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NOTE

# Should urologists care for the pharyngeal infection of *Neisseria gonorrhoeae* or *Chlamydia trachomatis* when we treat male urethritis?

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**Abstract** Detection of *Neisseria gonorrhoeae* (NG) or *Chlamydia trachomatis* (CT) from the pharynx of women or men is not uncommon. However, there is no recommendation how urologists should care for the pharyngeal infection of men with urethritis in Japan. The aim of this study is to clarify the prevalence of NG or CT infection in the pharynx of men and to show a recommendation for urologists. The Japanese reports about the detection of NG or CT from the pharynx or the oral cavity of men in Japan are reviewed in the literature from 1990 to 2011. The prevalence of NG or CT in the pharynx was 4% or 6% in men who attended clinics, and 20% or 6% in men who were positive for NG or CT from genital specimens, respectively. Single 1-g dose ceftriaxone was recommended to treat pharyngeal NG, but no evidence was found for pharyngeal CT. There was not enough evidence for recommendation. However, when men with urethritis only caused by NG or CT are treated through the guideline of the Japanese Society of Sexually Transmitted Infection, we do not think additional tests or treatment for the pharynx are needed when a single 1-g dose ceftriaxone for gonococcal urethritis or a single 1- or 2–g dose azithromycin is prescribed for chlamydial urethritis in Japan.

**Keywords** *Neisseria gonorrhoeae* · *Chlamydia trachomatis* · Pharynx · Heterosexual men · Urology

Orogenital contact has been recognized as a route for transmission of infectious agents causing male urethritis. *Neisseria gonorrhoeae* or *Chlamydia trachomatis* are the most common pathogens for male urethritis, and some patients are infected by pathogens for urethritis only through fellatio performed by female commercial sex workers (FCSW) in Japan [1, 2]. The detection rates of *N. gonorrhoeae* or *C. trachomatis* from the pharynx of FCSW in Japan have increased. In addition, the treatment of pharyngeal infection of *N. gonorrhoeae* or *C. trachomatis* has not been clearly determined. Some reports of treatments for pharyngeal gonorrhoeae can be found in the literature [2, 3]. The pathogens of sexually transmitted infections (STI) infected at the pharyngeal sites became problems of concern as the source of male urethritis and as newer antimicrobial resistance, especially in *N. gonorrhoeae* strains, developed [4].

Recently, *N. gonorrhoeae* or *C. trachomatis* detected from the pharyngeal sites of heterosexual men like cases in women or in men who have sex with men (MSM) are reported in Japan [5, 6]. If these pathogens are commonly detected from the pharynx of heterosexual men, urologists who treat male urethritis in Japan have to care for the pharyngeal infection at the same time as the treatment of male urethritis. However, the detection rates of *N. gonorrhoeae* or *C. trachomatis* from the pharynx of heterosexual

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men have been unclear in Japan. In this study, the Japanese reports are analyzed and the current status of the pharyngeal infection of *N. gonorrhoeae* or *C. trachomatis* in Japanese men is shown. We want to show some recommendation for the treatment of urethritis in heterosexual men in Japan.

Japanese reports about the detection of *N. gonorrhoeae* or *C. trachomatis* from the pharynx or the oral cavity of men in Japan are reviewed in the literature from 1990 to 2011. We searched for peer-reviewed papers written in English in Medline and for peer-reviewed papers written by Japanese in Japana Centra Revuo Medicina ("Ichushi" website). The search strategy used the following key words: male or men, *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and Japan, combined with oral cavities, pharynx, pharyngitis, and tonsillitis. In the literature, detection rates of *N. gonorrhoeae* or *C. trachomatis* from pharyngeal sites in men were found. In addition, the detection rates of the two pathogens were analyzed by sexual orientation when described in the literature. The treatment for the pharyngeal infection of these pathogens in men was analyzed.

