

Group B streptococcus carriage and vulvovaginal symptoms: causal or casual? A case-control study in a GUM clinic population

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Objectives: The isolation of group B streptococcus (GBS) on routine swabs taken from genitourinary medicine (GUM) clinic attendees is a common finding. The relation of GBS to vulvovaginal symptoms is unclear, creating confusion about management. This case-control study tested the hypothesis that detection of GBS on routine clinical specimens is not causally related to vulvovaginal symptoms in female GUM clinic attendees.

Methods: Data were collected on all female GUM clinic attendees who had GBS isolated from anogenital swabs between July 1999 and July 2001. Controls were randomly selected from all new and rebooking female GUM clinic attendees. Controls were group matched for age with cases and were included only if a sexual health screen was performed and the results of this were available.

Results: 118 cases and 308 controls were identified during the study period. There was no significant difference between cases and controls in patient demographic or behavioural characteristics, the presence of genital co-infection, or vulvovaginal symptoms. There was no relation between symptoms and quantitative growth of GBS reported by the laboratory in either cervical or urethral swabs. Only nine cases had high vaginal swabs taken, in whom there was a significant association between a heavy growth of GBS and vulvovaginal symptoms ($p=0.008$).

Conclusion: The isolation of GBS from routinely collected genital swabs in female attendees of a GUM clinic is not causally related to vulvovaginal symptoms. We recommend that patients should receive this advice and should not be treated with antibiotic therapy for this indication.

Group B streptococci (GBS) are known to colonise the genital tract in 4–18% of healthy women,¹ and are frequently isolated in genital specimens taken from patients attending genitourinary medicine (GUM) clinics with vulvovaginal symptoms. In women who do not have a well defined alternative explanation for their symptoms, uncertainty often prevails about the aetiological relevance of GBS carriage, particularly the need for treatment and the advice given to patients; consequently, there is much variation in practice. The primary focus of research into GBS infection has been its potential to cause sepsis in the newborn.² Its causal role in vulvovaginal symptoms has not been well researched.

This retrospective case-control study was designed to test the hypothesis that the detection of GBS on routine clinical specimens is not causally related to vulvovaginal symptoms in female GUM clinic attendees.

METHODS

Cases were defined as all female GUM clinic attendees between 1 July 1999 and 31 July 2001, in whom any anogenital specimen cultured GBS. Controls were group matched for age with all new and rebooking female GUM attendees and were randomly selected from all female attendees over the same time period. Controls were included only if they had a sexual health screen performed and the results of this were available.

All new patients attending the GUM service were offered a sexual health screen. All clinical data were collected on a standardised proforma, including printed diagrams for documentation of clinical signs. This included pH measurement, microscopy of a Gram stained high vaginal specimen and a wet mount preparation to identify yeasts, bacterial vaginosis,

and *Trichomonas vaginalis*. Endocervical swabs were routinely taken for *Chlamydia trachomatis* detection by ligase chain reaction. Endocervical and urethral swabs were taken for *Neisseria gonorrhoeae* microscopy and culture. Both selective and non-selective agar plates were prepared from gonococcal agar base (Oxoid CM 367), with 5% defibrinated horse blood. High vaginal, rectal, pharyngeal, and midstream urine cultures were taken only if specific clinical indications were present. Syphilis serology was performed in all clients who agreed to venepuncture, and HIV testing was offered to all attendees, with a 27.4% uptake during that time (personal communication, Scottish Centre for Infection and Environmental Health).

Identification of GBS on agar plates was performed by visual examination for growth at 24 and 48 hours; any haemolytic streptococci were directly selected for grouping, using the Streptex kit (Murex). The isolates were reported with a semiquantitative analysis of light, moderate or heavy growth. Light growth was defined as semiconfluent growth confined to the point of inoculation on the plate. Moderate growth was defined as semiconfluent growth, with single colonies appearing at the second plating out streaks. Heavy growth was defined as semiconfluent growth, with single colonies appearing at the end of the plating out streaks.

