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A PubMed Search: Is *Helicobacter pylori* a Sexually Transmitted Organism?

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Abstract

Background: *Helicobacter pylori* is usually a gastrointestinal bacterium. Infected individuals may carry this organism in their saliva; and can transmit the infection sexually on practicing fellatio (oral sex).

Objective: To determine the possibility of *H. pylori* to be one of the causative agents leading to sexually transmitted infections.

Materials and methods: A PubMed search was performed through the wording: *Helicobacter pylori* infection, fellatio, vaginitis, and urethritis.

Result: All studies reviewed are advocating the hypothesis that *H. pylori* might be one of the causative agents leading to non-specific urethritis and bacterial vaginosis.

Conclusion: The act of fellatio may be infrequently a possible tool to transmit *H. pylori* in young sexually active adults; resulting in urethritis and vaginosis. This organism has a large prevalence among patients with non-specific urethritis and vaginosis, where no other causative organism could be isolated.

Key words: *H. pylori*, Fellatio, Urethritis

Introduction

Helicobacter pylori (*H. pylori*) has a helix shape (hence its generic name was derived). It is a curved, Gram negative, comma or S-shaped. It usually causes gastritis, peptic ulcer, gastric carcinoma, gastric lymphoma, and diarrhoea in children. The patient may suffer from acute gastritis with abdominal pain or nausea. This may develop into chronic gastritis, with dyspepsia, stomach pains, nausea, bloating, belching, and sometimes vomiting or bleeding (black stool). *H. pylori* patients have a risk of developing peptic ulcer and a risk of developing stomach cancer. It was isolated in 1982 by Barry Marshall and Robin Warren (Australians) from patients with

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gastritis and gastric ulcers. For that they were awarded the Nobel Prize (Fig. 1).



Fig. 1: Barry Marshall and Robin Warren

The normal habitat of (*H. pylori*) is the human stomach. There are many assumptions on the routes of transmission including, e.g. oral-oral, faecal-oral, iatrogenic, fomite, and vector borne. *H. pylori* can survive in the stomach low pH using its urease enzyme to convert urea to ammonia; thus forming an alkaline mist that protects it from the stomach acids¹. Infection is acquired in childhood by ingestion or by vertical transmission during birth. Spread among families is more prevalent in areas with poor hygiene. *H. pylori* was found on cockroaches, in cockroach droppings, and on houseflies. *H. pylori* was also found in dogs, cats, birds, shellfish, sharks and dolphins².

Sexual transmission of *H. pylori* was postulated to be oro-anal transmission (rimming), direct oro-genital transmission (cunnilingus), indirect oro-genital transmission (fellatio) followed by sexual intercourse, oro-oral transmission (kissing), masturbation transmission (using saliva as a lubricant), and fomites transmission (sex toys)¹.

The infectious dose of *H. pylori* is unknown in humans; but in a Rhesus monkey it was found as 10^4 *H. pylori* cells intake. Thus so far it is not possible to judge whether the infectious dose of *H. pylori* is enough to cause human sexually transmitted infections³.

Laboratory diagnosis of *H. pylori* can be performed by collecting a blood specimen or a gastric biopsy. Microscopy is conducted using Giemsa or Gram stains. Culture of the organism may be done by inoculating Butzler medium; and incubating at 37°C in moist carbon dioxide environment for 3-7 days. Full identification of the organism is made by the biochemical reactions: oxidase, catalase, and urease. The most reliable identification method is examining an endoscopy biopsy. Serology testing is performed to detect *H. pylori* antigen in stool by the immunochromatographic test. Detection of *H. pylori* IgG antibodies in serum may be run by the

rapid latex agglutination test; and detection of *H. pylori* IgM antibodies in serum and urine by the enzyme-linked immunosorbent assay. Urease breath test is performed by requesting the patient to swallow a urea-containing tablet. If *H. pylori* is present in the stomach, it will convert the urea in this tablet to ammonia and CO₂. The CO₂ evolves and thus detected in the breath of the patient on blowing in a specialized detector⁴.

