Is there a Difference Between the Management of Grade 2b and 3 Corrosive Gastric Injuries?

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Abstract

Objective : To evaluate the differences between treatment of patients with grade 2b or grade 3 gastric injuries.

Setting : A University Hospital.

Design : Retrospective review.

Patients : Thirty patients who ingested caustic agents over a 5 year period were examined by endoscope within 48 hours of injury.

Result : Twenty one patients ingested strong acid or alkali. Among these patients, five had grade 2b, and two had grade 3 injuries. In both cases of grade 3 injuries, extensive surgical approach was initially performed, then delayed jejunal and colonic interpositions were done. On the other hand, one 2b patient had exploratory laparotomy, while others were treated conservatively. All 2b patients had satisfactory conditions during the initial follow-ups. Three patients were healthy during the 11, 16, and 44 months follow-up, one developed chronic gastritis at 5 months and one patient failed to follow-up.

Conclusion : Early and aggressive extensive removal of necrotic tissue is necessary and can certainly increase the survival. There is on going controversy in the management of injuries less than grade 3. Grade 2b gastric injury patients can be managed conservatively.

Key word : Corrosive Ingestion, Corrosive Injury, Esophageal Stricture, Esophago-Gastrectomy, Esophageal Replacement

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The severity of corrosive injuries depends mainly on the pH, the concentration, amount and duration of ingestion[1]. While other factors, which have been shown to correlate with the extent of injury are the following: an empty stomach, vomiting and antidotes[2,3]. In Asia, acid ingestion occurs more commonly than in Western countries[2,4-6]. It is unclear as to why this method of attempted suicide is prefered in Asia, but these chemicals are readily availble. In Thailand, most of the common household cleaning agents are acid. In India, hydrochloric and sulfuric acid are easily accessible over the counter[2,5].

Strong acids contain an offensive odor, and taste both sour and bitter. It induces extreme pain in the lips and oral cavity when ingested. Strong acids are known to produce coagulation necrosis and eschar formation. Injury to the esophagus has usually been found to be less severe than that of the stomach because of the squamous epithelium's greater resistance to trauma, and the liquid's rapid transit time through the esophagus[2,7-11]. In contrast to acid, strong alkali will usually cause more extensive damage. Commercial cleaners contain: powdered lye, 100 per cent of sodium hydroxide, potassium hydroxide, liquid sodium hydroxide, or as seen in liquid Drano (2-10% sodium hydroxide) (Bristol Company) [2,11]. Strong alkali produces severe liquefaction necrosis and thermal burns that penetrate through the intestinal wall[2-8,11,12]. Pyloric spasms causes lye to move to and fro in the stomach[13]. Occasionally the esophagus may be spared[2], but most patients end up having severe esophageal and gastric injuries[1]. Saponification progresses to cellular necrosis within a few days, mucosal sloughing and deep ulceration occurs during the first week. After 3 weeks, stricture formation and cicatrization cause obstruction of the gastrointestinal tract. Esophagus and gastric cicatrization, hourglass deformity and linitis plastica are known to be late complications in grade 2b and 3 injuries[1].

Because of the pathophysiologic difference between acid and alkali[14], mixing of strong alkali and gastric juice initiates a powerful chemical reaction, which produces heat from the hydration reaction[15]. Alkali ingestion injuries of grade 2b have a significantly worse progressive nature[3]. Exploratory laparotomy should be considered as the treatment of choice[13,15]. It is difficult to assess the degree of injury from only endoscopic findings. Several surgeons advocate laparotomy in cases of second or third degree burns and adequate assessment may require thoracotomy[15-19]. Due to the various kinds of management options, the author studied the differences in treatment of patients with grade 2b and 3 injuries.

PATIENTS AND METHOD

A retrospective study at Thammasart University Hospital was performed. During the inclusion period of 5 years, from January 1996 to May 2001, 42 patients who ingested caustics were admitted. From this group, 30 patients were assessed by flexible endoscope within 48 hours after ingestion. Modification of endoscopic classification by Zargar was used[20]. (Table 1)

RESULT

Thirty patients who were examined by endoscope, consisted of 24 women, 5 men and one child. The mean age was 27 years (16-37 years) for males, 21.6 years (15-30 years) for females and a 14 year old child. Five patients were suicidal, two had accidental ingestions and the last was diagnosed with adjustment reaction disorder.

Table 1. Endosopic grade of esophagus and stomach injuries.