Bacterial vaginosis was diagnosed using Hay's criteria.³ Vaginal candidiasis was defined as microscopic evidence of yeasts or a positive culture of candida species, accompanied by symptoms of vaginal soreness, itching, or discharge. A past history of a sexually transmitted infection was defined as previous documented infection with herpes simplex virus type 2 (HSV-2), *Trichomonas vaginalis*, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, HIV, or syphilis. A regular relationship was defined as a continuous sexual partnership lasting 6 months or more. Vulvovaginal signs were considered present if any of the following clinical signs were recorded on a clinical diagram in

Table 1 Clinical features in all patients (1) and after exclusion of patients with defined genital tract infection (2)

1 All patients	Cases	Controls	p Value
Symptoms			
None	75 (63.5%)	190 (61.6%)	0.722
Vaginal discharge	28 (23.7%)	67 (21.7%)	0.661
Local discomfort	14 (11.8%)	36 (11.6%)	0.960
Itch	12 (10.1%)	39 (12.6%)	0.478
Other	3 (2.5%)	10 (3.2%)	0.705
Clinical signs	10 (8.4%)	10 (3.2%)	0.022
Total	118	308	
2 Excluding patients with defined genital tract infection	Cases	Controls	p Value
Symptoms			
None	58 (74.3%)	154 (74.7%)	0.945
Vaginal discharge	10 (12.8%)	24 (11.6%)	0.786
Local discomfort	8 (10.2%)	20 (9.7%)	0.890
Itch	5 (6.4%)	18 (8.7%)	0.521
Other	1 (1.2%)	5 (2.4%)	0.549
Clinical signs	4 (5.1%)	3 (1.4%)	0.075
Total	78	206	

the case notes—vulvar erythema, vulvar swelling, vaginal erythema, or vaginal desquamation. Isolated vaginal discharge, in the absence of symptoms, was not classified as a clinical sign.

Data were retrospectively collected from case notes using standardised proformas, entered onto ACCESS 97 (Microsoft) software and analysed using SPSS for Windows v11.0. A univariate comparison of demographic, behavioural, and clinical variables between cases and controls was performed using χ^2 tests.

RESULTS

Patient characteristics

In all, 131 cases of group B streptococcal infection were identified during the study period, of which 118 (90.0%) case notes were available. A total of 308 controls were identified, representing 7.7% of total new and rebooked female registrations during the same time period. There was no significant difference in the age distribution of the cases and controls,

which was consistent with the age profile of the female population attending the GUM service in Glasgow during the study period; data not shown.

Patients with GBS did not differ from controls in respect of their sexual behaviour, past history of STI, current smoking status, or diagnosis of other defined genitourinary infections (vaginal candidiasis, bacterial vaginosis, trichomoniasis, bacterial urinary tract infection, genital herpes, chlamydial or gonococcal infection; data not shown). Data were also collected on same sex partnerships (one control patient identified) and blood borne viral co-infection (none identified); 76 (64.4%) cases and 201 (65.3%) controls were documented as being in a regular relationship.

Site(s) of GBS isolation

In all, 109 cases had cervical swabs taken, of which 85 (77.9%) were positive; 65 of those (76.4%) were reported as a heavy growth of GBS. A total of 106 urethral swabs were taken, of which 95 (89.6%) were positive; 71 of those (74.7%) were reported as a heavy growth of GBS. Only nine high vaginal swabs were taken in the 118 cases, of which eight (88.8%) were positive and seven of those were reported as a heavy growth of GBS. One positive rectal swab was obtained, which showed a heavy growth of GBS.

Clinical features (table 1)

There was no difference in the proportions of cases and controls who complained of vulvovaginal symptoms (table 1). When all patients were considered, there was an association between GBS and the presence of clinical signs. However, after exclusion of patients diagnosed with other defined genitourinary infections, this association was no longer observed.

There was no relation between symptoms and whether the growth of cervical or urethral group B streptococcus was reported as light, moderate, or heavy. Likewise, the number of genital sites from which the organism was identified was not associated with the presence of symptoms (table 2). However, in the nine cases who had high vaginal swabs taken, there was a significant association between heavy growth of GBS and the presence of symptoms.

DISCUSSION

The results of this retrospective case-control study suggest that the detection of GBS on routine clinical specimens in

Table 2 Association between laboratory report and presence of clinical symptoms

	Symptoms	No symptoms	p Value
Urethral swab			
Heavy	26	45	0.823
Moderate	8	14	0.887
Light	0	2	0.629
Cervical swab			
Heavy	25	40	0.904
Moderate	6	11	0.828
Light	0	3	0.175
Vaginal swab			
Heavy	6	1	0.008
Moderate	0	1	0.435
One site positive			
Urethra only	12	14	0.244
Cervix only	7	12	0.968
Vagina only	0	2	0.280
Rectum only	0	1	0.447
Two sites positive			
Urethra and cervix	23	38	0.768
Urethra and vagina	0	3	0.184
Three sites positive			
Urethra, cervix, and vagina	0	3	0.184

female GUM clinic attendees is not causally related to vulvovaginal symptoms.

