Gonococcal culture and drug sensitivity pattern in patients with urethral discharge and vaginal discharge with cervicitis

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ABSTRACT

INTRODUCTION: Sexually transmitted infections (STIs) continue to present major health, social, and economic problems in the developing world. Gonococcal infections and their complications are amongst the most frequent communicable diseases in many countries. The objectives of this study is to determine the incidence of gonorrhoea among patients presenting with urethral discharge syndrome and vaginal discharge syndrome with cervicitis and to explore the pattern of resistance to commonly used antibiotics against Neisseria gonorrhoeae.

METHODS: Urethral swab from male patients and endocervical swab from female patients were collected. All the samples were subjected to Gram-staining and gonococcal culture. Antimicrobial susceptibility testing by standard disc diffusion method was performed using antibiotics commonly prescribed for the treatment of gonorrhoea.

RESULT: Significant numbers of cases with uretheral discharge were found to be culture positive for N. gonorrhoeae (70.1%). As a tool for detecting N. gonorrhoeae, both the microscopical examination and culture were equally useful. Cefixime, ceftriaxone and spectinomycin were sensitive in all of those tested. Few cases were resistant to penicillin, ciprofloxacin and cefotaxime while most of cases were resistant to ampicilin, cotrimoxazole and tetracycline.

CONCLUSION: N. Gonorrhoeae is an important cause of Urethral discharge syndrome in our country with 70.1% culture positivity. Our observations reinforces that N. gonorrhoeae isolates has a changing pattern of drug resistance to various antibiotics emphasizing that continuing surveillance of gonococcal drug sensitivity patterns is necessary.

KEY WORDS: Urethral discharges syndrome, Vaginal discharge syndrome, N gonorrhoeae, Gonorrhoea, Drug sensitivity pattern.

INTRODUCTION

Sexually transmitted infections (STIs) continue to present major health, social, and economic problems in the developing world, leading to considerable morbidity, mortality, and stigma.[1] The prevalence rates apparently are far higher in developing countries where STD treatment is less accessible.[2]

Gonorrhoea is a sexually transmitted infection caused by the bacteria Neisseria gonorrhoeae (N. gonorrhoeae). The disease most frequently affects 15 to 25-year-olds. Patients present with dysuria and pus like discharge per urethra in male; while in female they present with lower abdominal pain and discharge per vagina. It is a major cause of pelvic inflammatory disease often leading to ectopic pregnancy and infertility, and it can facilitate human immunodeficiency virus (HIV) transmission[3].

N. gonorrhoeae is generally sensitive to a wide range of antimicrobial drugs but a certain strains have developed resistance to drugs which have been most commonly used in therapy. Studies have shown that treatment failures occur frequently when gonococcal infections are treated with a drug to which the infecting strain is resistant[4]. The efficacy of various gonococcal treatment regimens is dependent upon the type, degree and prevalence of antibiotic

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resistance in the gonococcal population of a particular area[5]. Thus, study of antimicrobial resistance patterns in gonococci is necessary to assist in the formulation and modification of standardized treatment regimens.

METHODS

This is a prospective, hospital based study conducted in Bir Hospital for a period of one year (16th July 2008 - 15th July 2009). Ethical clearance was taken from Institutional Review Board. All the patients presenting to Dermatology and Venereology Out Patient Department with features of uretheral discharge and vaginal discharge with cervicitis were enrolled in this study. Known non- venereal cause of urethral discharge such as trauma and catheterization, female without signs of cervicitis on per speculum examination, and patients not willing to give consent or undergo lab investigation were excluded.

Relevant history and examination findings were noted in a predesigned Performa. Urethral / endocervical swab were collected from these patients aseptically using a sterile swab stick. Samples were sent immediately to the lab for gram stain and gonococcal culture. Chocolate agar media incubated anaerobically at 37°C in an atmosphere of 5-10% CO_2 in carbondioxide jar was used for culture. All N gonorrhoea isolates were tested for antimicrobial susceptibility by disc diffusion method against Penicillin, Tetracycline, Cefixime, Ciprofloxacin, ceftriaxone, azithromycin, cefotaxime and spectinomycin. Some samples were not tested for all drugs due to technical difficulty.