Grade	Endoscopic Findings
0	Normal examination
1	Edema and hyperemia of the mucosa
2a	Friability, hemorrhages, erosions, blisters, whitish membrane, exudates and superficial ulceration
2b	Degree 2a plus deep discrete or circumferential ulceration
3	Multiple ulcerations and areas of necrosis

* From ; Zargar SA, Kochhar R. The role of fiberoptic endoscopy in the management of corrosive ingestion and modified endoscopic classification of burns. Gastroint Endos 1991, 37: 165-9.

Twenty patients ingested strong acid and one ingested strong alkali. Two patients had grade 3 injuries and five others had grade 2b injuries of the gastric antrum. (Table 2)

The first patient ingested about 500 ml. of toilet cleaner which contained 13 per cent of HCl w/w. Her physical exam and X-rays revealed generalized peritonitis and intra-abdominal free air. Endoscopic findings showed third degree burns at the lower esophagus and stomach. Esophago-gastrectomy was performed. Six months later, a Roux-en-Y esophago-jejunostomy was done. The second patient ingested strong alkali (Drano). Drooling, hoarseness and stridor were noted during the physical examination. Endoscopic findings showed grade 3 injury of the esophagus and stomach. Because of severe necrosis, esophago-gastrectomy and pacreatico-duodenostomy were done. Five months later, colonic interposition was performed.

All 5 patients who had grade 2b injuries ingested strong acid. In all of these patients injury was contained in the gastric antrum. Only one patient underwent laparoscopic exploration. Patients in this group did not have early complications. Three patients were found to be healthy at 11 months after ingestion. One patient, however, developed chronic active gastritis 5 months post ingestion. One patient failed to follow-up. Nevertheless, he only had mild symptoms of dysphagia and epigastric pain before he was discharged.

DISCUSSION

Corrosive ingestion is not uncommon. Accidental ingestion occurs more often in children compared to adults, but the amount of substance ingested is usually smaller. The suicidal patients in this study ingested large amounts and the injuries were severe especially in cases of lye ingestion. Crain suggested that a combination of at least two of these specific signs and symptoms : vomiting, drooling, and stridor would have predictive power to various esophageal injuries[21]. The author found that significant drooling can predict severe esophageal injury, but the absence of drooling does not rule out this degree of severity. Many clinical findings such as: vomiting, dysphagia, excessive salivation, abdominal pain, injuries of esophageal zone and vocal cord or combination of these reliably indicated esophageal injuries[5,21,22]. Both grade 3 injury patients had hoarseness and stridor, they had severe burn at the epiglottis and larynx. These signs were not found in the grade 2b patients. However, it was found that early endoscopic evaluation within 48 hours was important to determine severity and predict prognosis[18].

Only one of five patients in grade 2b was treated by exploratory laparotomy due to severe pain and guarding in the epigastric region, others were conservatively managed. Excluding the one patient who failed to follow-up, the other four patients were healthy and free of symptoms for 11 - 44 months. Evidence suggests that grade 2b injuries can be managed selectively. The authors do not have experience with esophageal stents, through gastrostomy as suggested by Estera, who had optimistic experience with the treatment of second degree and non extensive third degree esophageal burns[15]. In addition, early bougienage and stent to avoid stricture development are still controversial[1,4,7,12,23].

Third degree burns have a significantly worse progressive nature. Early extensive resection of necrotic tissue is necessary[3,14,24]. Conserva-

Table 2. Clinical data in 7 patients which have grade 2b or 3 injuries.

Cases	Age	Sex	Strong caustic agent	Endoscopic grade	Treatment	Early Result
1	26	F	HCl	3	Esophago-gastrectomy	Laryngeal stricture (tracheostomy 1 mo and jejunal interposition 6 mo later)
2	23	M	NaOH	3	Esophago-gastrectomy Pancreatico-duodenectomy,	Jejunostomy tube feeding (5 mo follow-up then colonic interposition)
3	19	F	HCl	2b	Explore laparotomy	Healthy (11 mo follow-up)
4	18	M	HCl	2b	Conservative	Healthy (16 mo follow-up)
5	27	F	HCl	2b	Conservative	Healthy (44 mo follow-up)
6	28	F	HCl	2b	Conservative	Chronic active gastritis (5 mo later)
7	20	F	HCl	2b	Conservative	Loss to follow-up (mild dysphagia and epigastric pain when discharge)

tive procedures with second-look operations are not recommended[14,17,24]. The author has performed aggressive removal of dead tissue in both cases of third degree burns, with jejunal and colonic interposition done afterwards. They resulted in complications of hoarseness and aspiration. Permanent tracheostomy was necessary in one patient.

