Pharyngeal Gonorrhea and Chlamydial Infections in Men who have Sex with Men, a Hidden Threat to the HIV Epidemic

Renee Jiddou[1], Maria Alcaide[2], Isabella Rosa-Cunha[2] and Jose Castro[2*]

[1]Jackson Memorial Hospital; [2]Division of Infectious Diseases, Miller School of Medicine, University of Miami, Miami, FL, USA

Abstract: *Background*: Pharyngeal infections with gonorrhea (GC) and chlamydia (CT) can be missed if screened only by routine methods of urethral or urine specimens and may increase the risk of sexually transmitted infections and HIV acquisition and transmission. The prevalence of pharyngeal GC and CT in men who have sex with men (MSM) has been reported as 5.3-9.2% and 1.4-1.9% respectively. The objective of this study is to determine the rates of pharyngeal GC and CT infections in MSM in the Miami Dade Health Department (MDHD) STD clinic.

Methods: Routine screening for pharyngeal GC and CT infections in MSM was implemented in the MDHD STD clinic in October 2011 using APTIMA Combo 2 Assay®. Validation studies were performed in the Florida Department of Health Laboratories prior to implementation of the test. Retrospective review of medical records of individuals tested for pharyngeal GC/CT from October 2011 to March 2012 was performed. Results from urine and rectal GC/CT testing done at the same time from the same individuals were also reviewed.

Results: A total of 475 pharyngeal swabs were performed. Fifty-two (10.9%) were positive for GC and 13 (2.7%) were positive for CT. Among the individuals with GC pharyngeal infection, 21 (52.5%) had a positive GC rectal test and 14 (28%) a positive urine test. Among the individuals with CT pharyngeal infection, 3 (30%) had a positive CT rectal test and 1 (7.7%) a positive urine test.

Conclusions: The prevalence of pharyngeal GC/CT in MSM in the MDHD STD clinic is higher than what has been previously reported in other centers. The discrepancy between pharyngeal, rectal, and urine tests emphasizes the importance of extragenital testing in the MSM population.

Keywords: Chlamydia Trachomatis, Neisseria Gonorrhea, Men who have Sex with Men, Sexually Transmitted Infections, Pharyngeal infections, Screening, HIV.

INTRODUCTION

Chlamydia trachomatis (CT) and *Neisseria gonorrhea* (GC) sexually transmitted infections (STIs) are a growing concern in the United States. The Centers for Disease Control and Prevention (CDC) estimates that more than 700,000 people in the United States get new GC infections annually; and CT remains the most frequently reported bacterial STI with an estimated 2.8 million infections occurring annually [1, 2].

Among men who have sex with men (MSM), rates of both GC and CT have recently been increasing [3]. In MSM with HIV infection, rates of both GC and CT are higher than in the general population and studies evaluating extragenital infections continue to demonstrate high rates of rectal and pharyngeal infections in this population [3, 4].

The CDC guidelines recommend that MSM are screened for GC and CT at least annually, and every 3-6 months if report sexual encounters with multiple or anonymous partners [5]. Screening includes the use of urine nucleic acid amplification technique testing (NAAT) in urethral or urine, rectal, and pharyngeal samples. Although urethral screening is widely available, screening for infections in extragenital sites is not performed routinely [6]. This is primarily due to lack of validated commercially available tests and low uptake by providers of the CDC guidelines [6].

Since GC and CT increase the risk of acquisition and transmission of HIV and other STIs, untreated genital and extragenital gonorrhea and chlamydia infections can negatively impact HIV and STIs rates in the MSM population [7]. In addition, untreated GC infections could negatively affect development of multidrug resistant gonorrhea as well as the spread of lymphogranuloma venereum CT strains, both of which are growing concerns in the individuals with HIV Infections [7, 8].

This study describes the prevalence of pharyngeal GC and CT infections in MSM presenting to the Miami Dade Health Department (MDHD) STD clinic. Rates of pharyngeal GC and CT infections have not been evaluated in MSM in Miami, a city with a large multiethnic population and high rates of STIs and HIV. Pharyngeal GC and or CT infections could account for

*Address correspondence to this author at 857 CRB, 1120 NW 14th Street, Miami, FL 33136, USA; Tel: 305-243-2399; Fax: 3052435367;
E-mail: JCastro2@med.miami.edu

E-ISSN: 2309-0529/13

increasing number of STIs and HIV acquisition in our city.

