Beleid na ingestie van corrosiva

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wij zorgen voor u

Disclosure

(potentiële) belangenverstrengeling	Geen
Voor bijeenkomst mogelijk relevante relaties met bedrijven	Nihil
• Sponsoring of onderzoeksgeld • Honorarium of andere (financiële) vergoeding • Aandeelhouder • Andere relatie, namelijk …	Nihil

Corrosives

What ?

- Definition
  - A substance tha histological dam surfaces.
- Agents
  - Acids
    - Proton donor
    - pH ≤ 3
  - Alkalis
    - Proton acceptor
    - pH ≥ 11

Table 1 Most commonly ingested caustic substances

Caustic substance	Type	Commercially available form
Acids	Sulfuric	Batteries
		Industrial cleaning agents
		Metal plating
	Oxalic	Paint thinners, strippers
		Metal cleaners
	Hydrochloric	Solvents
		Metal cleaners
		Toilet and drain cleaners
		Antirust compounds
	Phosphoric	Toilet cleaners
Alkali	Sodium hydroxide	Drain cleaners
		Home soap manufacturing
	Potassium hydroxide	Oven cleaners
		Washing powders
	Sodium carbonate	Soap manufacturing
		Fruit drying on farms
Ammonia	Commercial ammonia	Household cleaners
	Ammonium hydroxide	Household cleaners
Detergents, bleach	Sodium hypochlorite	Household bleach, cleaners
	Sodium polyphosphate	Industrial detergents
Condy's crystals	Potassium permanganate	Disinfectants, hair dyes

Goldfrank's Toxicologic Emergencies, IX Edition
Bonnici K. Clin Toxicol 2014; 52(9):911-25
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Who ?

Table 17A. Substance Categories Most Frequen

Substance (Major Generic Category)
Analgesics
Cosmetics/personal care products
Cleaning substances (household)
Sedative/hypnotics/antipsychotics
Antidepressants
Foreign bodies/toys/miscellaneous
Cardiovascular drugs
Antihistamines
Topical preparations
Pesticides
Alcohols
Vitamins
Cold and cough preparations
Bites and envenomations
Stimulants and street drugs
Antimicrobials
Hormones and hormone antagonists
Anticonvulsants
Gastrointestinal preparations
Plants
Dietary supplements/herbals/homeopathic
Chemicals
Fumes/gases/vapors
Hydrocarbons
Electrolytes and minerals

[a]Percentages are based on the total number of substances reported in all exposures (N = 2,396,913)
[b]Percentages are based on the total number of single substance exposures (N = 1,950,455)

Table 17C. Substance Categories Most Frequently Involved in Pediatric (≤5 years) Exposures (Top 25)[a].

Substance (major generic category)	All substances	%[b]	Single substance exposures	%[c]
Cosmetics/personal care products	151,154	13.82	148,040	14.52
Cleaning substances (household)	113,872	10.41	109,548	10.75
Analgesics	106,639	9.75	97,388	9.55
Foreign bodies/toys/miscellaneous	75,184	6.88	73,366	7.20
Topical preparations	66,893	6.12	65,756	6.45
Vitamins	47,816	4.37	43,355	4.25
Antihistamines	45,250	4.14	40,983	4.02
Pesticides	35,254	3.22	34,246	3.36
Plants	29,346	2.68	28,296	2.78
Gastrointestinal preparations	28,481	2.60	25,883	2.54
Antimicrobials	27,928	2.55	26,294	2.58
Cold and cough preparations	25,708	2.35	23,647	2.32
Dietary supplements/herbals/homeopathic	24,638	2.25	22,550	2.21
Cardiovascular drugs	23,124	2.11	14,645	1.44
Arts/crafts/office supplies	20,736	1.90	20,126	1.97
Hormones and hormone antagonists	20,522	1.88	15,869	1.56
Electrolytes and minerals	20,071	1.84	18,293	1.79
Deodorizers	17,555	1.61	17,354	1.70
Other/unknown nondrug substances	13,261	1.21	12,627	1.24
Sedative/hypnotics/antipsychotics	12,676	1.16	9,844	0.97
Antidepressants	11,526	1.05	8,343	0.82
Alcohols	11,026	1.01	10,756	1.06
Information Calls	9,984	0.91	9,389	0.92
Hydrocarbons	9,947	0.91	9,622	0.94
Asthma therapies	9,923	0.91	9,112	0.89

