Balanoposthitis associated with *Gardnerella vaginalis* infection in men

G R KINGHORN,* B M JONES,† F H CHOWDHURY,* AND I GEARY†

From the *Department of Genitourinary Medicine, Royal Infirmary, and the †Department of Medical Microbiology, University of Sheffield Medical School, Sheffield

SUMMARY Fourteen of 194 (7.2%) consecutive unselected men had positive culture results from genital swabs for *Gardnerella vaginalis*. A higher yield of isolates was obtained from preputial (93%) than from urethral swabs (64%). Of the 14 men, two had no detectable genital abnormality, eight non-gonococcal urethritis, and nine balanoposthitis. The urethral isolation rates for *G vaginalis* in men with and without non-gonococcal urethritis were not significantly different, but preputial isolation rates were significantly higher ($P < 0.001$) in men with balanoposthitis than in those without. The prevalence rate for *G vaginalis* in men with non-candidal balanoposthitis was 31%.

In a second study, concomitant *Bacteroides* species were isolated in preputial swabs from nine of 12 (75%) men with *G vaginalis*-associated balanoposthitis and may play a role in its pathogenesis.

Introduction

Gardnerella vaginalis (*Haemophilus vaginalis*, *Corynebacterium vaginale*) has been described as the most prevalent sexually transmitted organism in the causation of bacterial vaginitis.¹ Although women may harbour the organism without symptoms (as is the case with almost all genital pathogens), many infected women complain of an excessive malodorous vaginal discharge which is relieved when the organism is eradicated.

Evidence for the sexual transmission of *G vaginalis* rests on the higher prevalence rates in the more sexually active women attending sexually transmitted disease (STD) clinics² compared with those attending family planning³ or gynaecological clinics and on the high isolation rates from the urethra^{4,6} or urine⁷ of men known to be consorts of women harbouring *G vaginalis*. Although *G vaginalis* has been isolated in men with non-gonococcal urethritis (NGU),^{8,9} a causal role for the organism has not been established and asymptomatic colonisation of the male genitalia is assumed to be the rule.¹⁰

Previous work in this department² showed that *G vaginalis* was isolated from urethral, urine, or

prostatic specimens in only a few men who were consorts of women infected with *G vaginalis*. In two men, however, much heavier growths of the organism were obtained from preputial swabs than from concomitant urethral swabs.

In this study we have investigated further the prevalence of *G vaginalis* in urethral and preputial swabs from a group of consecutive unselected men and attempted to determine whether the presence of *G vaginalis* on the male genitalia is associated with signs or symptoms of disease.

Patients and methods

One hundred and ninety-four consecutive unselected men presenting to the department of genitourinary medicine at this hospital with new complaints were prospectively studied at their first attendance. Urethral and preputial swabs (in circumcised men swabs were rolled on the glans penis and the coronal sulcus) were taken routinely, each immediately placed in peptone starch dextrose (PSD) transport medium, and left at room temperature until sent to the laboratory. This was usually done within an hour; the longest delay in transportation was three hours.

CULTURAL DIAGNOSIS

Swabs were inoculated on to Columbia blood agar plates² and incubated in 5% CO₂ at 37°C. After 48

Address for reprints: Dr G R Kinghorn, Department of Genitourinary Medicine, Royal Infirmary, Sheffield S6 3DA

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hours *G vaginalis* appeared as round raised glistening colonies, 0.5 mm in diameter, and often with a narrow zone of α -haemolysis. Gram-stained films of these colonies showed slender Gram-variable bacilli. Pure subcultures were confirmed by their inhibition by hydrogen peroxide, a negative catalase test result, and fermentation of glucose, maltose, starch, but not mannitol.

STATISTICAL ANALYSIS

The sites of isolation of *G vaginalis* and the clinical presentations in men with *G vaginalis* infections and in those without were compared by Yates's modified χ^2 test.

SECONDARY STUDY

In a second study we investigated symptomatic men and women with culture-confirmed *G vaginalis* infection for the presence of concomitant anaerobic bacteria using the cultural methods of Duerden *et al.*¹¹ The swabs taken for *G vaginalis* isolations were used for this.

