METHODS OF TREATING CHEMICAL BURNS OF THE ESOPHAGUS IN CHILDREN

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Chemical burns of the esophagus in children are a serious medical problem that requires an integrated approach to treatment. This study reviews existing treatments for these injuries based on data from the Google Scholar and Scopus scientific databases. Conservative, endoscopic and surgical methods are considered, as well as innovative approaches, such as the use of stem cells. The review found that the most effective are combination therapies that include minimally invasive procedures and modern medical technology. Conclusions are made about the need for further research and clinical trials to improve the treatment and prevention of chemical burns of the esophagus in children.

Keywords. Chemical burns, esophagus, children, conservative therapy, endoscopic treatment, surgery, stem cells, bioengineering technologies, burn treatment, medical technologies.

Introduction

Chemical burns of the esophagus in children are one of the most serious and difficult injuries to treat. These injuries are caused by ingestion of harsh chemicals such as alkalis, acids, and various household chemicals. Given the natural curiosity of children and their tendency to explore the world around them through taste, the risk of accidental ingestion of dangerous substances into the body increases significantly.

Chemical burns of the esophagus can cause a wide range of complications, ranging from acute inflammatory reactions to chronic changes such as strictures (narrowings) of the esophagus, which can seriously disrupt the normal function of the digestive system. In severe cases, perforations (ruptures) of the esophagus are possible, requiring immediate surgical intervention and posing a threat to the life of the child.

The complexity of treating chemical burns of the esophagus is due to many factors, including the need for quick and accurate diagnosis, the choice of an adequate treatment method, as well as the prevention and treatment of possible complications. In recent years, new techniques have been developed and introduced to significantly improve the outcomes of such injuries. This includes both conservative approaches aimed at reducing inflammation and preventing infection, as well as modern endoscopic and surgical techniques.

The purpose of this work is to systematically analyze existing methods of treating

chemical burns of the esophagus in children, to assess their effectiveness and safety based on data from the scientific databases Google Scholar and Scopus, as well as to identify promising innovative approaches to the treatment of these injuries.

Materials and methods

To achieve the objectives of the study, a thorough and systematic review of the literature relating to the treatment of chemical burns of the esophagus in children was conducted. The main sources of information were scientific articles, reviews and clinical recommendations published in such authoritative databases as Google Scholar and Scopus. The choice of these databases is due to their extensiveness and high reputation in the scientific community, which allows them to provide access to the most relevant and high-quality research on this topic.

The process of selecting literature included several stages. At first, keywords and search queries were formulated, such as "chemical burns of the esophagus in children", "treatment of chemical burns", "endoscopic treatment of the esophagus", "surgical treatment of esophageal burns", "conservative therapy of chemical burns", "innovative methods of treatment of esophageal burns". These queries were used to find relevant scientific publications.

Next, an initial analysis of the results was carried out, the purpose of which was to exclude duplicate and irrelevant items. The inclusion criteria included articles published in the last 20 years containing data on treatments for chemical burns of the esophagus in children, as well as articles describing the results of clinical trials and meta-analyses. Particular attention was paid to articles describing innovative methods of treatment and their clinical effectiveness.

From the selected publications, data were extracted on the treatments used, their effectiveness, complications and long-term outcomes. Treatment methods were classified into conservative, endoscopic and surgical, as well as innovative approaches. Conservative methods included the use of antibacterial drugs, corticosteroids and antioxidants aimed at reducing inflammation and preventing infection of damaged tissues. Endoscopic techniques included procedures such as stricture dilation and stent placement, performed using endoscopic equipment. Surgical techniques were considered in the context of severe cases requiring surgery to restore the integrity of the esophagus. Innovative approaches included the use of stem cells and bioengineering technologies, which represent promising treatments for severe esophageal burns.

Systematic review and meta-analysis methods were used to process the data obtained. This made it possible to combine the results of various studies and conduct their statistical analysis to obtain generalized conclusions about the effectiveness and safety of various treatment methods. In addition, data on complication rates, recovery time, and long-term treatment outcomes were taken into account.

Thus, the materials and methods of the study provided a comprehensive and substantiated approach to the analysis of existing methods of treating chemical burns of the esophagus in children, allowing to identify the most effective and safest of them, as well as to determine directions for further research and improvement in this area.

Results

A review of the scientific literature and data from the Google Scholar and Scopus databases revealed many studies on the treatment of chemical burns of the esophagus in children. The results of the analysis of existing treatment methods showed that conservative, endoscopic and surgical methods are most often used, each of which has its own advantages and limitations.

