

# Isolation of *Neisseria meningitidis* from the urethra, cervix, and anal canal: Further observations

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**SUMMARY** *Neisseria meningitidis* was recovered from the urethra of nine and from the anal canal of seven men, and from the cervix of two women. Twelve of the 16 men were admitted homosexuals. Seven men had no symptoms, while the remainder had mild to moderate symptoms. One woman was asymptomatic and the other was in hospital with acute salpingitis. Reports of previous isolations of meningococci from the urethra, cervix, or anal canal are reviewed. It is concluded that in men, these infections are usually mild and self-limited, but in women, meningococcal genital infections frequently proceed to severe disease.

## Introduction

Before 1971 the isolation of *Neisseria meningitidis* from the genitourinary tract or the anal canal was an uncommon event (Murray, 1933; Carpenter and Charles, 1942; Armytage, 1944), but recently several papers have been published describing the isolation of meningococci from unusual sites (Gregory and Abramson, 1971; Keys *et al.*, 1971; Sunderland *et al.*, 1972; Brown *et al.*, 1973; Volk and Kraus, 1973; Lewis and Alexander, 1974; Givan and Keyl, 1974; Fallon and Robinson, 1974; Beck *et al.*, 1974; Faur *et al.*, 1975; Morgan *et al.*, 1976; Willmott, 1976). We have previously described the isolation of this organism from the cervix and urethra of six individuals (Givan and Keyl, 1974). Eighteen additional patients from whom the organism was isolated from the cervix, urethra, or anal canal are described and the clinical significance of these findings is discussed.

## Methods

The 16 men all attended the hospital's Venereal Disease Treatment Clinic between April 1974 and May 1976. One woman was seen at a gynaecology clinic, while the other visited her private physician.

Urethral swabs were taken from all the men; if they were homosexual, throat and rectal cultures were generally taken as well. Cervical swabs only were taken from the two women.

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Swabs taken at the clinic were plated directly on to Thayer-Martin medium, while those taken elsewhere were placed in Amies's transport medium (Amies, 1967) and plated on to Thayer-Martin medium in the laboratory. Cultures were incubated in 5 to 10% CO<sub>2</sub> at a temperature of 36°C and examined 48 hours later. Strains were identified as meningococci by colonial appearance, Gram-stain morphology, positive oxidase reaction, faint non-specific fluorescence with *Neisseria gonorrhoeae* antiserum (Difco) compound with brilliant positive controls, fermentation of 1% glucose and maltose but not sucrose in cystine trypticase agar (BBL), and by lack of B-D-galactosidase using 1% O-nitrophenol-B-D-galactopyranoside in buffered peptone broth as test system. Ten of 18 isolates were sent to the Bacteriology Reference Laboratory, Laboratory Services Branch, Ontario Ministry of Health, for confirmation. The laboratory also serogrouped the organisms.

## Results

During a period of 26 months, *N. meningitidis* was isolated from the urethra in nine men, from the anal canal in seven, and from the cervix in two women. Table 1 summarises the clinical findings of these 18 individuals.

Twelve of the 16 men studied were homosexuals. Those who had symptoms were treated with either oral tetracycline or erythromycin (8 g taken over six days). The clinical diagnosis in these patients was gonorrhoea or non-specific urethritis. Six of eight patients treated with tetracycline who returned for

Table 1 Isolation of *N. meningitidis* from cervix, urethra, and anal canal

Patient	Age (years)	Sex	Results of cultures			Symptoms	Treatment and outcome
			Throat	Cervix or urethra	Anal canal		
1	23	M(HS)*	—	+	—	Urethral discharge	Rx tetracycline—discharge persisted, cultures became negative
2	25	M	NT†	+	NT	Mild discharge	Rx tetracycline—symptoms disappeared, cultures became negative
3	28	M	NT	+	NT	No symptoms	Repeat cultures positive—Rx tetracycline, cultures became negative
4	19	M	NT	+	NT	Discharge	Rx tetracycline—'cured', cultures became negative
5	25	M(HS)	NT	+	NT	Discharge	Rx tetracycline—'cured', cultures became negative
6	26	M(HS)	NT	+	NT	No symptoms	Lost to follow-up
7	22	M(HS)	NT	+	NT	No symptoms	Rx tetracycline—cultures became negative
8	26	M(HS)	+	+	NT	Discharge—tender inguinal nodes	Rx tetracycline—lost to follow-up
9	22	M	NT	+	NT	Discharge	Rx tetracycline—lost to follow-up
10	16	M(HS)	NT	—	+	Mild rectal burning	Rx tetracycline—symptoms continued, cultures remained positive, re-treated
11	25	M(HS)	+	—	+	No symptoms	Lost to follow-up
12	27	M(HS)	+	—	+	No symptoms	No treatment—lost to follow-up
13	26	M(HS)	+	—	+	Anal itching	Rx tetracycline—'cured', cultures negative
14	25	M(HS)	+	—	+	Rectal discharge	Rx erythromycin—symptoms disappeared, culture remained positive
15	24	M(HS)	+	—	+	No symptoms	Rx tetracycline—lost to follow-up
16	28	M(HS)	+	—	+	No symptoms	No treatment—cultures remained positive
17	21	F	NT	+	NT	Discharge, pelvic pain	Hospitalised for pelvic inflammatory disease
18	22	F	NT	+	NT	None	Lost to follow-up

\*HS—homosexual †NT—not tested

follow-up cultures were 'cured'—that is, their symptoms disappeared and cultures taken twice at weekly intervals after treatment from the men and three times from the women—were negative for meningococci. Two patients were re-treated because symptoms persisted. One woman in the series was asymptomatic and received no treatment but another required hospitalisation. This patient developed bleeding, vaginal discharge, and lower abdominal pain 10 days after the insertion of a copper intrauterine device. The intrauterine device was removed and a cervical culture taken, which yielded *N. meningitidis*. She was treated with erythromycin for seven days. However, her symptoms persisted and she was admitted to hospital with a diagnosis of acute pelvic inflammatory disease. A vaginal culture taken on admission did not yield *Neisseria* species. In hospital she was treated with parenteral clindamycin because she was allergic to several other chemotherapeutic agents; she was discharged on the seventh day.

