tive sign of overdosage could be observed. However, it has to be kept in mind that some of the other drugs simultaneously consumed might have influenced the course of intoxication.

REFERENCE

Gonorrhoea in Heterosexual Men
Correlation between Gonococcal W Serogroup, Chlamydia trachomatis Infection and Objective Symptoms

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Among 292 heterosexual men with gonorrhoea seen during one year, 59 (20%), had a co-existing chlamydial infection. Of the men infected with a serogroup W I strain 30% had a chlamydial infection compared with 16% of those infected with a serogroup W II/III strain (p<0.01). Heterosexual men infected with W I strains had less objective symptoms as judged by the number of leucocytes per high power field and by discharge, than men infected with W II/III strains (p<0.05 and p<0.01, respectively). Key word: Monoclonal antibodies. (Received March 17, 1986.)

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Serological classification of Neisseria gonorrhoeae by co-agglutination has recently been developed (1). With monoclonal antibodies the gonococci can be divided into two serogroups, W I and W II/III and further subdivided into serovars (2, 3). The serogroup W antigen, the major outer membrane protein, protein I, exists in two forms with different molecular weights (4). Serogroup W I and W II/III correspond to the two different proteins, protein I A and I B respectively.

A high frequency of co-existing chlamydial infection in patients with gonorrhoea is well-known (5, 6, 7). Approximately 20% of heterosexual men with gonorrhoea also have a chlamydial infection.

The purpose of this study was to investigate, if the serogroup of gonococcal isolates from heterosexual men with uro-genital gonorrhoea was correlated to a co-existing chlamydial infection and urethral symptoms.

MATERIAL AND METHODS
The venereal disease outpatient clinic at the Department of Dermatology-Venereology, Södersjukhuset, Stockholm, was attended during one year up to April 1983, by 312 consecutive heterosexual men.
with a positive gonococcal culture from the urethra. In 20 of these 312 men, who were considered for this study, chlamydial culture was not performed. The remaining 292 patients were included in the study. One of the men had two gonococcal strains of different serogroups isolated on the same occasion. The study thus comprised 293 gonococcal isolates from 292 men.

All patients were asked about sexual preference and their reason for attending the clinic. They were also asked about subjective symptoms from the urethra.

Smears from the urethra were taken and stained with methylene-blue. The number of leucocytes per high power field (HPF) (x100 objective) were counted. The counts were graded: <10, or ≥10 leucocytes per HPF. Objective discharge was recorded by the venereologist according to a three-graded scale, where grade two and three were classed as objective fluor.

Specimens for chlamydial and gonococcal cultures were taken from the urethra. Specimens for Chlamydia trachomatis culture were incubated onto McCoy cells, treated with cycloheximide and stained with iodine after three days of incubation (8). The gonococcal specimens were directly inoculated onto selective and non-selective hematin agar plates and incubated in 5% CO\textsubscript{2} atmosphere at 37°C. Gonococci were identified by microscopy, oxidase test and carbohydrate utilization tests (9).

All gonococcal isolates were serogrouped by co-agglutination (1). Monoclonal antibody reagents were used for the identification of serogroup W1 and WII/III respectively (2, 3). All isolates were typable and no isolate reacted with both W1 and WII/III reagents.

Fisher's exact test was used for statistical analysis.

RESULTS AND DISCUSSION

The dominating gonococcal serogroup was WII/III with 204/293 (70%) of the isolates (Table I). This is in agreement with the findings in heterosexual men reported earlier (10).

