

# Gonococcal oro- and nasopharyngeal infection

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Although known to occur in the past, it is only in recent years that the incidence and importance of oral infection by the gonococcus has come to be assessed. The first case of gonococcal pharyngitis was described by Fiumara, Wise, and Many (1967). Thatcher, McCraney, Kellogg, and Whaley (1969) found no gonococci in the urethra and rectum in a routine screening by culture of 505 military subjects; in one case, they obtained a positive culture from the pharynx. Gonococcal ulceration of the tongue was described by Cowan (1969) in a female patient with gonococcal cervicitis and urethritis. Metzger (1970) described one patient with gonococcal pharyngitis, septicaemia, and polyarthritis. A possible case of gonococcal tonsillitis was described by Iqbal (1971).

In a series of fifty patients with gonorrhoea who admitted recent orogenital contact, Hellgren (1971) isolated gonococci from the tonsils in one out of twenty women and one out of thirty men. Bro-Jørgensen and Jensen (1971), investigating unselected Danish patients with gonorrhoea, found gonococci in the tonsils in six (6 per cent.) of 95 Danish men and in six (9 per cent.) of 66 women. Among 49 foreign men with gonorrhoea, the incidence was 2 per cent. Of 71 Danish men 57 (80 per cent.), and of 62 Danish women 38 (61 per cent.), stated that they had had orogenital contact during their last sexual experience; it was much more commonly practised with regular partners than with casual contacts.

Owen and Hill (1972) reported eleven positive cultures from the pharynx in an investigation of 79 homosexual men in the U.S.A. Rodin, Monteiro, and Scrimgeour (1972), in London, found only one positive culture in 73 throat swabs from 65 male homosexuals, 33 of whom had urethral or rectal gonorrhoea; half of these 65 patients admitted recent orogenital contact. Ratnatunga (1972) described three gonococcal infections of the pharynx in male homosexuals. These three cases were diagnosed in a V.D. clinic where 113 men with gonorrhoea (including 23 homosexuals) were diagnosed in the same year.

Schuller and Stolz (1972) described a female patient with gonococcal tonsillitis and polyarthritis.

Wiesner, Tronca, Bonin, Pedersen, and Holmes (1973) found a frequency of 5.6 per cent. in an investigation of 2,224 patients in a V.D. clinic. Among the patients with gonorrhoea, infection of the oropharynx was found in 20.9 per cent. of the homosexual men, 10.3 per cent. of the women, and 3.2 per cent. of the heterosexual men. Treatment with procaine penicillin G (4.8 m.u.) and tetracycline HCl (2 g. daily for 5 days) was successful, while treatment with 4 g. spectinomycin in a single dose was often unsuccessful.

We now report a series of patients with positive cultures of material from the oropharyngeal and tonsillar (OP/T) areas. Special attention is paid to the epidemiology, bacteriology, and results of treatment of gonococcal infection at this site.

## Material and methods

The patients consisted of males and females from the civilian population, and male sailors. The investigation was carried out in three periods:

(1) After the recognition of a female patient with gonococcal tonsillitis, we took OP/T specimens in the period from January 20 to August 1, 1972, from some of those patients who admitted recent orogenital contact.

(2) From August 1, 1972, to January 1, 1973, OP/T specimens were taken from all patients at each visit. The average number of swabs taken was 2.6 for males, 3.4 for females, 1.6 for sailors, and 2.4 for the group as a whole.

(3) It is known that the nasopharynx can harbour *Neisseria meningitidis*; in order to investigate whether it can also harbour *Neisseria gonorrhoeae* gonococcal cultures were made from the nasopharynx (NP) as well as from the OP/T during the last two months of 1972. Special flexible nasopharyngeal swabs were passed *via* the nares.

During all the investigation periods, culture material was also taken from the cervix (C), urethra (U), and rectum (R) in the cases of women, and from the urethra (U) in men.

If indicated, prostatic fluid (P) and material from the rectum (R) were also investigated in men.

The sampling was carried out with carbon-impregnated swabs, which were then placed in Stuart's transport medium. The material was inoculated within 4 hrs on to a selective medium like that described by Thayer and Martin (1966). The medium consisted of GC Base (Difco) with haemoglobin (Difco) and isovitalex (BBL).