MATERIAL AND METHODS

Study Site

The study was performed at the MDHD STD clinic. The main clinic of MDHD is centrally located in the city and is an urban area with high rates of low income ethnic minorities, STIs, and HIV.

Ethics Statement

Approvals from the University of Miami and the Department of Health (DOH) Institutional Review Boards were obtained prior to any study-related interventions.

Methods

In October 2011, at the MDHD STD clinic, routine screening for pharyngeal GC and CT infections was included in the routine screening for STI in MSM individuals who reported performing oral sex. Routine STI screening included HIV screening using the rapid test Clearview® Complete HIV 1/2 (Inverness Medical, Louisville, CO, USA); syphilis testing with RPR and syphilis IgG confirmation when RPR reactive (dilution 1:1 or higher); screening for urethral, rectal, and pharyngeal GC and CT performed in samples from urine, rectal, and oral swabs, respectively using APTIMA Combo 2 Assay® (Gen-Probe, San Diego, CA, USA) [9].

The sensitivity of the urine APTIMA Combo 2 Assay® for urine samples to detect GC and CT as reported by Gen-Probe in males are 98.5% and 97.9%, respectively [9]. However, there are no data that correlate with pharyngeal infections.

As per clinic protocol, screening for pharyngeal and rectal GC/CT was offered to all MSM that reported engaging in oral sex. Pharyngeal swabs were collected by inserting the swab into the tonsillar and pharyngeal area and rotating it until gag reflex or adequate sample was obtained. Validation studies were performed by the Florida DOH laboratory services prior to utilization of the test.

Study Design and Data Collection

The study consisted of a retrospective review of medical records of all MSM tested for pharyngeal GC and CT from October 2011 to March 2012. Information was abstracted from the STD clinic medical charts and recorded into an Excel database with protected patient identifiers.

The data was collected from the standardized STD history and physical form and included: age, race, ethnicity, reason for visit, number of partners within the last two months and one year, history of STIs, types of sexual practices, condom use, symptoms, abnormal physical examination findings, pharyngeal, urine, and rectal testing for GC and CT, and co-infection with HIV and other STIs. Race was defined as black, white, or other. Ethnicity was defined as Hispanic, non-Hispanic, or other. Abnormal physical pharyngeal findings were recorded as the presence or absence of pharyngeal erythema, exudates, or cervical lymphadenopahy. Pharyngeal, urine, and rectal NAAT test results for GC and CT were recorded as positive or negative. Known HIV status prior to testing was documented as well as the results of the HIV test at the time of the visit. A history of STIs was classified as either the presence or absence of one or more STIs (CT, GC, syphilis, genital herpes, or genital warts) in the past. Infectious syphilis was defined as the presence of primary, secondary, or early latent syphilis according to the diagnosis at the clinic visit.

RESULTS

A total of 475 MSM received routine pharyngeal STI screening during the study period. Results of tests are described in Figure **1**. Over 10% of patients had pharyngeal GC. Rates of pharyngeal CT were lower (3%). Three of the patients with positive pharyngeal GC/CT test had dual infection with both GC and CT. Sixty two patients tested positive for GC or CT, giving a prevalence of 13% of pharyngeal GC or CT in our clinic.

Demographic characteristics, sexual risk factors, and co-infections with HIV in patients with a positive pharyngeal GC or CT test are described in Table **1**. The median age of the men who tested positive for pharyngeal GC and/or CT was 29 years. Most of the men tested were of Hispanic ethnicity (over 70%). Over half of the patients had a prior history of STIs including GC, CT, syphilis, or genital warts.

The mean number of sex partners was high (3.5 partners in the prior 2 months and 8 in the past year) and self reported condom use for anal intercourse was low (40%). Most patients presented to clinic due to symptoms related to other STIs (42%, Table **1**). However, none of the men reported any pharyngeal

