Comparative assessment of *Helicobacter pylori* colonization in children tonsillar tissues

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ABSTRACT

**Objective:** The objective was to survey the results of RUT (rapid urease test) in children tonsillar tissues.

**Methods:** In a prospective clinical study 285 children (4–14 years) tonsillar tissue tested with RUT (rapid urease test) and histopathologic biopsy and simultaneously serum IgG *Helicobacter pylori* level was measured for all patients.

**Results:** One hundred and thirteen patients (39.6%) were positive to *H. pylori* in histopathologic examination. Forty patients (14%) had positive RUT and 15 patients had positive serum IgG anti-*H. pylori* level. In 40 patients the results in both histopathology and RUT were positive (*P* = 0.000) although in 172 patients the results in both histopathologic and RUT were negative (*P* = 0.000).

**Conclusions:** This study showed that *H. pylori* was present in tonsillar tissue and RUT is not sensitive enough for diagnosis of *H. pylori* in tonsillar tissue. Indicating that *H. pylori* has a possible role in reservoir of *H. pylori* in children.

1. Introduction

*Helicobacter pylori* infects the gastric antrum of half the world’s population and represents the major cause of acute and chronic gastro-duodenal pathologies. Although the stomach is the natural reservoirs of *H. pylori*, various tissues have been proposed as potential reservoirs of infection such as tonsil, gingival, dental plate, gall bladder, and coronary arteries [1,2]. The bulk of data suggests that the organism is transmitted from person to person by fecal–oral and/or oral–oral route [3,4]. Tonsillar tissue is a component of mucosa-associated lymphoid tissue (MALT) that has evolved to protect the vulnerable mucosal surface. However, even they may also serve as a reservoir for pathogens [5]. The rapid urease test is fast and inexpensive but it also invasive in addition, the accuracy of this method can be affected by biopsy location, bacterial load and recent antibiotic use. Investigation has shown sensitivity and specificity of 92.6% and 100%, respectively for this test, and in another study 89.2% [6,7]. *H. pylori* with a unique array of features that permit entry into the mucosa, swimming and spatial orientation in the mucus, attachment to epithelial cell, evasion of the immune response and, as a result persistent colonization and transmission [5].

Because of MALT of Waldeyer’s ring is the first line of mucosal defense against invading pathogens, it is plausible that *H. pylori* induce a pro-inflammatory reaction that is both local and systemic so some authors have suggested that tonsils may act as reservoirs for recurrent systemic infection and tonsillectomy may protect the host against *H. pylori* infection of the stomach [1]. In one study in Turkey positive RUT of tonsil tissue had been reported [8]. While Skinner et al. found negative result for the same test [9]. But Boris et al. reported tonsillar colonization is unlikely to play important role in *H. pylori* infection in Bosnian children [10].

Khademi et al. reported that a swab is neither specific nor sensitive as an indicator of the presence or absence of *H. pylori* colonization in tonsillar core tissue and RUT of tonsillar core is more reliable than swab test and probably there are some similarity between tonsillar crypt and gastric mucosa [11]. Because of different results of several studies on tonsillar tissue we investigate this study to identify the presence of *H. pylori* in tonsillar tissues and assess the correlation of RUT and histology in the tonsil and compared this with serologic finding in serum.

2. Methods and materials

Biopsy samples were collected from 285 children aged from 4 to 14 years who were admitted to the Ear, Nose and Throat Clinic of Children Hospital of Tabriz Medical University from December 2006 to November 2007.
All the children who were 4–14 years old and were admitted in the hospital because of tonsillitis were included in the study. Any of these patients who used antibiotics (amoxicillin, co-amoxiclav, cefixim, metronidazole, and all macrolide antibiotics) during 2 weeks before surgery or proton pump blocker or H2 blocker during 4 weeks before surgery were excluded from study. All the parents of children had information about this study and the design of this study had been approved by the ethical committee of Tabriz Medical University. Preoperatively, all patients were visited by one otolaryngologist and all necessary information about medical history and physical examination of children was collected in specific charts. Serum anti-H. pylori IgG level was measured simultaneously with preoperative blood examination. Following tonsillectomy, two tissue core samples were obtained from each of right and left tonsils, then the pieces were placed in RUT kits (Kimberly-Clark, Pronto Dry, Medical Instrument, Brignais, France). Results were read in 30 min and 1 h after sampling as directed by the manufacturer. The color change from yellow to pink was considered positive result and no color change as negative for Pronto Dry. All remnants of tonsils were sent to Pathology Department and studied by one pathologist.