The following antibiotic mixture was added:

3 µg./ml. vancomycin  
7.5 µg./ml. Na-colistimethate  
12.5 i.u./ml. nystatin

Incubation was carried out at 37°C. in a CO<sub>2</sub>-rich atmosphere. If suspect colonies were observed after 48 hrs, Gram preparations were made, the oxidase test applied, and sugar fermentations carried out. The strains isolated from the OP/T and from the NP, like those isolated from the urogenital/rectal region, were tested for sensitivity to ampicillin, penicillin, and tetracycline by the plate-dilution method, using GC base, haemoglobin (Difco), and isovitalex (BBL). Apart from the gonococcal strains from the patients, three gonococcal strains of a known sensitivity pattern and one Oxford staphylococcus were inoculated as controls. The minimum inhibitory concentration (MIC) was estimated using two-fold dilutions:

between 0.64 and 0.005 µg./ml. for ampicillin  
between 1.28 and 0.0025 µg./ml. for penicillin  
between 2.56 and 0.04 µg./ml. for tetracycline

## Results

### *Frequency of positive OP/T and NP cultures*

During the first investigation period, seven patients had positive OP/T cultures. The numbers of these patients according to age and sex are shown in brackets in Table I.

In the second investigation period, gonococci were found in the OP/T cultures in 23 patients. The number of cases diagnosed in this second investigation period will be used for the frequency calculations.

In the third investigation period, out of 160 patients with gonorrhoea, we found two with gonococci in the NP; one of the two also had a

positive OP/T culture, and was thus classified with the 23 patients from the second investigation period. Both these patients with positive NP/cultures were from a group of 452 new patients.

The thirty positive patients from the first (in brackets) and the second investigation periods were divided as follows among the various groups:

Male civilians 9+(2); Females 11+(4); Male sailors 3+(1)

The number of individuals with gonococci in the OP/T cultures, taken as a percentage of all the patients with gonorrhoea in the second investigation period was as follows:

Male civilians 3.6 per cent. (9 out of 250);  
Females 8.4 per cent. (11 out of 130);  
Male sailors 3.4 per cent. (3 out of 87);  
Total 4.9 per cent. (23 out of 467)

When the percentage of individuals with gonococci in the OP/T was calculated for all new patients seen in the second period, the following figures were found:

Male civilians 1.3 per cent. (6 out of 455);  
Females 3.3 per cent. (9 out of 268);  
Male sailors 0.7 per cent. (3 out of 410);  
Total 1.6 per cent. (18 out of 1,133)

The age distribution of the thirty patients from both investigation periods with positive OP/T cultures is given in Table I (numbers in brackets are those from the first period). The youngest patient was a 16-year-old girl; the oldest a man aged 57.

Of the eleven male civilians, five+(2) were Dutch, two were from Surinam, one from the Dutch Antilles, and one from Pakistan. Of these eleven men, four+(2) were single, four married, and one divorced, and one+(1) was homosexual. Two heterosexual single men lived with their partner.

TABLE I *Sex and age distribution of patients with positive OP/T cultures during the first and second investigation period*

Sex	Age (yrs)				
	16-20	21-25	26-30	31-35	36
Male civilians	—	2	4+(1)	2	1+(1)
Females	2+(2)	3+(1)	5	—	1+(1)
Male sailors	1+(1)	—	2	—	—
Total	3+(3)	5+(1)	11+(1)	2	2+(2)

Figures in brackets indicate patients of the first investigation period

Of the fifteen females, nine+(4) were Dutch, one was from Surinam, and one from England; seven+(2) were single, one+(2) married, and three divorced. The latter and one of the single women lived with their partner.

Of the four sailors, two were West German, one was Finnish, and one a Portuguese from the Cape Verde Islands; two+(1) were single and one married.

Information about the sites where gonococci were isolated in the patients with positive OP/T cultures and their partners with gonorrhoea is given in Table II, which also shows the common minimum inhibitory concentrations (MICs) for ampicillin, penicillin, and tetracycline of the gonococcal strains isolated in these patients and their partners, and whether they admitted orogenital contact.

Of the thirty patients, nineteen had both urogenital

gonorrhoea and positive OP/T cultures. In nine patients a positive OP/T culture was found in a follow-up check after ampicillin treatment of urogenital gonorrhoea. An isolated OP/T culture was found in two patients, in one of whom this culture was followed by a positive urethral and OP/T culture; the gonococci had the same sensitivity pattern in all tests on this patient.

*Symptoms*

Of the thirty patients, 25 were asymptomatic. Three complained spontaneously of a slight sore throat. Two women had a severe sore throat; one of these had a raised temperature but a blood culture for the gonococcus was negative; the other had regional lymphadenitis and arthritis, probably gonorrhoeal in origin (Schuller and Stolz, 1972).

