Non-gonococcal urethritis, 
*Helicobacter pylori* infection 
and fellatio: a new ménage à trois?

There have been a number of organisms 
that are associated with sexually transmitted 
urethritis (see Table 1); however, the 
majority of non-gonococcal urethritis 
cases (up to 50%) are due to *Chlamydia trachomatis* (Shahmanesh, 2001). No other 
micro-organism has been shown to cause 
any larger proportion of the remaining 
non-gonococcal urethritis cases, although a 
large number of organisms have been 
isolated from the urethra of young males 
(Kumar et al., 1995). In addition, oral sex is 
a very common sexual activity with nearly 
80% of single whites and almost 50% of 
African Americans engaging in the activity, 
although variations in the prevalence of 
oral sex exist due to differences in gender, 
marital status, race and ethnicity (Billy 
et al., 1993). *Helicobacter pylori*, a gastric 
organism discovered more than 20 years 
ago, is responsible for chronic gastritis 
and peptic ulcer disease and is associated 
with an increased risk of developing 
stomach cancer (Edlick et al., 1999).

Table 1. Organisms that cause or are 
associated with sexually transmitted 
urethritis

<table>
<thead>
<tr>
<th>Organism</th>
<th>No. of cases (%)</th>
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</thead>
<tbody>
<tr>
<td><strong>Gonococcal</strong></td>
<td></td>
</tr>
<tr>
<td><em>Neisseria gonorrhoeae</em></td>
<td></td>
</tr>
<tr>
<td><strong>Non-gonococcal</strong></td>
<td></td>
</tr>
<tr>
<td><em>Chlamydia trachomatis</em></td>
<td>15–50</td>
</tr>
<tr>
<td><em>Ureaplasma urealyticum</em></td>
<td>10–40</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td><em>Mycoplasma genitalium</em></td>
<td>15–25</td>
</tr>
<tr>
<td><em>Trichomonas vaginalis</em></td>
<td>Rare</td>
</tr>
<tr>
<td>Yeasts</td>
<td>Rare</td>
</tr>
<tr>
<td>Herpes simplex virus</td>
<td>Rare</td>
</tr>
<tr>
<td>Adenoviruses</td>
<td>Rare</td>
</tr>
<tr>
<td><em>Haemophilus sp.</em></td>
<td>Rare</td>
</tr>
<tr>
<td>Other bacteria?</td>
<td>Unknown</td>
</tr>
<tr>
<td>(Helicobacter)</td>
<td></td>
</tr>
</tbody>
</table>
H. pylori infection has also been implicated in numerous enterohelial and extragastric diseases (Eslick et al., 2002; Solnick & Schauer, 2001; On et al., 2002).

The aim of this article is two-fold: firstly, to postulate that H. pylori may be transmitted sexually through the act of fellatio and thus, secondly, to highlight the possibility that H. pylori may be another micro-organism responsible for urethritis among males.

The idea that H. pylori or another species of Helicobacter could cause urethritis has never before been proposed. There have been three conflicting studies conducted to determine if sexual contact plays any role in the transmission of H. pylori (Aceti et al., 1987; Polish et al., 1991; Perez-Perez et al., 1991). These studies were inadequate in terms of sample size, study design and causal information regarding sexual practices by the participants.

Non-gonococcal urethritis is predominantly developed through sexual activities, although rare reports exist of non-sexual transmission (Kleist & Moi, 1993; David, 1997). The sexual routes for the transmission of urethritis among males include vaginal intercourse, anal intercourse and oral sex (Martinez-Garcia et al., 1996; Jensen et al., 1993; Burstein & Zenilman, 1999). Moreover, uropathogens including Escherichia coli have been shown to be sexually transmitted between sex partners (Foxman et al., 1997). Oral sex (fellatio) is one of the main routes for the transmission of urethritis among homosexuals (fellatio) is one of the main routes for the transmission of urethritis among homosexuals (Aceti et al., 1987; Polish et al., 1991; Perez-Perez et al., 1991). Thus, H. pylori could inhabit the urethra and perhaps colonize the tissues leading to inflammation and/or pathology.

The natural infective dose of H. pylori is unknown. Based on the analogy of other enteric pathogens (Shigella, Giardia lambia, Entamoeba histolytica) it has been suggested that the infectious dose of H. pylori is small (Feldman et al., 1998). If the minimum infective dose of H. pylori is small, then the chance of a urethral infection is greater if a high inoculum were needed. One would suspect that low doses of H. pylori should be sufficient to cause urethritis given the correct environmental conditions of temperature and pH.

If H. pylori can survive in the extreme acidic environment of the stomach, can it live in the urethra with acidic-neutral or even alkaline urine flowing through it? Based on previous studies of H. pylori and environmental pH it is possible for H. pylori to survive in pH ranges between 2-2 and 7-2 (Clyne et al., 1995). Moreover, the optimal pH for H. pylori survival is between 4-5 and 7-0 which is also the pH range for human urine. The urinary tract may provide an ideal environment for H. pylori to thrive in once colonization has been established. Will the flow of urine affect the colonization of H. pylori? I suspect no more than any other sexually transmitted infection. In the stomach, H. pylori adheres to gastric epithelium using adhesins interacting with the host-cell receptor (Noach et al., 1994). It does this to avoid being washed away into the intestines by peristalsis. The urethra should support H. pylori (microaerophilic) just as it does a number of other organisms (i.e. lactobacilli, enterococci, β-haemolytic streptococci) (Kumar et al., 1995).

In conclusion, oral sex is one of the most common sexual practices in the world and it is possible that H. pylori could be transmitted via the act of fellatio to the urethra leading to infection. This organism may be the ‘missing link’ in explaining the large proportion of males with non-gonococcal urethritis where no other responsible organisms can be isolated. This is the first article to suggest a link between H. pylori infection and urethritis. Studies will be required to determine if H. pylori is transmitted via oral sex to the urethra; what, if any, interactions might occur with other uropathogens; if any pathologies arise from such an association [e.g. prostate (prostatitis), epididymitis, seminovascularis, testicles (orchitis, cancer) and urinary calculi]; and potential treatment modalities.

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