

Modern Non-Steroidal Anti-Inflammatory Drugs

Bekchanov Bakhtiyar Gafurovich

Head of the Department of Pediatriya of Urgench branch of Tashkent Medical Academy, Uzbekistan

Masharipov Otaboy Olimovich

Professor of the Department of Pediatriya of Urgench branch of Tashkent Medical Academy, Uzbekistan

Komilova Dilrabo Rakhimboy qizi, Masharipov Ogabek Atabaevich

Students of the Urgench branch of Tashkent Medical Academy, Uzbekistan

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Abstract: Over the past decade, employees of the departments of pharmacology, general and bioorganic chemistry of the Tashkent State Medical Institute (since 1990, I Tashkent State Medical Institute) have been conducting targeted research to find, study new, more advanced anti-inflammatory drugs in a number of new pyrazole derivatives and related compounds (in general, nutrition more than 300 new drugs were exposed). These studies revealed a number of highly active and low-toxic compounds, and also established the dependence of the anti-inflammatory activity of these compounds on the chemical structure.



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The main representative of acetic acid derivatives is indomethacin. In anti-inflammatory activity, indomethacin is several times superior to salicylates and stronger than butadione. The anti-inflammatory effect of indomethacin has been clinically confirmed in the treatment of various forms of rheumatism and non-specific infectious polyarthritis.

Indomethacin is widely used in practical medicine in the treatment of rheumatism, ankylosing spondylitis, rheumatoid arthritis, gout and other diseases of inflammatory etiology.

Indomethacin inhibits inflammation by limiting the production of ATP, reducing the permeability of capillaries and lysosome membranes, inhibiting the synthesis of prostaglandins, histamine, and kinins.

Indomethacin has an antipyretic effect, which is associated with an inhibitory effect on the synthesis of endogenous pyrogenic substances, an effect on the thermoregulatory center.

The analgesic effect of the drug is weakly expressed. Apparently, this is due to the fact that it does not affect the inflammatory mediators involved in the formation of pain.

Indomethacin very often causes various side effects and complications. More often, adverse effects are observed from the gastrointestinal tract: Epigastric pain and burning sensation, nausea, vomiting.

A dangerous complication is the formation of ulcers, hidden bleeding.

From the side of the central nervous system, headaches, dizziness, tinnitus, depression, fainting are observed.

Recently, it has been proven that indomethacin can contribute to the development of hepatitis, stomatitis, pancreatitis, and cause hematuria.

On the part of the hematopoietic system, leukopenia, thrombocytopenia and agranulocytosis are observed.

Allergic reactions are possible in the form of skin rashes, itching, urticaria. Anti-inflammatory drugs that have low toxicity and high activity include drugs from the group of alkanolic acids, the main representatives of alkanolic acid derivatives are voltaren (ortofen, diclofenac-sodium) and ibuprofen (brufen, lyutrin). In terms of anti-inflammatory activity, ibuprofen occupies an intermediate position between salicylates and pyrazole derivatives: it is significantly inferior not only to voltaren and indomethacin, but also to acetylsalicylic acid.

In the therapeutic effect of ibuprofen, the analgesic effect prevails over the true anti-inflammatory.

Voltaren is superior in anti-inflammatory activity to butadione and indomethacin.

The mechanism of the therapeutic action of alkanolic acid derivatives is not well understood. There is evidence that they affect inflammatory mediators, stabilize cell membranes, reduce vascular permeability and limit the energy supply of the inflammatory process.

Ibuprofen and Voltaren are most widely used for osteoarthritis and rheumatoid arthritis, for the treatment of bursitis, tendovaginitis, neuralgia of traumatic injuries and other diseases in which its analgesic effect is mainly used.

When using Voltaren and ibuprofen, side effects rarely occur. Among the adverse events, mild dyspeptic disorders, headaches, taste disorders, diabetes insipidus syndrome, hepatotoxic effects should be noted. There is information about the nephrotoxic effect of ibuprofen. Allergic reactions in the form of skin rashes are possible. There are isolated cases of reversible toxic amblyopia, exacerbation of bronchial asthma and peptic ulcer of gastric bleeding.

Anthranilic acid derivatives also include mefenamic and flufenamic acids. In terms of effectiveness, they approximately correspond to salicylates and are inferior to butadione. Recently, more and more often they are taken for the treatment of rheumatism, rheumatoid arthritis, and neuralgia.

Mefenamic and flufenamic acids suppress the exudative phase of inflammation, which may be related to the ability of these drugs to stabilize the protein components of membranes, as a result of which it prevents damage and reduces the permeability of both cellular and intracellular membranes. This leads to a decrease in the release of lysosomal enzymes and, consequently, the overall vascular tissue permeability, to a significant suppression of exudative manifestations.

Anthranilic acid derivatives also have a significant effect on proliferative processes in the focus of inflammation, which manifests itself in their inhibition. Reducing the mass of granulation tissue.

A distinctive feature of anthranilic acid derivatives is that they are able to inhibit the activity of proteases, which are also involved in the development of the inflammatory response.

Derivatives of anthranilic acid have analgesic and antipyretic effects. By the strength of the analgesic effect, mefenamic acid is superior to butadione and sodium salicylate. According to the antipyretic effect, anthranilic acid derivatives are stronger than salicylates, amidopyrine and are approximately equivalent to butadione.

The use of mefenamic and flufenamic acids is indicated for various forms of acute rheumatism, rheumatoid arthritis, neuralgic and myalgic pains.

Anthranilic acid derivatives in therapeutic concentrations prevent the formation of experimental gastric ulcers caused by various methods, which served as the basis for the treatment of ulcerative necrotic processes. Side effects of anthranilic acid derivatives are relatively rare. With prolonged use of drugs, nausea, loss of appetite, diarrhea, headaches, skin rashes may appear, and often pronounced albuminuria, hematuria, leukopenia, anemia are also noted. After discontinuation of the drug, all these adverse events quickly disappear.

High activity and fewer side effects and complications in clinical use put these drugs among the most effective non-steroidal anti-inflammatory drugs.

Thus, based on the literature data, it can be concluded that modern medicine has a wide arsenal of anti-inflammatory drugs. However, it cannot be considered that the existing anti-inflammatory drugs

have exhausted the possibilities of searching for new drugs. It can be assumed that intensive research conducted in recent years will lead to the creation of drugs with a fundamentally different effect, more effective and safer than existing ones. At the same time, valuable agents can also be found among analogues of known anti-inflammatory drugs. In this regard, the search and study of new inflammatory and low-toxic anti-inflammatory substances are of great practical interest.

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