

Original Article

Risk factors of caustic agent ingestion in a single center in Tehran

Nasibeh Khaleghnejad Tabari (MD) ¹
Rosminasadat Moulai (MD) ¹
Mehdi Sarafi (MD) ¹
Gholamreza Ebrahimisaraj (MD) ¹
Amirhossein Hosseini (MD) ²
Arameh Abbasian (MD) ¹
Ahmad Khaleghnejad Tabari (MD) ^{1*}

1. Pediatric Surgery Research Center, Research Institute for Children's Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

2. Pediatric Gastrointestinal Research Center, Research Institute for Children's Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

*** Correspondence:**

Ahmad Khaleghnejad Tabari,
Pediatric Surgery Research Center,
Research Institute for Children's Health,
Shahid Beheshti University of Medical Sciences, Tehran, Iran

E-mail: khaleghnejad@gmail.com

Abstract

Background: Caustic ingestion remains a preventable but persistent cause of morbidity in children. This study aimed to identify risk factors associated with caustic substance ingestion in children.

Methods: In this case-control study, 122 children aged <18 years were included. Cases comprised 54 children with caustic ingestion referred to Mofid Children's Hospital between 2016 and 2022, while 68 randomly selected hospitalized children without esophageal burns served as controls. Sociodemographic and behavioral characteristics were collected using a validated checklist and compared between groups.

Results: Most cases were aged 1–5 years (40, 74.1%) and involved girls (22, 40.7%). Acid ingestion accounted for 31 cases (57.4%). Domestic problems were significantly more common among cases than controls (40.7% vs. 22.1%; $P=0.029$; OR=2.429, 95% CI: 1.103–5.350). Higher family income (>30 million IRR) was associated with lower odds of caustic ingestion (OR=0.412, 95% CI: 0.187–0.907). Most incidents occurred at home (72.2%) and while parents were present (90.7%). Child-resistant safety caps were absent in 92.6% of cases, and 61.1% involved substances stored in their original containers; these variables were not compared with controls.

Conclusion: Domestic problems and lower family income were significant risk factors for pediatric caustic ingestion. Socioeconomic support, parental education, safer household storage, and stronger safety regulations may help prevent these potentially avoidable injuries.

Keywords: Caustic ingestion, Corrosive ingestion, Accidental ingestion, Esophageal burn.

Citation:

Khaleghnejad Tabari N, Moulai R, Sarafi M, et al. Risk factors of caustic agent ingestion in a single center in Tehran. *Caspian J Intern Med* 2026; 17(3): 653-658.

Corrosive agent ingestion remains a widespread problem in many parts of the world. The incidence has been estimated at approximately 5,000–15,000 cases annually in the United States. This issue is not limited to developing countries but is also observed in urban areas of developed nations (1, 2), and it represents a serious condition that can lead to significant morbidity and mortality (3). Children account for nearly 80% of unintentional caustic substance ingestions worldwide (4, 5). Although the incidence of caustic ingestion in children has declined in high-income countries for example, a reduction of approximately 30% over 12 years in the United States this decrease has been largely attributed to stricter regulations governing the production and packaging of caustic materials, as well as increased public awareness (6). Nevertheless, it continues to be a major concern in developing countries, particularly among families with low literacy levels and low socioeconomic status (7). Preventive measures, including improvements in packaging safety and protective regulations, should be strengthened, especially in developing countries, to reduce the incidence of accidental exposures, which predominantly affect unsupervised children (8, 9).

Received: 18 Feb 2026

Revised: 9 May 2026

Accepted: 8 Aug 2026

Published: 1 Sep 2026



© The Author(s)

Publisher: Babol University of Medical Sciences

Given that accidental caustic ingestion is largely preventable (10), and considering that most incidents occur within the home and familiar family environments, investigating the circumstances under which these events take place may provide valuable insights for prevention. The severity of injury following caustic ingestion in children varies widely. At one end of the spectrum are mild injuries that may not require prolonged hospitalization, while at the other extremes are severe injuries that can result in death. Many affected children experience long-term complications that persist throughout their lives. Therefore, identifying the factors associated with caustic ingestion in children is an important step toward effective prevention. The present study aimed to identify and evaluate the socio-demographic and environmental risk factors associated with caustic substance ingestion in children through a case-control design, to provide evidence for targeted preventive strategies.