[a]Includes all children with actual or estimated ages ≤5 years old. Results do not include "Unknown Child" or "Unknown Age".
[b]Percentages are based on the total number of substances reported in pediatric exposures (N = 1,093,578).
[c]Percentages are based on the total number of single substance pediatric exposures (N = 1,019,297).

Mowry J. Clin Toxicol 2014; 52, 1032–1283

Belgian Poison Control Center

- Data from 01/01/2014 till 30/06/2014

Aantal casussen	
Januari	72
Februari	93
Maart	138
April	144
Mei	146
Juni	140
TOTAAL	**733**

Leeftijdsverdeling	
< 1 jaar	1
> 1 ≤ 2 jaar	24
> 2 ≤ 3 jaar	38
> 3 ≤ 4 jaar	22
> 4 ≤ 5 jaar	7
> 5 ≤ 10 jaar	8
> 10 ≤ 14	6
Kind, niet-gepreciseerd	21
Volwassene	501
Eindtotaal	**628**

Data from Geert Verstegen, personal communication

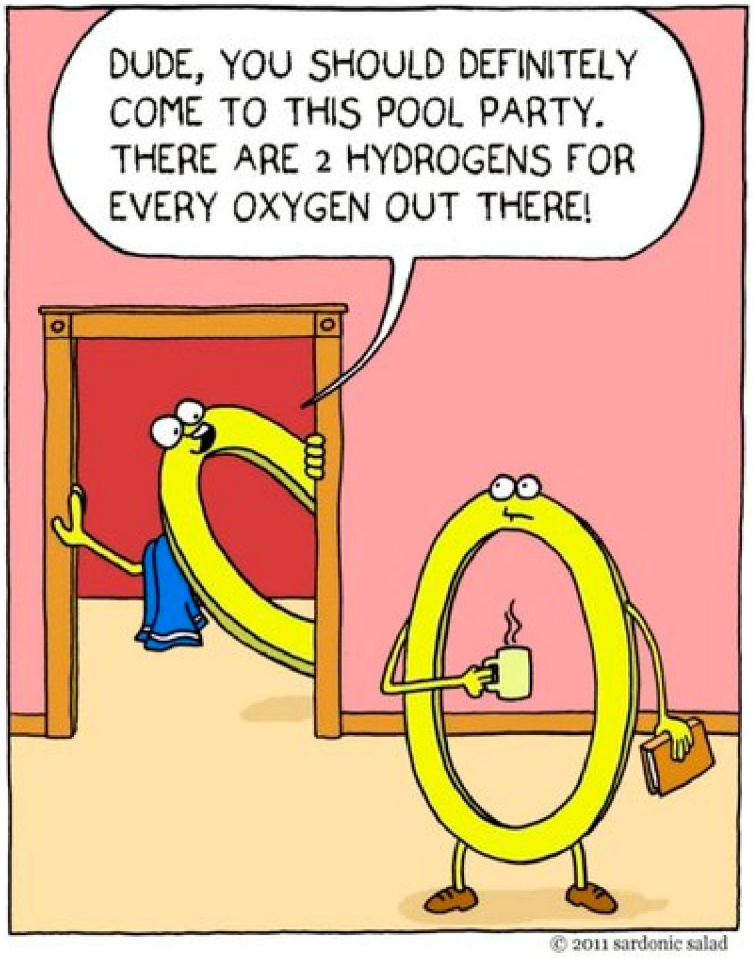
Belgian Poison Control Center

Volwassen slachtoffers		
Ongeval in de privésfeer		*Professione*
Base	141	Base
Zuur	97	Zuur
Hypochloriet	80	Hypochlor
Quaternaire ammoniumverbindingen	24	Quaternair ammoniumve ndingen
Andere	27	Andere
TOTAAL	**380**	**TOTAAL**

