

Juvenile corrosive esophagitis due to accidental caustic soda ingestion: report on a series of cases, including a four-year follow-up

by

Manea M.¹, Dinant G.J.²

Abstract

Objectives: *To assess the incidence and to evaluate the clinical evolution of juvenile corrosive esophagitis (CE) due to accidental caustic soda ingestion.*

Methods: *A retrospective case series study- of 46 cases with post caustic esophagitis, hospitalized between 01-01-1994 and 30-11-1994 in the Hospital no.1 in Craiova, Romania. The evolution of these cases was followed since 1998, in ambulatory settings.*

Results: *Most cases (80%) occurred among young children between the ages of 0 and 3. Irrespective of their age, boys were more often involved than girls, probably because of their higher level of curiosity, and the habit of drinking alcohol by young parents, especially in rural areas (where 82% of the patients came from). Caustic solution is easily con-*

Correspondance: Dr Manea Madalina, MD, Assistant Professor of General Nursing, UMF Craiova, Petru Rares, Craiova Romania – Fax +04.51.122740.

¹ GP Specialist first degree, Department of General Nursing, College of Medicine, University of Medicine and Pharmacology (UMF), Craiova, Romania.

² Department of General Practice and Research Institute of Extramural and Transmural Health Care, Maastricht University, Maastricht, The Netherlands.

fused with alcohol. Furthermore, caustic products are more frequently used in households in rural areas. As a result of the custom of general house cleaning before Easter and Christmas, acute esophagitis was found to have a higher incidence in winter and spring.

During the hospitalization period, 24% of the cases were found to be mild forms of CE; 61% were moderate cases (characterized by ulcerative and pseudomembranous mouth lesions and damage to the anterior pillar muscles) and 13% had severe forms. Severe forms included acute inefficient breathing and edema of the posterior pillar muscles and arithenoids. One patient had a particularly severe form and died of mediastinal necrosis. Fourteen days after admission to the hospital, 30 patients had been cured, while 15 cases developed early axial stenosis of the esophagus.

One patient died due to perforation of the esophagus after dilatation. Over the entire study population of 46 children, no more than 9 cases did not need dilatation. However, these children developed anemia, respiratory problems, anxiety and behavioral and intellectual problems.

Conclusion: The incidence of the disease is an alarm signal for Rumania because of its severe and enduring consequences, in particular in young children. Because cheap alternatives are available, the free sale of caustic solutions should stop immediately.

Keywords

Esophagitis, exogenic toxicosis, pediatrics.

Introduction

NaOH (caustic soda) is a strong base with a very high corrosive potential. Ingestion results in very deep burns (corrosive esophagitis). In households, caustic soda is used for making soap by an empirical method. The resulting product is customarily used for cleaning clothes in many poor regions. However, as people never receive any instructions about the danger of using this product (1) and since it can easily be confused with water or alcoholic beverages, children may drink it accidentally.

Corrosive esophagitis (CE) is thought to evolve in three phases: acute esophagitis, a quiet phase and installed sequelae (6 months after the onset

of the disease). Because of its severity, the various anatomical regions involved, the treatments it requires and the long evolution, including the development of sequelae, juvenile CE is a complex disease, requiring attention from different specialities. General practice is one of these, playing an important role in the prevention and general aspects of disease management.

CE as a result of NaOH ingestion has been known for a long time, but scientific studies were only done between 1960 and 1975 (2). In 1951 (3) a high incidence was found in the Balcans, with 65% of the cases involving women. In France, men and children were more often involved, with 60-75% of the children being between 3 and 8 years old. During the interbellum, CE was frequent in Europe, while during and after the Second World War its frequency dramatically increased in France, Germany, Belgium, the Balcan countries and Japan (3-6). Medical and social interventions were promptly established, resulting in a considerable decrease in its frequency in Western Europe. For the period after 1970 in particular, no relevant statistics are to be found in Romania. The literature provides a few condensed statistics, particularly from the medical specialities, e.g. ear-nose-throat (ENT) and pediatric hospital departments. One statistic came from the pediatric ENT-department of the Coltea Hospital in Bucharest (7) and concerned the period 1960-1969, when child CE was almost 10% of the hospitalized population at this department (Table 1).