Methods

Case and control groups: This case-control study included 122 children under 18 years old (54 cases, 68 controls). Cases were children diagnosed with esophageal burns due to caustic ingestion at Mofid Children's Hospital between 2016 and 2022. Controls were hospitalized children without esophageal burns. Intentional ingestion cases were excluded.

Data collection: Data were collected using a structured questionnaire developed from previous studies and expert consultation. Variables included demographic characteristics, parental education, occupation, smoking, family history (mental illness, addiction), and storage practices of caustic substances.

Statistical analysis: SPSS Version 25 was used. Continuous variables were assessed for normality using the Kolmogorov-Smirnov test. Normally distributed variables were compared using the Student's t-test, while non-normally distributed variables were analyzed using the Mann-Whitney U test. Categorical variables were compared using Fisher's exact test. Odds ratios (OR) with 95% confidence intervals (95%CI) were calculated to determine associations between risk factors and caustic ingestion. A p-value <0.05 was considered significant.

Results

There was no statistically significant difference in demographic variables between the case and control groups. The median age (interquartile range, IQR) at the time of the

accident was 29.5 (20.8–48.0) months in the case group and 32.5 (9.5–72.0) months in the control group (Mann-Whitney U-test, $p>0.05$). The highest frequency of caustic ingestion occurred among children aged 1–5 years ($n=40$, 74.1%), followed by those older than 5 years ($n=9$, 16.7%) and younger than 1 year ($n=5$, 9.3%). The mean age ($\pm$ SD) of mothers was 32.7 ($\pm$ 6.6) years in the case group and 33.0 ($\pm$ 6.3) years in the control group, while the mean age of fathers was 37.4 ($\pm$ 7.2) and 37.4 ($\pm$ 8.1) years, respectively, with no significant differences between groups (student's t-test, $p>0.05$). The distribution of sex was similar between the two groups, with females accounting for 22 (40.7%) cases and 28 (41.2%) controls, and males comprising 32 (59.3%) cases and 40 (58.8%) controls (Fisher's exact test, $p>0.999$; OR= 0.982, 95%CI= 0.475 – 2.031).

Most mothers in both groups had a diploma or lower level of education (cases: 36, 66.7%; controls: 52, 76.5%), while 18 (33.3%) mothers in the case group and 16 (23.5%) in the control group had education above the diploma level (Fisher's exact test, $P=0.310$; OR= 0.615, 95%CI= 0.278 – 1.365). A similar pattern was observed for fathers' education, with 37 (68.5%) in the case group and 48 (70.6%) in the control group having a diploma or lower, compared to 17 (31.5%) and 20 (29.4%), respectively, with higher education (Fisher's exact test, $P=0.845$; OR= 0.901, 95%CI= 0.417 – 1.970). Regarding maternal occupation, the majority were housewives in both groups (cases: 48, 88.9%; controls: 61, 89.7%), while a smaller proportion were employed (cases: 6, 11.1%; controls: 7, 10.3%) (Fisher's exact test, $P>0.999$; OR= 0.918, 95%CI= 0.289 – 2.911). Fathers were predominantly self-employed (cases: 26, 48.1%; controls: 32, 47.1%), followed by manual workers (cases: 13, 24.1%; controls: 20, 29.4%) and governmental employees (cases: 15, 27.8%; controls: 16, 23.5%), with no significant difference between groups (Fisher's exact test, $P=0.750$; OR (governmental vs. self/manual employee) = 1.250, 95%CI= 0.552 – 2.832). Family income distribution was similar between the two groups, with the majority of families earning between 10 and 30 million IRR (cases: 27, 50.0%; controls: 41, 60.3%). Lower income ($\leq$ 10 million IRR) was reported in 10 (18.5%) cases and 12 (17.6%) controls while 13 cases (24.1%) and 13 (19.1%) controls had incomes between 30 and 50 million IRR.

A small proportion of participants reported income levels above 50 million IRR (cases: 4, 7.4%; controls: 2, 2.9%). Overall, no statistically significant difference was observed between the groups (Fisher's exact test, $P=0.551$). However, when income was dichotomized ($\leq$ 30 million vs. $>$ 30 million IRR), a statistically significant association was

identified (OR=0.412, 95% CI=0.187–0.907), indicating that children from higher-income families (>30 million IRR) had lower odds of caustic ingestion compared to those from lower-income families.

