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A prospective study of genital infections in a family-planning clinic

1. Microbiological findings and their association with vaginal symptoms

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SUMMARY

A prospective study of genital infection was conducted in four inner-city family-planning clinics. Fifteen per cent of routine attenders had symptoms and signs of vaginal infection and many more women attended primarily because of symptoms. Among the women with both signs and symptoms, 70% had positive laboratory findings, *Trichomonas vaginalis*, *Candida albicans* and bacterial vaginosis being equally prevalent. Measurement of vaginal pH in the clinic was the single most useful clinical finding for directing empirical therapy. Among patients with a discharge confirmed on examination and an abnormally high pH, 72% had either *T. vaginalis* or bacterial vaginosis. *Neisseria gonorrhoeae* was isolated from 4% of women with, and 1% of those without, symptoms. We believe that it is worthwhile to investigate patients presenting to family-planning clinics with vaginal symptoms. No single specimen was found ideal for all pathogens, a cervical swab is better for gonococci and also for *T. vaginalis* but a vaginal swab is needed for candida and bacterial vaginosis.

INTRODUCTION

Family-planning clinics (FPCs) not only provide facilities for contraceptive advice and prescription but also it is tacitly accepted that a number of women attend FPCs solely because of lower genital symptoms, particularly vaginal discharge. Whatever reasons underlie this, a practical question exists as to whether such patients should be referred to their GPs or whether they should be examined and have specimens taken to identify the cause.

We therefore designed a study to establish the prevalence of different pathogens in women attending FPCs with symptoms and/or signs suggestive of genital infection and to determine the most appropriate level of investigation for these patients.

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METHODS

Clinics and patient selection

The study was conducted in four inner-city FPCs. The majority of the patients were social class 3. Sixty-eight percent were caucasian and a large minority (21%) West Indian. In general the first five patients per clinic session were included in the study.

Patients fell into two main groups:

(*A*) 'Gynaecology' patients, i.e. those who attended the clinic solely because they had genital symptoms, mainly vaginal discharge, irritation, soreness or smell. Many of these patients had attended the clinic for contraception previously.
(*B*) Routine family-planning patients some of whom had symptoms on direct enquiry.

Clinical and epidemiological data

Before patients were included, the aims of the study were explained and verbal consent obtained. Enquiries were made concerning symptoms of genital infection including discharge, vaginal irritation, soreness or smell, pelvic, abdominal or back pain and dyspareunia. All women in the study were examined by passing a speculum. Information was recorded on the amount of discharge if any, its smell, colour and consistency, the presence or absence of vaginal inflammation and the presence of any cervical abnormalities. The vaginal pH was measured using pH papers (Merck).

After examination a standardized questionnaire was used to collect data on social and sexual history, contraception and details of menstrual cycle. The same four FPC doctors examined all the patients and regular meetings were held before and throughout the study to discuss problems and standardize methods.

Specimens

The following specimens were obtained from all women; high vaginal and endocervical swabs sent in Stuart's transport medium, endocervical swabs sent in chlamydia transport medium and direct cervical and vaginal smears made in the clinic. A large proportion of women also had a routine cervical smear sent for cytology

Laboratory methods

Vaginal and cervical swabs in Stuart's transport medium were cultured for *Canidida albicans* and *Neisseria gonorrhoeae* using a selective medium containing vancomycin, polymyxin and trimethoprim. Organisms were identified by standard methods. Direct smears were prepared from the swabs and together with those made in the clinic were stained with acridine orange (1). The smears were examined using fluorescent microscopy with a $\times 20$ objective for pus cells, clue cells, *Trichomonas vaginalis* (TV) and yeasts. Pus cells were recorded as present if there were > 5/field.

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Table 1. *Correlation between symptoms and signs of vaginal infection in symptomatic patients (group A) and routine family-planning patients (group B)*

Group	1 Symptoms+ Signs+	2 Symptoms+ Signs−	3 Symptoms− Signs+	4 Symptoms− Signs−	Total
A	108 (48%)	86 (38%)	7 (3%)	25 (11%)	226
B	41 (15%)	62 (23%)	29 (11%)	137 (51%)	269
Total	149 (30%)	148 (30%)	36 (7%)	162 (33%)	495

Criteria for bacterial vaginosis

A patient was regarded as having bacterial vaginosis (BV) if, in the absence of TV she fulfilled the three criteria; signs of abnormal discharge, vaginal pH > 4·5, clue cells seen on microscopy (2).

