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Editorial

Will saliva test be a good method to detect *Helicobacter pylori* in *H. pylori*-infected patients?

In developing a noninvasive method of detecting *Helicobacter pylori* from saliva, there are several issues that require clarification.

First, is the presence of *H. pylori* in dental plaque equal to the presence of *H. pylori* in the stomach? In earlier studies, the prevalence of *H. pylori* in dental plaque ranged from 0% to 100% in patients positive for gastric *H. pylori*.[1,2] This wide variation may be explained by the use of different sampling procedures to detect the bacterium in dental plaque [urease tests, polymerase chain reaction (PCR) techniques, immunoassays, cytology, and culture]. The prevalence rate reported in studies using urease tests was higher than with other techniques. The lowest rate of detection has been reported with microbial culture (usually < 20%),[1] which has been attributed to the existence of *H. pylori* in the metabolically active but unculturable coccoid form in dental plaque.[3] The use of urease tests for the detection of *H. pylori* in dental plaque has been debated. This controversy results from the fact that although *H. pylori* is the only urease-positive microorganism that resides in the stomach, many urease-positive bacterial species, such as *Haemophilus*, *Streptococcus*, and *Actinomyces* species, may be detected as part of the normal oral flora. However, it has been reported that only *H. pylori* produces large amounts of urease, such that a positive urease test can occur within 20 minutes, while other urease-producing bacteria are not positive within 1 hour.[4] The PCR technique for detection of *H. pylori* provides the advantage of detecting even small numbers of the target species and detecting the target DNA in spite of the viability of the bacteria. The results of utilizing PCR techniques have been variable, ranging from 0% to 100%.[1]

Second, does the presence of *H. pylori* in saliva match the presence of *H. pylori* in the stomach? The detection rate in saliva was generally less than in dental plaque (usually < 50%).[1] However, the prevalence rate was even lower in studies in which culture was used for detecting *H. pylori* compared with studies using PCR.[5] This may be because dental plaque is a biofilm, which allows the bacteria to adhere to solid surfaces, and the continuous flow of saliva may result in a reduction in bacterial load, making detection difficult.[6] As with dental plaque, researchers have differed in their opinions regarding the significance of detection of *H. pylori* in the saliva. In fact, the detection of *H. pylori* in saliva and dental plaque may be independent of gastric infection.[7–9] It is not yet clear whether the presence of *H. pylori* in the oral cavity represents long-term colonization or whether its presence is transient due to gastric reflux or because it is *en route* to the stomach. While some investigators maintain that *H. pylori* may be a normal commensal organism in the oral cavity unrelated to gastric infection,[10,11] other experts, based on detection of *H. pylori* from dental plaque and saliva of patients with and without *H. pylori* infection, have suggested that the oral cavity may be a permanent reservoir of the microorganism, acting both as a route of transmission and a source of reinfection.[7,12]

After reviewing the aforementioned issues, we understand the reason why Khadir et al's[13] study showing that a low detection of *H. pylori* antigens in saliva compared to the presence of this bacterium in gastric mucosa, and Yang et al's[14] study revealing that a one-step *H. pylori* saliva test exhibited a low specificity in *H. pylori* detection, although the saliva test is a sample noninvasive test for *H. pylori* detection.

In conclusion, although *H. pylori* has been detected in the oral cavity for > 10 years, the clinical significance remains controversial. If the oral cavity is an important extragastric reservoir of *H. pylori*, then this finding may have a principal impact because the oral cavity can serve as both a route of transmission and a source of reinfection. Thus, it is imperative to identify the role of saliva and dental plaque in *H. pylori* infection. Once these factors are clearly understood and the fact that the oral cavity is a major extragastric reservoir of *H. pylori* is confirmed, then a new diagnostic method, especially using saliva as a sample, could be useful in the future.

Conflicts of interest

The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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