Pediatric esophageal stricture after chemical ingestion

https://doi.org/10.56238/sevened2024.001-026

AmandaTeixeira Veloso[1], Cibelly Leite Wanderley Fidélio[2], Ellen Caroline Silva Prado[3], Hanne Karoline Lopes Oliveira[4], Hugo Severo Saraiva[5], João Victor Braga Milhomem[6], Joyce Giovana da Silva[7], Thaysa Renata Jorge Oliveira[8], Vitor Fiori Paulo Kopke Silva[9] and Vinicius Fernando Pereira Falavigna[10]

ABSTRACT

Pediatric esophageal stricture following ingestion of chemical substances is a condition that arises from the accidental ingestion of caustic products by children. This ingestion can cause damage to the esophagus, leading to the formation of scars and narrowing of the organ. Diagnosis involves examinations such as endoscopy and radiographs, while treatment may include esophageal dilation and, in some cases, surgical intervention. Regular medical follow-up is essential to monitor development and ensure an effective therapeutic approach, aiming to improve the quality of life for the affected child.

Keywords: Esophageal Stricture, Pediatric Stricture, Chemical Substances.

[1] Medical Students
[2] Medical Students
[3] Medical Students
[4] Medical Students
[5] Medical Students
[6] Medical Students
[7] Medical Students
[8] Medical Students
[9] Medical Students
[10] Medical Students

INTRODUCTION

Esophageal stricture is a medical condition characterized by abnormal narrowing of the esophagus, the muscular tube that connects the throat to the stomach. It can be caused by gastroesophageal reflux disease, esophagitis, the presence of tumors, a hiatal hernia, or scarring from ingestion of caustic substances. Symptoms include difficulty swallowing, pain when swallowing, regurgitation, and a feeling of tightness in the chest. Diagnosis involves tests such as endoscopy, x-rays, or esophageal manometry. Treatment depends on the cause and severity, including esophageal dilation, medications, and, in some cases, surgery.

METHODOLOGY

This integrative literature review was conducted from October 2023 to February 2024 to analyze the accidental ingestion of chemicals in children as causes of esophageal stricture, with a special focus on the specific categories of chemicals most frequently ingested.

The search for scientific articles was carried out in the databases of the journals SciELO and PubMed, as well as the Brazilian Society of Pediatrics. Descriptors such as "Chemical Intake in Children", "Esophageal Stenosis" and "Esophageal Stenosis in Pediatrics" were used. The search covered the mentioned period, in order to address relevant studies published during this time interval.

The inclusion criteria defined for the selection of primary studies included articles published in Portuguese and English, available in full online, and directly related to the theme of esophageal stenosis in children after chemical ingestion. Articles that were duplicate or not pertinent to the proposed approach were excluded.

The synthesis of the results of the integrative review will provide a comprehensive view of the prevalence of esophageal stricture in children after chemical ingestion, highlighting the most common substances and associated factors. This method aims to contribute to the understanding of the problem of esophageal stenosis in children after chemical ingestion, providing support for the implementation of preventive measures and effective interventions in the field of child health.

RESULTS AND DISCUSSION

Esophageal stenosis in children, although less frequent than in adults, can have several origins. Among the main pediatric causes, esophageal atresia stands out, a congenital condition that prevents the proper development of the esophagus during pregnancy, leading to total or partial blockages. Severe gastroesophageal reflux (GERD) is also a significant cause, resulting from the chronic reflux of stomach acid into the esophagus, causing irritation and scarring that culminate in stenosis. In addition, accidental ingestion of caustic substances by young children, such as cleaning products, can cause damage to the esophagus, contributing to the development of stenosis.

Eosinophil esophagitis, an inflammatory condition triggered by food allergies, is another reason, leading to scarring and narrowing. Congenital malformations associated with congenital gastroesophageal reflux disease also increase the risk of stenosis in children. Additionally, post-surgical complications from previous procedures in the esophagus can result in stenosis as a complication. Proper diagnosis and treatment, tailored to each child's individual needs, are key, involving tests such as endoscopy, esophageal manometry, and contrast-enhanced radiographs, as well as interventions such as esophageal dilation, medications, and, in some cases, surgery. Ongoing medical follow-up is essential to monitor development and ensure an effective therapeutic approach.

Accidental ingestion of caustic substances is one of the main causes of esophageal stricture in children. This scenario is drawn when the little ones, driven by their natural curiosity, inadvertently ingest corrosive chemicals such as detergents, disinfectants, acids or strong bases. This direct contact with the esophagus results in significant damage to the inner lining of the organ.

The process unfolds as follows: initially, the accidental ingestion of these substances occurs, often when children bring objects or their own hands to their mouths after having contact with these products. The caustic substance then causes burns and damage to the esophagus, triggering inflammation, irritation, and eventually scarring during the healing process.