The mean number of children per family was 1.98 (± 0.92) in the case group and 2.04 (± 0.93) in the control group (student's t-test, $p > 0.05$). Similarly, the mean number of family members living in the household was 3.98 ± 0.89 in cases and 4.22 ± 1.09 in controls, with no statistically significant difference (student's t-test, $p > 0.05$). Domestic problems were reported more frequently in the case group ($n = 22$, 40.7%) compared with controls ($n = 15$, 22.1%), representing a significant difference (Fisher's exact test, $P = 0.029$; OR= 2.429, 95%CI= 1.103 – 5.350). A positive family history of mental illness was reported in 13 (24.1%) cases and 10 (14.7%) controls (Fisher's exact test, $P = 0.245$; OR= 1.839, 95%CI= 0.736 – 4.598). Smoking was reported in 24 (44.4%) cases and 25 (36.8%) controls (Fisher's exact test, $P = 0.458$; OR= 1.376, 95%CI= 0.664 – 2.852), most commonly by the father.

A history of drug addiction in the family was reported in 10 (18.5%) cases and 9 (13.2%) controls ($P = 0.460$; OR= 1.490, 95%CI= 0.558 – 3.976), with no significant differences between the groups. More than half of the ingested substances were acids ($n = 31$, 57.4%), while alkalis accounted for 23(42.6%) cases. Among specific substances, drain cleaners were the most commonly ingested ($n = 24$, 44.4%), followed by bleach ($n = 14$, 25.9%), sodium hydroxide ($n = 8$, 14.8%), hydrochloric acid

($n = 4$, 7.4%), and smaller proportions of hair oxidants ($n = 2$, 3.7%), salicylic acid ($n = 1$, 1.9%), and dishwasher powder ($n = 1$, 1.9%). The characteristics related to caustic substance exposure and the circumstances of ingestion are summarized in table 1. Overall, the frequency of household use of caustic substances (Fisher's exact test, $P = 0.106$; OR (never vs. ever) = 4.125, 95%CI= 0.798 – 21.33) and the type of packaging (standardized vs. non-standardized) (Fisher's exact test, $P = 0.677$; OR= 0.800, 95%CI= 0.353 – 1.812) were not significantly different between the case and control groups. Among the cases, most incidents occurred during daytime hours ($n = 43$, 79.6%), while fewer took place at night ($n = 11$, 20.4%).

The majority of ingestions happened at the child's home ($n = 39$, 72.2%), followed by relatives' homes ($n = 9$, 16.7%) and outside the home ($n = 6$, 11.1%). In most cases, parents were present at the time of the incident ($n = 49$, 90.7%), whereas a small proportion occurred in the presence of other individuals ($n = 2$, 3.7%) or when the child was alone ($n = 3$, 5.6%) (table 1). Regarding storage conditions, 33 (61.1%) cases involved substances kept in their original containers, while 21 (38.9%) cases were stored in non-original containers. Notably, child-resistant safety caps were absent in the vast majority of cases ($n = 50$, 92.6%) and present in only 4 (7.4%) cases (table 1). The volume of ingestion varied, with 16 children (29.6%) consuming less than 5 cc, 23 (42.6%) consuming 5–15 cc, and 4 (7.4%) consuming more than 15 cc, while in 11 cases (20.4%) the amount ingested was unknown (table 1).

Table 1. Variables related to caustic substance ingestion in case and control groups

Variable	Category	Cases (n= 54)	Controls (n= 68)	P-value
Frequency of caustic use	Never	6 (11.1%)	2 (2.9%)	0.106
	Rarely	17 (31.5%)	17 (25.0%)	
	Sometimes	14 (25.9%)	15 (22.1%)	
	Always	17 (31.5%)	34 (50.0%)	
Packaging method	Standard/branded	39 (72.2%)	52 (76.5%)	0.677
	Non-standard/unbranded	15 (27.8%)	16 (23.5%)	
Season	Spring	24 (44.4%)	—	—
	Summer	10 (18.5%)	—	
	Fall	6 (11.1%)	—	
	Winter	14 (25.9%)	—	
Time of incident	Day	43 (79.6%)	—	—
	Night	11 (20.4%)	—	
Location	Child's home	39 (72.2%)	—	—
	Relative's home	9 (16.7%)	—	
	Outside	6 (11.1%)	—	

