

THE SIGNIFICANCE OF EARLY PANENDOSCOPY IN CAUSTIC INGESTION IN CHILDREN*

Wrzesław Romanczuk MD**, Ryszard Korczowski MD***

SUMMARY: Romanczuk W, Korczowski R. (Pediatric Clinic, Institute of Clinical Medicine, Rzeszow, Poland). The significance of early panendoscopy in caustic ingestion in children. Turk J Pediatr 34: 93-98, 1992.

Fourteen cases of esophageal and gastric burns following the accidental ingestion of a caustic substance are presented. Early fiberoptic endoscopy was necessary, for it made possible a precise assessment of the severity and extent of injury and the application of proper conservative therapy. Signs and symptoms of caustic burns in children are an unreliable guide to injury, therefore, panendoscopy should be performed as soon as possible. A delay in the performance of a fiberoptic examination could result in the perforation of the affected organs. *Key words: caustic ingestion, esophageal perforation, early panendoscopy.*

The ingestion of caustic agents in children, though infrequent, is a serious therapeutic problem. It requires immediate and complex treatment and any delays may make the prognosis considerably worse¹⁻⁶.

Corrosive esophagitis and gastritis follow oropharyngeal burns in frequency. The effects of the intake of a strong base (NaOH, Ca (OH)₂), concentrated sulphuric or hydrochloric acid, salts of heavy metals, formalin, boiling water or hot food may permanently damage the organs. In order to prevent the possible consequences of such ingestions, i.e. perforation, stenosis, scar formation, ulceration and inflammation of mucosal membranes of the upper segment of the alimentary tract, prompt and intensive treatment must be initiated.

The peak incidence of caustic ingestions, mainly those occurring by accident, is seen in children under five years of age^{2,3,5,6}. There is usually a lack of reliable information on the amount and kind of toxic product ingested. Very often we do not even know whether the intake of a caustic substance had actually occurred. Therefore, the necessity for early esophagogastrosocopy, even in children only suspected of having consumed a corrosive compound, has been generally accepted^{1,5-7}.

In addition, in patients with no external signs of burns in the oral cavity or pharynx, flexible fiberoptic endoscopy is absolutely necessary to make a proper diagnosis¹⁻

* From the Pediatric Clinic, Institute of Clinical Medicine, Rzeszow, Poland.

** Pediatrician, Pediatric Clinic, Institute of Clinical Medicine.

*** Professor of Pediatrics, Pediatric Clinic, Institute of Clinical Medicine.

8.9. A delayed diagnosis will inevitably result in permanent post - burn changes in the upper segments of the alimentary tract (cicatrical stricture, scarring and stenosis) in which some improvement in the condition may be attained only through surgical intervention.

Material and Methods

Fourteen children aged 17 / 12 - 5 3 / 12 years (mean: 28 months) who were hospitalized in the Pediatric Clinic of the Institute of Clinical Medicine, Rzeszow between 1988 - 1989 because of the accidental ingestion of a caustic agent were enrolled in this study.

All patients underwent panendoscopy within the first 24 hours of ingestion. Type GIF - P 10 or GIF - XP 10 Olympus fiberscopes were used in the panendoscopies performed under general anesthesia of short duration (intravenous ketamine). Steroids, antibiotics, H₂ blockers (cimetidine) and drugs to protect the mucosa (antacids) were also given to the patients. For the first three to seven days, depending on the general condition and the endoscopic findings of the patient, only parenteral nutrition was used. Liquid, semi - solid or pap meals were gradually introduced within two to three weeks until oral feeding could be re - established.

Results

All the children were males and two - thirds of them were from the town in which the hospital was located. The agents most frequently ingested by seven patients were either hydrochloric acid or sulphuric acid in concentrated solutions. In the remaining seven cases, either formalin, potassium permanganate, liquid detergents, drain "decloggers" ("Kret and Swider") or the boiling contents from a juice extractor were ingested. With one exception (patient N.R.), all patients were brought to our clinic within the first 24 hours of ingestion.