Prevention of *H. pylori* infection may be accomplished by ingestion of green tea, garlic, or yogurt to help in combating any colonization with *H. pylori*. The patient is advised to avoid consuming refined white flour and polished white rice. Extensive vaccine studies in mouse models are in progress and have shown promising results. Treatment of symptomatic *H. pylori* patients may be performed using a one-month triple therapy regimen consisting of omeprazole (or pantoprazole), metronidazole, and amoxicillin⁴ (Fig. 2).



Fig. 2: *H pylori*

Review of current studies

Most studies reported that 90% of *H. pylori*-infected patients carry *H. pylori* in their mouth and saliva; thus creating a route of transmission via oral sex. Fellatio is a route for spread of oral flora such as streptococci and *N. meningitidis*, and a route of spread of urethritis resulting from syphilis, herpes, fungi and *Chlamydia*⁵.

Because *H pylori* has been cultured from saliva and the oral cavity, *H pylori* is supposed to be transmitted via kissing or other sexual activities. Also *Candida albicans* is a normal flora of the mouth and acts as a vector for *H pylori* transmission. Sexual transmission of non-specific

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urethritis (NSU) in men usually results from vaginal, anal, and oral sex. *H. pylori* colonizes the squamous epithelium of the mouth and tongue. Thus it can inhabit the human urethra which consists of squamous epithelium as well. At the same time, *H. pylori* uses its lectins (adhesions) to connect itself to the epithelial surface; hence avoiding being washed away by the stomach peristalsis or the flow of urine. Also, *H. pylori* is able to live in higher pH environments (pH 6.0) which is the pH of urine and urethra. This fact had helped microbiologists to isolate *H. pylori* from urine specimens collected from *H. pylori*-infected patients⁶.

Candida albicans protects *H. pylori* against adverse vaginal environment by allowing it to live inside a vacuole; thus assisting *H. pylori* transmission by oral-genital contact. Furthermore, molecular studies showed that *Candida albicans* isolated from the vagina has been found to contain *H. pylori* specific genes. Also, some studies reported presence of comma-shaped bacteria in the vagina that has similar characteristics of *Helicobacter* species. It is known that *H. pylori* is a microaerophilic organism and the vagina may support its growth equally as other microaerophilic organisms, e.g. lactobacilli, *T. vaginalis*, and *Actinomyces israelii*. On the other hand, because of the close proximity of the vagina to the anus, *H. pylori* colonizing the faeces could be transmitted to the vagina by hand contact or by wiping after defecation⁷. Other studies reported the possibility of the fecal-oral transmission of *H. pylori* between male homosexuals; and that vertical transmission of *H. pylori* may occur during birth if *H. pylori* was prevalent in the vagina. Statistically, the prevalence of *H. pylori* in pregnant women was found about 20%; and *H. pylori* was isolated from a 6 days neonate who developed vomiting, and difficulty in suckling after birth⁸.

Recent studies postulated transmission of *H. pylori* to the female genital tract during sexual activities such as oro-genital sex. *H. pylori* expressing *CagA* gene may disturb sperm quality of men; and infected women have antibodies in their cervical mucus that may decrease sperm motility. Also molecular studies suggested transmission of *H. pylori* between spouses, where individuals are reinfected with the identical *H. pylori* strain detected in their spouses⁹. Unfortunately, the infectious dose of *H. pylori* is unknown in humans; but in a Rhesus monkey it was found as 10^4 *H. pylori* cells intake. Thus so far it is not possible to judge whether the infectious dose of *H. pylori* is enough to cause human urethritis¹⁰.

Furthermore, *H. pylori* hasn't been recovered from the human urethra or vagina in routine microbiology practices. The reasons for that are the fastidious nature of *H. pylori* since this organism needs tedious culture techniques, and most microbiologists are reluctant and don't bother. Also, microbiologists look only for micro-organisms related to the clinical information provided by clinicians' laboratory requests. They consider any 'one-off' micro-organism as a contaminant or not clinically significant¹¹.

Conclusion: The act of fellatio may be infrequently a possible tool to transmit *H. pylori* in young sexually active adults; resulting in urethritis and vaginosis. This organism has a large prevalence among patients with non-specific urethritis and vaginosis, where no other causative organism among patients could be isolated.

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