As the esophagus recovers, scar tissue develops, leading to narrowing of the organ over time, culminating in the condition known as esophageal stenosis. Symptoms associated with this situation include pain when swallowing, difficulty swallowing, excessive salivation, vomiting, abdominal pain, and refusal to eat. It is of paramount importance to seek immediate medical assistance when suspecting the ingestion of caustic substances, as prompt intervention can positively impact prognosis and reduce damage to the esophagus. Treatment may include measures such as gastric lavage, administration of activated charcoal, endoscopy for direct evaluation of the lesion and, in more severe situations, reconstructive surgical intervention.

The prevalence of each type of substance will depend on the presence of these products in domestic environments, the access children have to these substances, and the safety practices adopted by families. Education of parents, caregivers, and healthcare professionals plays a crucial role in preventing accidental ingestion of chemicals by children, underscoring the importance of safe storage and active supervision to ensure a safe and healthy environment for child development.

The unfortunate reality is that accidental ingestion of chemicals by children can occur, posing a serious health risk. Among the chemicals most frequently ingested by children, several categories stand out:

HOUSEHOLD CLEANING PRODUCTS (DETERGENTS, DISINFECTANTS, BLEACHES):

Mechanism: Ingestion of these products can lead to corrosive damage to the esophagus, causing burns and inflammation.

Stenosis: The healing process after injury can result in the formation of scar tissue in the esophagus, leading to gradual narrowing of the organ.

MEDICATIONS: INCLUDING PAIN RELIEVERS, VITAMINS, SUPPLEMENTS, AND OTHER MEDICATIONS, BOTH PRESCRIPTION AND OVER-THE-COUNTER.

Mechanism: Certain medications, especially those with irritant potential, can cause damage to the lining of the esophagus.

Stenosis: Scarring and inflammation resulting from the injury can lead to scarring and, consequently, esophageal stricture.

GARDEN & AGRICULTURE PRODUCTS (FERTILIZERS, PESTICIDES):

Mechanism: Toxic chemicals present in these products can cause damage to the esophagus after ingestion.

Stenosis: The healing process can lead to the formation of scar tissue, contributing to the narrowing of the esophagus.

PERSONAL HYGIENE PRODUCTS (SOAPS, SHAMPOOS):

Mechanism: Certain personal care products may contain irritating or corrosive substances.

Stricture: Ingestion of these products can cause inflammation and damage to the esophagus, resulting in narrowing during the healing process.

AUTOMOTIVE PRODUCTS (BRAKE FLUIDS, ANTIFREEZE):

Mechanism: Toxic substances present in these products can cause damage to the esophagus.

Stenosis: Scarring after injury can lead to narrowing of the esophagus.

PAINT PRODUCTS (PAINTS, SOLVENTS):

Mechanism: Chemical agents present in these products can be corrosive. Stenosis: Ingestion can result in damage to the esophagus, triggering a healing process that contributes to stenosis.

In all these cases, esophageal stenosis is a possible complication, and the severity will depend on the amount ingested, the toxicity of the agent, and how quickly the medical intervention is performed. Treatment may involve esophageal dilation, anti-inflammatory medications, and, in

severe cases, surgery. It is critical to seek immediate medical assistance in cases of accidental ingestion of chemical substances.

The incidence and prevalence of chemical ingestion in children vary significantly, being influenced by factors such as geographic region, safety practices adopted by families, and socioeconomic and cultural elements. Accidental ingestion of chemical substances is a substantial concern in home environments, posing a considerable risk to children's health.

The occurrence of accidental ingestion of chemicals in young children is a fairly common phenomenon, driven by their natural curiosity, exploration of the surrounding environment, and a lack of discernment as to what is safe for consumption. Younger children, especially those under the age of five, are more vulnerable to inadvertently ingesting chemicals due to their exploratory nature and inclination to put objects in their mouths.

Several types of substances are often associated with cases of accidental ingestion in children, including cleaning products, medications, and personal hygiene items. Implementing preventive measures plays a crucial role in reducing the occurrence of these events. This includes practices such as safely storing chemicals out of the reach of children, using safety locks, and active supervision.

The ingestion of chemical substances by children can have serious health consequences, such as poisoning, damage to the digestive system, and, in more severe cases, esophageal stricture, as previously discussed.

FINAL THOUGHTS

In conclusion, esophageal stricture in children after chemical ingestion is a serious complication that can result from several types of corrosive substances. The severity of this condition is intrinsically related to the nature of the agent ingested, the amount absorbed, and the readiness of medical intervention. Accidental ingestion of chemicals by children is a worrisome occurrence, often stemming from their natural curiosity and lack of discernment about what is safe. Household cleaning products, medicines, personal care products, and other chemical compounds are among the main sources triggering this scenario.

