococcal discharge with penicillin.

Balanitis.—The highest incidence of *T. vaginalis* was found in the series of forty cases of balanitis. The incubation periods varied from 3 to 19 days without obvious reason. No accounts could be obtained of irritation or injury which might have precipitated active inflammation. It is interesting to note that in only one patient were the trichomonads limited to the subpreputial sac. Three patients were found to have, in addition, urethral and prostatic infections, and in the remainder flagellates were identified in the prostatic fluid. These infections were always trivial and cleared spontaneously with the disappearance of trichomonads from the subpreputial sac. One patient (Case 21) developed an acute inflammation of Tyson's duct and *T. vaginalis* was demonstrated in the gland exudate.

The duration of the infection varied from one to 25 days. The healing of the subpreputial lesions was no guide to the disappearance of the organisms. Thus, trichomonads were found in one patient (Case 21) for a considerable period after the inflammatory processes had terminated. The folds of mucous membrane at the frenum were the sites most liable to remain infected and careful examination and appropriate treatment of all recesses which might favour anaerobic growth were found necessary, not only to prevent a relapse of the condition, but as a guard against subsequent coital dissemination of the organism.
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As a potential source of T. vaginalis spread, the infected subpreputial sac is obviously of considerable importance. This is especially so when it is considered that infectivity of this type must be present not only when the disease is clinically manifest, but also during the period of incubation when the patient would be unaware of any physical reason for refraining from sexual intercourse. This is well illustrated in Case 24, where T. vaginalis was present in the subpreputial sac for 45 days; for almost half of this period (the time of incubation), the patient was not conscious of any abnormality.

The discovery of T. vaginalis in the urethral and prostatic secretions and the complete absence of any signs or symptoms of this invasion was significant. It indicated that the organism is not only potentially so, and that the onset of urethritis, or other inflammatory reaction, is dependent on additional factors which are at present unknown.

Balanitis due to T. vaginalis was successfully treated by daily cleansing of the subpreputial sac with normal saline solution. Great care was necessary to make certain that this cleansing included all the possible sites of infection.

Presence of Infection in Normal Controls

Investigation for trichomonads in normal sub-preputial sacs was too limited to be of any real significance, and it is therefore felt to be unwise to draw conclusions.

The finding of a symptomless vector in the series of ‘normal’ married men is of interest and of obvious importance. There were no signs or symptoms of this infection and T. vaginalis were found in the urethral scrapings for as long as 24 hours after each marital coitus, the organisms always disappearing spontaneously. Although in this instance the duration of urethral infection was limited, there appears to be no reason why this could not be considerably longer. Further investigation of this type of infection is clearly necessary before the full significance of the coital transmission of T. vaginalis is known.

Conclusions

This investigation demonstrates that T. vaginalis infection in the male is not rare. The preputial sac, urethra, or prostate may all be sites of infection. The signs of infection are varied and a symptomless vector state may exist. Infections appear to be self-limiting and self-cureative and cause no serious lesions. It is therefore concluded that the male is not an infrequent vector of T. vaginalis and that spread of disease by coitus is not uncommon. The transient nature of the infection in the male and its lengthier course in the female might account for the disparity in the relative infection rates.

Summary

(1) 735 male patients attending venereal disease clinics were examined for infection with T. vaginalis.
(2) Eighteen trichomonad infections were found in 310 patients with urethritis (non-gonococcal), two in 285 patients with gonorrhoea, and five in forty patients with balanitis. The clinical features of these cases are discussed.
(3) No symptomless infections of the subpreputial sac were found in a series of sixty patients who admitted sexual promiscuity.
(4) Forty ‘normal’ married men were examined, and one was found to harbour T. vaginalis in the urethra without signs or symptoms for a period of 24 hours after each marital coitus.

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Trichomonas Vaginalis Infections in the Male

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