In the study 20% of the patients had a chlamydial infection (Table I). There was a difference in incidence of chlamydial infections in patients infected with gonococcal strains of the two different serogroups. Thus, 30% of the patients infected with W I strains also had a co-existing chlamydial infection as compared with 16% of those infected with WII/III strains (p<0.01). There was no difference between the two groups of patients in the number attending for urethral symptoms, 77/89 (86%) of men infected with W I strains and 178/204 (87%) of those infected with WII/III strains. However, men infected with W I strains had less objective symptoms as judged by the number of leucocytes per HPF and less objective discharge than men infected with WII/III strains. In men with W I isolates 67/76 (88%) had 10 leucocytes/HPF or more compared with 185/193 (96%) of those with WII/III isolates (Table II), (p<0.05). Also objective discharge was seen more seldom in patients infected with W I strains, 41/68 (60%), than in those infected with WII/III strains, 136/173 (79%), (p<0.01), (Table II). No statistical significance was noted concerning the result of chlamydial culture in relation to objective findings.

Table I. Serogroup of 293 gonococcal isolates from 292 heterosexual men with uro-genital gonorrhoea correlated to a co-existing chlamydial infection.

<table>
<thead>
<tr>
<th>Chlamydial culture</th>
<th>W I</th>
<th>WII/III</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>27</td>
<td>30</td>
<td>59</td>
</tr>
<tr>
<td>Negative</td>
<td>62*</td>
<td>70</td>
<td>234</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>204</td>
<td>293</td>
</tr>
</tbody>
</table>

* One patient was infected with one W1 and one WII/III strain.
Table II. Serogroup of gonococcal isolates correlated to number of leucocytes/HPF (×100 objective) in urethral smear and objective discharge from 268 and 240 men, respectively, with uro-genital gonorrhoea

Data concerning number of leucocytes/HPF and objective discharge were not available from 24 and 52 men respectively

<table>
<thead>
<tr>
<th>Gonococcal serogroup</th>
<th>Objective findings</th>
<th></th>
<th></th>
<th>Objective discharge</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of leucocytes/HPF</td>
<td>&lt;10</td>
<td>≥10</td>
<td>Total</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>WI</td>
<td>9</td>
<td>67&lt;sup&gt;a&lt;/sup&gt;</td>
<td>76</td>
<td>27</td>
<td>41&lt;sup&gt;a&lt;/sup&gt;</td>
<td>68</td>
</tr>
<tr>
<td>WII/III</td>
<td>8</td>
<td>185&lt;sup&gt;a&lt;/sup&gt;</td>
<td>193</td>
<td>37</td>
<td>136&lt;sup&gt;a&lt;/sup&gt;</td>
<td>173</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>252</td>
<td>269</td>
<td>64</td>
<td>177</td>
<td>241</td>
</tr>
</tbody>
</table>

<sup>a</sup> One patient was infected with one WI and one WII/III strain.

Women were not included in this report because chlamydial culture was not taken in 89 (29%) of the 310 women with uro-genital gonorrhoea originally considered for the study. There was, however, the same results concerning gonococcal serogroup and co-existing chlamydial infection in women as in heterosexual men. Forty-eight per cent of the women with gonococcal isolates of serogroup WI and thirty per cent with WII/III isolates also had a chlamydial infection (p<0.01). Among 38 homosexual men with uro-genital gonorrhoea, from whom specimens for chlamydial culture were taken, only 2 had a chlamydial infection.

These findings might be explained by epidemiological factors or biological interaction. Men infected with WI strains had less objective symptoms than those infected with WII/III strains and this might have delayed their decision to visit a doctor. During the rather long period, when they were undiagnosed, they would have had a greater opportunity to acquire a chlamydial infection than patients infected with WII/III strains. An already acquired chlamydial infection might also during this period develop into a phase where it can be diagnosed by culture.

Furthermore biological differences between WI and WII/III strains might facilitate the co-existence between WI strains and Chlamydia trachomatis. It has earlier been shown, that gonococcal strains causing asymptomatic gonorrhoea in men often belong to a special auxotype with unique nutritional requirements, i.e. AHU<sup>+</sup> (11). It has also been shown that AHU<sup>−</sup> strains mostly belong to serogroup WI (12). Chlamydial infection might thus be favoured by an environment suitable for WI strains with unique nutritional requirements.

Alternatively a low-grade persistent chlamydial infection, present for a long time, might be reactivated by a gonococcal infection with WI strains.

ACKNOWLEDGEMENTS

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