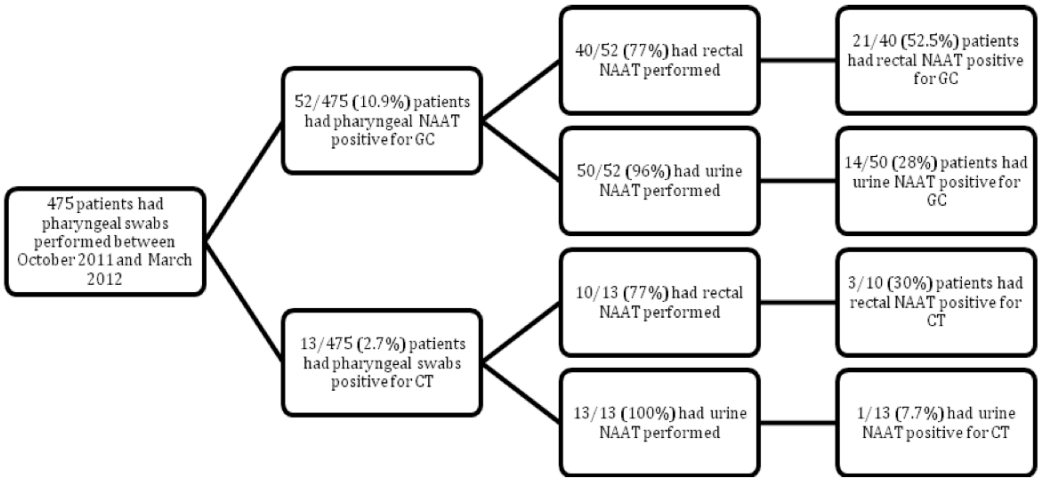

Figure 1: Results of Genital and Extragenital Gonorrhea (GC) and Chlamydia (CT) testing in MSM.

Table 1: Demographic and Clinical Characteristics of Individuals Diagnose with Pharyngeal GC or CT (n=62)

Age	29.2 years old	
Race	White	50 (81%)
	Black	12 (19%)
Ethnicity	Hispanic	44 (71%)
	Non-Hispanic	18 (29%)
Number Partners 2 months (mean, range)	3.55 (0-100)	
Number Partners in 12 months (mean, range)	7.94 (1-100)	
History of STD	34 (55%)	
	Syphilis	18 (52.9%)
	GC	16 (47.1%)
	CT	13 (38.2%)
	Genital Warts	6 (17.6%)
Prior HIV Status	Positive	16 (25.8%)
	Negative	41 (66.1%)
	Never Tested	5 (8.1%)
Condom Use (last encounter)	24 (39%)	
Reason for Visit	Symptoms	26 (41.9%)
	Urethral discharge	16 (61.5%)
	Rectal discharge	2 (7.7%)
	Genital lesion	6 (23.1%)
	Other	4 (15.4%)
	Asymptomatic Screening	16 (25.8%)
	Other	20 (32.3%)
HIV results on this Visit (n=46)	Positive	6 (13%)
	Negative	31 (67.4%)
	Not Checked	9 (19.6%)

symptoms and only 2 had pharyngeal erythema on examination.

Among patients who tested positive for pharyngeal GC, 77% had rectal and 96% had urine testing performed at the same visit. The rates of rectal and urine GC among those with pharyngeal GC were low (52% and 28% respectively) (Figure **1**). Among patients who tested positive for pharyngeal CT, 77% had rectal and all had urine testing performed at the same visit. The rates of rectal and urine CT among those with pharyngeal CT were also low (30% and 8% respectively) (Figure **1**).

One fourth of the patients were known to have HIV infection at the time of the clinic visit and over 10% of the patients that had positive pharyngeal GC/CT were

newly diagnosed with HIV infection at the clinic visit (Table **1**).

DISCUSSION

Pharyngeal infections with GC and CT have been reported in the MSM population and can account for an important reservoir that if not diagnosed and then not treated, could contribute to the HIV and STI epidemics. These concerns are especially relevant given the growing problem of multidrug resistant GC [10, 11] and reports of the re-emergence of lymphogranuloma venereum [12]. In this report we describe the prevalence of pharyngeal GC and CT in MSM attending the Downtown MDHD STD clinic, located in an urban area with high prevalence of ethnic minorities, STIs, and HIV. We found 10.9% prevalence of GC and 2.7% of CT.

Several studies in MSM have been performed at different locations across the United States describing the rates of infections by anatomic site. In 2003, a study evaluating rates of pharyngeal GC and CT infections in 2 clinical settings in San Francisco (CA, US) found the rates of pharyngeal GC and CT were 9.2% and 1.4%, respectively [13]. A recent study by Park *et al.* focused on surveillance of pharyngeal STI infection in MSM in San Francisco (CA, US) in 2010 [14]. They found that overall pharyngeal GC positivity was 5.76%, while overall CT positivity was 1.69% [14]. Moreover, these studies and others have found discrepancy in rates of GC and CT by anatomic site. Kent *et al.* in San Francisco found that 64% of GC infections and 53% of CT infections were at non-urethral sites and would have been missed and not treated if extragenital testing were not performed [13]. Marcus *et al.* retrospectively evaluated MSM visiting a San Fransisco STD clinic between 2008- 2009 and found that 83.8% of GC and CT infections would have been missed by urethral screening only, compared with 9.8% by screening the rectum and pharynx [15].