RESULTS

A total of 86 cases (67 male and 19 female) were enrolled in the study with age range 17-52 years and Mean age 28.99yrs. (shown in table: 1)

Table 1: Frequency distribution according to age and sex.

Age range in yrs	Male	Female	Total
0-10	0	0	0
11-20	5	3	8
21-30	44	10	54
31-40	12	5	17
41-50	5	1	6
51-60	1	0	1
Total	67	19	86

Marital status showed majority of the patients 64 (74.4%) were married. When comparing marital status with gender, 68.7% male were married while 94.7% of female were married.

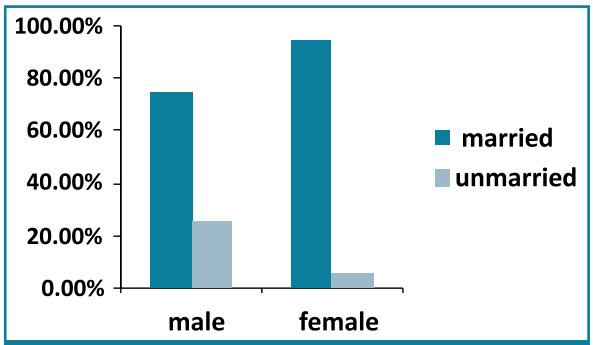

Figure 1; marital status in male and female

In occupation, 17(25.4%) male patients were involved in business and 17 (25.4%) in private service, 3 were unemployed while only 1 was involved in agriculture. In female patients 11 (57.9%) were housewives, 3 (15.8%) were involved in business while 1 was involved in agriculture. The occupations previously thought to be a risk factor for STIs such as driver and police/army were not found to be significant. None of the female in the study were involved in commercial sex work.

Incubation period was calculated by the time interval in days between suspicious sexual exposure and development of S/S. It was calculated only from the male participants as most of the female patients could not ascertain the history of suspicious sexual exposure. The minimum time interval was 2 days while maximum was 21 days. The mean incubation period was 5.93 days. (Table: 2)

Table 2: Incubation period

Incubation (days)	Frequency
0-4	34
5-9	23
10-14	6
15-19	3
20-24	1
Total	67

In clinical features, most male patients 44 (65.7%) came with the complaint of discharge per urethra and on examination 58 (86.5%) patients had frank pus-like discharge per urethra. (Table: 3, figure: 2)

Table 3: presenting complaint in male		
Presenting complaint	Frequency	Percent
Dysuria	1	1.5
Urethral discharge	44	65.7
Dysuria + Urethral discharge	22	32.8
Total	67	100.0

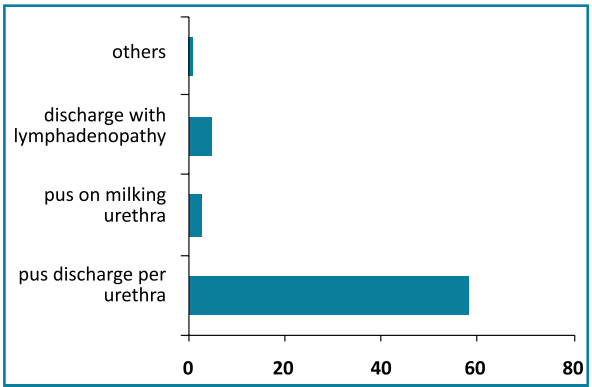

Figure 2: Clinical presentation in male.

In female, all patient came with the complaint of foul smelling vaginal discharge. Examination findings are shown in fig; 3.

