Infections and stroke: which potential pathogenic mechanism?

Davide Giuseppe Ribaldone,[1] Rinaldo Pellicano[2]

[1] Department of Medical Sciences, Division of Gastroenterology, University of Torino, Torino, Italy

[2] Unit of Gastroenterology, Molinette-SGAS Hospital, Turin, Italy

Davide Giuseppe Ribaldone, Department of Medical Sciences, Division of Gastroenterology, University of Torino, C.so Bramante 88, 10126 Turin, Italy; tel (0039)0116335208, fax (0039)0116336752, davrib_1998@yahoo.com

Rinaldo Pellicano, MD, Unit of Gastroenterology, Molinette-SGAS Hospital, Via Cavour 31, 10126 Turin, Italy; tel (0039)0116335208, fax (0039)0116336752, rinaldo_pellican@hotmail.com

Keywords

Infections, stroke, cytomegalovirus, hepatitis virus, Toxoplasma, *Helicobacter pylori*, atherosclerosis

Word count: 299

Dear Editor,

In a recent cohort-study, Pearce et al evaluated the potential association between chronic infections and stroke. Serological evidence of prior infection was categorized based on immunoglobulin G to cytomegalovirus, hepatitis A virus, hepatitis B virus, Toxoplasma gondii, and Toxocara spp. The positive association was significant among patients aged 20-59 years ($p = 0.005$) (1).

Helicobacter pylori (H. pylori) infection is a chronic one, acquired during childhood as a rule. The habitat of the bacterium is the stomach, where it is the major causal factor of several gastroduodenal diseases (2). Moreover, *H. pylori* has been involved in diverse extragastric manifestations, including cardiovascular disease (3) and stroke (4).

This microorganism could be a model to understand how an infectious agent could act in the pathogenesis of thrombosis in case of stroke.

While atherosclerosis is an inflammatory disease in which immune mechanisms interact with metabolic factors to initiate, propagate, and activate lesions in the arterial tree, endothelial dysfunction is an early key event in the onset of acute events (5). *H. pylori* genomic material has been detected in the plaque of atherosclerosis only in sporadic occasions. Therefore, the hypothesis of an indirect pathway has been raised. Indeed, the long-term inflammation generated by *H. pylori* might raise cytokine levels in the bloodstream, and consequently, activate fibroblast and smooth muscle cell proliferation. Some study has shown that *H. pylori* binds von Willebrand factor and interacts with glycoprotein Ib to induce platelet aggregation (3). Its glycoproteins Ib and IIb/IIIa engage surface molecules on the endothelium cell, which may contribute to endothelial activation (5).

Because stroke is the outcome of a multiplicity of factors and processes (6), complete understanding of causation is difficult.

Considering the interesting findings reported by Pearce et al (1), prospective population-based studies should be performed in order to provide support for a causal relationship.

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

The Author(s) declare(s) that there is no conflict of interest.

References

1. Pearce BD, Bracher A, Jones JL, Kruszon-Moran D. Viral and parasitic pathogen burden and the association with stroke in a population-based cohort. Int J Stroke. 2018;13:481–95.
2. Pellicano R, Ribaldone DG, Fagoonee S, Astegiano M, Saracco GM, Mégraud F. A 2016 panorama of Helicobacter pylori infection: Key messages for clinicians. Panminerva Med. 2016;58:304-317.
3. Ribaldone DG, Fagoonee S, Hickman I, Altruda F, Saracco GM, Pellicano R. Helicobacter pylori infection and ischemic heart disease: Could experimental data lead to clinical studies? Minerva Cardioangiol. 2016;64:686-96.
4. Ponzetto A, Marchet A, Pellicano R, Lovera N, Chianale G, Nobili M, et al. Association of Helicobacter pylori infection with ischemic stroke of non-cardiac origin: the BAT.MA.N. project study. Hepatogastroenterology;49:631–4.
5. Deb P, Sharma S, Hassan KM. Pathophysiologic mechanisms of acute ischemic stroke: An overview with emphasis on therapeutic significance beyond thrombolysis. Pathophysiology. 2010;17:197–218.
6. Zack CJ, Fender EA, Holmes DR. Stroke prevention in atrial fibrillation with left atrial appendage closure. Minerva Med. 2017;108:199–211.