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ABOUT MODERN ANTIPYRETIC DRUGS IN PEDIATRICS: EFFECTIVENESS AND SAFETY

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Abstract: The article presents the main mechanisms and age-related features of thermoregulation of the child's body in norm and pathology. The article covers the pathogenesis of various types of hyperthermia, their clinical features, and issues of differential diagnostics. Rational tactics of observation and symptomatic treatment of children with fever are defined. The mechanisms of antipyretic action of antipyretics are presented. The issues of optimal choice and rational use of antipyretics in pediatric practice are considered. Modern antipyretic drugs with antipyretic and analgesic action are presented.
Keywords: children, fever, pathogenesis, treatment, nonsteroidal anti-inflammatory drugs.

INTRODUCTION

Since fever is a non-specific protective and adaptive reaction of the body, the causes that cause it are very diverse.

For practical purposes, it is customary to distinguish the following types of fever [1]:

■ infectious fever, occurring with infectious diseases;

■ non-infectious, caused by aseptic inflammation, various tissue damage and dysfunction of the central nervous system.

Fever of infectious genesis is the most common and develops in response to the effects of pyrogens of viral or bacterial origin.

MATERIALS AND METHODS

The genesis of a non-infectious temperature reaction is much more complex. A non-infectious increase in body temperature can be:

■ central (damage to various parts of the central nervous system - hemorrhage, tumor, trauma, cerebral edema, developmental defects);

■ psychogenic (functional disorders of higher nervous activity (neurosis, mental disorders), emotional stress, the effect of hypnosis);

■ reflex (pain syndrome in urolithiasis, cholelithiasis, peritoneal irritation, etc.);

■ endocrine (hyperthyroidism, pheochromocytoma);

■ resorption (bruise, compression, incision, burn, necrosis, aseptic inflammation, hemolysis contribute to the formation of endogenous pyrogens of protein nature (nucleic acids));

■ medicinal (enteral or parenteral administration of xanthine drugs, ephedrine, methylene blue, hyperosmolar solutions, antibiotics, diphenin, sulfonamides).

RESULTS AND DISCUSSION

Each of these fever variants, despite the common mechanisms of thermoregulation disorders, has specific features of pathogenesis and clinical picture [2]. Temperature reaction of non-infectious origin is associated with central and peripheral action of endogenous pyrogens, hormones and mediators. The main link of pathogenesis in this case is a decrease in heat transfer without increasing heat production. Fever is based on specific changes in the activity of nerve centers regulating heat exchange. These changes are aimed at switching temperature homeostasis to a higher level due to simultaneous increase in heat production and limitation of heat transfer. It has been established that one of the links in the pathogenesis of fever are phagocytic blood cells (neutrophils, monocytes) and tissue macrophages. Changes in the body's homeostasis during an infectious invasion or a non-infectious inflammatory process lead to activation of phagocytosis

and increased synthesis of a biologically active substance by phagocytes, leading to an increase in body temperature and, due to this, designated endogenous or leukocyte pyrogen. It was subsequently established that leukocyte pyrogen is heterogeneous and represents a group of proteins, among which two active polypeptides with a relative molecular weight of 13,000–20,000 were isolated, which are usually designated as interleukin-1 (IL-1) [2, 3]. IL-1 is considered the main initiating mediator in the mechanism of fever development and other acute phase inflammatory processes. It stimulates the secretion of prostaglandins, amyloids A and P, C-reactive protein, haptoglobin, 1-antitrypsin and ceruloplasmin. Under the influence of IL-1, the production of interleukin-2 by T-lymphocytes is initiated and the expression of cellular receptors increases. In addition, there is an increase in the proliferation of B-lymphocytes, stimulation of antibody secretion and expression of the membrane Ig receptor. Under normal conditions, IL-1 does not penetrate the blood-brain barrier. However, when immune homeostasis is disrupted (infectious or non-infectious inflammation), IL-1 reaches the preoptic area of the anterior hypothalamus and interacts with the receptors of neurons of the thermoregulatory center.

When analyzing the temperature reaction, it is very important not only to evaluate the magnitude of its rise, duration and fluctuations, but also to compare this with the child's condition and clinical manifestations of the disease. This will not only significantly facilitate the diagnostic search, but will also allow you to choose the right tactics for monitoring and treating the patient, which will ultimately determine the prognosis of the disease. Particular attention should be paid to the clinical equivalents of the correspondence of heat transfer processes to an increased level of heat production, since depending on individual characteristics and background conditions, fever, even with the same level of hyperthermia, can proceed differently in children. Thus, if with an increase in body temperature, heat transfer corresponds to heat production, then this indicates an adequate course of fever. Clinically, this is manifested by normal behavior and well-being of the child, pink or moderately hyperemic skin coloring, moist and warm to the touch ("pink fever"). This is a prognostically favorable variant of fever [4, 5].

CONCLUSION

Thus, to summarize the above, the rational therapeutic tactics for fever in children is as follows: only safe antipyretic drugs should be used in children. The drugs of choice for fever in children are paracetamol and ibuprofen. The priority of the latter is obvious, since the drug has a favorable efficacy and safety profile for children in a single dose of 5-10 mg/kg.

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