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PHARMACOLOGICAL PROPERTIES OF DRUGS USED TO REDUCE THE INFLAMMATION PROCESS

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Abstract
Nosteroidal anti-inflammatory drugs (NSAIDs) are a group of pharmaceutical drugs that are commonly used in medicine to stop various inflammatory processes, relieve pain, reduce fever, and prevent thrombosis. To understand the mechanism of action of anti-inflammatory drugs, it is necessary to understand the features of the course of inflammatory processes in the body. Currently, the group of drugs known as NSAIDs includes about 50 original drugs. These drugs can be classified by their chemical structure into several groups, including salicylic acid derivatives, indole derivatives, heteroarylacetic compounds, propionic derivatives, enolic acids, pyrazolone derivatives, coxibs and others. Despite some differences in the chemical structure and features of each group, all these NSAIDs have common pharmacological properties. However, these drugs also have common side effects. They can cause damage to the gastrointestinal tract (gastritis, gastric ulcer and duodenal ulcer), kidney dysfunction, inhibition of platelet aggregation and others.

Keywords: Anti-inflammatory drugs, SOG-1, SOG-2, gastric ulcers, as NSAID.

INTRODUCTION

Currently, anti-inflammatory drugs are drugs used to reduce the inflammatory process, and in recent decades they have become the most widely used drugs in clinical practice. They are intended for topical, oral, rectal and injectable use, and are produced in almost all dosage forms. According

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to the latest data, anti-inflammatory drugs are the second most widely used drugs after antibiotics, only a small percentage of patients buy anti-inflammatory drugs according to a doctor's prescription, while the rest use over-the-counter drugs. The combination of anti-inflammatory, antipyretic, anti-inflammatory, and analgesic effects makes nonsteroidal anti-inflammatory drugs valuable drugs. In addition, many dosage forms of anti-inflammatory drugs have been developed, which are produced under different brand names and differ in their therapeutic effect, the number and severity of side effects, and the pathogenesis of the disease. It allows you to individually select anti-inflammatory drugs for each patient according to their characteristics. Nonsteroidal substances have a common mechanism of action - inhibiting the cyclooxygenase enzyme, reducing the formation of the main mediators of inflammation, prostaglandins, thromboxane. Anti-inflammatory drugs differ in their potency, the severity of individual effects, the speed of their onset and duration, as well as the ability to cause side effects. The stronger the anti-inflammatory effect of anti-inflammatory drugs, the higher their affinity for the cyclooxygenase enzyme, the higher the concentration of nonsteroidal substances in inflamed tissues, the higher the acidity of the drug solution helps to create a high concentration in the area of inflammation. Depending on the active substance, all anti-inflammatory drugs are divided into steroid and non-steroid. Steroid agents include glucocorticosteroids (GCS), while NSAIDs consist of organic acids and do not contain hormones. When using GCS, the active substance suppresses all phases of the inflammatory process. Today, synthetic analogs of hormones that are normally produced by the human adrenal glands are widely used in the treatment of chronic pain. But these types of anti-inflammatory drugs have a number of contraindications and a large number of side effects, so GCS are prescribed only by a doctor after a thorough examination of the patient.

The more neutral the pH of the solution of anti-inflammatory drugs, the faster the anti-inflammatory, antipyretic, and analgesic effects develop. Such drugs penetrate the central nervous system faster and paralyze the thalamic pain centers and the thermoregulation center. Patients are at a much higher risk of developing possible side effects of anti-inflammatory therapy. Even short-term use of drugs in this group in small doses can lead to the development of side effects, which usually occur in every fourth case and can be life-threatening in 6% of patients. The most common adverse effects of anti-inflammatory drugs are damage to the gastrointestinal tract, impaired platelet aggregation, renal function, and the circulatory system. Experimental and clinical studies have confirmed that the above complications are caused by the blockade of cyclooxygenase-1, which is necessary for the synthesis of prostaglandins, which are involved in the regulation of many physiological processes and maintaining homeostasis in the body.

Prolonged use of anti-inflammatory drugs, especially salicylates, can cause gastric ulcers and bleeding from this site - hemorrhages, hemorrhages are more common in young children. Salicylates prevent the formation of thromboxane - platelet aggregation, which can also cause bleeding. Gastrointestinal pathology is characterized by damage to the mucous membrane (erosion, development of ulcers and their complications - gastrointestinal bleeding, perforation and obstruction of the gastrointestinal tract).

Taking anti-inflammatory drugs increases the risk of gastrointestinal bleeding and ulcer perforation by more than 5 times. Gastrointestinal bleeding and perforation occur in 1 in 100 to 200 patients taking anti-inflammatory drugs regularly, and clinically visible ulcers of the stomach

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and duodenum occur in about 10%. Patients with risk factors are more likely to develop serious side effects, including peptic ulcer disease, older age, high doses of anti-inflammatory drugs, concomitant use of anticoagulants and glucocorticoids, as well as smoking, alcohol consumption, severe cardiovascular disease, and H. pylori. A selective inhibitor of cyclooxygenase-2, which is produced by inflammatory agents, to reduce the risk of dangerous gastrointestinal complications. The mechanism of anti-inflammatory drugs is that they block the COX enzyme, which results in a decrease in the formation of prostaglandins. There are two isoforms of the enzyme: COX-1 and COX-2. COX-1 is mainly found in the wall of the stomach, blood vessels and kidneys. It performs protective functions: maintaining the mucous membrane of the stomach, regulating blood pressure, and serves as an inflammation mediator. COX-2 accumulates in bones, organs of the reproductive and nervous systems. It is activated during inflammatory processes and participates in the formation of prostaglandins, which cause painful sensations, hyperemia and edema.

Nonsteroidal anti-inflammatory drugs have been created. Among them, meloxicam selectively inhibits SOG-2 (SOG-2 is mainly located at the site of inflammation). Among other anti-inflammatory drugs, nabumetone selectively inhibits SOG-2. The effect is indirect, since the active metabolite of the drug (6-methoxy-2-naphthyl acetic acid) blocks SOG-2. Celecoxib blocks SOG-2 100 times more strongly than SOG-1. It does not have an adverse effect on MIT. It does not prolong platelet aggregation. Kryzanol is a gold preparation, the effect begins late (after 2-3 months), but is persistent. There are many adverse effects, because it is highly toxic. It negatively affects the liver, kidneys, and the formation of deposits, allergic reactions develop. But it does not cause ulcers in MIT. It has been proven that the use of selected nonsteroidal anti-inflammatory drugs reduces the risk of gastrointestinal bleeding and perforation of stomach ulcers by 3 times. In addition, good results were obtained when these drugs were used in courses, especially by patients at risk. Thus, nonsteroidal anti-inflammatory drugs When choosing an anti-inflammatory agent, it is necessary to take into account not only the effectiveness, but also the safety of the drug, taking into account the pathogenesis of the existing pathology and the presence of concomitant pathology in the patient. In addition, when prescribing the drug, it is necessary to know the characteristics of pharmacodynamics and pharmacokinetics in order to rationally select nonsteroidal anti-inflammatory agents.

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