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ORIGINAL ARTICLE

Neurological Manifestations of H. Pylori Infection

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ABSTRACT

Background: Helicobacter pylori are a gram negative bacterium that spreads infection in nearly half of a population. It lives in gastric conditions and causes various gastric disorders. Besides, h.pylori infection affects other organs of the body and causes many disorders including ischemic stroke, Parkinson's disease, Alzheimer's disorder, migraine headache and multiple sclerosis.
Material and Method: A cross-sectional study was conducted on H.pylori patients through convenient sampling. Patients were admitted to hospital with clinical symptoms of disease and with neurological manifestations. Their co morbid factors were also identified along with laboratory investigations
Result: Among the 276 hospitalized patients 138 were males and 138 were females with age of 60-80.Seventy-two with diabetes mellitus, 45 had ischemic heart disease, 57 had hypertension. Multiple neurological disorders including Parkinson's disorder, Alzheimer's, ischemic stroke, multiple sclerosis, migraine are present in patients of h.pylori infection.
Conclusion: H. pylori infection has been associated with the development and progression of neurological conditions, basically by inducing systemic inflammation, molecular belittlement , and interference with the absorption of drugs. Eradication of h.pylori infection lessens the threat of many neurological conditions.
Keywords: h.pylori, gastrointestinal disorders, neurological manifestation, Alzheimer's , Parkinson's disorder, ischemic stroke, headache, sclerosis

INTRODUCTION

Nearly half of the population is infected with H.pylori. [1,2]. This bacteria belongs to the Gram-negative phylum. It is found in the stomach. Numerous modes of adaptability are available to the bacteria, allowing it to thrive in the acidic gastric environment and colonise the gastrointestinal system. The ability of bacteria to create biofilms, which in turn favours their survival and contributes to remedial failure, is important for further bacterial colonisation.

Despite the fact that approximately half of the world's population is infected with H. pylori, many of those infected do not display any symptoms and do not suffer from long-term complications, such as gastritis or peptic ulcer disease.

The prevalence of H. pylori infection in impoverished nations is between 85–95 percent and 30–50 percent, whereas the prevalence in advanced countries is between 30–50 percent.

A stomach infection with the H. pylori bacteria results in an H. pylori infection. In most cases, H. pylori bacteria are transmitted through direct contact with saliva, vomit, or stool. Atrophic and metaplastic alterations in the stomach are caused by chronic infection with H pylori.

H pylori infection is most commonly spread through oral-to-oral or fecal-to-oral transmission. It can also spread through the water. ' [3,4] The transmission of this ailment will be decreased if we enhance hygienic conditions.

This bidirectional transmission between the GIT and the brain can be affected by H. pylori's direct neurotoxic action, activation of inflammatory processes in nerves, and infection-caused microelement shortages [5,6].

Peptic ulcer illness and Helicobacter pylori infection go hand in hand, as you might expect.

However, new research has shown how this virus affects other parts of the body, including the brain and nervous system. Ischemia stroke, Alzheimer's disease, Parkinson's disease, and migraine problem have all been linked to infection in a number of studies.

MATERIAL AND METHOD

An experimental study was conducted in a hospital and anotamized successive cases from 15th March 2018 to 30th September 2019, who were admitted to hospital with moderate to severe H.pylori infection and had neurological involvement.

Cases were verified . Laboratory examinations were done as needed. As the study was conducted on admitted patients so according to protocol and demand of time informed consent was taken at time of admission from attendants of patients.

Data was collected from the record sheets of each verified case of H.pylori infection .Data collected on age, gender, neurological manifestations, , co morbid factors.

Both male and female genders were included.

Table 1: Clinical characteristics of patients with h.pylori infection .

Characteristics	Total N=276	Moderate disease N=24	Severe Disease N=252
Men	138	12	126
Women	138	12	126
Age	60-80	62-68	70-80
COMORBID FACTORS			
Hypertension	57	2	55
Diabetes	72	7	65
Ischemic heart disease	45	7	38
NEUROLOGICAL DISORDERS			
Ischemic stroke	28	1	27
Parkinson's disease	120	5	115
Alzehmier's disease	116	4	112
Migraine	4	1	3
Multiple sclerosis	8	2	6

RESULT

Among the 276 hospitalized patients 138 were males and 138 were females with age of 60-80. Seventy-two with diabetes mellitus, 45 had ischemic heart disease, 57 had hypertension.

Multiple neurological disorders including parkinson's disorder, Alzheimer's, ischemic stroke, multiple sclerosis, migraine are present in patients of h.pylori infection.

DISCUSSION

Now we will discuss how h.pylori causes various neurological disorders.

Ischemic Stroke: Occlusion of blood vessels carrying blood to the brain causes this stroke to occur. About half of all strokes are caused by ischemic stroke. Occlusion of the carotid or cerebral arteries serves as a pathophysiologic medium for ischemic strokes to mature. Stroke risk may be altered by seditious and infectious factors. [7] Infection with H.Pylori has a significant impact on the development of this stroke.

