

Possible inhibition of *N. gonorrhoeae* by *C. albicans*

A clinical study

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It has recently been demonstrated by Hipp, Lawton, Chen, and Gaafar (1974) that *C. albicans* produces a substance which has an inhibitory effect on the growth of *N. gonorrhoeae* *in vitro*, and they discussed the possibility of a false negative gonococcal culture as a result of this effect. If false negative cultures do occur, this could add to the difficulties of controlling the spread of gonorrhoea and would demonstrate how important it is that the clinician should not accept, without reservation, a negative gonococcal culture from a patient with a concomitant candidiasis. We have investigated the importance of this suggested form of inhibition under clinical conditions.

Material and Methods

All patients attending the VD clinic of the University Hospital in Uppsala between February and May, 1972, and between September and November, 1973, were included in this study. Those patients who had taken antibiotics in the 2-week period before their first visit and those who had recently been treated for gonorrhoea were excluded. The final series comprised 1,136 men and 598 women.

The specimens for culture for *N. gonorrhoeae* and *C. albicans* were taken from the male urethra and the endocervix using charcoal-coated cotton-wool swabs.

The transportation medium for gonococci was trypticase soy broth (Difco) partly stabilized with 3 or 5 per cent. sucrose and for yeasts, Diamond's medium (Diamond, 1957).

Gonococcal cultures were made on conventional media and, during the first part of the study, also on media especially adapted for the growth of cell-wall-defective gonococci. The compositions of the media have already been described (Gnarpe and Wallin, 1973). All cultures were incubated at 37°C. in 5 per cent. CO₂ for 48 hrs. Final identification of *N. gonorrhoeae* was done by immunofluorescence (Gnarpe and Wallin, 1973). *Candida albicans* was grown in Diamond's medium, which lacks any substances with fungicidal or fungistatic effects. With the use of Dubos' medium, it was distinguished from other yeasts.

Results

Table I shows the occurrence of *C. albicans* in relation to *N. gonorrhoeae*. *C. albicans* was found in

33 of the 1,136 men investigated and seven of them (21 per cent.) had a concomitant growth of *N. gonorrhoeae* while the corresponding figure for the 1,103 without *C. albicans* was 254 (23 per cent.). *C. albicans* was isolated from 152 women and 24 of them (16 per cent.) also had a gonococcal infection as compared with 111 of the 446 women without *C. albicans* (25 per cent.). This difference in women is probably significant ($P < 0.05$).

TABLE I *Results of cultures for C. albicans in relation to those for N. gonorrhoeae of specimens taken from the male urethra and the endocervix*

Sex	C. albicans	N. gonorrhoeae		Total
		Positive	Negative	
Male	Positive	7	26	33
	Negative	254	849	1,103
	Total	261	875	1,136
Female	Positive	24	128	152
	Negative	111	335	446
	Total	135	463	598

The 463 women with negative cultures for *N. gonorrhoeae* have been divided into two groups according to whether or not they were known to be secondary contacts of men with gonorrhoea. The relationship between these groups and the growth of *C. albicans* is shown in Table II, which shows that 16 per cent. of those with *C. albicans* (20 women) had gonorrhoea-positive partners compared with 21 per cent. of those without *C. albicans* (70 women). This difference is not significant.

TABLE II *Growth of C. albicans related to known contact with a N. gonorrhoeae-positive partner in 463 women*

C. albicans	N. gonorrhoeae in partner		Total
	Present	Absent	
Positive	20	108	128
Negative	70	265	335
Total	90	373	463

Discussion

The frequencies of 3 per cent. for *C. albicans* isolated from the male urethra and 25 per cent. from the endocervix seem to be representative for VD Clinic patients. Auckland and Preston (1954) reported microscopical evidence of fungal elements in the urethral smears from 4 per cent. of 722 men attending a VD unit, and Rohatiner and Grimble (1970) found *C. albicans* in 29 per cent of smears from the vagina, cervix, and urethra from all the women attending a VD clinic during one year.

In the presence of *C. albicans*, *N. gonorrhoeae* was isolated less frequently from cervical specimens; this could support an *in vitro* study by Hipp and others (1974) in which they demonstrated that the growth of a cervical *C. albicans* might cause false negative gonorrhoea cultures. Another explanation, however, could be that many women with a candidal vaginitis did attend the VD unit to be examined and treated although no possibility was at hand for a gonococcal infection. For the men no differences in the frequencies of positive gonococcal isolations were found according to whether there was a growth or not of *C. albicans*. This might be due to a less dense growth of *Candida* in the male urethra than in the endocervix.

The *in vivo* effect of *C. albicans* was investigated in women known to have been exposed to *N. gonorrhoeae* but who had a negative culture. There was nothing to indicate that the presence of *C. albicans* in the cervical mucosa would render women less apt to contract gonorrhoea.

Summary

A probably significant difference ($p < 0.05$) in the occurrence of gonorrhoea was found between women with and without concomitant *C. albicans* infection. Although this difference could support the recently reported inhibitory effect by *C. albicans* on *N. gonorrhoeae* *in vitro* another explanation might be the possibility that too many women with vaginal candidiasis and no risk for a gonococcal infection were included in the material.

There was nothing to support the *in vivo* effect of *C. albicans* on *N. gonorrhoeae* as negative gonococcal cultures in women known to have been exposed to *N. gonorrhoeae* could not be correlated with the presence of *C. albicans*.

Until the clinical importance of the inhibitory factor of *C. albicans* has been studied further, the clinician has to be aware of the possibility of false negative gonococcal cultures from women with vaginal candidiasis.

References

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