TABLE II *Sites of gonococcal infection in patients with positive OP/T cultures and in the partners with gonorrhoea, common MICs of strains isolated for ampicillin, penicillin, and tetracycline, and incidence of orogenital contact*

Patients with positive oropharynx-tonsils (OP/T) cultures			Corresponding partners with gonorrhoea			Common MICs			Orogenital contact admitted
Group	Case no.	Other positive sites	Partner no.	Sex	Positive sites	Ampicillin (µg./ml.)	Penicillin (µg./ml.)	Tetracycline (µg./ml.)	
Males	1	U	1	Female	CUR	0.64	0.16	0.64	+
	2 H	U	—	—	—	0.64	0.64	1.28	+
	3	U	2	Female	CU	0.04	0.01	0.08	—
	4	U	—	—	—	0.32	0.64	2.56	—
	5	U	3	Female	CU	0.64	1.28	1.28	+
	6	U/PF	4	Female	CUR	0.02	0.01	0.32	+
			5	Female	CUR/OP/T	0.04	0.01	0.32	—
	7	U	6	Female	CU	0.04	0.02	0.16	+
			7	Female	CUR	0.04	0.02	0.16	—
	8	U	8	Female	CU/OP/T*1	0.64	0.64	1.28	+
	9	U	—	—	—	0.04	0.005	0.16	+
10 H	R	9 H	Male	U	0.04	0.01	0.16	+	
11	U	10	Female	CU	0.08	0.04	0.32	+	
Females	12	CU*1	11	Male	U/OP/T	0.64	0.64	1.28	+
	13	C	12	Male	U	0.02	0.04	0.32	—
	14	CU	13	Male	U	0.04	0.0025	0.16	+
	15	CUR	14	Male	U	0.04	0.01	0.16	+
	16	CU	—	—	—	0.04	0.02	0.16	+
	17	CUR	15	Male	U	0.32	1.28	1.28	+
	18	C	16	Male	U	0.08	0.04	0.64	+
	19	CU	—	—	—	0.02	0.005	0.16	+
	20	CUR	17	Male	U/PF/OP/T	0.02	0.01	0.32	—
	21	CU	18	Male	U	0.16	0.08	0.64	+
	22	CUR	—	—	—	0.16	0.08	0.64	—
	23	CU	19	Male	U	0.32	0.16	0.64	—
	24	CU	—	—	—	0.64	0.32	0.16	+
	25	CU	—	—	—	0.04	0.01	0.16	—
26	CUR	20	Male	U	0.32	1.28	1.28	+	
Sailors	27	U	—	—	—	0.02	0.01	1.28	—
	28	U	—	—	—	0.32	0.64	1.28	?
	29	NP	—	—	—	0.16	0.08	0.64	?
	30	U*2	—	—	—	0.64	1.28	2.56	—

H = homosexual  
 U = urethra  
 PF = prostatic fluid  
 R = rectum  
 C = cervix  
 NP = nasopharynx  
 OP/T = oropharynx/tonsils  
 Patient 6 = partner 17  
 Patient 8 = partner 11  
 Patient 12 = partner 8  
 Patient 20 = partner 5  
 \*1 and \*2 OP/T isolates showed different MICs  
 \*1 0.02 0.01 0.16 ? not asked  
 \*2 0.16 0.08 0.16

**Treatment**

All patients with uncomplicated gonorrhoea were given the standard treatment of 1 g. ampicillin intramuscularly followed by 2 g. ampicillin by mouth 4 hrs later.

If this treatment was not suitable (*e.g.* because of hypersensitivity to penicillin), the patient was given 2 g. tetracycline HCl daily for 5 days.

Patients with a positive OP/T culture after ampicillin treatment and those known to have a positive OP/T culture before treatment was started were given 4.8 m.u. Bicillin (3 parts procaine penicillin G+1 part sodium penicillin G) intramuscularly daily for 10 days.

Follow-up tests were planned for 1 and 2 weeks after treatment and in the case of females again at 6 and 12 weeks.

In order to compare the results of various therapies, we considered only those cases in which the OP/T culture was positive at the time of treatment and in which at least two successive OP/T cultures were negative after treatment.

Of the nineteen patients with positive urogenital and OP/T cultures fourteen were given ampicillin with ten failures and four were given tetracycline with one failure; four of the failures defaulted, seven were re-treated with Bicillin and five of the latter who attended for follow-up were all cured. One sailor (Case 28) was treated with 1.2 m.u. procaine penicillin daily for 14 days because he also had secondary syphilis but the OP/T culture remained positive.

Of the nine patients who had positive OP/T cultures only after ampicillin treatment for urogenital gonorrhoea, two defaulted and seven were given Bicillin; the five of the latter who attended for follow-up were all cured. The two patients with positive OP/T cultures who had not had urogenital gonorrhoea defaulted without receiving any treatment.