Group B streptococci (GBS) are known to colonise the genital tract in up to 18% of healthy women.¹ However, studies of carriage of GBS should be interpreted with caution, as the presence of these organisms may be intermittent and can vary with factors such as the menstrual cycle.⁴ Detection rates may also be increased if selective enrichment media are used to isolate the organism and if several clinical specimens are taken.^{5,6}

A number of studies have reported an increased rate of carriage in sexually transmitted diseases and GUM clinic attendees.^{7–12} However, the evidence on sexual transmission is conflicting. A large prospective study among minority women attending community clinics in San Antonio, Texas,¹⁰ found no association between GBS and number of sexual partners, concurrent STI, past history of STI, or condom usage. In one study in a UK GUM clinic, identical serotypes were found in only three out of 20 couples who were both colonised.⁹ However, more recent studies in a GUM setting in the United Kingdom and in college students have supported the concept of sexual transmission.^{8,11}

The overall period prevalence of GBS detection in routine specimens in our study was 2.1%, which is considerably lower than the 23–42% found in other studies. It should be emphasised, however, that our aim was to study the clinical significance of GBS when detected in routine GUM practice, not to investigate the prevalence of GBS in female GUM clinic attendees. Had selective enrichment media been used to optimise GBS detection, we would have expected much higher carriage rates. Association between the presence of symptoms and heavy growth of GBS in high vaginal swabs may be the result of selection bias, as high vaginal swabs were not routinely taken in the GUM clinic and would only be done for specific indications such as clinically obvious vulvovaginitis.

We could identify only two previous studies which investigated the relation between anogenital GBS carriage and clinical disease.^{12,13} A large study in a Greek gynaecology outpatient setting detected GBS in 10.1% of 6226 women who presented with vaginal discomfort and concluded that GBS caused vaginitis¹²; however, as no controls were included in the study, this conclusion has limited validity. A case-control study recruited from family practices retrospectively assessed clinical features, treatment, and outcome by means of a questionnaire sent to the general practitioners of 174 patients with GBS and 96 control patients.¹³ Control patients were randomly selected from those with negative HSV reports in the early part of the study. Patients with trichomoniasis, vaginal candidal infection, gardnerella, or anaerobic infection were excluded from the study. A total of 270 of 322 (84%) questionnaires were returned and data on clinical features were unavailable in a proportion of the cases. The conclusion of the study was that there was no correlation between isolation of GBS and recorded clinical symptoms and signs. Treatment outcomes were similar, irrespective of whether GBS cases were treated with appropriate or inappropriate antimicrobials.

There is currently no evidence to support an aetiological role for GBS in women with vulvovaginitis. However, this has not been particularly well studied in the past and any studies which set out to investigate this in the future should include appropriate controls, incorporate prospective methodology, and use selective enrichment media to isolate the organism from vaginal specimens.

In conclusion, GBS is common finding in genital specimens taken from women attending genitourinary medicine (GUM) clinics for any reason. Some women presenting with vulvovaginal symptoms do not have a well defined explanation for their symptoms; a small proportion of such patients will carry GBS, creating uncertainty about management. There is currently much variation in practice in this regard; during the time period of our study 12 women (10.1%) with

Key messages

- Although isolation of group B streptococcus (GBS) on routine swabs taken from genitourinary medicine (GUM) clinic attendees is a relatively common finding, its significance is uncertain
- This case-control study showed that the patients in whom GBS were detected on routine genital swabs were similar, in respect of their demographic, behavioural, and clinical characteristics, to other female GUM clinic attendees. Specifically, isolation of GBS from routine cervical or urethral swabs was not associated with vulvovaginal symptoms
- We recommend that patients in whom GBS is isolated from routinely collected genital swabs should be advised that the organism is not causally related to vulvovaginal symptoms and they should not be treated with antibiotics for this indication

GBS received antimicrobial treatment in our clinic, often in the absence of symptoms, with no evidence of clinical benefit. Confusion and anxiety may also be generated by explanations given to the patient about the uncertain significance of this organism in the context of vulvovaginitis. The overall conclusion of this study is that the detection of GBS on routine clinical specimens taken in female GUM clinic attendees is not causally related to vulvovaginal symptoms; we recommend that patients should receive this advice and should not be treated with antibiotics for this indication.

CONTRIBUTORS

CS wrote the first draft of the paper, collected and contributed to analysis of all data and proposed the original idea for this study; MM provided laboratory data and contributed to interpretation of the laboratory findings; AS provided supervisory support at all stages of the study, assisted with data collection, analysed the data, and wrote the final draft of the papers.

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