

STUDIES ON TRICHOMONIASIS IN MALES*

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The presence of *Trichomonas vaginalis* in the male urinary tract was discovered as early as 1883 by Kunstler (Kozłowski, 1951), but trichomoniasis in men, a disease which because of its high incidence is becoming a serious social problem, has only recently drawn the attention of medical research workers. The three recent international symposia (see References) have led to the publication of three monographs comprising most of the papers dealing with this subject.

In Poland, *T. vaginalis* infection of the male urinary system has been investigated by various authors (Kolankowski, 1951; Kozłowski, 1951), and the studies reported below were undertaken by the Dermato-Venereological Clinic of the University Medical School of Białystok.

Material and Methods

410 persons were examined for *T. vaginalis* (258 men and for comparison 152 women.)

Of the 258 men examined, fifty had had sexual relations with women suffering from trichomoniasis; 34 young men with no subjective or objective abnormality of the urogenital organs provided a control group. The other men examined were recruited from the patients reporting to the clinic with urethritis or suspected gonorrhoea. All the women examined had reported to the clinic with inflammatory conditions of the genital tract or suspected gonorrhoea.

Material was taken from the urethral mucous membrane in males and from the vaginal mucous membrane in females. In addition, the prostate secretion (after massage) and semen (obtained by masturbation) of 94 of the men were also examined.

Direct microscopic preparations and cultures were made in each case. For the cultures the medium described by Sorel (1954) was used. Most of the subjects were examined twice and in some several times.

In one selected group of 22 men, in addition to the

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examinations for *T. vaginalis*, the entire bacterial flora of the urogenital tract was investigated. The cultured strains were analysed in detail, and their iso- and hereto-antagonistic properties determined by the technique of Jennings and Sharp (1947). The strains cultured from each individual were tested separately for antagonistic properties, *i.e.* each strain was tested for antagonism to the other strains cultured from the same person.

Results

966 examinations were carried out on the 410 subjects by the direct method and the same number by the culture method. The direct method gave 170 positive results (17.6 per cent.), whereas the culture method gave 183 positive results (18.9 per cent.).

T. vaginalis was found in eighty (19.5 per cent.) of the 410 subjects examined, and in eighteen (7 per cent.) in the urogenital tracts of the 258 males (Table I, opposite).

T. vaginalis was not found in the 34 healthy controls. Four (4.1 per cent.) of the 96 men suffering from gonorrhoea who were examined before treatment had concomitant trichomoniasis, and fourteen (10.9 per cent.) of the 128 men under observation for venereal diseases were found to be infected with *T. vaginalis*.

62 (40.7 per cent.) of the 152 females examined were found to be infected with *T. vaginalis* (36.3 per cent. of the women suffering from gonorrhoea and 42.5 per cent. of those under observation for venereal diseases).

Table II (opposite) shows the incidence of *T. vaginalis* in cases of gonorrhoea examined while the gonococci were still present in the urinary tract and again when the gonococci had been destroyed by penicillin treatment. *T. vaginalis* was found in twenty (14.2 per cent.) of the 140 persons examined before treatment for gonorrhoea and in 27 (26.4 per cent.) of the 102 persons examined after treatment. In males the difference was insignificant, but 23 (60.5 per

TABLE I
INCIDENCE OF *T. VAGINALIS* BY PRELIMINARY DIAGNOSIS AND SEX

Group	Males			Females			Total		
	No. of Cases	Positive Results		No. of Cases	Positive Results		No. of Cases	Positive Results	
		No.	Percent.		No.	Percent.		No.	Percent.
No Pathological Symptoms ...	34	0	—	0	—	—	34	0	—
Untreated Gonorrhoea Patients	96	4	4.1	44	16	36.3	140	20	14.2
Suspected Venereal Disease ...	128	14	10.9	108	46	42.5	236	60	25.4
Total	258	18	7.0	152	62	40.7	410	80	19.5

TABLE II
INCIDENCE OF *T. VAGINALIS* IN GONORRHOEA PATIENTS BEFORE AND AFTER TREATMENT, BY SEX

Sex		Male			Female			Total		
		No. of Cases	Positive Results		No. of Cases	Positive Results		No. of Cases	Positive Results	
			No.	Percent.		No.	Percent.		No.	Percent.
Examination	Before Treatment	96	4	4.1	44	16	36.3	140	20	14.2
	After Treatment	64	4	6.1	38	23	60.5	102	27	26.4

cent.) of the 38 women examined after treatment were found to be infected with *T. vaginalis*, as against sixteen (36.3 per cent.) of the 44 women examined before treatment. Of the 23 women found to have *T. vaginalis* after treatment, fourteen had already been infected before treatment but in nine of them *T. vaginalis* was not found until after the gonorrhoea had been cured.