Variable	Category	Cases (n= 54)	Controls (n= 68)	P-value
People present	Parents	49 (90.7%)	—	—
	Others	2 (3.7%)	—	
	Alone	3 (5.6%)	—	
Container type	Original	33 (61.1%)	—	—
	Non-original	21 (38.9%)	—	
Child-resistant cap	Present	4 (7.4%)	—	—
	Absent	50 (92.6%)	—	
Volume consumed	<5 cc	16 (29.6%)	—	—
	5–15 cc	23 (42.6%)	—	
	>15 cc	4 (7.4%)	—	
	Unknown	11 (20.4%)	—	

Discussion

Caustic substance ingestion in children remains a significant public health issue, particularly in developing countries, largely due to the lack of strict regulations and oversight regarding household cleaning products (11). In this study, 54 cases of caustic ingestion were recorded over a six-year period. Most cases occurred in children aged 1–5 years (n=40, 74.1%), which is consistent with previous studies (12–15). This finding may be explained by the fact that children under five years of age are still in the developmental stages of motor and sensory skills and are unable to make rational decisions about what they should or should not ingest (16). Boys accounted for 32 cases (59.3%), which is in line with prior reports (13, 14, 16–18). This observation may be related to biological and behavioral differences between sexes, as boys may exhibit more risk-taking behaviors and greater interaction with hazardous environments (19). Additionally, socially acquired gender-related behaviors may also contribute to this pattern (20).

More than half of the parents in this study had a high school diploma or lower level of education. Similarly, many studies have reported that a large proportion of affected children come from families with lower parental education levels (14, 21). Limited educational background may lead to insufficient awareness of the hazards associated with caustic agents stored at home (20). Therefore, educating parents about the safe storage of these substances particularly keeping them in original, child-resistant containers and out of children's reach is essential (12). Nearly half of the fathers (n=26, 48.1%) were self-employed. Socio-demographic findings from the study by Sánchez-Ramírez et al. also suggest that having a higher proportion of self-employed fathers may be associated with

an increased risk of injury in children (19). Regarding socioeconomic status, although the overall distribution of family income did not differ significantly between cases and controls (P=0.551), further analysis revealed a significant association when income was categorized into two groups. Families with higher income levels (>30 million IRR) had significantly lower odds of caustic ingestion compared to those with lower income (≤30 million IRR) (OR=0.412, 95% CI=0.187–0.907). This finding suggests that socioeconomic status may play an important role in the risk of caustic ingestion. Lower-income families may have reduced access to safer, standardized products and may be more likely to purchase cheaper, unlabelled, or non-standard substances, thereby increasing the risk of accidental exposure (22). In addition, financial constraints may limit the ability to implement safer storage practices or childproofing measures within the household.

Domestic problems were also found to be significantly associated with caustic ingestion, being more frequently reported in the case group (n=22, 40.7%) compared with controls (n=15, 22.1%) (P=0.029; OR=2.429, 95% CI=1.103–5.350). This finding highlights the potential impact of family environment and psychosocial factors on child safety. Households experiencing domestic instability may have reduced supervision, increased stress, and less attention to safety practices, all of which could contribute to a higher risk of accidental ingestion. Similar associations between adverse family environments and increased risk of childhood injuries have been reported in previous studies (20). Most incidents in our study occurred at the child's home (n=39, 72.2%) and during daytime hours (n=43, 79.6%). Similarly, Sánchez-Ramírez et al. reported that 63.8% of incidents occurred at home and 54.3% took place between 8 a.m. and 3 p.m. (19). Unsafe storage practices

were common in our study. Non-original containers were used in 38.9% (n=21) of cases, and 92.6% (n=50) lacked child-resistant safety caps. Previous studies have shown that children often ingest these substances accidentally, mistaking them for beverages such as milk, juice, or soda (20). In some cases, corrosive substances are purchased from small markets or street vendors and subsequently stored in various containers, such as beverage bottles or cups (23, 24). These unlabelled substances are particularly dangerous because their composition and concentration are unknown, and they are often odorless and colorless when removed from their original packaging (22).