Early endoscopy revealed traces of burns in the esophagus, cardia, stomach and pylorus in all patients. The intensity (congestion, edema, erosions, ulcerations and mucosal fragility) and extent (involving only the esophagus or the esophagus along with the stomach and pylorus) of the lesions varied from patient to patient. The most pronounced changes were noted at the level of the physiological narrowing of the esophagus and in the angulus of the stomach. Each endoscopy took three to ten minutes and produced no complication.

Early fiberoptic endoscopy was coupled with immediate medical treatment. Recovery was sustained in 13 patients, who are still being followed at our outpatient clinic of the Gastroenterology Department. No late complications were encountered in our series after an average 18-month follow - up. In one case,

however, N.R., a 27-month-old boy, the clinical course was very complicated and resulted in sequelae. For a demonstrative discussion, we present below the clinical course and outcome of the afore - mentioned case.

The patient was admitted to the intensive Care Unit of our hospital because he had accidentally ingested a large quantity of concentrated sulphuric acid. He was in critical condition, evidenced by tachypnea, cardiovascular collapse, unconsciousness and post - burn changes in the oral cavity, pharynx, and in the lungs. After nearly two weeks of intensive medical treatment, he was transferred to the Hospital for Infectious Diseases because of infectious diarrhea. After one week, he was readmitted to our clinic for further therapy. His general condition was poor. He had severe pneumonia and was fed by an orogastric tube. Panendoscopy revealed erosive changes throughout the esophagus and stomach, with ulceration of the angulus of the stomach (Fig. 1). The therapeutic regimen consisted of cimetidine and antacids. Oral feeding was gradually introduced. Ten

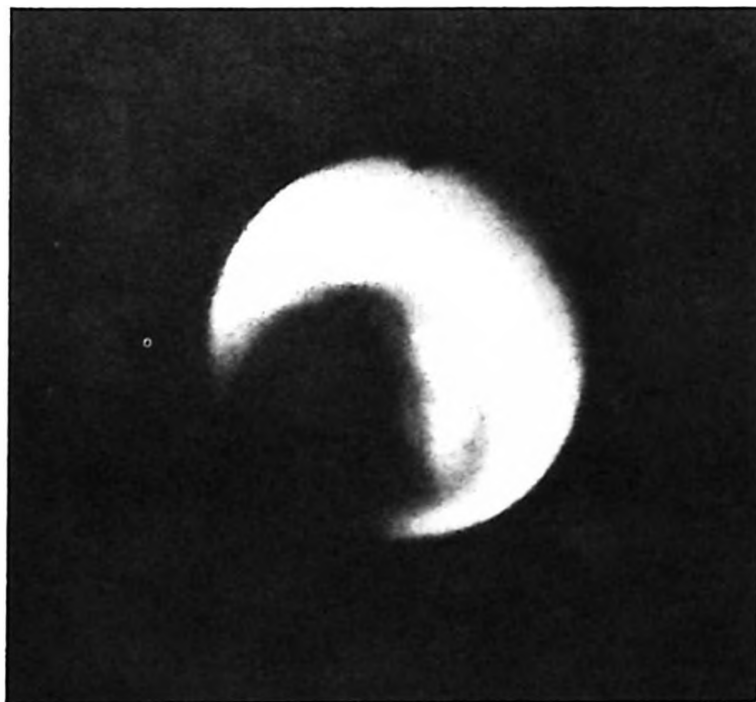


Fig. 1: Changes revealed by panendoscopy in the gastrointestinal tract.

days after initiation of oral feeding, he started to vomit following feedings and refused food. A repeat emergency endoscopic examination was performed. Narrowing of the lumen of the esophagus was detected 7 - 8 cm. down the incisors (Fig. 2). During the withdrawal of the endoscope, pneumothorax developed and the patient was immediately transferred to the Intensive Care Unit where pleural cavity drainage was performed. The chest X-ray showed a right-sided pneumothorax with a shift of the mediastinum to the left and