Table III shows the relationship of the incidence of *T. vaginalis* in males to sexual contact with infected women. Fifteen (30 per cent.) of fifty men known to have had sexual relations with infected women were found to be infected, whereas only three (1.4 per cent.) of 208 men examined for other reasons showed evidence of *T. vaginalis* infection.

Table IV gives the results of examining the prostate secretion and semen as well as the urethral

secretion in 94 men. In seven there were no pathological symptoms in the urogenital tract, 73 were suffering from non-gonococcal urethritis, and fourteen were the consorts of women with trichomoniasis. *T. vaginalis* was found in the urethral and prostate secretions of seven (7.4 per cent.). Microscopic examinations of the semen of eleven males infected with *T. vaginalis* revealed aspermia in three, 50 per cent. immobile spermatozoa in four, and no abnormality in four.

Our investigations also included full bacteriological examinations of the urethral and prostate

TABLE IV
INCIDENCE OF *T. VAGINALIS* IN THE MALE URETHRAL TRACT, BY PRELIMINARY DIAGNOSIS

Group	No. Tested	<i>T. vaginalis</i> Present in					
		Urethra		Prostate		Semen	
		No.	Per-cent.	No.	Per-cent.	No.	Per-cent.
No Pathological Symptoms	7	0	—	0	—	0	—
Non-gonococcal Urethritis	73	5	6.8	5	6.8	7	9.6
Consorts of Women with Trichomoniasis	14	2	14.2	2	14.2	4	28.5
Total ..	94	7	7.4	7	7.4	11	11.7

TABLE III

T. VAGINALIS IN MEN AFTER SEXUAL CONTACT WITH WOMEN WITH TRICHOMONIASIS

Group	No. Tested	Positive Results	
		No.	Percent.
No Contact with Infected Women	208	3	1.4
Consorts of Infected Women	50	15	30.0
Total	258	18	7

secretions and semen of 22 men, who were consorts of women with trichomoniasis; eleven were infected with *T. vaginalis* and eleven were free from infection. Cocci were bred from eight and *Corynebacteria* from all the eleven of the first group, and cocci were cultured from all eleven of the second group and *Corynebacteria* from only five.

84 bacterial strains were cultured from the eleven men infected with *T. vaginalis* as a result of sexual contact with women suffering from trichomoniasis, those with iso-antagonistic properties in five cases and those with heteroantagonistic properties in eleven. Strains with iso-antagonistic properties was observed in one and strains with hetero-antagonistic properties in six of the eleven men who were liable to infection but remained free from it.

Discussion

Methods.—The direct microscopical method appears to be efficacious only in testing female secretions (Coutts and Silva-Inzunza, 1954). The culture method (18·9 per cent. positive) gave better results than the direct microscopic method (17·6 per cent. positive). This parallels the experience of Sorel (1954) and Roiron and Champanhet (1958). For the routine laboratory diagnosis of trichomoniasis in females the direct microscopic method is quite adequate despite the disadvantage of having to examine the preparations immediately after the material is taken for testing, but it should be supplemented by the culture method especially in examining male patients and for treatment follow-up examinations.

T. vaginalis was found in 62 (40·7 per cent.) of the 152 women examined but in only eighteen (7 per cent.) of the 258 men examined. In 34 of the 258 men, who were healthy subjects with no abnormality of the urogenital system, and whose ages ranged from 16 to 18 years, *T. vaginalis* was not discovered. Fourteen (10·9 per cent.) of the 128 men suffering from non-gonococcal urethritis were found to be infected with *T. vaginalis*. Our findings from this group are similar to those of other authors. Kolankowski (1951) found *T. vaginalis* in 15 per cent. of a series of men with non-gonococcal urethritis, Kozłowski (1951) in 10 per cent., Feo, Varano, and Fetter (1956) in 10·5 per cent., Jira (1957) in 8·8 per cent., Whittington (1957) in 15·3 per cent., and Durel (1957) in 10·4 per cent.

Of the 96 men with gonorrhoea who were examined before treatment, four (4·1 per cent.) had concomitant trichomoniasis. Concomitant trichomonal and gonococcal infection has been observed by many authors including Kolankowski (1951), Bauer

(1957), Feo and others (1956), Durel (1957), and Bogaczewa (1958).

