Special Communication

Helicobacter pylori in dental plaque and gastric mucosa: Correlation revisited

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Abstract

Helicobacter pylori (H. pylori) related gastric infection is highly prevalent in developing countries. Prevalence of bacterium in dental plaque from these regions is also reported to be high, but association between simultaneous colonization of H. pylori in both these sites has not been established yet. Aim of this paper is to review possible association between simultaneous oral and gastric H. pylori colonization in dyspeptic patients. Pertinent literature was reviewed and all available evidence collected from Medline and PakMedinet. Studies conducted in the developing world show conflicting results. Some report a positive relation between oral and gastric H. pylori colonization while others deny any association. This may be due to the population sampled or methodology applied. Further studies are recommended to confirm the association between concurrent presence of H. pylori in dental plaque and gastric mucosa of dyspeptic patients using sensitive and specific tests for detection of bacterium in oral samples.

Introduction

The presence of Helicobacter pylori (H. pylori) in humans is recognized as a chronic infection, which in most cases persists indefinitely.1 H. pylori is a gram negative, motile, microaerophilic, rod-shaped bacterium that colonizes the human stomach. It lives beneath the gastric mucous layer adjacent to gastric epithelial cells.2 It is a major human gastric pathogen responsible for gastritis and peptic ulcer disease.3 It has also been designated a type I, or definite, carcinogen by World Health Organization, as it is associated with the development of gastric adenocarcinoma, the second most commonly diagnosed fatal cancer worldwide.4 H. pylori is also associated with gastric MALTomas.3

References

Prevalence

Approximately 50% of the world's population is affected by gastric H. pylori infection. Infection is significantly more prevalent in developing countries where reported prevalence in adult population is around 90% as compared to less than 40% in developed nations. Asians carry higher prevalence of H. pylori infection with large inter-country variation. Infection is more frequent in less developed countries like Pakistan, India, and Bangladesh, as compared to Japan and China. H. pylori infection is very common in Pakistan with infection rates reported to be as high as 90% in adult population. The exposure rate in children is around 33% with infection rates of 67% in infants and 30% in children under fifteen years of age.

Route of transmission

Exact mode and route of transmission of H. pylori is still unknown. Faecal-oral and oral-oral routes are generally accepted as the most probable ones. The bacterium is believed to be transferred through person to person contact occurring more in close contacts and in situations of poor social hygiene. Overall, inadequate sanitation practices, low social class, and crowded living conditions are related to high prevalence of H. pylori infection.

Extra gastric ecological niche

H. pylori is known to resides in human stomach. Other possible extra gastric ecological niche for H. pylori being evaluated recently is the oral cavity. Human oral cavity has a complex flora of 350 different species. Presence of carbohydrate fermenting organisms and an optimum oral temperature of 35-37°C provides an ideal environment and a vast static area of dental plaque (collection of microorganisms forming soft debris, covering the exposed tooth surface) for growth of H. pylori.

The bacterium has been detected in saliva, in the microbiota from the dorsum of the tongue, on the surface of oral ulcerations, oral neoplasia and in dental plaque. High rates of H. pylori detection in dental plaque and saliva suggest that the oral cavity might be an important reservoir of the bacterium which can lead to infection in the stomach. Kamada et al. reported three cases of H. pylori related acute gastric mucosal lesions following dental treatment in all patients. Furthermore, dental plaque has been implicated as a possible source of gastric re-infection after apparently successful gastric eradication as H. pylori eradication therapy successfully removes the bacterium from stomach but not from dental plaque.

Detection rate in dental plaque

Rate of detection of H. pylori in dental plaque also varies among studies conducted on different populations with very low figures in Western countries while extremely high rates have been reported from developing nations around the world, including Pakistan.

Correlation of H. pylori in dental plaque and gastric mucosa

H. pylori related gastric infection is highly prevalent in developing countries. Prevalence of bacterium in dental plaque from these regions is also reported to be high but correlation between simultaneous oral and gastric H. pylori colonization in dyspeptic patients has not been yet. Studies done so far to find association between oral and gastric H. pylori infection have revealed conflicting results. Some report a positive relation while others deny any association. Studies from Iran, Brazil, and Venezuela have found no relation between the two, while those from Pakistan, India, and Nigeria have reported a positive association. A study from Venezuela also reported positive correlation between oral and gastric H. pylori. Variations in prevalence of infection in stomach among sampled populations and methods used for detection of the bacterium may account for conflicting results among studies.

Two studies have been conducted so far in Pakistan addressing this issue. Butt et al. reported it to be 100% in dental plaque of patients with symptomatic dyspepsia. Another study reported majority of Pakistanis to have possible H. pylori colonization in dental plaque while about two-thirds had H. pylori associated chronic active gastritis. The researchers implicated that oral cavity may be the first place for colonization and then infection involves the gastric mucosa.

