THE USE OF VAGINAL AND RECTAL CULTURES IN THE
MANAGEMENT OF GONORRHEA IN THE FEMALE

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The advent of such a potent and yet non-toxic
drug as penicillin has necessitated a re-examination
of all aspects of the management of gonorrhoea in
the female. Recently there has been a marked
tendency, especially in the United States, to shorten
the post-treatment period of observation and
bacteriological investigation before cure is pre-
sumed. Duncan and others (1945) used the
criterion of at least three negative smears and
cultures of the urethral and cervical secretions at
forty-eight-hourly intervals after the completion
of treatment. Thomas and Meyer (1945) carried out
four examinations of the urethral and cervical secre-
tions by smears and cultures on alternate days,
starting the day following the completion of treat-
ment. Van Slyke and Heller (1945) insisted on a
minimum of ten days' post-treatment observation
including at least three negative cultures. These
periods refer only to the surveillance for gonorrhoea
as distinct from the serological observation to
detect incubating syphilis.

While such short observation periods have not
been adopted in this country, their acceptance
elsewhere serves to emphasize the importance of
raising to the highest possible degree of efficiency
the standards of the bacteriological investigations
employed as tests of cure. The very number and
variety of culture media which have been
elaborated for the isolation of the gonococcus
suggest strongly that the ideal medium has not yet
been discovered. Those in general use have been
developed empirically, and further improvement of
media must probably await a more precise know-
ledge of the growth requirements of the organism.
But even with the media available examination of
material from a wider range of potentially infected
sites might be expected to raise the standards of
results.

Investigations in routine tests are usually restric-
ted to the cervix and urethra. Examination of the
vaginal secretion, as recommended by King and
Mascall (1935), but despite the excellent results
obtained this practice does not appear to have been
widely adopted. It has been recognized for a long
time that the gonococcus may often be found in the
rectum of females with genito-urinary gonorrhoea,
the rectal involvement being sometimes symptom-
less. Vaginal cultures have been employed as a
routine at the Whitechapel Clinic since 1935. During
the past two years a large number of rectal smears and cultures have been examined
and sufficient cases have now been accumulated
to form an opinion as to the value of examination
of material from these two sites in the diagnosis of
gonorrhoea.

Case Material and Methods Employed

The results of all cultures and smears taken in the
female department of the Whitechapel Clinic in the
twelve-month period from Oct. 1, 1947, to Sept. 30, 1948,
form the basis of this study. Throughout this period the
culture medium has consisted of nutrient agar enriched
with hydrocele fluid in the proportion of 1 part of
hydrocele to 4 of the agar base, the medium having a pH
within the range of 7.4 to 7.6. Besides the routine
urethral and cervical smears and cultures, material from the
posterior vaginal fornix has been examined in all
cases. Cultures and smears from the rectal mucosa have
been examined in the majority of new cases according to
the technique described by Nicol (1948). Smears of
vaginal secretion have not been examined as a routine as
it had been found that they usually consisted of a mass
of secondary organisms in which it was not possible to
identify the gonococcus with certainty.

Cultures were incubated in air at 37°C. for forty-
hours and then flooded with a freshly prepared
1 per cent. aqueous solution of dimethyl—p—phenylene
diamine hydrochloride. Oxydase-positive colonies having
typical colonial and microscopical morphology were
 provisionally accepted as gonococci. Isolation in pure
culture and the study of fermentation reactions was
attempted in doubtful cases or in cases in which legal
issues were involved. Plate cultures were used only for
a proportion of the vaginal cultures; slopes were used
for the remainder and for specimens from other sites.
This was done to economize the medium in view of the
difficulty experienced in obtaining adequate supplies of
hydrocele fluid.
Results Obtained

In the period under review 10,355 cultures from 3,179 cases were examined; these figures include both the initial diagnostic cultures in new cases and cultures taken during the period of observation after treatment. In 323 patients (10-16 per cent.) gonococci were found either in smears or cultures. Of this number 281 were either untreated patients or were patients in whom re-infection was considered to have occurred. Together these are subsequently referred to as Group A. The remaining forty-two patients, forming Group B, are those classed as treatment failures or relapses. A proportion of the so-called relapsed cases may have been re-infections, despite the denial of re-exposure, but a distinction has been made between the two groups for the purpose of analysing the results obtained. These are summarized in Table I.

Table I

<table>
<thead>
<tr>
<th></th>
<th>Group A: Fresh cases and re-infections (281 cases)</th>
<th>Group B: Treatment failures and relapses (42 cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Cultures positive</td>
<td>256</td>
<td>91</td>
</tr>
<tr>
<td>Smears positive</td>
<td>198</td>
<td>70.5</td>
</tr>
<tr>
<td>Smears and cultures positive</td>
<td>173</td>
<td>61.5</td>
</tr>
<tr>
<td>Cultures alone positive</td>
<td>83</td>
<td>29.5</td>
</tr>
<tr>
<td>Smears alone positive</td>
<td>25</td>
<td>9</td>
</tr>
</tbody>
</table>

Discussion

The results obtained demonstrate the superiority of cultures over smears in the diagnosis of gonorrhoea. Without cultural examination 29-5 per cent. of the fresh cases and 45 per cent. of the relapsed cases might have been overlooked. The analysis of the sites of infection in Table II shows the marked preponderance of isolations from the cervix over those from other sites. These results are shown in diagrammatic form in the Figure.