The formation of scars in the esophagus, resulting from the injury caused by chemical ingestion, can lead to esophageal stenosis, characterized by the progressive narrowing of the organ. The severity of narrowing can vary, impacting swallowing ability and causing significant discomfort. Prevention plays a crucial role in mitigating this complication. Measures such as safe storage of chemical substances, active supervision of children, and the implementation of safety barriers are key. Additionally, educating parents and caregivers about the potential dangers associated with chemical ingestion is vital to avoid risky situations.

Education and awareness are key in the preventive approach to these incidents. Educational programs targeting parents, caregivers, and healthcare professionals play a crucial role in raising awareness of the potential dangers associated with chemical ingestion and in promoting safe practices in the home environment. Therefore, effective management of this scenario requires a multidisciplinary approach, involving preventive actions, ongoing education, and appropriate medical interventions to ensure the well-being and healthy development of affected children.

REFERENCES

1. Voronetsky AN, Gulenko AV. (2023). Patogistologicheskaya kharakteristika striktury pishchevoda pri kausticheskom ozhoge u detei [Histological evaluation of esophageal stricture in children with caustic burn]. Khirurgiia (Mosk), (12), 43-51. doi: 10.17116/hirurgia202312143. PMID: 38088840.

2. Tang LJ, Lou JG, Zhao H, Peng KR, Yu JD. (2023). 内镜下食管扩张治疗儿童腐蚀性食管狭窄的临床分析 [Clinical analysis of endoscopic esophageal dilation for the treatment of corrosive esophageal strictures in children]. Zhongguo Dang Dai Er Ke Za Zhi, 25(12), 1265-1269. doi: 10.7499/j.issn.1008-8830.2305106. PMID: 38112145; PMCID: PMC10731973.

3. Askarpour S, Peyvasteh M, Dashtyan M, Javaherizadeh H, Ahmadi M, Ali-Samir M. (2020). Incidence of malnutrition, esophageal stenosis and respiratory complications among children with repaired esophageal atresia. Arq Bras Cir Dig, 33(1), e1486. doi: 10.1590/0102-672020190001e1486. PMID: 33206845; PMCID: PMC7668295.

4. Vieira E, Cabral MJ, Gonçalves M. (2013). Perfuração Esofágica na Criança: Casuística de um Serviço de Cirurgia Pediátrica (16 Anos) [Esophageal perforation in children: a review of one pediatric surgery institution's experience (16 years)]. Acta Med Port, 26(2), 102-106. PMID: 23809740.

5. Rebelo PG, Ormonde JV, Ormonde Filho JB. (2013). Congenital esophageal stenosis owing to tracheobronchial remnants. Rev Paul Pediatr, 31(3), 406-410. doi: 10.1590/S0103-05822013000300020. PMID: 24142326; PMCID: PMC4182969.

6. BITTENCOURT, Paulo Fernando Souto; CARVALHO, Simone Diniz; FERREIRA, Alexandre Rodrigues; MELO, Suzana Fonseca Oliveira; ANDRADE, Denise Oliveira; FIGUEIREDO FILHO, Paulo Pimenta; ALBUQUERQUE, Walton; MOREIRA, Edivaldo Fraga; PENNA, Francisco José. (2006). Tratamento das estenoses esofágicas por dilatação endoscópica em crianças e adolescentes. Jornal de Pediatria, 82(2), 127-131. doi: http://dx.doi.org/10.1590/s0021-75572006000200009.

7. CAMPOS, Alessandra Marcuz de Souza; BUCARETCHI, Fábio; FERNANDES, Luciane Cristina Rodrigues; FERNANDES, Carla Borrasca; CAPITANI, Eduardo Mello de; BECK, Ana Raquel Medeiros. (2017). EXPOSIÇÕES TÓXICAS EM CRIANÇAS A SANEANTES DE USO DOMICILIAR DE VENDA LEGAL E CLANDESTINA. Revista Paulista de Pediatria, 35(1), 11-17. doi: http://dx.doi.org/10.1590/1984-0462/;2017;35;1;00010.

8. Campos, J. A., Costa, D. M. & Oliveira, J. S. (1998). Intoxicações agudas na infância e adolescência. Em A. J. Lima (Org.). Pediatria Essencial (pp. 803-819). São Paulo: Atheneu.

9. MARTINS, Christine Baccarat de Godoy; ANDRADE, Selma Maffei de; PAIVA, Priscila Aparecida Batista de. (2006). Envenenamentos acidentais entre menores de 15 anos em município da Região Sul do Brasil. Cadernos de Saúde Pública, 22(2), 407-414. doi: http://dx.doi.org/10.1590/s0102-311x2006000200018.