

Microbiology of acute epididymitis in a developing community

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Abstract

Objective—To investigate the aetiology of acute epididymitis in a developing community with a view of determining appropriate antimicrobial therapy.

Setting—City Health Sexually Transmitted Diseases Clinic, King Edward VIII Hospital, Durban, South Africa.

Participants—144 adult men with clinically diagnosed acute epididymitis.

Method—Endourethral swab and mid-stream urine (MSU) specimens were processed to detect sexually transmitted pathogens and urinary tract infections.

Results—The majority of patients (93%) were less than 35 years of age. *Neisseria gonorrhoeae* and/or *Chlamydia trachomatis* were detected in 78% of patients: *N gonorrhoeae* in 57%, *C trachomatis* in 34% and both in 13%. *Escherichia coli* was cultured more frequently from MSU specimens of older patients, 30% versus 3%. In 53% of patients urethritis was diagnosed by the presence of inflammatory cells in endourethral smears in the absence of a visible urethral discharge.

Conclusion—In our setting of a busy clinic with limited facilities, we recommend the performance of a Gram stain on endourethral specimens from patients with acute epididymitis. If inflammatory cells and Gram negative diplococci are detected, treatment with antimicrobial agents to cover both penicillinase-producing *N gonorrhoeae* strains and *C trachomatis* is recommended. If Gram negative diplococci are not detected in the presence of microscopic evidence of urethritis, treatment for chlamydial infection alone is recommended.

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Introduction

Acute epididymitis is a common clinical problem occurring in both developing and developed communities. Sexually acquired pathogens are usually responsible for this condition in young men, whilst in older men (>35 years age) and children Gram negative bacilli are more frequently implicated.¹

Chlamydia trachomatis has been shown to be an important cause of acute epididymitis in studies amongst sexually active young men in developed communities.²⁻⁴ Data on the aetiology of this condition in developing soci-

eties are lacking. This study was undertaken to investigate the aetiology of acute epididymitis in patients attending an STD clinic situated at a large tertiary teaching hospital centre, serving mainly an indigent African population of the province of Natal, South Africa.

Patients and methods

A total of 144 consecutive adult male patients presenting with clinically diagnosed acute epididymitis were studied. Informed consent for participation in the study was obtained from each patient. All patients were examined by doctors working at the STD Clinic. The examining doctor recorded the age of the patients, the presence or absence of a urethral discharge, whether one or both epididymes were affected and any other relevant clinical information. Patients who had received antimicrobial therapy in the preceding two weeks were excluded from the study.

Endourethral specimens were collected with narrow shaft calcium alginate swabs (Calgiswab—Inolex, USA) and used for the following: (i) preparation of a wet smear for microscopic detection of polymorphonuclear neutrophils (PMNs) and motile trichomonads; (ii) preparation of smears for Gram stain for microscopic examination and detection of *C trachomatis* antigen by direct immunofluorescence (Microtrak, Syva, USA); and (iii) inoculation onto modified New York City medium⁵ and Shepard's A₇ agar⁶ for the isolation of *Neisseria gonorrhoea* and genital mycoplasmas respectively. A midstream urine specimen (MSU) was also collected from each patient for microscopic examination and culture on CLED (cystine, lactose and electrolyte deficient) agar. Epididymal aspiration was not performed.

Results

The mean age of all 144 patients studied was 24.7 years (range 16 to 54); 134 were less than 35 years of age and only 10 were 35 years or older. The microorganisms detected in endourethral and MSU specimens for both groups are shown in table 1. *N gonorrhoeae* was the commonest isolate, being cultured from 54% (77 of 144) patients. Penicillinase-producing strains (PPNG) accounted for 13% of the isolates. In the younger (<35 years) age group endourethral *N gonorrhoeae* and/or *C trachomatis* was present in 78.4%; mixed infections were present in 17 (12.7%),

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Table 1 Micro-organisms detected in endourethral and midstream urine specimens.

| | Patient age groups | | | |
|---------------------------------|----------------------|------|---------------------|------|
| | < 35 years (n = 134) | | > 35 years (n = 10) | |
| | No | % | No | % |
| <i>N gonorrhoeae</i> | 76 | 56.7 | 1 | 10.0 |
| <i>C trachomatis</i> | 46 | 34.3 | 2 | 20.0 |
| <i>T vaginalis</i> | 3 | 2.2 | 1 | 10.0 |
| <i>U urealyticum</i> (N = 101*) | 50 | 49.5 | 1 | 10.0 |
| <i>E coli</i> | 4 | 3.0 | 3 | 30.0 |
| <i>S haematobium</i> | 3 | 2.2 | 0 | 0.0 |
| None | 20 | 14.9 | 4 | 40.0 |

*Culture performed on 101 specimens. In 9 patients this was the only organism detected and in the remaining 41 it was accompanied by *N gonorrhoeae* and/or *C trachomatis*.