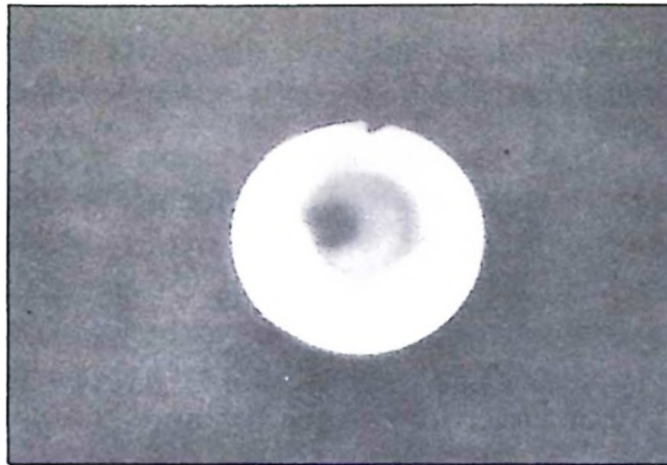


Fig. 2: Permanent narrowing of the lumen of the esophagus.

subcutaneous emphysema involving the right side of the thorax and neck (Figs. 3, 4). A barium follow-through revealed esophageal stenosis at the level of the fifth thoracic vertebra. The patient was treated for three days and was then transferred to the Children's Health Center in Warsaw for dilatation therapy.



Fig. 3: Esophageal stenosis at the level of the fifth thoracic vertebra and a leakage of air into the mediastinum.



Fig. 4: Esophageal stenosis at the level of the fifth thoracic vertebra and a leakage of air into the mediastinum.

Discussion

It is generally assumed that in children who have ingested a caustic substance, early fiberoptic endoscopy is necessary. This also refers to cases with no external traces of burns in the oral cavity and / or throat^{1,2,3,5,7}. It is also believed that endoscopy should be performed no later than the fourth day after the incident, since during this period only surface changes (edema and hyperemia of the esophageal mucosa with no violation of its continuity) occur and the esophageal wall shows a high resistance to mechanical injury, which may occur during the examination. This type of injury may be avoided by use of a flexible fiberoptic endoscope with axial optics along with a short - term general anesthesia.

Early endoscopy is decisive in selecting the type of therapy. It makes possible, when necessary, the immediate application of esophageal dilatation, thus preventing permanent stenosis or total obliteration^{1,2,4,8-10}.

Five days following ingestion, superficial lesions in the walls of the esophagus and stomach tend to be deeper and involve the muscular layer with derangement of mucosal continuity, which make these organs more vulnerable to mechanical injuries, iatrogenic perforations and permanent effects like esophagitis dissecans superficialis et profunda and esophagitis corrosiva. American investigators refer to this state as the "ulcerative granulation phase"^{3,6}. Proper treatment does not

necessarily ensure a satisfactory outcome and the general prognosis may be poor. These suggestions are in accord with our experience in treating patient N.R., in whom a repeat endoscopy was performed because of his life - threatening condition on the 32nd day after ingestion of strong sulphuric acid, resulting in perforation of the esophagus. In the other cases, early panendoscopy allowed for the introduction of pharmacological treatment and feeding, thus resulting in complete recovery. In half of the children, repeat endoscopies four to five months after the incident revealed normal findings. These children were developing normally and eating normal food.

Our experience with 14 cases indicates the usefulness of early endoscopic diagnosis in children suspected of having ingested a caustic substance. It is worth noting that panendoscopy performed in the seven other children suspected of having ingested a caustic substance enabled us to rule out this possibility and prevented unnecessary intensive treatment and longer hospitalization. After an observation period of one to two days, all these children were sent home.

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