In the present study, acidic substances accounted for 57.4% of cases (n=31). However, other studies have reported a higher prevalence of alkali ingestion (21, 25, 26). In contrast, research conducted among Arab children found that acidic agents were the most common cause, similar to our findings (1). Overall, alkaline agents are more frequently reported in the developed countries, whereas, acid ingestion is more common in the developing countries (23, 29). This study has several limitations that should be considered when interpreting the findings. First, its case-control design is inherently subject to recall bias, particularly because exposure-related variables such as storage practices, supervision at the time of ingestion, and household circumstances were obtained retrospectively through parental interviews. Parents of affected children may have been more likely to recall or overreport potentially relevant exposures compared with controls, which could have influenced the observed associations.

Second, the study was conducted in a single tertiary referral center, which may limit the generalizability of the findings to other regions or healthcare settings. Referral bias may also be present, as more severe cases of caustic ingestion are more likely to be admitted to a specialized hospital, potentially underrepresenting milder cases managed in outpatient settings or other facilities. Third, although multiple socio-demographic and environmental variables were assessed, residual confounding cannot be excluded. Some potentially important factors, such as precise socioeconomic indicators, caregiver supervision quality, and detailed environmental safety practices, were not fully quantified or may not have been captured comprehensively by the questionnaire. Fourth, the relatively small sample size, particularly in the case group, may have limited the statistical power to detect weaker associations between certain risk factors and caustic ingestion. This may partly explain the lack of statistically significant differences in several variables despite observable numerical variations. Finally, the study relied on self-reported data,

which may introduce information bias due to inaccurate recall or reporting errors. In addition, the severity of exposure and long-term clinical outcomes were not evaluated, which limits the ability to assess the full clinical impact of caustic ingestion events.

Conclusion: Caustic substances pose a serious risk to children, particularly boys under five years of age. In the present study, acid ingestion was more common than alkaline ingestion. Importantly, lower family income and the presence of domestic problems were identified as significant risk factors for caustic ingestion. These findings highlight the critical role of socioeconomic and family-related factors in the occurrence of such incidents.

Given that caustic ingestion is largely preventable, prevention remains the most effective strategy. Strengthening socioeconomic support, improving parental awareness, and addressing family-related risk factors are essential components of prevention. In addition, the implementation of national safety regulations regarding the production, labeling, and distribution of caustic agents is strongly recommended. Comprehensive preventive strategies combining public education, safer product design, and social support measures are necessary to reduce the incidence of these avoidable and potentially devastating events.

Acknowledgments

The authors would like to thank the staff of Mofid Children's Hospital for their cooperation.

Funding: This study received no financial support.

Ethics approval: The study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RAMREC.1394.186). Written informed consent was obtained.

Conflict of interests: The authors declare no conflict of interest.

Authors' contribution: Nasibeh Khaleghnejad Tabari: Conceptualization, methodology, investigation, data curation, formal analysis, writing, original draft preparation, project administration. Rosminasadat Moulai: Investigation, data curation, validation, writing, review and editing. Mehdi Sarafi: Methodology, formal analysis, visualization, writing, review and editing. Gholamreza Ebrahimisaraei: Investigation, data curation, resources, writing, review and editing. Amirhossein Hosseini: Investigation, data curation, validation, writing, review and editing. Arameh Abbasian: Investigation, data curation, resources, writing, review and editing. Ahmad Khaleghnejad Tabari (Corresponding Author):

Conceptualization, methodology, supervision, project administration, resources, validation, writing, review and editing, final approval of the manuscript.