The severity of the disease and the high cost of treatment has made colleagues conclude by consensus that caustic soda should no longer be sold to the general public. Despite the availability of cheap alternatives so far, however, no such ban has been introduced in Romania. The lack of product regulations is partly due to this situation.

TABLE 1
Hospital incidences of corrosive esophagitis (CE)

Pediatric ENT section of the Coltea Hospital – Bucharest 1960 – 1969	Pediatric Hospital no. 1 Craiova 1994
hospital incidence of CE = 9.95% 0 – 3 years 46% 3 – 7 years 37% 7 – 16 years 17% Male/female = 60%/40% Rural/urban = 71%/29%	hospital incidence of CE = 1840/46 (2,5%) 0 – 3 years 80% 3 – 7 years 15% 7 – 13 years 5% Male/female = 76%/24% Rural/urban = 82%/18%

The present study tried to answer to the following questions. a) What is the hospital incidence of CE (i.e. the number of cases with CE that have occurred during 11 months in 1994, divided by the total number of children hospitalized during this period, in one clinic) b) What is the clinical evolution of CE, including what happened to ex-patients after childhood?

Methods

Cases were studied in three different places, and during the period indicated below.

1) Pediatric Hospital no.1 in Craiova (South Romania), between 1 January 1994 and 30 November 1994. During this period the first author was a trainee at this clinic. Data concerning the period January-April 1994 were collected retrospectively, by carefully studying the clinical files of all children hospitalized with CE. After this period, the registration was done on a daily basis, in collaboration with various specialists from the clinic. All new cases of CE were recorded in detail.

2) The pediatric ENT department of Hospital no.1 in Craiova, between 1 January 1994 and 31 December 1997. During this period, the first author was allowed to study the medical files of children diagnosed with CE during the period mentioned under 1). This step was followed by detailed discussions with ENT specialists regarding the various treatment modalities applied to these children.

3) Dispensary no.9 at Craiova and home visits, between 1 January 1995 and 31 November 1998. Letters were sent to the families of the above children who never visited the ENT clinic, inviting them for a meeting at the dispensary or at the pediatric office of the ambulatory clinic, or asking permission for a home visit. On this occasion, data were collected regarding the clinical status and evolution of the children, development of intercurrent disease and treatments. A few cases were also discussed in detail with the children's general practitioners (GP's).

Results

A total of 46 cases were diagnosed at Pediatric Hospital no.1 in Craiova during 11 months in 1994; each successive case was included in the study (Table 1). All patients were followed until December 1998. The clinical outcomes per phase were as follows.

Acute esophagitis

Most cases (80%) occurred among young children between the ages of 0 and 3 (Table 2). Irrespective of their age, boys were more often involved than girls, probably because of their higher level of curiosity, and the habit of drinking alcohol by young parents, especially in rural areas (where 82% of the patients came from; Table 1). Caustic solution is easily confused with alcohol. Furthermore, caustic products are more frequently used in households in rural areas. As a result of the custom of general house cleaning before Easter and Christmas, acute esophagitis was found to have a higher incidence in winter and spring.

During the hospitalization period, 24% of the cases were found to be mild forms of CE; 61% were moderate cases (characterized by ulcerative and pseudomembranous mouth lesions and damage to the anterior pillar muscles) and 13% had severe forms. Severe forms included acute inefficient breathing and edema of the posterior pillar muscles and arithenoids. One patient had a particularly severe form and died of mediastinal necrosis. Fourteen days after admission to the hospital, 30 patients had been cured, while 15 cases developed early axial stenosis of the esophagus.