N gonorrhoeae alone in 59 (44.0%) and *C trachomatis* alone in 29 (21.6%). Overall in this group therefore 56.7% had a gonococcal infection and 34.3% had a chlamydial infection. Characteristic Gram negative bean-shaped diplococci were observed in endourethral smears of 77% patients from whom *N gonorrhoeae* was cultured.

Trichomonas vaginalis was only detected in association with either *N gonorrhoeae* or *C trachomatis*. Culture for *Ureaplasma urealyticum* was performed on 111 patients only: 50 of 101 (49.5%) patients <35 year age group and 1 of 10 (10%) >35 years were culture positive. In only nine patients was *U urealyticum* the only microorganism detected, the remaining 41 having concomitant gonococcal and/or chlamydial infection.

Escherichia coli (more than 10⁵ organisms per ml) was cultured from 30% of MSU specimens of older patients compared with 3% from younger men. No other urinary pathogen was cultured and ova of *Schistosoma haematobium* were seen in specimens of three patients.

The presence or absence of a urethral discharge was recorded for 94 patients. The correlation between urethral discharge and the presence of inflammatory cells (≥ 4 polymorphonuclear neutrophils per high power field) in Gram-stained endourethral smears is shown in table 2. In slightly more than half of the patients (53%), there was no clinical discharge and urethritis was diagnosed by the presence of inflammatory cells in smears. In only 7 patients, there was no clinical discharge nor inflammatory cells on microscopy. *E. coli* was isolated from MSU specimens of 3 of these patients.

Discussion

The high prevalence of sexually transmitted pathogens in this study was not unexpected,

Table 2 Correlation between urethral discharge and inflammatory cells in Gram-stained endourethral smears (n = 94).

| | | | No. | % |
|-------------------|-----|----------------------|-----|------|
| Discharge present | and | ≥ 4 PMNs / HPF* | 37 | 39.4 |
| No discharge | and | ≥ 4 PMNs / HPF* | 50 | 53.2 |
| No discharge | and | < 4 PMNs / HPF* | 7 | 7.4 |

*PMNs/HPF = polymorphonuclear neutrophils per high power field ($\times 1000$ magnification).

as the study population comprised mainly young men (less than 35 years age). However, a striking difference of this study when compared with reports from developed communities²⁻⁴ is the high prevalence of mixed urethral infections and the more frequent detection of *N gonorrhoeae* than *C trachomatis*. A high prevalence of mixed infections and PPNG strains in Johannesburg's mine workers with epididymitis has been reported previously.⁷ Such findings have considerable therapeutic implications for the management of patients with acute epididymitis in developing communities.

The importance of performing a Gram stain on endourethral specimens of patients with acute epididymitis is also highlighted. In more than half of the patients, inflammatory cells were seen in endourethral smears in the absence of a visible urethral discharge. *E coli* bacteriuria was detected in three of seven patients with no urethral discharge or inflammatory cells in endourethral smears. In keeping with the findings of other studies, the more frequent detection of significant bacteriuria, presumably indicative of urinary tract infection in older men, was also a feature of this study (30% vs 3%).

U urealyticum, an organism which has been implicated in the aetiology of acute epididymitis,⁸ was usually isolated in association with other pathogens in this study. In only nine patients, it was the sole micro-organism detected; however, as epididymal aspiration was not performed, its pathogenic role could not be confirmed in this study. The role of *T vaginalis* in acute epididymitis is also unclear and we found this protozoan always in association with either *N gonorrhoeae* or *C trachomatis*.

Suggestions have been made for the use of quinolones⁹ and the newer macrolides¹⁰ in the treatment of acute epididymitis. In the absence of clinical studies showing cure and eradication of chlamydial infection, the routine use of these agents has not gained popularity.¹¹ Ideally all patients should be fully investigated for sexually transmitted infections and uropathogens and treated accordingly. In our setting of a busy clinic with limited facilities, we recommend the performance of microscopic examination of a Gram stained smear of an endourethral specimen from each patient with acute epididymitis. If sufficient inflammatory cells indicative of urethritis are present together with characteristic Gram-negative diplococci suggestive of *N gonorrhoeae*, single dose therapy for gonococcal infection using either a quinolone or ceftriaxone plus a ten day course of tetracycline against likely concomitant chlamydial infection is recommended. For the patients whose smears show evidence of urethritis but no characteristic diplococci, administration of a ten day course of tetracycline only is recommended. It should be noted that local gonococcal strains are uniformly sensitive to the tetracyclines¹² and high level plasmid mediated resistance has not been detected in Durban. As for other sexually transmitted

infections efforts should be made to contact sexual partners of such patients and to treat them appropriately.

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