We searched for data that included the prevalence of *N. gonorrhoeae* and *C. trachomatis* at pharyngeal sites or the oral cavity of men. Five English [2, 6–8] and 4 Japanese papers [9–12] for *N. gonorrhoeae* and 1 English paper [5] and 3 Japanese papers [9, 11, 12] for *C. trachomatis* were found. In addition, 1 well-designed paper, which has now been submitted to a journal in English, was added for both *N. gonorrhoeae* and *C. trachomatis* [13]. The summary of our search is shown in Table 1. The data of 1 paper [2] were omitted from the total prevalence because the data were presented only in table form without details of methods and specimens. *N. gonorrhoeae* or *C. trachomatis* was detected from 14% or 6% of men who were tested for these pathogens at the pharynx, respectively. When patients were positive for *N. gonorrhoeae* or *C. trachomatis* in the genital specimens, the prevalence of *N. gonorrhoeae* or *C. trachomatis* at the pharynx was 20% or 6%, respectively. In 3 papers [5, 6, 13], including ours, the data of heterosexual men were shown. In heterosexual men, the detection rates of *N. gonorrhoeae* or *C. trachomatis* at the pharynx were 30% (18/61) or 10% (6/60), respectively, when *N. gonorrhoeae* or *C. trachomatis* was detected in the genital specimens. For the treatment of these pathogens at the pharynx, only 2 papers [7, 8] regarding *N. gonorrhoeae* were found. A single 1-g dose of ceftriaxone could eradicate *N. gonorrhoeae* at both the pharyngeal sites and genital sites, but a single 1-g dose of cefodizime could not eradicate all *N. gonorrhoeae* at the pharyngeal sites.

Pharyngeal infection by *N. gonorrhoeae* or *C. trachomatis* has not been uncommon. In the 1970s, the first reports of the detection of *N. gonorrhoeae* from MSM or FCSW were published [14]. Some reports of detection of *C. trachomatis* from the pharynx of MSM or FCSW were also published in the 1980s [15]. In cases of MSM or FCSW, the contamination of the pharynx by these pathogens is easy for us to imagine, because their pharynx are in contact with the urethral meatus of the penis of men when they are performing fellatio for their sexual partners or customers who are infected with the pathogens of urethritis. However, in heterosexual men, the means of contamination of their pharynx by pathogens such as *N. gonorrhoeae* or *C. trachomatis* were different from MSM or FCSW; possible ways include cunnilingus or kissing with women who are infected with pathogens of STIs. In our research, only three papers showed data for heterosexual men [5, 6, 13]. When heterosexual men have urethritis with *N. gonorrhoeae* or *C. trachomatis*, these pathogens can be detected from the pharynx in 30% or 10% of men, respectively. The prevalence of pharyngeal infection is depended on the method for detection, such as culturing or nucleic acid amplification tests, the kinds of specimens, such as pharyngeal swabs or oral wash specimens, and the timing of taking the specimens. Detection rates by nucleic acid amplification tests probably appeared higher than those from culturing to detect *N. gonorrhoeae* [6–8]. In addition, the detection rates of *C. trachomatis* in oral wash specimens were higher than those in swab specimens [5]. However, the prevalence in heterosexual men was higher than that which we had assumed, because of the mode of contamination of the pharynx as just described.

When *N. gonorrhoeae* or *C. trachomatis* is detected from the pharynx, we have to try to eradicate these pathogens. However, we could not find enough evidence in the literature. In Japan, only two papers [7, 8] regarding pharyngeal infection of *N. gonorrhoeae* were found. In these papers, a single 1-g dose ceftriaxone could eradicate *N. gonorrhoeae* at the pharynx, but a single 1-g dose cefodizime could not. Recently, cases of treatment failure of pharyngeal infection by ceftriaxone were reported in Sweden [3] and Australia [16]. In addition, an *N. gonorrhoeae* strain with high-level resistance against ceftriaxone was first isolated from the pharynx of FCSW in Kyoto, Japan [4]. In the oral cavity, other *Neisseria* species, such as *Neisseria subflava* and *Neisseria cinerea*, were closely related to a genomic mutation of cephalosporin-resistant *N. gonorrhoeae*. In a Canadian study, *N. gonorrhoeae* remained positive in 10% of patients after treatment with a single 400-mg dose cefixime [17]. All *N. gonorrhoeae* strains were sensitive to cefixime, which means that the appropriate amount of antimicrobials to treat pharyngeal gonococcal infection has not been determined. Regarding the treatment of pharyngeal chlamydia, it is still unclear. When a single 1-g dose of azithromycin was administered,