Vaginal Infections.—It is interesting to compare the present results with those of King and Mascall (1935), which were obtained in the pre-chemo-therapeutic era. They recommended the inoculation of large amounts of material from the posterior vaginal fornix on to plates of Price's egg albumen agar (Price, 1935). Analysis of their figures shows that from a total of 263 cases examined gonococci were found by smear and culture in 138. Of these 138 positive cases, urethral smears were positive in twenty-two cases (16 per cent.), and urethral cultures positive in forty-nine cases (35-5 per cent.); cervical smears were positive in seventeen cases (12 per cent.) and cervical cultures positive in thirty-three cases (24 per cent.). The percentages of isolations from these two sites are considerably below those obtained in the present series, and it is noteworthy that in the 1935 series the urethra was a more fruitful source of gonococci than the cervix—a reversal of the present findings. The vaginal plate technique gave positive results in ninety-eight cases (71 per cent.) as against 61 per cent. of isolations from this site in the present series. Plate cultures were used in a proportion of the cases under discussion, but their use did not increase the number of isolations. Thus, of ninety-four cultures from positive patients on slopes, fifty-six (59-6 per cent.) were positive as against seventy-one (60-1 per cent.) of 118 cases cultured on plates. Nevertheless it is felt that plates are preferable since a larger inoculum can be used and inspection and isolation of suspicious colonies are very much easier than when slopes are used.

In this series a diagnosis of gonorrhoea was made from vaginal cultures only (smears being negative) in five fresh and two relapsed cases.

Table II

<table>
<thead>
<tr>
<th>Site</th>
<th>Group A: Fresh cases and re-infections</th>
<th>Group B: Treatment failures and relapses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cultures</td>
<td>Smears</td>
</tr>
<tr>
<td>Urethra</td>
<td>280</td>
<td>172 (61-4%)</td>
</tr>
<tr>
<td>Cervix</td>
<td>274</td>
<td>217 (79-2%)</td>
</tr>
<tr>
<td>Vagina</td>
<td>262</td>
<td>160 (61%)</td>
</tr>
<tr>
<td>Rectum</td>
<td>216</td>
<td>39 (18%)</td>
</tr>
</tbody>
</table>
Figure.—Cultures and smears at the various sites.
Rectal Infections.—The occurrence of symptomless gonococcal infection of the rectum in females is well established. Clements and Hughes (1935) examined 160 cases by cultural methods and found sixty-nine (43 per cent.) positive. Nicol (1948) in a previous series from this Clinic examined seventy-four consecutive patients and in twenty-six found gonococci, smears alone being positive in twenty-one cases, cultures alone in three cases, and both smears and cultures positive in two cases. Only eight of the patients admitted to any rectal symptoms and these were discovered only after careful questioning.

In the present series of cases combining Groups A and B, rectal cultures were taken from 224 patients suffering from gonorrhoea, and forty (17.8 per cent.) were found to be harbouring gonococci. In a few cases these were isolated in pure culture and their identity confirmed by fermentation reactions. Examination of smears (the majority of which were examined by the medical officers of the Clinic) gave a higher proportion of positive results; of 243 examined, sixty-eight (28 per cent.) showed pus cells with gram-negative intracellular diplococci having the morphological appearance of gonococci. In the fresh cases of Group A the diagnosis of gonorrhoea was based on a positive rectal culture with negative smears in one case; in an additional five cases smears were also positive—three of them in the rectal smear only. Seven cases showed a positive rectal smear only, all the cultures being negative; and in another nine cases the rectal smear alone was positive in addition to positive cultures from other sites.

It is recognized that the present method of rectal culture is imperfect; a heavy growth of the normal rectal flora is usually obtained and if gonococci are scanty they are readily overgrown. The development of a selective medium which would favour the growth of gonococci at the expense of the rectal flora is desirable, and it is hoped to explore this possibility. But even the present crude culture methods revealed the presence of gonococci in an important proportion of the cases examined, and, since they are in an environment where penicillin given parenterally might well be destroyed by the penicillinase produced by the normal inhabitants of the bowel, their significance as a possible nidus from which infection might spread may be of importance.

Summary
1. The results of the examination of 10,355 cultures for gonococci from female patients are presented and analysed.
2. The results and advantages of cultures from the vagina and rectum are discussed and their importance as an adjuvant means of diagnosis is stressed.

References