References

- de Jong AL, Macdonald R, Ein S, Forte V, Turner A. Corrosive esophagitis in children: a 30-year review. *Int J Pediatr Otorhinolaryngol* 2001; 57: 203–11.
- Rothstein FC. Caustic injuries to the esophagus in children. *Pediatr Clin North Am* 1986; 33: 665–674.
- Ekpe EE, Ette V. Morbidity and mortality of caustic ingestion in rural children: experience in a new cardiothoracic surgery unit in Nigeria. *ISRN Pediatr* 2012; 2012: 210632.
- Gumaste VV, Dave PB. Ingestion of corrosive substances by adults. *Am J Gastroenterol* 1992; 87: 1-5.
- Sarioglu-Buke A, Corduk N, Atesci F, Karabul M, Koltuksuz U. A different aspect of corrosive ingestion in children: socio-demographic characteristics and effect of family functioning. *Int J Pediatr Otorhinolaryngol* 2006; 70: 1791–8.
- Lavaud J, Peynègre R, Besson-Léaud M, Cloup M. Accidental ingestion of caustic in childhood. *Ann Pediatr* 1979; 26: 9–15. [in French]
- World Health Organization. Strengthening poison prevention and treatment programme. Regional workshop, Kathmandu, Nepal; 1999. Available from: <https://iris.who.int/server/api/core/bitstreams/591832da-829b-4657-b206-6e2eed0c821c/content>. Accessed 8 Aug, 2026.
- Di Nardo G, Betalli P, Illiceto MT, et al. Caustic ingestion in children: 1-year experience in 3 Italian referral centers. *J Pediatr Gastroenterol Nutr* 2020; 71: 19–22.
- Arnold M, Numanoglu A. Caustic ingestion in children a review. *Semin Pediatr Surg* 2017; 26: 95–104.
- Gün F, Abbasoğlu L, Celik A, Salman ET. Early and late term management in caustic ingestion in children: a 16-year experience. *Acta Chir Belg* 2007; 107: 49–52.
- Küçük G, Göllü G, Ateş U, et al. Evaluation of esophageal injuries secondary to ingestion of unlabeled corrosive substances: pediatric case series. *Arch Argent Pediatr* 2017; 115: e85-8. [in English, Spanish]
- Narkutė A, Žilinskaitė V. Overview of caustic ingestion cases at the Children's Hospital of Vilnius University Hospital Santaros Klinikos between 2011 and 2018. *Acta Med Litu* 2019; 26: 199.
- Niedzielski A, Schwartz SG, Partycka-Pietrzyk K, Mielnik-Niedzielska G. Caustic agents' ingestion in children: a 51-year retrospective cohort study. *Ear Nose Throat J* 2020; 99: 52–57.
- Caganova B, Foltanova T, Plackova S, et al. Caustic effects of chemicals: risk factors for complications and mortality in acute poisoning. *Monatsh Chem* 2017; 148: 497–503.
- Casasnovas AB, Martinez EE, Cives RV, et al. A retrospective analysis of ingestion of caustic substances by children: ten-year statistics in Galicia. *Eur J Pediatr* 1997; 156: 410–4.
- Honar N, Haghighat M, Mahmoodi S, et al. Caustic ingestion in children in south of Iran: retrospective study from Shiraz. *Rev Gastroenterol Peru* 2017; 37: 22–25.
- Dehghani SM, Bahmanyar M, Javaherizadeh H. Caustic ingestion in children in south of Iran: a two-year single center study. *Middle East J Dig Dis* 2018; 10: 31–4.
- Rohlfs I, Borrell C, Fonseca MD. Conocimientos y desconocimientos. *Gac Sanit* 2000; 14: 60–71. [in Spanish]
- Sánchez-Ramírez CA, Larrosa-Haro A, Vásquez-Garibay EM, Macías-Rosales R. Socio-demographic factors associated with caustic substance ingestion in children and adolescents. *Int J Pediatr Otorhinolaryngol* 2012; 76: 253–6.
- Rafeey M, Ghojzadeh M, Sheikhi S, Vahedi L. Caustic ingestion in children: a systematic review and meta-analysis. *J Caring Sci* 2016; 5: 251.
- Boybeyi O, Göllü G, Kisa U, et al. Danger in labelled bottles: analysis of corrosive substances. *Turk J Gastroenterol* 2015; 26: 71–72.
- Kayaalp L, Odabaşı G, Doğangün B, et al. Corrosive esophagitis in children: social and psychological aspects. *Turk Pediatr Ars* 2006; 41: 24–30. [in Turkish]
- Sarioglu-Buke A, Corduk N, Atesci F, Karabul M, Koltuksuz U. A different aspect of corrosive ingestion in children: socio-demographic characteristics and family functioning. *Int J Pediatr Otorhinolaryngol* 2006; 70: 1791–8.
- Losada M M, Rubio M M, Blanca G JA, Pérez A C. Ingestion of caustic substances in children: 3 years of experience. *Rev Chil Pediatr* 2015; 86: 189-93. [in Spanish]
- Riffat F, Cheng A. Pediatric caustic ingestion: 50 consecutive cases and review of literature. *Dis Esophagus* 2009; 22: 89–94.
- Arévalo-Silva C, Eliashar R, Wohlgeleitner J, Elidan J, Gross M. Ingestion of caustic substances: a 15-year experience. *Laryngoscope* 2006; 116: 1422–6.