Weg van blootstelling		
	Absoluut	% t.o.v. categorie
Privé-sfeer		
Volwassenen	380	100.0
Huid	171	45.0
Ogen	120	31.6
(Per)oraal	81	21.3
Gemengd	5	1.3
Respiratoir	3	0.8
Kinderen	127	100.0
(Per)oraal	63	49.6
Huid	41	32.3
Ogen	19	15.0
Gemengd	4	3.1
Professioneel		
Volwassenen	121	100.0
Huid	76	62.8
Ogen	39	32.2
Gemengd	3	2.5
(Per)oraal	3	2.5

Data from Geert Verstegen, personal communication

Pathophysiology



Mechanism

- Neutralization of substance
  - Release thermal energy (burns)
  - Chemical effects

- Extent of injury
  - Duration of contact
  - Penetration into tissues
  - Agent
    - Volume
    - pH
    - Concentration
  - TAR (Titratable acid/alkaline reserve)

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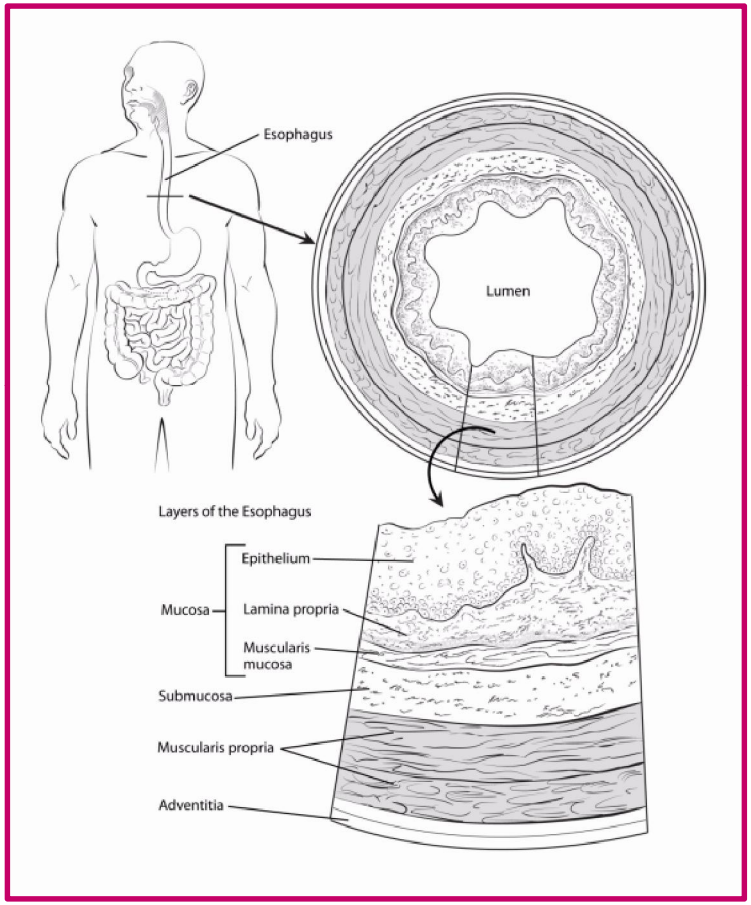
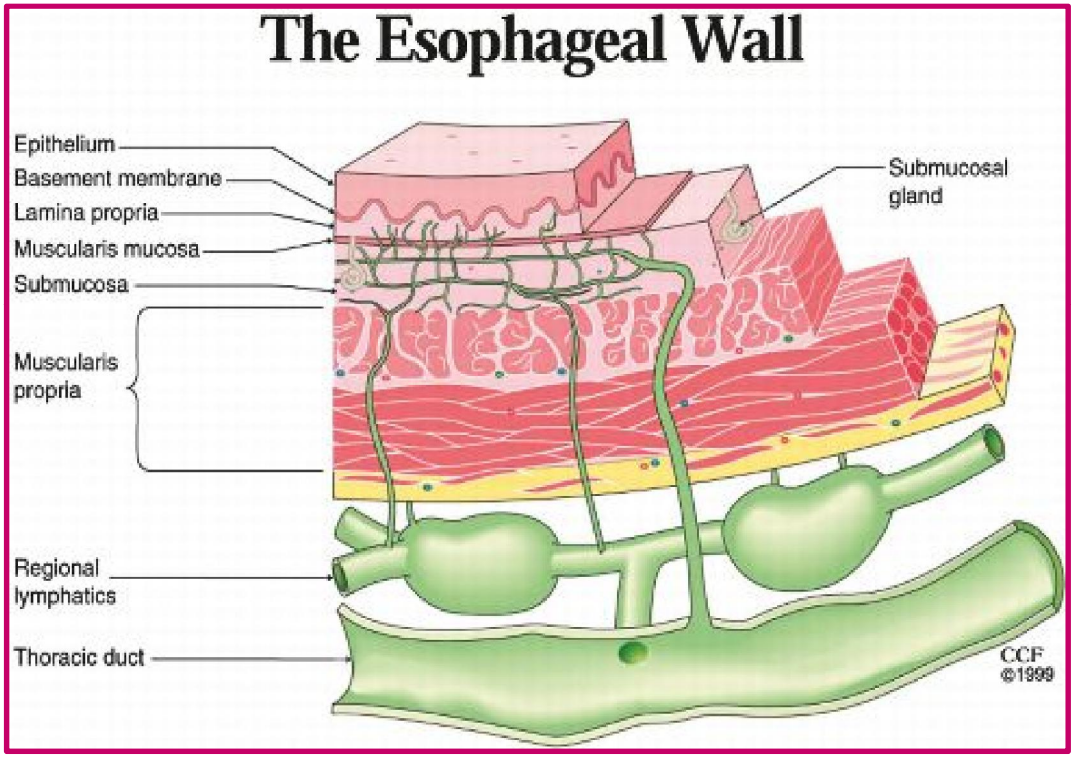
Esophagus … most long term sequelae from caustic ingestion