Our study demonstrates slightly higher rates than described in other studies for both GC and CT. Reasons for this may be because of higher percentages of Hispanic population as well as HIV infected patients. In terms of ethnic difference in STI rates, according to the CDC, rates of both GC and CT have increased among Hispanics. In 2011, the gonorrhea rate among Hispanics was 53.8 cases per 100,000 population and chlamydia rates were 383.6 cases per 100,000 population, these rates are double of those among whites for both infections [16]. This disparity in rates of GC and CT between Hispanics and whites is larger for men than for women [16]. Since our population was primarily Hispanic men and had high rates of GC and CT, we believe strategies need to be in place to target Hispanic MSM.

We also found high rates of HIV infection in individuals diagnosed with pharyngeal GC and CT (over 35%). Several studies have described high rates of STIs in individuals with HIV infection and compared them with those without HIV infection. The STD Surveillance Network (SSuN) described rates of STIs in MSM visiting 12 STD clinics across the US. The prevalence of both GC and CT was higher among HIV-infected MSM than among HIV-non infected ones [4, 8]. Rates of rectal GC and CT were almost double in HIV-infected patients (12.9% vs 7.2% for GC and 20.6% vs 10.8% for CT). This study also evaluated pharyngeal GC infection, and found that pharyngeal GC positivity was 6.6% in HIV-infected and 5.5% in HIV-non infected men.

In our clinic, we have high rates of HIV infection and over 35% of the patients tested for pharyngeal GC and CT were co-infected with HIV. Moreover, 25% of those HIV infections were diagnosed at the same time as the pharyngeal infection. Our study support previously published data that HIV- infected individuals are at high risks of other STIs and prevention campaigns should target this population.

The discrepancy of number of genital compared to extragenital infections is important since undiagnosed infections can contribute to transmission of both STIs and HIV. CDC recommends routine screening for MSM in urethral, rectal, and pharyngeal sites. Although urethral screening is widely available, screening for infections in extragenital sites is not performed routinely [17]. NAATs are highly sensitive and specific for the detection of GC and CT using swabs from genital tract or urine specimens but have not been approved by the food and drug administration for diagnosis of extragenital gonorrhea or Chlamydia infection [18, 19]. Culture, although less sensitive, remains the standard test for extragenital sites but can rarely be performed in most clinical facilities [18]. Several laboratories perform in-house validations in order to use NAATs as we did in our study, and we have shown that rates of GC and CT infections are higher when this method is used [18].

Untreated pharyngeal infections have recently gained more attention. Recent studies have suggested that underdiagnosed infections of the pharynx may play a critical role in antibiotic resistant gonorrhea infections

as well as serve as important infection reservoirs [10, 17].

There were several limitations to our study. Data were collected retrospectively by chart documentation review. At times, charts were not fully completed which resulted in missing data. Chart documentation also may not have captured our intended, entire target population as some men may not have reported oral sex. Since pharyngeal testing was newly introduced, not all clinic providers performed pharyngeal testing and some men who were offered the test may have refused. Pharyngeal screening was only offered to men who admitted to engage in oral sex, and the rates of pharyngeal infections may have been higher if we included all men for testing. Our study only includes subjects that seek care at the MDHD and the population may not be fully inclusive of all the age groups affected with STIs. In addition, retrospective review may not reflect accurate sexual history and risk factors such as number of partners and use of condoms, especially for oral sex.

Despite the limitations above, our findings are important and highlight the importance to perform GC/CT screening in MSM population. The prevalence of pharyngeal GC(10.9%)/CT(2.7%) we found is high and all presented as asymptomatic infections. Medical providers need to increase GC/CT extragenital screening in high risk groups regardless of symptoms given the high rate of asymptomatic infections.

REFERENCES

[1] CDC. http://www.cdc.gov/std/gonorrhea/STDFact-gonorrhea.htm. Available from: http://www.cdc.gov/std/gonorrhea/STDFact-gonorrhea.htm.

[2] CDC. http://www.cdc.gov/std/chlamydia/STDFact-Chlamydia.htm.