RESULTS

Morbidity

A total of 495 patients was included in the study. There was considerable morbidity in patients attending the clinic. There were 194 patients who attended solely because of gynaecological symptoms compatible with lower genital infection (discharge, irritation, soreness or smell); together with 32 patients who came with other gynaecological problems (e.g. pelvic pain or worried about sexually transmitted disease) they form group A patients, who did not attend primarily to get contraceptive advice. In addition, among the 269 routine family planning patients (group B), 103 (38%) admitted to symptoms of lower genital infection on direct enquiry.

There were many discrepancies between symptoms reported by patients and signs observed by the clinician. This is highlighted in Table 1, which shows that both among the 'gynaecology' patients and the routine family planning patients there was a discrepancy between the two parameters in approximately one third of patients.

Laboratory findings

Given similar clinical findings, the gynaecological and family planning patients had similar laboratory results so that we chose to combine the two groups and present the laboratory data according to clinical findings.

Table 2 relates abnormal laboratory findings to the presence or absence of symptoms and signs of vaginal infection. It is apparent from this that patients with symptoms only (group 2) and patients with signs only (group 3) had very similar results to those with neither (group 4). The only difference was a higher prevalence of clue cells in group 3. We therefore chose to concentrate on the patients whose symptoms were confirmed on examination.

The prevalence of *C. albicans* (22%), TV (23%) and BV (26%) in group 1 was very similar. However this group was not homogeneous and within it the microbiological finding were markedly affected by four factors: vaginal pH, vaginal inflammation, smell on examination, and cervicitis/contact bleeding

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Table 2. *Abnormal findings related to symptoms and signs of infection*

Group	1 Symptoms+ Signs+	2 Symptoms+ Signs−	3 Symptoms− Signs+	4 Symptoms− Signs−	Total patients positive
T. vaginalis	33 (22%)	7 (5%)	3 (8%)	9 (6%)	52 (11%)
C. albicans	35 23%)	17 (11%)	2 (6%)	18 (11%)	72 (15%)
Clue cells	58 (39%)	38 (26%)	15 (42%)	35 (22%)	146 (29%)
Any of these	105 (70%)	59 (40%)	17 (47%)	55 (34%)	236 (48%)
Bacterial vaginosis	36/141* (26%)	NA	11/34* (32%)	NA	—
GC	6 (4%)	4 (3%)	—	2 (1%)	12 (2%)
Total patients	149	148	36	162	495

*Ten patients in whom pH was not recorded were not categorized.

Table 3. *Correlation of laboratory results with findings on examination in the 149 patients with both signs and symptoms*

	Laboratory results				
	Pos.	Neg.	Pos.	Neg.	χ^2
	Inflammation		No inflammation		
TV	16	50	17	66	N.S.
Candida	24	42	11	72	9·67
Clue cells	18	48	40	43	5·92
	Smell		No smell		
TV	18	42	15	74	2·9
Candida	8	52	27	62	4·85
Clue cells	29	31	29	60	3·1
	Cervicitis*		No cervicitis*		
TV	20	38	13	78	7·9
Candida	13	45	22	69	N.S.
Clue cells	16	42	42	49	4·38
	High pH		Low pH		
TV	23	63	5	50	7·5
Candida	18	68	16	39	N.S.
Clue cells	48	38	5	50	29·1
Clue cells ±TV	62	24	8	47	42·0

*Patients with cervicitis and/or contact bleeding.

(Table 3). Both TV and clue cells were significantly associated with raised pH and indeed 72% of patients with high pH had TV and/or clue cells compared with only 15% of those with normal pH. Cervicitis/contact bleeding was strongly associated with TV ($P < 0{\cdot}005$), but negatively correlated with clue cells. As might be expected *C. albicans* was associated with inflammation, whereas clue cells were negatively associated. Surprisingly the association between smell and clue cells was not significant but *C. albicans* was negatively associated with smell.

As can be seen in Table 2, *N. gonorrhoeae* was isolated from 12 patients (2·4%).

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Table 4. *Laboratory results according to specimen type*

	Vag swab	Cx swab	Vag smear	Cx smear	Cytology smear	Total patients positive	Total patients examined*
T. vaginalis	13	16	8	11	28	35	284
Clue cells	98	37	46	46	—	125	450
GC	4	12	—	—	—	12	495
C. albicans	71	55	—	—	—	72	495

* Patients were included only when all possible specimens had been taken.