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Pathophysiology

- Phases of injury
  1. Erythema, edema and inflammation (sec to min)
  2. Inflammation - vascular thrombosis (2 – 4 days)
     - Further necrosis
     - Sloughing of mucosa
  3. Fibroblast proliferation (weeks – months)
     - Scar formation (decreased secretion)
     - Strictures
     - Shortening (functional effects)

- Alkali
  - Deep and progressive damage
  - Histological: liquefaction necrosis
  - Oesophageal carcinoma (1000 fold risk)
- Acid
  - Denature enzymatic proteins
  - Histological: coagulation necrosis (coagulum layer)
  - Gastric damage (pylorospasm)

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Clinical presentation

Symptoms

- Pain
- Airway proble
- Dysp
- Vomiting
- Oropharyngeal burns
- Systemic toxicity

No single sign or symptom is predictive of the presence of an esophageal injury.

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Diagnosis

"I'm sorry, the doctor no longer makes diagnoses."

Diagnosis and staging

- Radiologic studies
  - Chest & abdomen : perforation ?
- Esophagogastroduedonoscopy

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Endoscopic classification

Table 1: Zargar's grading classification of mucosal injury caused by ingestion of caustic substances

Grade 0	Normal examination
Grade 1	edema and hypermia of the mucosa
Grade 2a	Superficial ulceration, erosions, friability, blisters, exudates, hemorrhages, whitish membranes
Grade 2b	Grade 2a plus deep discrete or circumferential ulcerations
Grade 3a	Small scattered areas of multiple ulceration and areas of necrosis with brown-black or greyish discoloration
Grade 3b	Extensive necrosis

- Grade O, 1, 2A — Excellent prognosis
- Grade 2B – 3A — Strictures 70 – 100%
- Grade 3B — Early mortality 65%

Zargar S. Gastrointest Endosc 1991;37:165–9.
Cheng H. BMC Gastroenterology 2008, 8:31
Cabral C. Surg Endosc 2010;26:214–21

Endoscopy or CT ?