Results

ISOLATION RATE

Of the 194 men in the initial prospective study, *G vaginalis* was isolated from the urethral or preputial swabs or both in 14, an isolation rate of 7.2%.

SITES OF ISOLATION

All 14 men were uncircumcised. The preputial swabs were the more productive; 13/14 (93%) of the preputial swabs gave positive results compared with nine (64%) of the urethral swabs.

CONCOMITANT GENITAL CONDITIONS

Only two men were without symptoms or signs of genital infection. Eight men had non-gonococcal urethritis, nine balanoposthitis, and one each genital herpes, genital warts, and pediculosis pubis.

Of 80 men presenting with NGU, *G vaginalis* was isolated from the urethra of six compared with three (2.5%) of 114 without NGU ($\chi^2_1 = 1.5$, $P > 0.2$).

Of 39 men with balanoposthitis, *G vaginalis* was isolated from the prepuce of nine compared with four of 155 men without balanoposthitis ($\chi^2_1 = 17.8$, $P < 0.001$). Yeasts were isolated from preputial swabs of 10 men with balanoposthitis, but in no patient were yeasts and *G vaginalis* isolated together. Thus, nine of 29 (31%) men with non-candidal balanoposthitis had *G vaginalis* isolated from their preputial swabs. No significant differences were found between men with balanoposthitis, with or without *G vaginalis* infections, and those without balanoposthitis.

posthitis in the prevalence of preputial isolations of commensal organisms such as *Staphylococcus albus*, diphtheroids, micrococci, or potential pathogens such as *Enterobacteriaceae*, *Staphylococcus aureus*, or streptococci.

CONCOMITANT ANAEROBIC INFECTIONS

In our second study, both *G vaginalis* and *Bacteroides* species were isolated from the same swabs from nine of 12 (75%) men with *G vaginalis*-associated balanoposthitis and from 22 (73%) of 30 women with *G vaginalis*-associated vaginitis. Such anaerobic infections may play a role in the pathogenesis of *G vaginalis*-associated conditions.

G VAGINALIS-ASSOCIATED BALANOPOSTHITIS

Clinical features

A total of 21 men with balanoposthitis associated with the presence of *G vaginalis* were seen in the two studies. The onset of symptoms occurred in all men within seven days of their most recent sexual contact, most often within two days. They consisted of a mild irritation of the prepuce and glans penis usually associated with an excessive offensive-smelling subpreputial discharge. Men with an acquired or congenital phimosis or long redundant prepuces in whom hygiene was deficient were particularly affected. After retraction of the prepuce and removal of the mucoid discharge erythematous non-erosive macules or papules were visible on the mucosal aspect of the prepuce and the glans penis.

Discussion

Our prevalence rate of 7.2% for *G vaginalis* isolation in unselected men was similar to that reported by Karpovskaya¹³ (8%). The study confirms an earlier impression² that in uncircumcised men *G vaginalis* more frequently colonises, or is easier to isolate from, the glans penis and prepuce than from the urethra, where the organism can easily be eradicated by micturition. We found no evidence to implicate the organism as a cause of non-gonococcal urethritis, but our results suggest that subpreputial carriage of *G vaginalis* is associated with balanoposthitis in some men, particularly those with a relative phimosis. Typically, the condition is mild with preputial irritation and an offensive fishy odour and is associated with signs of increased subpreputial mucoid discharge and mild inflammation of the glans penis and prepuce.

Further study is necessary to determine the pathogenesis of this condition. Chen *et al.*¹³ have postulated that in non-specific vaginitis a symbiotic relationship between *G vaginalis* and other

organisms, particularly anaerobic bacteria, results in the production of amines which produce the characteristic symptoms. The frequent association of *G vaginalis* with *Bacteroides* species in subpreputial swabs from men with balanoposthitis suggests that a similar mechanism might result in the typical fishy smell and increased subpreputial secretion.

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