Acute or chronic inflammation role in gastrointestinal oncology

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Abstract

The following letter to the editor highlights the review titled “Inflammatory bowel disease-related colorectal cancer: Past, present and future perspectives” in World J Gastrointest Oncol 2022 March 15; 14(3): 547-567. It is necessary to explore the role of inflammation in promoting tumorigenesis and development of gastrointestinal cancers.

Key Words: Inflammatory; Gastrointestinal cancers; Development; Letter to the Editor; Colorectal cancer

Core Tip: Gastrointestinal cancers are systematic tumors with the largest number of patients in the world. Most patients are prone to migration, invasion or other malignant phenotypes. The treatment strategies mainly include surgical resection, radiotherapy and chemotherapy in clinic. However, the survival rate of cases still cannot be significantly improved. Recently, the relationship between inflammation and gastrointestinal tumors has been gradually clarified, and chronic inflammation plays an important role in the occurrence and deterioration of tumors. The main purpose of this letter is to illustrate the key role of inflammation in tumor progression and potential therapeutic directions.
TO THE EDITOR

We read with interest the review by Majumder et al[1], which is titled “Inflammatory bowel disease-related colorectal cancer: Past, present and future perspectives.” The tumor pathogenesis is complex and not yet clear. Recently, inflammation induced and promoted tumor occurrence and deterioration, and the presence of high levels of inflammatory factors in many tumor patients has gradually become clear. The gastrointestinal system is one of the most prone to inflammation. Patients with chronic inflammation are more likely to develop liver cancer, pancreatic cancer, stomach cancer and colon cancer than those without inflammation. Studies have demonstrated that hepatitis B virus patients were more likely to get cancer of the liver, and prognosis and survival time is far less than the patients without hepatitis B virus[2]. Patients with pancreatitis had a 4.8-times significantly higher risk of developing cancer than those without pancreatitis[3]. Helicobacter pylori is one of the important risk factors for gastric cancer patients, and Helicobacter pylori will induce the occurrence of chronic gastritis[4]. In addition, patients with colitis have an increased mortality of colon cancer by 15%[5]. Therefore, if the potential biomarkers can be identified by early intervention of the synthesis, secretion and release of inflammatory factors, it may have great clinical significance for gastrointestinal tumors and improve the overall understanding of gastrointestinal tumors.

The interleukin (IL) family is the most common biomarker of inflammation. IL-1β, IL-6 and IL-10 are involved in the development and progression of gastrointestinal tumors. On the other hand, external stimuli, such as excessive oxidative stress, promote the secretion and release of the IL family, while the IL family itself has a certain feedback activation effect, thus exacerbating the inflammatory response[5]. In colitis-cancer, IL-6 and other factors promote epidermal cell damage, and prolonged inflammatory damage will lead to abnormal proliferation of epidermal cells, which if not controlled will eventually lead to gene epigenetic modification mutation and ultimately induce tumorigenesis[6,7].

Tumor necrosis factor (TNF), another classic inflammatory factor, can promote the activation of neutrophils or macrophages to aggravate tissue damage by regulating monocyte chemotactic protein-1 and other mRNAs[8]. Moreover, TNF accelerates the inflammatory process and thus leads to the occurrence of tumors[9]. In addition, the role of a c-x-c motif chemokine ligand (CCL) family in gastrointestinal tumors is gradually becoming clear. CCLs infiltrated tissues by recruiting macrophages and releasing IL family members or TNF, further leading to local inflammatory infiltration of tissues, gene mutation and ultimately tumorigenesis[10].

Interestingly, some papers showed that chronic inflammatory responses promoted tumorigenesis and development, while acute inflammation is currently considered to inhibit tumor progression (Figure 1)[11]. The new clinical research paper indicated that colon cancer patients with higher IL-6 and TNF (chronic inflammatory factors) developed a cancer recurrence. However, acute inflammatory factors, IL-10 and interferon γ, were lower in expression compared with those who did not recur[7]. IL-12 is an acute inflammatory factor that could inhibit tumor progression in gastrointestinal tumors, and its high expression leads to a longer survival time[12]. Additionally, the interferon family is a potential therapeutic biomarker, which could inhibit the occurrence and progression of gastrointestinal tumors by regulating cellular immunity, controlling cell cycle or promoting cell apoptosis[13,14]. Moreover, the interferon family has been approved by the Food and Drug Administration for the treatment of tumors[15].

In conclusion, inflammation is involved in the entire gastrointestinal tumor process. The worse inflammation is mainly chronic inflammation, which can be induced by many reasons, such as unhealthy high-fat diet, excessive use of antibiotics, imbalance of intestinal flora and so on[16]. Majumder et al[1] systematically summarized the role of inflammatory factors in colon cancer. However, they failed to study and consider the role of acute inflammation in colon cancer. Therefore, inflammatory factors should be considered as important triggers to optimize current diagnosis and treatment strategies for early tumor diagnosis.
Figure 1 Relationship of inflammation and cancer.

FOOTNOTES

Author contributions: Chen HJ and Chen X designed the research; Chen HJ wrote this comment; Liang GY and Du Z reviewed and supervised this manuscript; All authors approved the final version of the article.

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