**Discussion**

The frequency of gonococci in the OP/T in our

patients with gonorrhoea (3.6 per cent. for male civilians and 8.4 per cent. for females) is similar to that found by Bro-Jørgensen and Jensen (1971), *viz.* 6 and 9 per cent. Like them we also found a lower incidence among foreigners; of the 75 foreign male civilians only one (1.3 per cent.) had a positive OP/T culture.

In a former study (Schuller and Stolz, 1972), we found on routine questioning of a series of patients at the VD clinic that 25 per cent. of the women admitted orogenital contact. The possibility of OP/T infection is clearly apparent from Table III.

The distribution by age, nationality, marital status, and MIC for ampicillin and tetracycline among those with positive OP/T cultures could not be compared with the overall distribution among all the gonorrhoea patients and new patients, because of the small numbers involved. However, it is striking that in only two patients (Cases 12 and 30) was a difference found in the MIC patterns for ampicillin, penicillin, and tetracycline between the urogenital and OP/T strains. In all other cases, the sensitivity patterns agreed within one dilution.

Of the twenty partners investigated, only one (the female contact No. 8 who was also Case 12) was found to have markedly different MICs for ampicillin, penicillin, and tetracycline for the strain cultured from the OP/T. In the nineteen other partners, there was close agreement between their sensitivity patterns and those of the partner's strain. Case 12 (=partner 8) admitted to both orogenital and genito-genital contact with her partner; she stated that the last orogenital contact with a person other than her present partner had occurred 4 years previously.

Recent orogenital contact was not admitted in several cases (see Table II); one man who denied such contact explained the presence of gonococci in his oropharynx by fellatio followed by kissing.

The fact that nine patients showed a positive OP/T culture only at a follow-up check after treatment of urogenital gonorrhoea is not surprising.

TABLE III *Type of sexual contact in three different groups of patients*

Type of contact patient-partner	Inhabitants of Rotterdam and surroundings and other non-sailors						Sailors	
	Dutch				Foreign		Dutch and foreign	
	Women		Men		Men		Men	
	No. (56)	Per cent. (100)	No. (46)	Per cent. (100)	No. (44)	Per cent. (100)	No. (32)	Per cent. (100)
Genital-genital	51	91	40	87	44	100	31	97
Genital-oral	11	20	10	22	—	—	1	3
Oral-genital	14	25	3	7	—	—	2	6
Genital-anal	—	—	3	7	—	—	—	—
Anal-genital	2	4	7	15	1	2	—	—

OP/T cultures from patients in our series who received no treatment between the taking of several specimens also did not give constantly positive results. It is likely that at least three cultures are needed to detect all possible cases of OP/T infection. Bro-Jørgensen and Jensen (1971) have pointed out that the treatment normally given in cases of urogenital gonorrhoea was often not effective against OP/T infection. This has been confirmed by our study.

### Summary

The epidemiology, bacteriology, and therapy of gonococcal pharyngitis are discussed with reference to 31 patients.

The incidence of pharyngeal infection among 467 consecutive patients with urogenital gonorrhoea was 4.9 per cent. (3.6 per cent. for male civilians, 8.4 per cent. for females, and 3.4 per cent. for sailors). Sensitivity patterns to ampicillin, penicillin, and tetracycline of the strains isolated from both sites were compared in each patient and also with the strain isolated from the partner. Routine therapy (1 g. ampicillin intramuscularly followed by 2 g. orally 4 hrs later) usually failed to eradicate gonococci from the pharynx. However, the administration of a combination of 3.6 m.u. procaine penicillin and 1.2 m.u. sodium penicillin intramuscularly daily for 10 days was successful in all cases.

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### Infection gonococcique de la bouche et du nasopharynx

#### SOMMAIRE

On discute l'épidémiologie, la bactériologie et le traitement de la pharyngite gonococcique en se référant à 31 malades présentant des gonocoques dans la bouche et le naso-pharynx.

L'incidence de l'infection pharyngée, chez 467 malades consécutifs atteints de gonococcie uro-génitale, fut de 4,9 pour cent (3,6 pour cent pour les civils masculins, 8,4 pour cent pour les femmes et 3,4 pour cent pour les marins). Les caractéristiques de la sensibilité à l'ampicilline, à la pénicilline et à la tétracycline des souches isolées dans les deux territoires furent comparées chez chaque malade et aussi vis-à-vis de la souche isolée chez le partenaire. Le traitement de routine (1 g d'ampicilline intra-musculaire suivi par 2 g oralement deux heures plus tard) fut incapable, habituellement, de faire disparaître les gonocoques du pharynx. Cependant, l'administration d'une association de 3,6 m.u. de pénicilline-procaïne avec 1,2 m.u. de pénicilline sodique intra-musculaire chaque jour pendant 10 jours, réussit dans tous les cas.