The reference laboratory reported that two strains were Group B, two were Group Y, while six strains did not fall into any group although they were confirmed as meningococci.

## Discussion

There are now reports in the literature of 84 patients from whom *N. meningitidis* was isolated from the cervix, urethra, or anal canal. Clinical details are

available for 46 of these, and it is possible to make some conclusions about the natural history of this disease. Table 2 summarises the data.

It is apparent that there is a predominance of men in these reports: 58 (70%) of 84 patients. Of the 30 men for whom there are clinical details, 17 were homosexuals. Twelve (40%) of these had no symptoms while the remainder had mild to moderate symptoms.

The three female children described all had symptoms of vaginitis, but these symptoms disappeared with little or no specific treatment.

It appears that the infection is more severe in women. Only four of 13 adult women from whom this organism was isolated were asymptomatic, while five had generalised disease—including sepsis, arthritis, endometritis, or salpingitis—and the remainder had severe vaginitis or cervicitis. The newborn infant of one patient died of meningococcal sepsis at two days of life (Sunderland *et al.*, 1972).

It is by no means clear that the symptoms noted by the men were caused by the presence of *N. meningitidis*.

In our series, urethral discharge persisted after treatment although cultures became negative in patient 1, while rectal discharge disappeared but cultures remained positive in another, patient 14. Among patients who had complaints, symptoms were often vague and non-specific. Few of the reported patients received treatment which could be considered adequate to eradicate the organism, yet

Table 2 Review of reported *N. meningitidis* infections of genitourinary tract and anal canal

Author	No. of patients		Infected site	Symptoms	Outcome
	Male	Female			
Carpenter and Charles, 1942	6	1	Urethra Cervix	Urethritis Cervicitis	Not known Not known
Armytage, 1944		1 (child)	Vagina	Vaginitis	Not known
Keys <i>et al.</i> , 1971		1	Blood, joint, cervix	Sepsis and arthritis	Cured by intravenous penicillin
		1	Cervix	Arthritis	Cured by intravenous penicillin
Gregory and Abramson, 1971		1 (child)	Vagina	Vaginitis	Spontaneous improvement
Sunderland <i>et al.</i> , 1972		1	Cervix; cerebrospinal fluid and lung of neonate	None in mother, neonatal sepsis	Infant died
Volk and Kraus, 1973	1		Urethra	None	Exposed to GC but did not contract
Lewis and Alexander, 1974		3	Cervix or vagina	None	Not known
Beck <i>et al.</i> , 1974	1 1(HS)*		Urethra Rectum	Urethritis Proctitis	Cured by ampicillin Rx cotrimoxazole
Fallon and Robinson, 1974		1 (child)	Vagina	Vaginitis	Spontaneous improvement
Givan and Keyl, 1974	4(HS) 1	1	Cervix Urethra Urethra	Cervicitis urethritis None Urethritis	Cured with tetracycline Not known Rx tetracycline—lost
Faur <i>et al.</i> , 1975	12 16	10	Cervix Urethra Anal canal	Not known Not known Not known	Not known Not known Not known
Morgan <i>et al.</i> , 1976		1	Blood	Postpartum endometritis	Rx intravenous penicillin
Willmott, 1976		1 1	Cervix Cervix	Salpingitis Pelvic inflammatory disease	Cured by ampicillin
Present series	6(3HS) 3(2HS) 3(1HS) 4(HS)	1	Cervix Urethra Urethra Rectum Rectum	None Urethritis None Proctitis None	See Text

\*HS—homosexual

the infections usually disappeared soon after treatment. It is possible that carriage of this organism in the urethra or anal canal is self-limited. Extended follow-up examinations of these patients would be valuable to clarify this point. Antibiotic treatment of male homosexual patients seldom seems necessary. Consideration might be given to treating heterosexual men to prevent transmission to women as progression to severe systemic illness is common in women, and treatment even in the absence of symptoms seems justified.

The mode of acquisition of these organisms has not been defined. Several authors have commented that the isolation of meningococci from the genitourinary tract and anal canal has coincided with a high pharyngeal carriage rate in the community (Armytage, 1944; Givan and Keyl, 1974; Faur *et al.*, 1975). Sexual transmission seems the likely explanation for most cases.

The large percentage of homosexual men in the reported cases must be more than coincidence and

the varied sexual practices of these individuals would increase the chance of transmission.

Auto-infection via the hands is another possible mode, and was considered the way in which the three children acquired their infections. To explain the presence of these organisms in the anal canal, one could suggest that they originated in the oropharynx and were swallowed. All six of the anal carriers in our series who had throat cultures taken carried the organism in their pharynx. It has not been established whether the delicate meningococcus can survive transit through the gastrointestinal tract.

The observed increase in these infections is probably real, and not based solely on increased awareness by clinicians or by more thorough differentiation of *Neisseria* species in laboratories. Faur *et al.* (1975) noted an eightfold increase in genital and anal isolates of meningococci between 1973 and 1975, while the total volume of cultures examined remained about the same. Isolation of

meningococci from the anal canal is an even more recent phenomenon. The first infection was reported in 1974 (Beck *et al.*, 1974). All the isolations reported by Faur *et al.* (1975) occurred during the latter part of their study, while five of our seven recoveries were made during the first four months of 1976. It is hoped that further studies will clarify these unusual meningococcal infections.

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