Table 2. Is endoscopy or CT best as the initial investigation?

Author	Year	Study type	Number in study	
Lurie et al.[23]	2013	Retrospective observational study	23 adults	• 78% of
				• The CT grading system for oesophageal stricture resulted in a slightly larger area under the receiver-operating characteristic curve (0.90) compared with endoscopic grading system (0.79) • The sensitivity and specificity of CT grading system were moderately higher than those of endoscopic grading system particularly when comparing grades I–III with grade IV injuries (CT sensitivity, 81.4% and specificity, 95.6% compared with endoscopy sensitivity, 62.8% and specificity, 84.8%)

Endoscopy > CT
CT when endoscopy not possible
Additional data

Endoscopy: who and when ?

- Review of 35 papers

- Asymptomatic patient
  - Asymptomatic 4 h after oral fluids / food
  - No endoscopy
  - Cave: children ☞ longer observation

- Symptomatic patient
  - Early endoscopy (12 h)
  - No evidence more risk after 48 h

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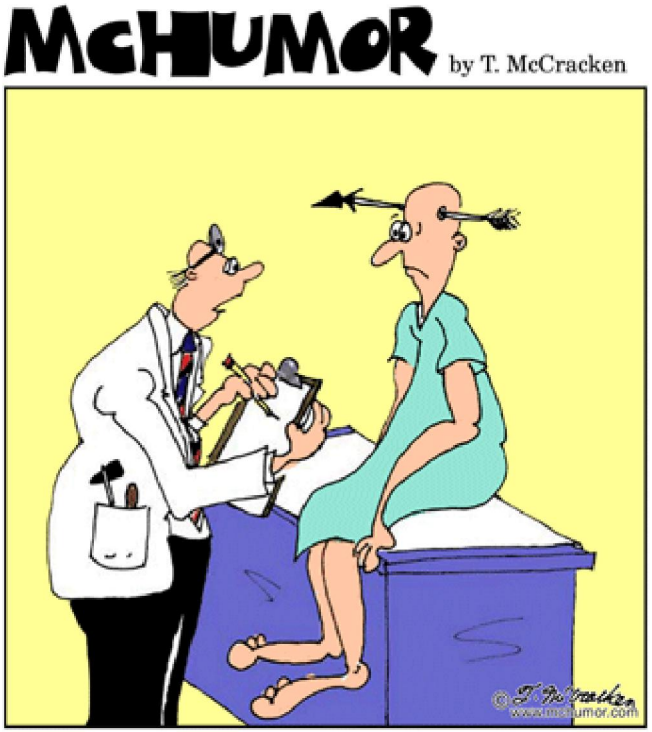
Management



"Off hand, I'd say you're suffering from an arrow through your head, but just to play it safe, I'm ordering a bunch of tests."

Early management

- A (cfr management burn airway)
- B
- C

- Specific treatment
- Aim of therapy
  - Prevent perforation
  - Avoid progresssive fibrosis and stenosis of the esophagus and stomach

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Surgical management

- Indications:
  - Perforation
  - Full thickness injury
    - Early surgery decreased morbidity & mortality
    - Identification challenging

- Technique
  - Inspection
  - Resection
  - Repair of perforation
  - Gastrostomy / enterostomy

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Emergency esophagectomy

Author	Journal/yr	Number	Technique	Survival
Brun	BJS 1984	17	Transhiatal stripping	76,5%
Sarfati	BJS 1987	44	Transhiatal	45,5%
Gossot	J Thorac Cardiovasc Surg 1987	29	Transhiatal stripping	62%
Hendrickx	Acta Chir Belg 1990	1	Transhiatal stripping	100%
Pruvot	Ann Chir 2003	28	Transhiatal stripping / exclusion	82%
Dapril	Surg Endosc 2007	1	Lap transhiatal	100%
Chou	World J Surg 2010	71	Transhiatal	57%
Chirica	Ann Surg 2012	268	Transhiatal stripping	76%

