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The Causal Relationship Linking Heart and Digestive System Diseases

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Abstract

The cardiovascular and digestive systems work jointly to ensure that the body tissues have the necessary energy and maintain health. The food breaks down and absorbs nutrients via the digestive system, subsequently migrating through the bloodstream. After that, the blood pumped by the heart delivers nutrients and oxygen to the body's cells and helps remove waste. Simultaneously, blood movement boosts the digestion process by providing nutrients and oxygen. Among the diseases that are of great importance to society and to people's health are diseases of the digestive system, as well as diseases of the cardiovascular system. Numerous studies indicate a reciprocal effect of disease in one system on the other. There is a similarity in the existence of joint pathological mechanisms, which invited specialists to think that they are interconnected, knowing that they appear as specific and clear diseases. Many studies have focused on the relationship between feeding and diseases affecting the digestive system and the heart. Several hypotheses and possibilities have been proposed to explain this pathological link between the two systems, such as a neurological connection (vagus nerve stimulation), as seen in coronary artery disease and gastrointestinal disorders. Inflammation and autoimmunity have also been suggested as mechanisms to explain this pathological link. Another hypothesis proposes the infiltration of microbes from the intestines, through which bacteria, toxins, and volatile organic compounds are transmitted via the bloodstream, promoting cardiovascular disease. A new hypothesis is attributed to the discovery of the organic pathway linking the digestive system and the heart. The disruption of this organic pathway can cause heart disease by facilitating the transfer of bacteria and harmful substances from the digestive system to the heart. This reinforces and supports the hypothesis of a pathological link between the digestive system and the cardiovascular system.



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Dear Editor,

The heart and arteries are important components of the cardiovascular system, while the stomach, esophagus, and intestines are major parts of the digestive system. Among the diseases that are of great importance to society and to people's health are diseases of the digestive system as well as diseases of the cardiovascular system [1]. There is a similarity in the existence of joint pathological mechanisms, which invited specialists to think that they are interconnected with each other, knowing that they appear as specific and clear diseases. The impact of this relationship between the two systems on cardiovascular health or the likelihood of developing disease is related to several factors, such as the level of inflammation, gut microbiota balance, and diet in the body. Taking into account that the overlap in pathologies of the two systems is not accurately understood. Therefore, researchers call to expand the understanding and knowledge of the overlapping foundations of diseases of the two systems to provide appropriate treatments and strengthen the health methods used to care for patients [1].

Cardiovascular diseases are among the most important causes of death around the world, and the most common of them are arrhythmia (ex. ventricular fibrillation, atrial fibrillation AF, ventricular flutter, and atrial flutter) and coronary artery disease. On the other hand, inflammatory bowel diseases and gastroesophageal reflux are among the most widespread digestive system disorders among humans (gastrointestinal disorders cause 10% of deaths in a country like the USA). Due to the similarity in symptoms and risk factors, many indications and signs have been recorded on the interaction between digestive system disorders and the heart, and what makes the clinical diagnosis inaccurate in some cases is that the person is having this interaction at the same time. Some of the known possible signs of digestive system disorders are chest pain or something similar to angina, which can indicate the possibility of heart disease [1, 2].

Gastroesophageal disorders continue to play a significant role in the differential analysis of chest pain ("linked angina phenomenon"). Actually, there is a common overlap between gastroesophageal disorders and coronary artery disease, with a reciprocal neurological relationship believed to occur between these conditions. This relationship may allow stimulation of the esophageal mucosa to influence blood flow within the "coronary arteries" [3]. Gastroesophageal reflux disease (GERD), as

reported in medical reports and site studies, can cause cardiac disorders such as atrial fibrillation (Fig. 1), and autoimmunity and inflammation, for example, are likely mechanisms to explain this pathological association [2, 4]. In recent years, Rommel coined the term "heart-gastric syndrome", showing that there is a link between heart disease and the upper digestive system, and it has been proven that heart rhythm disturbances can occur through stimulation of the esophagus [2, 4].

Atherosclerosis is also a result of many factors, including inflammatory bowel disease. The literature also indicates that metabolic liver diseases are associated with cardiovascular diseases such as diastolic dysfunction and ventricular contractility dysfunction in people with cirrhosis [4-6]. The digestive system and heart are connected by what is known as the "gut-heart axis", a two-way link where gut health and cardiovascular function are mutually influential. This relationship relies on processes such as the gut microbiome's production of metabolites (like tri-methylation oxide). These molecules play a bad role in heart health and systemic inflammation, which can harm arteries. "Gut infiltration" leads to toxins and bacteria being transferred into the bloodstream, and activating inflammation that may contribute to problems such as cardiovascular disease (like heart strokes and attacks) [7].

Volatile organic compounds (VOCs) are primarily connected to cardiovascular and gastrointestinal diseases via their impact on the gut microbiome, causing systemic inflammation and metabolic imbalances. These compounds originate after pollutants or are metabolized by "gut bacteria", leading to impaired "lipid metabolism" in the liver and impairment of "endothelial cells". Furthermore, imbalances in VOCs produced by gut microbes may contribute to the development of cardiovascular disease [8]. Many studies have focused on the relationship between feedings and diseases affecting the digestive system and the heart, and several hypotheses and possibilities have been proposed to explain this pathological link between the two systems, such as a neurological connection (Vagus nerve stimulation), as seen in coronary artery disease and gastrointestinal disorders. Inflammation and autoimmunity have also been suggested as mechanisms to explain this pathological link. Another hypothesis proposes the infiltration of microbes from the intestines, through which bacteria, toxins, and volatile organic compounds are transmitted via the bloodstream, promoting

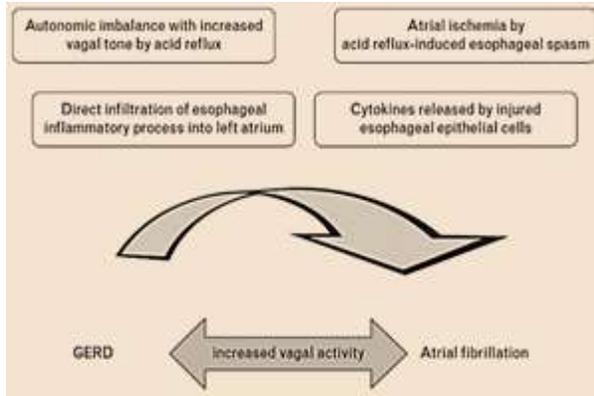


Fig. 1 The relationship between gastroesophageal reflux disease (GERD) and atrial fibrillation [1].

cardiovascular disease [7-22].

A new hypothesis can be added to these hypotheses, attributed to the discovery of the organic pathway linking the digestive system and the heart through a personal experiment [23]. This organic pathway can become diseased and cause heart disease, or it can facilitate the transfer of bacteria and harmful substances from the digestive system to the heart. Therefore, I expect that this important scientific discovery, as experimentally will strengthen the hypotheses of the proposed link between the digestive system and heart diseases and will contribute to finding new methods and mechanisms to treat these diseases, thus enhancing the healthy methods used in patient care.

Conflict of Interest

There are no conflicts of interest.

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