The prevalence seemed to be higher in symptomatic patients and indeed 10/12 isolates were obtained from group A patients (who had come solely because of symptoms). The overall prevalence in this group was 8/226 (4%). *N. gonorrhoeae* was associated with three parameters: age less than 25, no stable partner and use of oral contraception.

Type of specimen

The work involved in taking the various swabs and smears needed for this study was considerable and Table 4 shows the number of positives detected by each type of specimen. TV and particularly *N. gonorrhoeae* were both more readily detected in the cervical swab, this latter finding being a well established fact (4). On the other hand, clue cells and candida were mainly found in the vaginal swab, the difference being most significant for clue cells. TV was detected in the smear taken for cervical cytology in 12 patients whose specimens were negative in the microbiology laboratory.

DISCUSSION

The study highlighted the number of women who attended FPCs not for family-planning advice but because of symptoms. Even among routine family-planning patients approximately one third had symptoms suggestive of vaginal infection. We experienced the well-known problem of lack of correlation between symptoms of discharge as perceived by the patient and signs of discharge as detected by the clinician. Patients with symptoms of vaginal infection with no abnormal findings on clinical examination did not differ from symptomless women in respect of the prevalence of abnormal laboratory findings.

Candidiasis, trichomoniasis and BV were equally prevalent among women with confirmed vaginal discharge. It is difficult to find comparable figures in other series but in a study in North London, Adler and colleagues (5) estimated the incidence of candidiasis in general practice to be five times that of TV. We suspect that our results are biased by the fact that the acute irritation associated with candidiasis tended to lead women to consult their GPs and obtain treatment as a matter of urgency.

By contrast, the prevalence of BV in our patients probably reflects its lack of association with inflammation and the fact that it may grumble on for months unless diagnosed and appropriately treated. Simple tests which will confirm the

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diagnosis, such as measurement of vaginal pH and microscopy for clue cells are of considerable value. Indeed had one been giving 'blind' therapy without waiting for laboratory confirmation, the measurement of pH would have been the single most helpful clinical finding; 89% of the patients in whom metronidazole was the most appropriate therapy had high pH, whereas only 28% of those with high pH had neither TV nor clue cells.

One notable finding in our study was the presence of clue cells in 42% of patients with signs but no symptoms of vaginal infection; the majority (73%) of these patients had all three criteria of bacterial vaginosis, in spite of the lack of symptoms. Two factors may account for this, firstly these women may have been at the mild end of the spectrum of BV (6) and secondly may have had a higher threshold for regarding discharge as abnormal.

It is clear from Table 4 that the apparent prevalence of TV would have been much lower if we had examined vaginal swabs only. The more specimens examined the higher the change of detecting TV. However, cervical specimens seemed generally to be more sensitive than vaginal specimens. The fact that the cervical smear for cytology detected more cases than any other method may have been due, at least in part, to the fact that this was the first cervical specimen to be taken. However, cytology smears have been reported by Thin and co-workers (7) to be as sensitive as direct microscopy on vaginal secretions for diagnosing trichomoniasis.

Twelve of the 52 patients (23%) with TV had no symptoms. Fleury (8) reported that, particularly in post-menopausal women, trichomonas may be harboured in the vagina for years without any symptoms. There is no evidence that such patients benefit from therapy.

The association between gonococcal infection and symptoms was a surprise. Cervicitis caused by *N. gonorrhoeae* may be severe enough to produce a profuse purulent discharge discernible to the patient (9). However, we suspect that in most cases the association was an indirect one related to the presence of other pathogens. The prevalence of gonococcal infection in symptomless patients was low (1%) and there seems to be no justification for screening all family-planning attenders.

However, among the patients with discharge, the prevalence of 4% was worringly high and justifies routine gonococcal culture using a medium such as ours that will support growth of *C. albicans* and most strains of *N. gonorrhoeae*.

Our study has shown a substantial prevalence of treatable genital infections in the family planning populations. We feel that it is simple and efficient for patients complaining of symptoms suggestive of infection to be examined. If there are no abnormal findings the woman can be reassured. Any abnormality will require laboratory investigation, primarily a vaginal swab. However, this will be inadequately sensitive for TV and *N. gonorrhoeae*. If a cervical smear is being obtained for cytology this will suffice for diagnosis of TV. However, if cytology is not being performed or if the woman has risk factors for gonorrhoea then a cervical swab should be sent in addition to the vaginal specimens. Patients in whom positive laboratory findings are obtained will need to be referred for treatment and possibly contact tracing either to their GP or a GUM clinic.

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