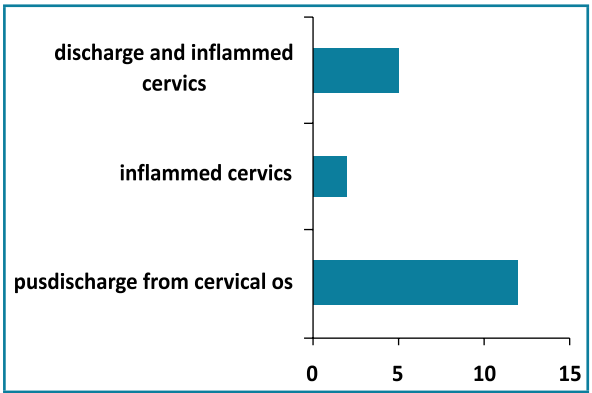

Figure 3: Clinical presentation in female

In gram staining, out of the total of 86 samples, 52 ((60.5%) showed intracellular gram negative diplococcic, while 34 (39.5%) did not show gram negative diplococci. Comparison of the result of gm stain in male and female is shown in Table: 4.

Table 4: Result of gram staining of samples.				
		Gender		Total
		male	female	
		Count (%)	Count (%)	
Gram stain	gm-ve diplococci seen	51 (76.1%)	1 (5.3%)	52 (60.5%)
	gm-ve diplococci not seen	16 (23.9%)	18 (94.7%)	34 (39.5%)
	Total	67 (100.0%)	19 (100.0%)	86 (100%)

On culture of urethral samples, N gonorrhea was isolated in 47 (70.1%) and Staphylococcus aureus was isolated in 5 (7.5%) while on culture of endocervical swab, N gonorrhea was isolated only in 1 (5.3%) sample (table: 5).

Table 5: Result of culture of samples from male and female.				
Culture result	Gender			
	Male		Female	
	Count	% N-67	Count	%N-19
gonococci isolated	47	70.1	1	5.3
gonococci not isolated	15	22.4	17	89.5
other organism isolated	5	7.5	1	5.3
Total	67	100.0	19	100.0

Drug sensitivity pattern:

Sensitivity pattern of the gonococcal isolates to various drugs tested is shown in table 6. A total of 40 samples were tested for Penicillin sensitivity out of which 35 (87.5%) were sensitive to it while 5 (12.5%) were resistant. Similarly Cotrimoxozole was resistant in 29.6%, Erythromycin in 18.2%, Tetracycline in 7.5%, Cefotaxime in 7.1% and Ciprofloxacin in 2.3% of the cases. Cefixime, Spectinomycin and Ceftriaxone were sensitive in 100% of the cases.

Table 6: Drug sensitivity pattern.			
Drugs	Total no. tested	Drug sensitivity pattern	
		Sensitive (%)	Resistant (%)
Penicillin	40	35 (87.5%)	5 (12.5%)
Tetracycline	40	37 (92.5%)	3 (7.5%)

Cefixime	38	38 (100.0%)	0 (0%)
Ciprofloxacin	43	42 (97.7%)	1 (2.3%)
Spectinomycin	27	27 (100.0%)	0 (0%)
Ceftriaxone	15	15 (100.0%)	0 (0%)
Erythromycin	11	9 (81.8%)	2 (18.2%)
Cotrimoxazole	27	19 (70.4%)	8 (29.6%)
Cefotaxime	14	13 (92.9%)	1 (7.1%)

DISCUSSION:

The control of gonococcal infection is important considering the high incidence of acute infections, complications, and sequelae, and its role in facilitating HIV acquisition and transmission.[6, 7] The knowledge of antimicrobial susceptibility of N. gonorrhoeae is a prerequisite for proper treatment and control of the disease. Programs for monitoring gonococcal antimicrobial susceptibility have been developed in developed countries such as the United States, Canada, Australia, and The Netherlands; however, in developing countries like ours where the disease burden is high and the resistance is greatest, such programme rarely exists.[8]

The disease was seen most commonly in sexually active age group (20-30) with the mean age of 28.9 years. Married couples were seen to be more affected. These results are similar to those observed by Panta et al[9].