The question arises whether the relationship of *T. vaginalis* to the gonococcus is antagonistic or synergistic. The subjects with gonorrhoea were examined twice for *T. vaginalis* in the urogenital tract, once before treatment (14·2 per cent. positive) and again after a cure had been effected (26·4 per cent. positive). Though the number of men infected with *T. vaginalis* before and after treatment was about the same, *T. vaginalis* was discovered much more frequently in the women after treatment (60·5 per cent. positive) than before (36·3 per cent. positive).

The importance of recognizing trichomoniasis in males as a venereal disease has interested many investigators. Our findings confirm the opinion of the majority of authors that sexual intercourse is the principal means of spreading the disease (Bauer, 1957; Durel, 1960; Keutel, 1959).

Many authors (including Jirovec and Peter, 1954; Bauer, 1957; Keutel, 1959) think that the *T. vaginalis* infection spreads up the genital tract from the urethra. Our investigations confirmed these observations; of the 94 males examined *T. vaginalis* was found in the urethra and prostate of seven (7·4 per cent.) and in the semen of eleven (11·7 per cent.). Microscopic examinations of the semen of these eleven men showed a high percentage of pathological changes in the spermatozoa. Bauer (1957), Keutel (1959), and Kuźnik (1960) mention changes in the semen in cases of trichomoniasis cases. Kolesow (1950) described the immobilization and phagocytosis of the spermatozoa by the trichomonad. In view of Kolesow's observations our findings are interesting, but require more detailed investigation. Finally we attempted to discover whether the prevailing ecological conditions of the bacterial flora of the male urogenital tract had any effect on susceptibility to *T. vaginalis* infection, a problem which has been studied by Kozłowski (1951), Candiani (1953), Feo, Fetter, Peoples, and Morton (1956), and Popchristov and Neytcheff (1960). Certain differences were noted in the bacterial flora of the urogenital tract of men infected with *T. vaginalis* and that of those who remained unaffected despite exposure to infection. A greater number of strains with antagonistic properties were observed in the bacteria from the men infected with *T. vaginalis* than in those from the men who were free from infection.

Summary

Examinations for *T. vaginalis* were carried out in 410 persons by the microscopic and culture methods

simultaneously; a higher percentage of positive results were obtained with cultures. Of 152 females examined 62 (40.7 per cent.) were infected with *T. vaginalis*. All 34 healthy males out of the 258 men examined were found free of trichomonal infection, but 14 (10.9 per cent.) of 128 males under observation for suspected venereal disease and four (4.1 per cent.) of 96 male gonorrhoea patients examined before treatment were infected with *T. vaginalis*.

In 102 persons examined before treatment and again after the gonorrhoea had been cured, *T. vaginalis* occurred more frequently after treatment. This was particularly noticeable in the females examined. When the secretions from the urethra, prostate, and semen of 94 men were examined, *T. vaginalis* was observed more frequently in the semen. The large percentage of pathological changes in the semen of men infected with *T. vaginalis* is of particular interest. A relationship was noted between the susceptibility to trichomonal infection and the composition and ecological conditions of the bacterial flora cultured from the male urogenital tract.

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Études des infections par *Trichomonas vaginalis* chez les hommes

Résumé

Chez 410 personnes soupçonnées d'infection par *T. vaginalis*, l'auteur procéda simultanément à des examens microscopiques et à des cultures; les cultures donnèrent un pourcentage plus élevé de résultats positifs. Sur 152 femmes examinées, 62 (40,7%) étaient infectées par *T. vaginalis*. Sur 258 hommes examinés, les 34 qui étaient en bonne santé, n'étaient pas infectés, mais 14 (10,9%) des 128 hommes soupçonnés d'avoir une maladie vénérienne et 4 (4,1%) des 96 hommes atteints de gonorrhée et examinés avant le traitement étaient infectés par *T. vaginalis*.

Chez 102 personnes examinées avant le traitement et après guérison de la gonorrhée, *T. vaginalis* était présent plus fréquemment après le traitement. Ce phénomène se manifesta surtout chez les femmes examinées. Quand les sécrétions de l'urètre, de la prostate et le semen de 94 hommes furent examinés, *T. vaginalis* fut observé plus fréquemment dans le semen. Le pourcentage élevé des changements pathologiques dans le semen des hommes infectés par *T. vaginalis* présente un intérêt particulier. L'auteur remarqua l'existence d'un rapport entre la susceptibilité à l'infection par *T. vaginalis* et la composition et les conditions écologiques de la flore bactérienne des voies uro-génitales mâles.