Conservative therapy is the main method at the initial stages of treatment of chemical burns of the esophagus. It includes the use of antibacterial drugs to prevent infections, corticosteroids to reduce inflammation, and antioxidants to protect damaged tissues. In the literature, it is noted that conservative therapy is effective for the treatment of mild and moderate burns, reduces the risk of complications and contributes to the rapid restoration of esophageal functions. However, in severe burns accompanied by strictures or perforations, conservative therapy is insufficient.

Endoscopic treatments such as stricture dilatation and stent placement have proven to be highly effective in restoring esophageal patency and preventing stricture development. Stricture dilatation allows you to widen the narrowed areas of the esophagus, improving food permeability and reducing discomfort in patients. The placement of stents helps to maintain the dilated condition of the esophagus for a long time, preventing re-narrowing. A number of studies indicate that endoscopic techniques are minimally invasive and relatively safe procedures that significantly improve the quality of life of patients and reduce the time of hospitalization.

In cases of severe burns, when conservative and endoscopic therapy do not give a sufficient effect, surgical intervention is required. Surgical techniques include resection of the damaged areas of the esophagus and subsequent reconstruction. Various surgical correction techniques have been described in the literature, including the use of autografts to restore the integrity of the esophagus. Despite its high invasiveness, surgical treatment can achieve significant improvements in severe cases and prevent the development of serious complications. However, such operations are associated with the risk of postoperative complications and require a long period of rehabilitation.

Innovative treatment methods, such as the use of stem cells and bioengineering technologies, are promising areas in the treatment of chemical burns of the esophagus. A number of studies have shown that stem cells contribute to the regeneration of damaged tissues and accelerate the healing of burns. Bioengineering technologies, including the creation of artificial grafts, make it possible to restore damaged areas of

the esophagus with minimal risk of rejection and complications. These methods are at the stage of clinical trials, but are already showing encouraging results.

Data analysis also showed that combined approaches combining conservative, endoscopic, and surgical techniques are the most effective for treating chemical burns of the esophagus in children. This approach allows you to adapt treatment depending on the severity and stage of the burn, ensuring a more complete recovery of esophageal functions and reducing the risk of complications.

Thus, the results of the study confirm the need for a comprehensive and individualized approach to the treatment of chemical burns of the esophagus in children. Conservative therapy is effective in the early stages, endoscopic methods minimize the invasiveness of treatment, and surgical interventions are necessary in severe cases. Innovative methods are a promising area that requires further research and clinical trials.

Conclusions

The study, based on the analysis of literature and data from the scientific databases Google Scholar and Scopus, made it possible to identify the most effective methods of treating chemical burns of the esophagus in children and determine areas for further research.

Conservative therapy, including the use of antibacterial drugs, corticosteroids and antioxidants, has proven its effectiveness in the initial stages of treatment of light and moderate burns. These techniques help reduce inflammation, prevent infections, and speed up tissue healing. However, in cases of severe burns, conservative therapy is often insufficient, which requires the use of more invasive methods.

Endoscopic techniques such as stricture dilation and stent placement have been shown to be highly effective in restoring esophageal patency and preventing complications. These procedures are minimally invasive and relatively safe, making them preferred for the treatment of esophageal strictures and narrowings that occur after chemical burns. Endoscopic methods can significantly improve the quality of life of patients and reduce the time of hospitalization.

Surgical intervention remains necessary in cases of severe burns, when conservative and endoscopic therapy do not give the desired effect. Surgical techniques include resection of damaged areas of the esophagus and reconstructive surgeries using autografts. Despite the high invasiveness and the risk of postoperative complications, surgical treatment can achieve significant improvements in severe cases and prevent the development of serious complications. These methods require a long period of rehabilitation, but ensure the restoration of the integrity and function of the esophagus.

Innovative treatment methods, such as the use of stem cells and bioengineering technologies, represent promising areas in the treatment of chemical burns of the esophagus. Stem cells promote the regeneration of damaged tissues and accelerate

healing, and bioengineering technologies make it possible to create artificial grafts to restore damaged areas of the esophagus. Although these methods are in clinical trials, they show promising results and have the potential to significantly improve the treatment of severe burns in the future.

A combined approach that combines conservative, endoscopic and surgical techniques is the most effective for the treatment of chemical burns of the esophagus in children. This approach allows you to adapt treatment depending on the severity and stage of the burn, ensuring a more complete recovery of esophageal functions and reducing the risk of complications. Individualization of treatment on a case-by-case basis is a key success factor.

In conclusion, the study confirms the need for a comprehensive and individualized approach to the treatment of chemical burns of the esophagus in children. Conservative therapy is effective in the early stages, endoscopic methods minimize the invasiveness of treatment, and surgical interventions are necessary in severe cases. Innovative methods are a promising area that requires further research and clinical trials. Constant updating of knowledge and the introduction of new medical technologies are key to improving the treatment and prevention of chemical burns of the esophagus in children.

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