Conservative treatment

- 91 children esophageal strictures
- 75% alkali

- Group A (43 patients)
  - Immediately
  - Grade 1 / 2A oral feeding
  - Grade 2B / 3 1 week enteral feeding (NG)
- Group B (48 patients)
  - After 6 – 12 weeks

Gun F. Acta Chir Belg 2007; 107: 49-52

Conservative treatment

Table I

Comparison of the groups according to th
of the esophageal burns

Grades	Gr n
2a 2b 3	7 28 8
Total	43

Table IV

Dilatation periods of the groups

Dilatation periods	Group A Patient no	%	Group B Patient no	%
				– 41.7 41.7 16.6
				100

Table VI

Additional treatment modalities and survival rates

Modality	Group A No :	%	Group B No :	%
Cured with dilatations	28	(65.1)	12	(25)
Patients still on dilatation programme	15	(34.9)	24	(50)
Colonic transposition	–		3	(6.25)
Patients with stents	–		4	(8.4)
Mortalitiy	–		3	(6.25)
Total	43	(100)	48	(100)

Differences of gr

perforation rates

Luminal diameters	Patient no A	%									B	%
0-3 mm	5	11.6								30	15	75
4-6 mm	16	37.2								31.2	9	60
7-10 mm	22	51.2	13	27.1	21	95.4	7	53.8	–	–	–	–
Total	43	100	48	100	28	65.1	12	25	9	20.9	24	50

Gun F. Acta Chir Belg 2007; 107: 49-52

Conservative treatment

- Grade 1
  - No risk for strictures
  - Normal diet
- Grade 2A
  - Normal diet or interim enteral support (nasogastric)
  - NG < 15 days (Risk: long strictures esophagus)
- Grade 2B
  - Gastrostomy / enterostomy
  - Avoid food irritation
- Grade 3
  - Will progress to stricture formation
  - Gastrostomy / enterostomy

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Dilutional therapy

- In vitro
  - Water or milk exothermic reaction
  - Limited effect
- In vivo
  - Limited effect

- Humans
  - Milk or water within seconds / minutes
  - Cave
    - Nausea – vomiting
    - Perforation
    - Airway

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Proton pump inhibitors

- Clear rationale
- No controlled study

- Cakal (2013)
  - 13 adults
  - 80 mg IV omeprazole bolus followed by a 72-h omeprazole infusion at a rate of 8 mg/h

Contini S. World J Gastroenterol 2013; 19(25):3918-3930
Cakal B. Dis Esophagus 2013 ; 26 : 22 – 26 .

Steroids

- Animal studies
- Human data
  - RCT, 60 child
    - Prednisol
    - Ster /31 strictures
    - Non 11/29 strictures
    - No us icture
  - Meta-anal s studies 1991 – 2004
    - Grade II esophageal burns
    - No benefit in stricture prevention

Anderson K. N Engl J Med 1990; 323: 637-640
Fulton J. Clin Toxicol 2007; 45:402-8.