[3] http://www.cdc.gov/msmhealth/STD.htm.

[4] Rietmeijer CA, McFarlane M. Web 2.0 and beyond: risks for sexually transmitted infections and opportunities for prevention. Curr Opin Infect Dis 2009; 22(1): 67-71. Epub 2009/06/18.

[5] Workowski KA, Berman S. Sexually transmitted diseases treatment guidelines, 2010. MMWR Recommendations and reports: Morbidity and mortality weekly report Recommendations and reports / Centers for Disease Control 2010; 59(RR-12): 1-110. Epub 2010/12/17.

[6] Koedijk FD, van Bergen JE, Dukers-Muijrers NH, van Leeuwen AP, Hoebe CJ, van der Sande MA. The value of testing multiple anatomic sites for gonorrhoea and chlamydia in sexually transmitted infection centres in the Netherlands, 2006-2010. Int J STD AIDS 2012; 23(9): 626-31. Epub 2012/10/04.

[7] Baker J, Plankey M, Josayma Y, Elion R, Chiliade P, Shahkolahi A, *et al*. The prevalence of rectal, urethral, and pharyngeal Neisseria gonorrheae and Chlamydia trachomatis among asymptomatic men who have sex with men in a prospective cohort in Washington, D.C. AIDS patient care and STDs 2009; 23(8): 585-8. Epub 2009/07/14.

[8] http://www.cdc.gov/std/stats11/msm.htm.

[9] Incorporated G-PG-PAfGaCG-P. www.gen-probe.com/products/aptima.aspx.

[10] Weinstock H, Workowski KA. Pharyngeal gonorrhea: an important reservoir of infection? Clinical infectious diseases: an official publication of the Infectious Diseases Society of America 2009; 49(12): 1798-800. Epub 2009/11/17.

[11] CDC Grand Rounds: the growing threat of multidrug-resistant gonorrhea. MMWR Morbidity and mortality weekly report. 2013; 62(6): 103-6. Epub 2013/02/15.

[12] Ronn MM, Ward H. The association between lymphogranuloma venereum and HIV among men who have sex with men: systematic review and meta-analysis. BMC Infect Dis 2011; 11: 70. Epub 2011/03/23.

[13] Kent CK, Chaw JK, Wong W, Liska S, Gibson S, Hubbard G, *et al*. Prevalence of rectal, urethral, and pharyngeal chlamydia and gonorrhea detected in 2 clinical settings among men who have sex with men: San Francisco, California, 2003. Clinical infectious diseases: an official publication of the Infectious Diseases Society of America. 2005; 41(1): 67-74. Epub 2005/06/07.

[14] Park J, Marcus JL, Pandori M, Snell A, Philip SS, Bernstein KT. Sentinel surveillance for pharyngeal chlamydia and gonorrhea among men who have sex with men--San Francisco, 2010. Sexually Transmitted Diseases 2012; 39(6): 482-4. Epub 2012/05/18.

[15] Marcus JL, Bernstein KT, Kohn RP, Liska S, Philip SS. Infections missed by urethral-only screening for chlamydia or gonorrhea detection among men who have sex with men. Sexually Transmitted Diseases 2011; 38(10): 922-4. Epub 2011/09/22.

[16] http://www.cdc.gov/std/stats11/minorities.htm.

[17] Battle TJ, Golden MR, Suchland KL, Counts JM, Hughes JP, Stamm WE, *et al*. Evaluation of laboratory testing methods for Chlamydia trachomatis infection in the era of nucleic acid amplification. J Clin Microbiol 2001; 39(8): 2924-7. Epub 2001/07/28.

[18] Schachter J, Moncada J, Liska S, Shayevich C, Klausner JD. Nucleic acid amplification tests in the diagnosis of chlamydial and gonococcal infections of the oropharynx and rectum in men who have sex with men. Sexually Transmitted Diseases 2008; 35(7): 637-42. Epub 2008/06/04.

[19] Clinic-based testing for rectal and pharyngeal Neisseria gonorrhoeae and Chlamydia trachomatis infections by community-based organizations--five cities, United States, 2007. MMWR Morbidity and mortality weekly report. 2009; 58(26): 716-9. Epub 2009/07/11.

Received on 25-05-2013 Accepted on 13-06-2013 Published on 30-06-2013

DOI: http://dx.doi.org/10.12970/2309-0529.2013.01.01.3