Frequency of simultaneous carriage of *Neisseria gonorrhoeae* and *Neisseria meningitidis*

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SUMMARY Gonococci were found by culture in 112 of 442 patients suspected of having gonorrhoea. Meningococci were cultured from the pharynx more than twice as often in patients harbouring gonococci (26%) than in patients from whom gonococci could not be cultured (11%). These results could indicate an individual susceptibility to *Neisseria* organisms or they could be caused by a difference in the behaviour of patients with and without gonorrhoea, the conduct of the former making them not only more likely to be infected with *Neisseria gonorrhoeae* but possibly more exposed to *Neisseria meningitidis* as well.

Introduction

Willcox *et al.* (1977) found that of 150 pharyngeal cultures from patients who were examined because they had a history of oral sexual intercourse *Neisseria meningitidis* was isolated nearly six times more often in patients with genital gonorrhoea than in those whose genital cultures gave negative results. On the other hand, *Neisseria gonorrhoeae* was found 2½ times more often in those who carried the meningococcus in the pharynx than in those who did not. Willcox *et al.* suggest that if these findings could be confirmed they could indicate an individual susceptibility to the acquisition of *Neisseria* organisms that would merit further investigation.

Rufli (1978), in a series of 2412 patients, isolated *N. meningitidis* 2½ times more often from patients with genital gonorrhoea than from patients without and genital *N. gonorrhoeae* almost twice as often from patients with tonsillar *N. meningitidis* than from patients without. The aim of the present paper is to see if these findings could be confirmed.

Patients and methods

Unselected patients suspected of having gonorrhoea who visited the Department of Venereal Diseases at the Oslo Board of Health from the middle of September to the end of October 1978 were included

in the study. On their first visit, samples were taken from the urethra, cervix, rectum, and pharynx in women and from the urethra and pharynx in men. In a few cases rectal samples were also taken from men.

The samples were taken with charcoal-impregnated swabs, which were placed in solid Stuart's transport medium, and sent to the laboratory, where they were cultured from two to five hours later. The specimens were streaked on selective chocolate agar medium containing colistin, lincomycin, trimethoprim, and nystatin (Ødegaard, 1971; Ødegaard *et al.*, 1975) and incubated at 37°C in an atmosphere containing 5% CO₂. The gonococci and the meningococci were identified on the basis of colonial and microscopical examination, oxidase and fermentation reactions, as well as growth requirements. Glucose, maltose, lactose, and sucrose were used for fermentation tests. Nutrient agar incubated at 22°C and Dubos oleic acid agar medium incubated at 36°C in an atmosphere containing 5% CO₂ were used for growth requirements.

The meningococci were distinguished from the gonococci by their ability to ferment maltose and to grow on Dubos oleic acid agar medium. Both organisms failed to ferment sucrose or lactose or to grow on nutrient agar at 22°C.

Results

Samples from 442 patients (149 women and 293 men) were collected. *N. gonorrhoeae* was isolated by culture in 112 (25%) patients (42 women and 70 men), while *N. meningitidis* was isolated in 64 (14%)

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Received for publication 7 February 1979

patients (22 women and 42 men). In four patients *N. gonorrhoeae* was cultured from the pharynx. In none of the cases was *N. meningitidis* cultured from the genital or rectal samples.

In 330 patients with negative culture results for *N. gonorrhoeae*, *N. meningitidis* was cultured from 35 (11%) (12 women and 23 men), whereas in the 112 patients with positive culture results for *N. gonorrhoeae*, *N. meningitidis* was cultured from 29 (26%) (10 women and 19 men). In 378 patients with negative culture results for *N. meningitidis*, gonococci were found in 83 (22%) (32 women and 51 men) whereas in the 64 patients from whom *N. meningitidis* was cultured, gonococci were found in 29 (45%) (10 women and 19 men). The results are shown in the Table.

Thus, a highly significant correlation appears to exist between the occurrence of gonococci and meningococci.

The relative risk of harbouring meningococci when gonococci are found is 2.44 with an approximate 95% confidence interval of 1.4-4.2.

Table Culture results for *Neisseria gonorrhoeae* and *Neisseria meningitidis* in 442 patients

	<i>Culture results</i>		
	<i>N. meningitidis</i>		
<i>Culture results</i>	<i>Positive</i>	<i>Negative</i>	<i>Total</i>
<i>N. gonorrhoeae</i>			
Positive	29	83	112
Negative	35	295	330
Total	64	378	442

$\chi^2 = 14.6$ $P < 0.001$

Discussion

The highly significant correlation between the occurrence of gonococci and meningococci is in agreement with the findings of Willcox *et al.* (1977) and Rufli (1978).

The results could indicate either an individual susceptibility to the acquisition of *Neisseria* organisms or a difference in behaviour of patients with and without gonorrhoea, the conduct of the former making them not only more likely to be infected with *N. gonorrhoeae* but possibly more exposed to the acquisition of *N. meningitidis* as well. Both possibilities might also co-exist.

The findings of Lee *et al.* (1978) of recurrent bacteraemic infections due to *Neisseria* associated with familial deficiency of the seventh component of complement indicate, however, that individual susceptibility factors may play a part.

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