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PHARMACOLOGY OF EXPECTORANTS

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Abstract: Excessive accumulation of secretions in the bronchial cavity may be associated with hypersecretion of mucus or a violation of the mechanism of its mucociliary transport or a combination of these mechanisms. Medicines used to ensure the transport of bronchial secretions bronchial mucous membrane It is very important to moisten mucus, cause mucolysis and increase cough. The article provides information on the pharmacokinetics and pharmacodynamics of a number of expectorant drugs and the use of these drugs in various diseases.

Key words: expectorants, bronchial contents, drug interactions.

EXPECTANT MEDICINES - medicinal substances that facilitate expectoration during coughing. They increase the activity of the bronchial mucous membrane glands or increase the contraction of the muscles of the bronchi and the activity of the epithelium in the respiratory tract.

The first representatives of expectorants are alkaloids and saponins from plants. This group of drugs helps to dilute mucus and increase bronchial motor function as a result of increased plasma transudation. However, the duration of the effect of these drugs is not long.

Due to the presence of Cytisine (N-cholinomimetic alkaloid) in the composition of afsonak (thermopsis), in large doses, it can often increase or decrease breathing in children.

There is a fairly large number of diseases accompanied by a productive cough (primarily chronic obstructive pulmonary disease). In these cases, expectorants should be taken to improve the evacuation of bronchial contents (1-6).

Expectorants (expectants) facilitate the release of mucus from the respiratory tract mainly due to a decrease in its viscosity. There are expectorants of reflex and direct action. The group of expectorants with reflex action includes preparations of a number of medicinal plants - thermopsis herbs, licorice root, istod root, rhizomes with elecampane roots, marshmallow root, thyme herb, rhizomes with cyanosis roots, etc. This group also includes the alkaloid lycorine, used in medical practice in the form of hydrochloride. Preparations of these medicinal plants are prescribed orally in the form of various dosage forms (powders, infusions, decoctions, extracts, preparations). Their expectorant effect is due to the fact that when taken orally, the active ingredients they contain (mainly alkaloids and saponins) irritate the receptors of the stomach and, as a result, reflexively increase the secretion of the bronchial glands, which is accompanied by a decrease in viscosity sputum. In addition, expectorants of reflex action stimulate peristaltic contractions of the bronchi, increase the activity of

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the cilia of the ciliated epithelium of their mucous membrane, i.e. increase the so-called mucociliary clearance of bronchial secretions, thereby promoting sputum production. In high doses (10 or more times higher than expectorants), they cause nausea and vomiting of reflex origin.

In terms of the nature of its effect on the secretory and motor function of the bronchi, apomorphine is close to a reflex action expectorant. However, unlike reflexively acting expectorants of plant origin (thermopsis herb, etc.), it enhances the secretion of the bronchial glands and the motility of bronchial smooth muscles by stimulating the trigger zones of the vomiting center in the medulla oblongata. In this regard, the expectorant effect of apo-morphine manifests itself through different routes of administration (oral, parenteral). In doses exceeding expectorant doses, apomorphine causes vomiting of central origin. The range between doses of apomorphine that cause expectorant and emetic effects is much less than that of reflex expectorants. For this reason, apomorphine is used relatively rarely as an expectorant.

The group of direct action expectorants includes drugs that have a direct stimulating effect on the bronchial glands, and drugs that thin sputum due to a direct effect on its physical and chemical properties. Some iodine preparations, essential oils and preparations containing them, ammonium chloride, sodium benzoate, etc. have a direct stimulating effect on the secretion of the bronchial glands.

Of the iodine preparations, sodium iodide and potassium iodide are used as expectorants, the expectorant effect of which is due to the fact that iodine ions are partially secreted by the bronchial glands and cause an increase in their secretory activity. As an expectorant, iodine preparations are usually prescribed orally; sodium iodide can also be used intravenously.

Direct action expectorants from essential oils include anise, fennel, thyme, eucalyptus and some others, as well as terpin hydrate. The active principles of essential oils are terpenes and aromatic carbohydrates, which directly affect the secretion of the bronchial glands. Along with expectorant properties, essential oils also have moderate deodorizing, antimicrobial and anti-inflammatory properties. The expectorant effect of essential oils is observed both when used inhalation and when taken orally. In the latter case, the stimulating effect of essential oils on bronchial secretion may be partially due to reflex mechanisms (due to irritation of the gastric mucosa). As an expectorant, essential oils (for example, anise oil, terpene hydrate) are used in pure form and as part of combined expectorants (for example, nasha-anise drops, breast elixir, etc.).

Synthetic drugs from direct action expectorants (ammonium chloride, sodium benzoate), like essential oils, cause an expectorant effect mainly as a result of a direct irritant effect on the bronchial glands and partly in a reflex way due to irritation of the gastric mucosa.

Direct-acting expectorants that thin sputum by influencing its physical and chemical properties include the so-called mucolytic drugs and sodium bicarbonate. Mucolytic drugs reduce the viscosity of sputum by depolymerizing its protein components. Preparations of a number of enzymes that cleave peptide bonds in proteins contained in sputum and pus (crystalline trypsin, crystalline chymotrypsin, chymopsin) or depolymerize RNA and DNA molecules (ribonuclease, deoxyribonuclease), some amino acid derivatives (for example, acetylcysteine), causing depolymerization of glycosaminoglycans by breaking disulfide bonds in their molecules, as well as the drug bromhexine, which depolymerizes mucoproteins and glycosaminoglycans. As an expectorant, enzyme preparations are used mainly by inhalation or endobronchially. Some of them (crystalline trypsin, crystalline chymotrypsin, acetylcysteine) are sometimes administered intramuscularly. Bromhexine is used orally.

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Sodium bicarbonate has a relatively weak expectorant effect, reducing the viscosity of sputum mainly due to its inherent alkaline properties. It is more effective when administered by inhalation than when taken orally.

In medical practice, a number of combination drugs are also used, which include expectorants with different mechanisms of action.

The active ingredients included in the preparations for the symptomatic treatment of wet cough (expectorants) and their pharmacological characteristics are presented in Table. 1.

These drugs include: pertussin (contains thyme extract or thyme extract 12 parts, potassium bromide 1 part, sugar syrup 82 parts and 80% ethyl alcohol 5 parts); ammonia-anise drops (anise oil 2.81 g, ammonia solution 15 ml, 90% ethyl alcohol up to 100 ml); chest collection No. 1 (crushed marshmallow root and crushed coltsfoot leaves, 2 parts each, crushed oregano herb, 1 part); chest collection No. 2 (crushed licorice root and crushed plantain leaves in 3 parts, crushed coltsfoot leaves in 4 parts); Breast collection No. 3 (crushed marshmallow root, crushed licorice root 28.8 g each, sage leaves, anise fruits and crushed pine buds 14.4 g each).

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