Quiet phase

Of the 46 patients, 45 reached this phase, which is characterized by relatively problem free feeding, on condition that the children had under-

TABLE 2
Age and gender frequencies of patients with corrosive esophagitis
(M = male, F = female)

Age (year)	SEX	NO.of	Totals No.
0 - <1	M	1	1
	F	-	
1 - <2	M	27	32
	F	5	
2 - <3	M	1	4
	F	3	
3 - <6	M	5	7
	F	2	
6 - <13	M	1	2
	F	1	
Totals	M	35	46
	F	11	

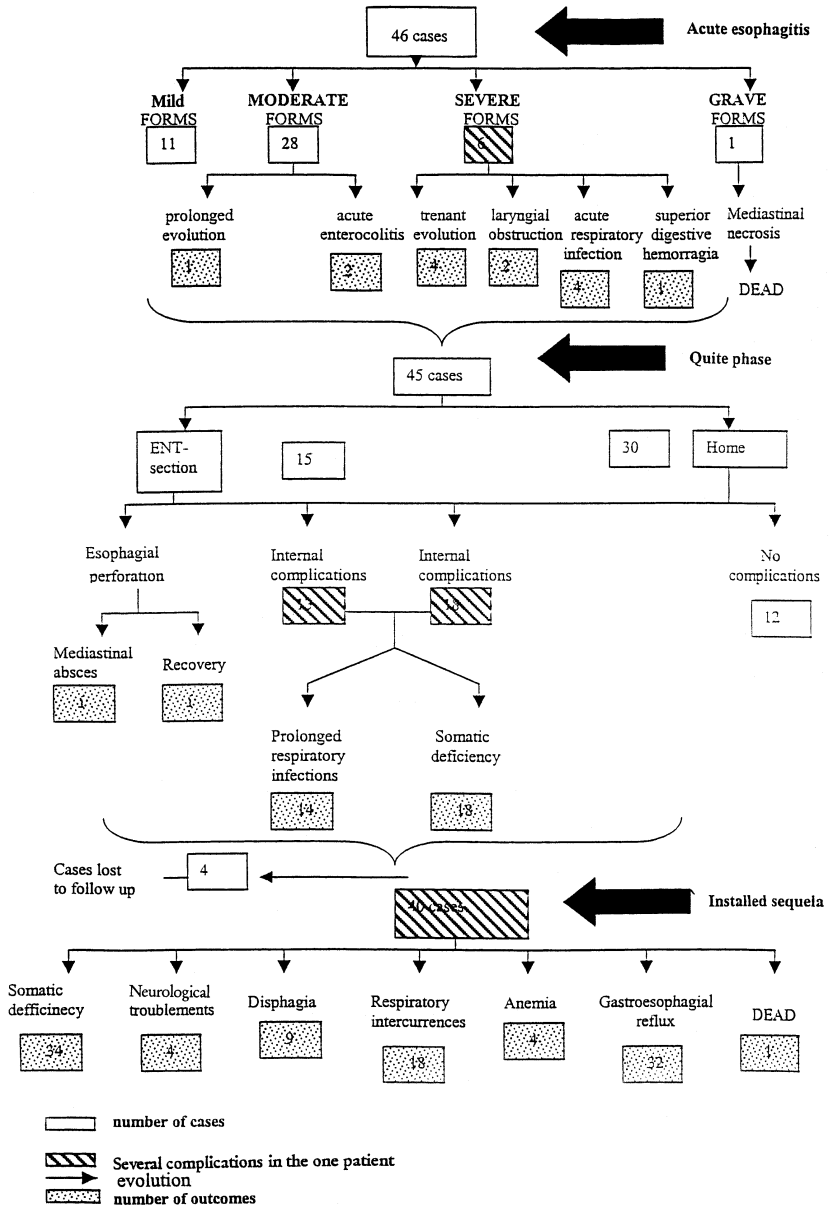


Fig. 1: Flow chart, showing the follow-up results of children with corrosive esophagitis.

gone esophageal dilatation at the beginning of this period. In 15 cases, dilatation was done immediately after the child had recovered. Prolonged respiratory infections, caused by the dilatation treatment, as well as poor somatic condition, caused by low calory intake and gastroesophageal reflux, diffuse hypertrophy and increased contractic as of esophageal muscles were the most common complications. Dilatation is a painful intervention with various psychological consequences, which was administered between 6-24 months after admission.