Problems with Helicobacter pylori detection in Oral Samples

There are several popular methods for detection of Helicobacter pylori infection. Detection of H. pylori infection in gastric biopsy specimens by urease test, histology, culture and polymerase chain reaction (PCR) is well documented; however detection of this bacterium in the oral cavity is a topic of considerable debate. Detection of Oral H. pylori is quite complex. Oral cavity is residence to several urease-producing species, including Streptococcus, Haemophilus species, and Actinomyces species. It is inappropriate to conclude that high urease activity in dental plaque indicates presence of
H. pylori. Histology, where H. pylori appear as Gram-negative, curved or spiral-shaped rods, provides low specificity in the case of oral samples, where spirochetes, including Treponema species, are present. Culture of oral H. pylori is more sensitive than other methods but has not met with much success. While the bacterium has been isolated from dental plaque and saliva samples, there is a potential for false-positives and detection rates have been consistently low. A difficulty in culturing the bacterium from oral samples is presence of a viable coccoid form that is unculturable by conventional techniques. While this coccoid form is not associated with disease, it reverts to the infectious rod-shaped form under appropriate conditions, and so its presence can still be considered clinically significant.

PCR based assays have proved to be promising tools for detecting H. pylori in dental plaque samples, but the sensitivity and specificity of the assay varies with the type of buffers and primers used and the detection method applied. Nested PCR using EHC-U/EHC-L primers, which amplifies a DNA fragment of 417 bp homologous to a DNA fragment of H. pylori of 860 bp, has been shown to carry highest sensitivity and specificity for detection of bacterium in oral samples.

**Conclusion**

Studies conducted so far to find correlation between oral and gastric H. pylori infection in developing countries are not in full agreement and need to be treated with reservations as the methodology applied is not sensitive and specific enough for detection of bacterium in plaque samples. Some researchers have done rapid urease test for detection of bacterium in plaque samples whereas others have performed culture. Few studies conducted have done PCR on oral samples but the primers used in these studies are not sensitive and specific for H. pylori detection. Furthermore, studies done in the developing world have not performed nested PCR, using EHC-U/EHC-L primers, on plaque samples to find the correlation between oral and gastric colonization.

**Future Research**

The correlation between the presence of H. pylori in dental plaque and gastric mucosa of patients with symptomatic dyspepsia is still not clear. Future research should aim at confirming this association using highly sensitive and specific PCR assays for diagnosis of Helicobacter pylori in dental plaque samples.

**References**


Case Report

Percutaneous balloon pericardiotomy in a patient with advanced case of malignant pericardial effusion and tamponade

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Abstract

Surgical creation of a pericardial window has been a standard procedure for relieving symptoms of patients presenting with recurrent pericardial effusion. In this report we describe the application of Multitrack balloon catheter for creating a pericardial window in a patient who had recurrent pericardial effusion with tamponade as a result of advance malignant disease of breast.

Introduction

The most common causes of pericardial effusion encountered, are tuberculosis, renal failure, infarction process and malignancy. It can also occur after trauma or acute myocardial infarction, hypothyroid, collagen vascular disease and idiopathic pericardial effusion. Patient presentation is either asymptomatic or symptoms of cardiac tamponade. In elderly patients after tuberculosis, malignant disease is the most common cause of pericardial effusion and cardiac tamponade.\(^1\)

In cardiac tamponade initial management is pericardiocentesis followed by surgical intervention if there is repeated accumulation of fluid in the pericardial sac.\(^2\)

Immediate management of tamponade has its impact on relieving the symptoms, while long term prognosis depends on the root cause of the disease, regardless of any intervening procedure.\(^2-5\)

Different approaches have been described for managing recurring pericardial effusion. This includes pericardiocentesis, surgically created pericardial window\(^6\) and percutaneous balloon pericardiotomy (PBP) which is a less invasive approach as compared to surgery.\(^7\)

Case Report

An 80 year old woman with advanced malignant disease of breast, treated by chemotherapy and radiotherapy was admitted through the emergency with dyspnoea functional class IV. On examination pulse was 150/minute low volume, paradox in character, B.P. 100-114/60 mm of Hg with a paradox of 14mmHg. JVP was raised with functional class IV . On examination pulse was 150/minute low volume, paradox in character, B.P. 100-114/60 mm of Hg with a paradox of 14mmHg. JVP was raised with respiratory rate of 28/min. Heart sounds were muffled. ECG showed low voltage QRS complex. Emergency echocardiography was repeated accumulation of fluid in the pericardial sac.\(^2\)

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Pigtail catheter was kept for three days with continuous drainage of fluid and with daily echocardiography for confirmation of fluid. Catheter was withdrawn on the fourth day and patient was discharged.