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Modern Approaches to the Diagnosis and Treatment of Esophageal Burns in Children

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Abstract Today, this method has become more effective because the aggressive properties of alkaline substances have decreased significantly in recent decades. The use of modern optical fibers has greatly expanded the diagnostic capabilities of endoscopy. The above circumstances have allowed the development and introduction into clinical practice of a new differential approach in the diagnosis and treatment of chemical burns of the esophagus in children.

Keywords Esophagus, Injury, Prophylactic, Chemical compounds

1. Introduction

Burns of the esophagus with chemical compounds in children are the most common type of traumatic injury to the esophagus. Burns occur after swallowing concentrated solutions of alkalis and acids. The most often affected are children aged 1 to 3 years, who, due to adult oversight, taste everything.

This complex method allows to differentiate II and III degree burns in the early stages with a high probability and thus save a large group of patients with second degree burns of the esophagus from unnecessary sputum. The method leads to almost 100% prevention of stenosis and complete recovery of organ function, significantly reduces the time of hospitalization of patients, allows outpatient treatment in 42% of cases.

The sight of a one-year-old baby exploring an unfamiliar object is touching. Examine, feel, sniff, taste - all this the baby does, learning the world around him. However, there are times when objects and substances that are completely not intended for him fall into the hands of a baby. The result - more than 60% of victims of chemical burns of the esophagus - children aged from one year to 3 years who have tasted aggressive chemicals.

Of the total number of victims of chemical burns of the esophagus, about 70-75% are children under the age of 10 years, 25-30% are adults. The frequency of chemical burns of the esophagus in children is explained, on the one hand, by the habit of children (especially of an early age) to take everything by mouth, on the other hand, by the negligence of adults when storing caustic chemicals used in everyday life; in some cases, burns occur when these substances are accidentally taken instead of medicines or drinks.

Burns of the esophagus in children occur when accidentally swallowing hot liquids, caustic chemicals, which include acid or alkali. In rare cases, when taking caustic chemicals in children, poisoning is possible, more often this happens when swallowing acids.

Burns have seasonality: in the spring, as a rule, in March, they begin to prepare seedlings for the dacha. Sometimes, for better growth, various liquid fertilizers and "potassium permanganate" are used. Preparations are made in autumn. Caution, vinegar essence!

The severity of the burn of the esophagus depends on many factors: the type and amount of the chemical, its concentration, the duration of exposure to the mucous membrane, the age of the child.

Household chemicals have become an integral part of our lives. In any home there are dangerous chemicals that pose a threat to an inquisitive baby. Today, burns of the esophagus in children are becoming more common.

Here is a conditional "rating" of the most dangerous chemicals in our home:

- acetic essence
- caustic soda (caustic soda)
- manganese crystals
- ammonia
- office glue
- turpentine

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- battery fluid
- means for cleaning clogged pipes, for example, "mole".

As you can see, the chances of getting a burn of the esophagus in children are the widest. Even the most harmless, at first glance, substances can cause a burn.

In case of burns with caustic chemicals, the localization, extent and depth of the lesion depend on the amount and type of chemical, its concentration, duration of exposure and the age of the child. In younger children, burns are more severe.

Alkalis penetrate deeper into tissues than acids, so when passing through the esophagus, they cause deeper lesions, especially in places of functional constriction. Acids, having a cauterizing property when exposed to tissue proteins, form a scab that prevents them from deep penetration into the wall of the esophagus. However, large concentrations and significant amounts of potent acids also cause profound changes in the wall of the esophagus.

The desire of children to taste everything is the cause of chemical burns of the esophagus. Commercial cleaning agents, vinegar essence, pipe cleaners are the main agents that cause chemical necrosis of the esophagus. The main reason for the high frequency of chemical burns is improper storage of burning substances. Target. Improving the results of treatment and preventing complications by improving the complex therapy and expanding the indications for the application of a gastrostomy for threading.

The patients. In the EHC department in the period from 2017–2019. were treated 220 children with chemical burns of the esophagus. Basically, these are children under 3 years old - 143 (65%) children; 3–7 years old - 66 (30%); older than 7 years - 11 (5%). Distribution by chemical agent: acetic essence - 132 (60%) children; alkali (“Mole” and other cleaning products) - 57 (26%), manganese - 13 (6%), another agent - 11 (5%), unknown - 6 (3%). According to the degree of damage: only the oropharynx - in 30 (14%) children, I degree - in 117 (53%), II degree - in 37 (17%), III degree - 36 (16%). Results. Children with grade I did not need bougienage. 46 (21%) children were bougied for 3 weeks in a hospital. After control esophagoscopy, they were discharged, there were no indications for further bougienage. 35 (16%) children were bougienage in the hospital and were discharged for outpatient bougienage.

Of these, 11 (32%) children underwent a gastrostomy with a nasogastric thread for bougienage. In 3 children, after a chemical burn with alkali during direct bougienage, iatrogenic perforation of the esophagus occurred, and subsequently a gastrostomy was imposed on them. In 5 children, after a burn with alkali, mediastinitis developed, in connection with which the bougienage was postponed, and treatment was carried out.

There are 3 degrees of burns of the esophagus. With a 1st degree burn, only the superficial layers of the mucosa of the esophagus are affected; with a II degree burn, the lesion extends to its muscular membrane, with a III degree burn, damage to all layers of the esophageal wall, as well as paraoesophageal tissue and surrounding organs, is observed. With a third-degree burn, in addition to local, general phenomena are also expressed, due to intoxication and shock. With burns II and especially III degree (if the patient can be saved), cicatricial changes in the esophagus, strictures, cicatricial shortening of the esophagus develop, in some cases chronic ulceration of the esophageal wall.

With cicatricial narrowing of the esophagus due to chemical burns surgery is possible no earlier than 5 months later. After conservative treatment, since after the operation stenosis of the anastomosis or the remaining part of the esophagus may occur. The type of operation is selected according to the location and extent of the stenosis. With cicatricial stricture of the upper and chest the esophagus is completely replaced by a transplant of the transverse colon or small intestine on a vascular pedicle, while a proximal anastomosis is made with either the pharynx or the remaining upper esophagus. Distal end of the graft anastomoses with the stomach. In this case, a graft from a thin or the large intestine is located prester Nally or in the chest cavity. With a relatively rare cicatricial stricture lower part of the esophagus to replace this segment is used only the stomach or part of it along the greater curvature, formed in the form of a tube.

The main measures to prevent burns of the esophagus are proper storage of household chemicals. Substances that are caustic liquids should be stored separately from food products. Keep household chemicals out of the reach of children. If everyone would heed this warning written on every label, there would be far fewer accidents. It is especially dangerous to pour chemicals into containers from under food products: jars, bottles. By mistake, these liquids are mistaken for water and drunk, getting a burn of the pharynx and esophagus.

About 70% of burns are caused by swallowing vinegar essence. Based on this, it is worth abandoning its use and replacing it with vinegar. Caustic soda, which is used to clean pots and pipes should not be stored in the kitchen. It does not have a sharp specific smell and is mistaken for baking soda. In previous years, up to 10% of the victims received burns after drinking a strong solution of potassium permanganate, which was used as a disinfectant. Therefore, if you still have stocks of this the drug, do not dilute it in mugs and do not leave the prepared solution where children or other family members can get it.

An important role in the prevention of burns of the esophagus is played by conversations with children about safety. It is necessary to tell the baby in a timely manner what danger household chemicals carry and why it is not worth it use inappropriately.

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