Installed sequela

Of the 45 remaining cases, 40 reached this phase; 4 children were lost for follow-up because they had moved, while one child died during dilatation. Characteristics of this period are the appearance of definite esophageal stenosis 6 months after the beginning of the disease. Almost all cases developed one or more complications, with somatic deficiency again being the most common one, developing between one and four years after intoxication. Gastroesophageal reflux was found to be very prevalent as well. One patient needed esophagoplastic surgery. One patient died due to perforation of the esophagus after dilatation. Over the entire study population of 46 children, no more than 9 cases did not need dilatation. However, these children developed anemia, respiratory problems, anxiety and behavioral and intellectual problems.

Discussion

CE is a very serious, sometimes life-threatening disease, with a broad spectrum of frequently occurring complications. It also has a long evolution and important consequences for the quality of life. Furthermore, it leads to high medical costs, while only a small percentage of children recovers fully. Even if the children are cured, they often suffer from abnormal intellectual development and psychological disorders due to the long and painful treatment.

Since the investigator (first author) was not involved in the treatment of the children included in the study, there are no reasons to believe that the observations or the clinical features extracted from files were biased in either a positive or negative sense. Furthermore, the additional meetings with ENT specialists took away any remaining doubts about the accuracy or completeness of the findings. The area where the study took place (in and around Craiova, a city of about 300,000 inhabitants) can be seen as

representative for the country, where most households are concentrated in cities, while urban areas are far less populated. Despite the revolution in 1989, this situation has not really changed.

It is especially in rural areas that there is a need to educate people, including an illustration of the risks and consequences of CE. GPs can play a key role in this effort by addressing children and their parents through schools, until now the only available way in which parents can be reached systematically. Since the parents of children attending school often have kids between 0 and 3 years of age, this way of addressing seems to be the most efficient one. For this purpose, GPs must be well informed about ways of preventing CE and of preventing early and late complications of the disease. A practical guideline might be very helpful. GPs must remember that affected children will suffer for a long time and that parents will always regret not having known the risks of caustic soda. Last but not least, because cheap alternatives are available, the free sale of caustic soda should stop immediately.

Acknowledgements

We would like to thank professor Genkiz Mustafa for his permission to start the study in Pediatric Hospital No. 1 in Craiova. We also want to thank Dr Liana Popescu for her collaboration at the Pediatric ENT department at Hospital no. 1 in Craiova. Furthermore, our gratitude is expressed to professor Dumitru Bulucea, Chief of Pediatric cathedra of the University of Craiova, supervised the study.

References

1. POPESCU L. Therapeutic objectives in corrosive esophagitis among children. *ENT Review* 1996; 16: 29-30.
2. GAVRILIU D. Pathology of esophag. *Ed Med Bucuresti* 1974; x: 90-96.
3. LEMAITRE F, BALDANWECK L, RICHIER L. *OtoRhinoLaryngologie, Encyclopédie médico-chirurgicale*. Paris, 1951; p 20800-20827.
4. MINITANI, HIROYASU, SHOMOZEN. Contributions to the study of burns caused by caustic soda. *Othologia Tokyo* 1936; 9: 736-743.
5. MARKOW. Research into the development of pathological anatomy in post caustic esophagitis among men. *Med Wsch Munchen* 1936; 83-/27: 1085-1088.
6. WILDENBERG. Traitement des burnures oesophagiennes. *Bull Trim Société Belge ORL* 1925; 77/36: 994.
7. PAUNESCU C, PEDIATRIC ENT. *Ed Med Bucuresti* 1981; 302-310.