Neutralizing ingested substance

Emesis

Gastric lavage

Activated charcoal

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Conclusion


A CONCLUSION IS THE PLACE...
WHERE YOU GOT TIRED OF THINKING.
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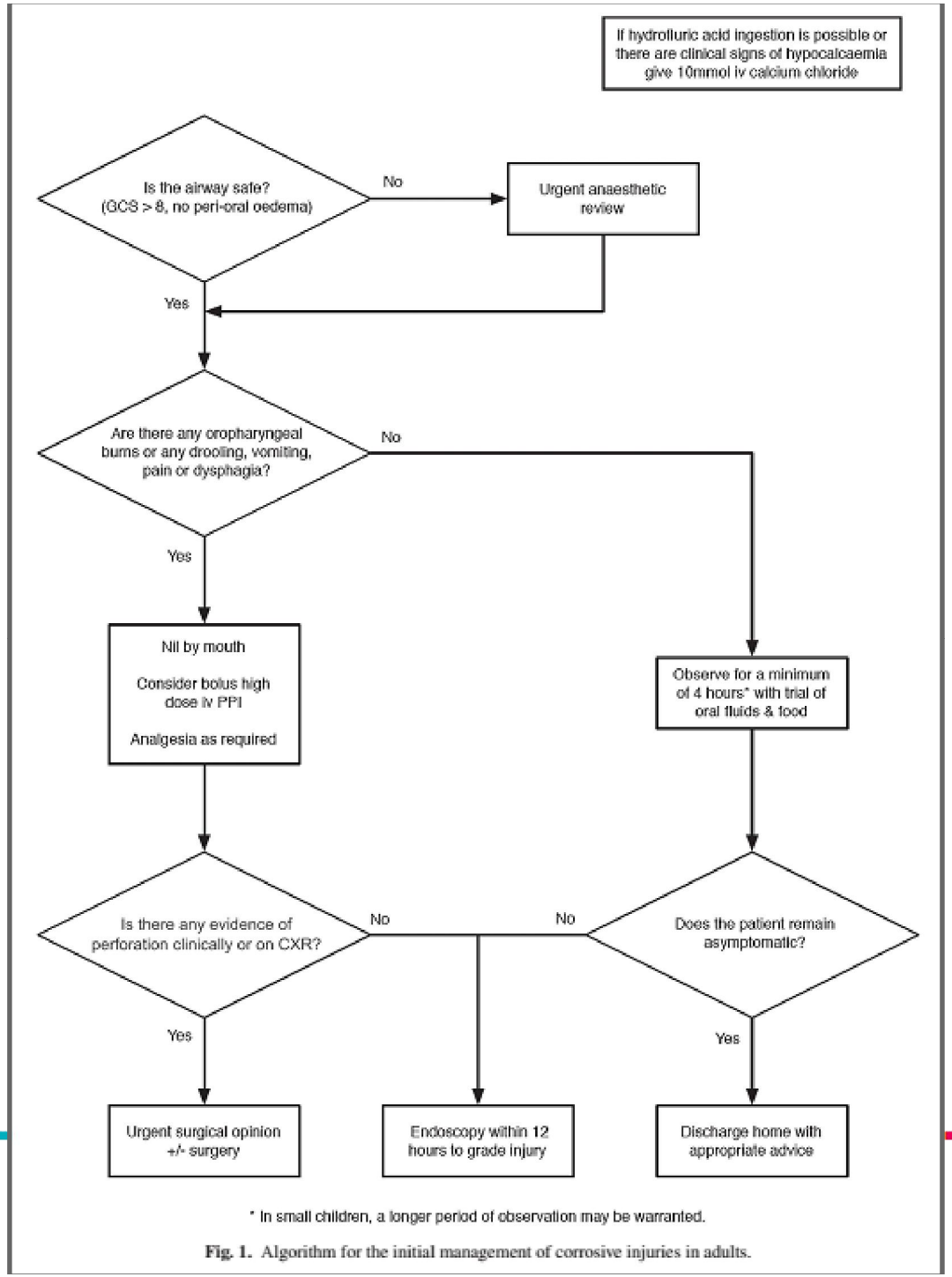

Fig. 1. Algorithm for the initial management of corrosive injuries in adults.

Bonnici K. Clin Toxicol 2014; 52(9):911-25

Conclusion

- Grade 1 / 2A
  - Oral feeding
  - PPI
- Grade 2B / 3A
  - Enteral feeding by nasogastric sonde
  - Oral feeding
  - PPI
- Grade 3B
  - Gastrostomy / enterostomy
  - TPN
  - Early surgery

Questions ?


SPINE
CAUSTIC SODA
Oh! Look who it is! If I had a face like that, I'd keep it in a bag. Does Lady Gaga know you're wearing her nose? But I shouldn't mock you for being ugly... Not when I can mock you for being stupid...
WWW.THE-SPINE.COM