3. Results
A total of 285 children tonsillar tissue were examined. Two hundred and one patients (79.3%) had recurrent pharyngitis more than 6 attack per year, 226 patients had night snoring (79.3%). One hundred and eleven patients had chronic abdominal pain (38.9%) and 155 patients had precocious satiety feeling (54.4%).

Eighty patients had serous otitis media (6.3%) and 45 patients had recurrent acute otitis media (15%). One hundred and thirteen patients (39.6%) had positive H. pylori IgG in histopathology examination, 40 patients (14%) had positive RUT test. In our study we found sensitivity of RUT 35% and specificity 100%. Fifteen patients had positive anti-H. pylori IgG. Forty patients had positive results in both histopathology and RUT (P = 0.000). One hundred and seventy-two patients had both negative histopathology and RUT (P = 0.000). Five patients had both positive in both RUT and serum IgG anti-H. pylori level (P = 0.32). Nine patients had both positive histopathology reports and positive serum IgG level (P = 0.053). There was no significant correlation between H. pylori colonization histopathology and RUT with patient’s weight (P = 0.6 and 0.54, respectively).

There was no significant correlation between H. pylori colonization histopathology and RUT results with height or weight/height of patients (P = 0.7 and 0.65). One hundred and eleven patients complained about chronic abdominal pain for more than 3 months, but there was no significant correlation between chronic abdominal pain (more than 3 months) and H. pylori in tonsillar histopathologic test (P = 0.9) or RUT (P = 0.102). One hundred and fifty-five patients complain about precocious satiety feeling although there was no significant correlation between it and H. pylori positive histopathology (P = 0.279) or RUT (P = 0.54). None of the patients complained about post-eating vomiting.

4. Discussion
Infection with H. pylori occurs worldwide, but the prevalence varies greatly among countries and among population groups within the same country [12]. Tonsil, a component of MALT, participates in the immune function, but it may serve as a reservoir for bacteria [13]. Minocha found a decreased prevalence of H. pylori gastric colonization in subjects with a history of tonsilllectomy [14], but Di Bonaventura et al. did not support this argument [14]. Bulut et al. studied association of cytotoxin-associated gene A (cag A) of H. pylori with adeno-tonsillar hypertrophy and suggested that presence of cag A H. pylori may be associated with development of tonsillar hypertrophy [15]. Khademi et al. compared helicobacter colonization on the tonsillar surface versus tonsillar core by RUT test, and (83%) positive findings core tissue RUT and suggested a tonsillar surface SWAB do not reliably reflect the presence or absence of H. pylori colonization [11]. RUT is highly specific (97%) and sensitive (98%) for H. pylori and it is the most common method of finding H. pylori used by gastroenterologist [16]. So we choose to use synchronous RUT and histopathology and serologic tests in our study. Analysis of our data revealed that the tonsillar crypts is the major site of H. pylori colonization in histopathologic examination, 39.6% of patients had positive H. pylori in tonsillar pathologic specimens especially tonsillar crypts and significant correlation were found between RUT and histopathologic examination (P = 0.000). Although the serum IgG antibody release in the children above the age of 4 is reliable as in adults [17] and in meta-analysis by Leal and co-worker in 2008, the serum IgG antibody detection for H. pylori in children is acceptable [18]. We found only 15 patients with positive serum IgG anti-H. pylori which did not have significant correlation with positive histopathology and RUT result. This study showed that, tonsils in most cases, releases antibodies locally, rather than systemically, into aero-digestive tract. And on the other hand, our positive histopathologic and RUT results are consistent with the findings of Minocha et al. [1], Unver et al. [8] and Khademi et al. [11], and histopathologic similarity between tonsillar crypt and gastric mucosal crypt may be the reason of our findings such as the reason suggested by Khademi et al. [11].

5. Conclusion
We concluded that H. pylori can colonize children tonsillar tissues and has possible role in reservoir of HP in children. Meanwhile, it seems that RUT is highly specific but it is not sensitive enough for diagnosis of HP colonization in tonsillar tissue. Another multi-centrual study should be done for assessing the H. pylori colonization in tonsillar tissues in children who had been infected with H. pylori in gastric mucosa biopsy.

References


