Neurologic diseases in helicobacter pylori infected patients

Saeed Shirali 1*, Masuomeh Shushtry 2, Esmaeel Ebrahim 2, Maryam Sadat Mirlohi 2
1-Hyperlipidemia research center, faculty of paramedicine, Ahvaz Jundishapur University of Medical sciences
2-Student Research Committee, Ahvaz Jundishapur University of Medical sciences

ARTICLE INFO

Article history:
Received 10.10.2015
Accepted 26.11.2015

Keywords:
Helicobacter pylori, negative gram, Neurologic disease, migraine, Alzheimer

Corresponding Author
Saeed Shirali
Hyperlipidemia research center, faculty of paramedicine, Ahvaz Jundishapur University of Medical sciences
saeed.shirali@gmail.com

ABSTRACT

Helicobacter pylori is a negative gram bacterium that it infection is associated with outbreak the numerous of digestive and non-digestive disease. One of way the effect of H.pilory in prevalence of Neurologic disease is absorption reduction vitamins such as A, B12, C, D and E. In addition, this bacterium by stimulate serotonin secretion and hyperphosphorilation of tau protein has a key role in prevalence of migraine and Alzheimer disease respectively. Here, we reviewed the relationship between infection-induced by Helicobacter pylori and neurologic disease.

Introduction:

Helicobacter pylori are a gram negative, microaerophilic and flagellate bacteria. It locates as non-invasive, gastric mucosa and is often as spiral and curved in the media (1). Infection of H.pylori is the most widespread infection in human, which has been found is more than 80% in developing countries (2). This infection has a negative relation with health of society condition so that it prevalence is very high in Third World countries. The occurrence infection is in childhood and concomitant increases with age its will increase. Various studies have been shown that H. pylori are a pivotal role in gastric diseases especially chronic gastritis and peptic ulcers (3). In several studies were reported the association between infection-induced by H. pylori to other diseases such as coronary heart disease, high blood pressure, chronic urticaria, vomiting during pregnancy (1). The bacteria have also been linked to childhood malnutrition in developing countries. Epidemiological studies; have been shown the association between infection with this organism and iron deficiency anemia (4). The vitamins have duties in the nervous system as follows: formation of synapses, formation of myelin, removal and prevention of amyloid production and protects from neuron (5-8). The effects of vitamin D deficiency, such as low levels of calcium and phosphate in children with this infection was observed, which these effects disappear after eradication of the bacteria and return the growth and activity of the patients (9). The bacteria influence on absorption of some vitamins such as B12, A, C, E and folic acid under infection condition. In other word, the elimination of this bacteria lead to improve the serum levels of iron and B12 and absorption of vitamins A and E (4). In line with our recent studies on Neurological diseases and related markers (32-35) this study designed. Here, we reviewed the relationship between infection with
a number of neurological diseases such as migraine, Ischemic stroke, Parkinson, Alzheimer, neural tube defects, Guillain-Barre syndrome, epilepsy and multiple sclerosis.

**Material and method**

As purpose the evaluation of new studies, we use databases such as pubmed, science direct and web of Science.

**The relation among helicobacter pylori infection to Neurologic diseases**

Alzheimer's is a brain progressive disease that typically occurs in old age (10, 11). Until the biological mechanism of Alzheimer unknown, but several factor such as obesity, insulin resistance, aging, lipoprotein E and inflammatory markers are important in it pathogenesis (12). Low levels of vitamin B12 play an important role in the pathogenesis of Alzheimer's disease (13). During infection with H pylori increase level of beta-amyloid proteins and inflammatory cytokines (13). Research has shown that the H. pylori induce hyper-phosphorylation of tau protein in Ser404, Thr205, and 231 in N2a cells from mouse neuroblastoma, which resulted in glycogen synthase kinase 3β activation (14). Histidine rich protein is abundant in H.pylori this protein involves in the formation of amyloid-like oligomers (15). Also, found that H.pylori infection linked to high level of phosphorylated tau proteins (16).

Migraine is most common headaches in all societies. The amount of it prevalence among men and women is 6.4 and 13 % respectively. Migraine may be start from childhood, adolescence or adulthood (17, 18). Some researchers believe to vascular mechanism in the pathogenesis of migraine, while another believe migraine resulted from vasomotor activity. One of the latest issues is possible relationship between H. pylori infection and the incidence of migraine. The bacteria secrete platelet-activating factor lead to release serotonin from platelet and ultimately occur migraine (18). In a study was observed that among 70 people with migraine about 75.7 % subjects had various digestive disorders and average titers of IgG antibody against Helicobacter pylori was about 60.8 (17). It has been reported prevalence of Helicobacter pylori among people with migraine, but is not well defined it relation to the state of oxidative stress in patients with migraines, which resulted in Hp doubts about the effects of Hp on migraines (19, 20).

Stroke is one of the causes of disability in worldwide. Infection induced by H.pylori is most common risk factors of stroke (21). In one study was shown that the prevalence of H. pylori among patients with stroke and healthy people was almost identical, while the outbreak strain with cytotoxin-associated gene-A (CagA), was higher in patients with stroke (22). Probably infection with H.pylori is effective in the incidence onset of stroke (23).

The neural tube defect is the second most common congenital among babies, which occurs between the third and fourth week of embryonic period (24). In a study was reported that maternal infection with the bacteria increases risk of neural tube defects in babies (25).

Guillain-Barre syndrome is an acute polyneuropathy in all parts of world. The main cause of Guillain-Barre syndrome is unknown, but the disease seems to begin with the development of antibodies against myelin of peripheral neurons (26). Structural similarity found between VacA Related to Helicobacter pylori and subunit Na,K –ATPase α that lead to demyelination in some patients (27).

Epilepsy is one of the most common neurological disorders. It outbreaks is about four to ten persons per ten thousand people (28). A study was determined the rate of Helicobacter pylori in patients with epilepsy were not higher than in healthy controls (29).

Multiple Sclerosis is the most common disabling neurological disease. Based on a hypothesis, H. pylori infection influence the balance between T
helper 1 and 2 that resulted in decreased immune response in MS (30). The inverse association between H. pylori and MS in Japanese people is stating that H. pylori infection may prevent development of MS (31).

Conclusion
According to our review on different studies, infection with H. pylori can involves in migraine, Alzheimer's disease, ischemic stroke, Guillain-Barre syndrome and neural tube defects, while it is a protective factor against multiple sclerosis. The bacteria also cause a deficiency of vitamins A, B12, C, D, E, which seen affect on Neurologic diseases.

Reference
32. Chashmpoosh M, Shirali S, Abyaz S, Shirali A. The effect of work shift and short sleep duration on hormonal changes in Ahvaz airport
personals. Persian Journal of Medical Sciences (PJMS), 2015, 2(3).
35. Esmaeel Ebrahimi, Seyed Ahmad Hosseini, Saeed Shirali, Mostafa Cheshmposh. Stem Cell-Based Therapy in Human Neurodegenerative Diseases BIOSCIENCES BIOTECHNOLOGY RESEARCH ASIA, 2015, 12, 19-24