Non-cardioembolic stroke was found to be a significant relationship in a recent meta-analysis of 13 studies and 4041 Chinese cases[94]. They found that a positive anti-CagA IgG was more effective for vaticination than a positive anti-H. pylori IgG or a positive (13)C-urea breath test, which is interesting. [8]

Parkinson's Disease: Typical symptoms include tremor, postural instability, and bradykinesia, and it is a degenerative neurological disease. Dopaminergic neurons are gradually lost as a result of the buildup of cytoplasmic proteins, particularly -synuclein.

Peptic ulcers were also seen in people with Parkinson's disease. Prior to H.pylori's discovery,

1-methyl-4-phenyl-1,2,36-tetrahydropyridine is a well-known byproduct of H. pylori infection (MPTP). Substances like these can cause dopamine depletion and injury to the substantia nigra, both of which can contribute to Parkinson's disease (PD).

Chronic H. pylori infection may cause neuronal damage in Parkinson's disease, according to a new theory.[9]

When H. pylori eradication failed, patients' neurological health deteriorated [10]. The absorption of L-dopa (the drug used to treat Parkinson's disease) will be improved if H. pylori is removed from patients.

Alzehmier's Disease: Cognitive decline with increasing sporadic memory is the most prevalent clinical manifestation of Alzheimer's disease (AD), a neurodegenerative disease.

Alzehmier's disease can be caused by H. pylori, herpes simplex, picornavirus, Borna virus, Chlamydia pneumonia, and spirochete infections.

Infections with H. pylori have been linked to Alzehmier's illness aetiology and development in numerous studies. [11]

According to Huang et al. [12], people who have tested positive for the presence of this bacterium in their bodies are 1.6 times more likely to develop the disease. It has been found that those who have been infected for 20 years have the same risk of acquiring dementia as those who have not been infected.

H. pylori, according to some theories, can cause stomach abnormalities that lead to a deficiency in Vitamin B-12. Homocysteine levels rise as a result of a deficiency in this vitamin, which causes dementia (major symptom of AD). Patients with a positive h.pylori test are more likely to suffer from Alzheimer's disease.

It has been shown in numerous investigations that h.pylori enters the brain in various ways and induces alterations in it that lead to Alzehmier's illness.

For example, platelets and H.pylori both contribute to the formation of beta-amyloid plaques in the intestines.

Migraine Headache: Headaches that come and go in waves are known as migraines, and they are caused by a neurological condition called migraine. Severe infections, such as H. pylori, have been linked to migraines, particularly in those who suffer from migraines without an aura. [14]

Migraine pathogenesis has evolved from the classic concept of vasoconstriction and vasodilatation to a basic neuronal malfunction [15].

Eradication of H. pylori in individuals with cirrhosis of the liver in China has resulted in a reduction or remission of headache symptoms [16].

Multiple Sclerosis: Demyelination of inflamed lesions in the central nervous system is caused by an inflammatory disease. This infection can be brought on by a variety of reasons, including H.pylori infection.

H. pylori infection has been implicated in the pathophysiology of a number of autoimmune illnesses, including multiple sclerosis (MS) [17,18].

Eighty-two percent of patients with NMO and seventy-three percent of those with MS were found to be seropositive to H. pylori in another investigation. A substantially increased seropositivity rate was seen exclusively in NMO patients ([19]). A higher frequency of H. pylori infection was found in the Greek community of patients with clinically isolated syndrome (CIS), which may point to the development of MS [20].

Anti-aquaporin 4 (AQP4) has been linked to H. pylori infections, and some studies have shown that patients improve following H. pylori eradication..

Gullian Bare Syndrome: Peripheral nerve demyelination is thought to be a contributing factor in this neurodegenerative condition. [21,22]

This disease is spread through a variety of infections. If the breathing muscles are paralysed, the risk of death increases.

Anti-VacCa IGg antibodies have been found in some GBS patients, according to some studies. To cause demyelination in humans, vaccae causes schwann cell binding. Anti-H. pylori IgG serum levels were shown to be related with a worse clinical status and demyelination in the proximal regions of peripheral nerves in patients with H. pylori infection. [23]

Table 2: Neurological manifestation of h.pylori

Alzehmier's disease	Deficiency of vit-B12 (due to h.pylori infection)causes increased concentration of homocysteine which leads to dementia.
Parkinson's disease	h.pylori decreases the absorption of L.dopa
Ischemic stroke	Eradication of h.pylori lessens the risk of strokes
Migraine	Improvement in headache following removal of h.pylori

CONCLUSION

Neurological disorders have been linked to H. pylori infection, which causes systemic inflammation, molecular diminution, and drug absorption interference. Infection with h.pylori reduces the risk of a wide range of neurological disorders.

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