The average incubation period according to patient statement was 5.93 days and the most frequent interval was 3 days which is consistent with Gonococcal disease.

In clinical presentation of male patient our findings are consistent with those of Jacques et al[10] where dysuria was complained by 96.2% of the cases and purulent discharge per urethra were noted in 85.3% patient. Similar finding was noted by Shilpee et al[11].

Our study has shown that microscopic examination of gram-stained smears is a very good tool for the rapid diagnosis of gonococcal infections. Hence a good quality microscopy can help in diagnosing gonorrhoea in suspected cases where facilities for bacteriological cultures are not available. This is true for countries like ours where there are very few centers having facilities for bacteriological culture. Our observation differs from observation made by Ghanem M et al[12] which showed that the use of the Gram-stained urethral smear permitted early treatment in only 1.8% of cases of genital gonorrhoea. This disparity is probably because all the specimens analyzed in their study were from female.

This study shows that N. gonorrhoeae is an important cause of UDS in our country with 70.1% (47) culture positivity. The result is consistent with other studies done on etiology of UDS in male.[13], [14]

It is said that regimens for the treatment of gonorrhoea should have efficacies that approach 100%, and treatment with efficacies less than 95% should never be used[15]. In our study, the percent resistance of N. gonorrhoeae isolates to the panel of antibiotics is lower than those shown in other countries. Still, they are above the significant level. (Table:7)

Table 7: Resistance pattern of N gonorrhoea in different countries.

Country	Penicillin resistance	Tetracycline resistance
Vietnam	98%	42.3%
Malaysia	80%	58.5%
Bangladesh	70%	54 %
India	47.4%	13.6%
Our study	12.8%	7.7%

In the present study, 12.8% of isolates were found to be penicillin resistant and the results compare well with a study done in Delhi by Bhalla et al.[16] which reported 11.1% of isolates to be PPNG in 2002. This is lower than those shown by another study from India which reported a resistance rate of 46.6%[17] in 2005 and from Indonesia where 63.1% strains were PPNG[18]. In WHO WPR, the prevalence of PPNG varied from 1% to 90%.[19]

National STI case management guidelines in Nepal recommended ciprofloxacin as first-line therapy for the management of uncomplicated gonococcal infection in 2001[20], but rapid development of resistance by N. gonorrhea to floroquinolones was shown in neighboring countries like India, China and Bangladesh. Even the pilot study done in Nepal in 2004 showed more than 80% resistance to ciprofloxacin. So, National STI case management guidelines in Nepal was revised in 2006 and cefixime was recommended as the first line therapy for the management of uncomplicated gonococcal infection[21], but this study shows that Ciprofloxacin with a resistance of 2.4% is still effective in treatment of gonorrhoea.

This study shows 100% susceptibility to spectinomycin, cefixime and ceftriaxone and proves that the present national guidelines for treatment of gonococcal disease is valid. This pattern is consistent with studies done in other countries like Sweden[22] and India[17]

The frequency of multi-resistant isolates found in the present study (6.3%) is also lower in comparison with that found in studies in India (23.3%).

CONCLUSION:

N. Gonorrhoeae is an important cause of Urethral discharge syndrome in our country with 70.1% (47 cases) culture positivity. With 100% susceptibility to spectinomycin, cefixime and ceftriaxone the study proves that the present national guideline for treatment of gonococcal disease is valid. Our observation also reinforces the changing pattern of drug resistance to various antibiotics in N. gonorrhoeae isolates. So, continuing surveillance of gonococcal drug sensitivity patterns is necessary not only to alert us on changes in resistance as they emerge, but also to allow timely, appropriate and cost-effective implementation of decisions on antibiotic therapy.

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