In conclusion, in high risk suicidal patients with large amount of alkali ingestion, the author believes that an aggressive approach and early adequate resection of all suspicious necrotic tissue or organs will result in the best prognosis. Selective management may be sufficient for patients with grade 2b acid injuries. Emergency exploratory laparotomy is definitely indicated in all grade 3 injuries.

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REFERENCES

1. Zargar SA, Kochhar R, Nagi B, Mehta S, Mehta SK. Ingestion of strong corrosive alkalis: Spectrum of injury to upper gastrointestinal tract and natural history. Am J Gastroenterol 1992; 87: 337-41.
2. Gumaste VV, Dave PB. Ingestion of corrosive substances by adults. Am J Gastroenterol 1992; 87: 1-5.
3. Wu MH, Wu-Wei Lai. Surgical management of extensive corrosive injuries of the alimentary tract. Surg Gynecol Obstet 1993; 177: 12-6.
4. Wu MH, Lai WW. Esophageal reconstruction for esophageal strictures or resection after corrosive injury. Ann Thorac Surg 1992; 53: 798-802.
5. Zargar SA, Kochhar R, Nagi B, Mehta S, Mehta SK. Ingestion of corrosive acids. Spectrum of injury to upper gastrointestinal tract and natural history. Gastroenterology 1989; 97: 702-7.
6. Subbarao KS, Kakar AK, Chandrasekhar V, Ananthakrishnan N, Banerjee A. Cicatrical gastric stenosis caused by corrosive ingestion. Aust N Z J Surg 1988; 58: 143-6.
7. Goldman LP, Weigert JM. Corrosive substance ingestion: A review. Am J Gastroenterol 1984; 79: 85-90.
8. Lowe JE, Graham DY, Boisaubin EV Jr, Lanza FL. Corrosive injury to the stomach: The natural history and role of fiberoptic endoscopy. Am J Surg 1979; 137: 803-6.
9. Maull KI, Scher LA, Greenfield LJ. Surgical implications of acid ingestion. Surg Gynecol Obstet 1979; 148: 895-8.
10. Davis LL, Raffensperger J, Novak GM. Necrosis of the stomach secondary to ingestion of corrosive agents: Report of three cases requiring total gastrectomy. Chest 1972; 62: 48-51.
11. Sugawa C LC. Caustic injury of the upper gastrointestinal tract in adult: A clinical and endoscopic study. Surgery 1989; 106: 802-7.
12. Campbell GS, Burnett HF, Ransom JM, Williams GD. Treatment of corrosive burns of the esophagus. Arch Surg 1977; 112: 495-500.
13. Meredith JW, Kon ND, Thompson JN. Management of injuries from liquid lye ingestion. J Trauma 1988; 28: 1173-80.
14. Jeng Benjamin L CH. Upper gastrointestinal tract ablation for patients with extensive injury after ingestion of strong acid. Arch Surg 1994; 129: 1086-90.
15. Estrera A, Taylor W, Mills LJ, Platt MR. Corrosive burns of the esophagus and stomach: A recommendation for an aggressive surgical approach. Ann Thorac Surg 1986; 41: 276-83.
16. Stiff G, Alwafi A, Rees BI, Lari J. Corrosive injuries of the oesophagus and stomach: Experience in management at a regional paediatric centre. Ann R Coll Surg Engl 1996; 78: 119-23.
17. Thompson JN. Corrosive esophageal injuries. I. A study of nine cases of concurrent accidental caustic ingestion. Laryngoscope 1987; 97: 1060-8.
18. Ferguson MK MM. Early evaluation and therapy for caustic esophageal injury. Am J Surg 1989; 157: 116-20.
19. Chaudhary A, Puri AS, Dhar P, et al. Elective surgery for corrosive-induced gastric injury. World J Surg 1996; 20: 703-6; discussion 706.
20. Zargar SA, Kochhar R, Mehta S, Mehta SK. The role of fiberoptic endoscopy in the management of corrosive ingestion and modified endoscopic classification of burns. Gastrointest Endosc 1991; 37: 165-9.
21. Crain EF, Gershel JC, Mezey AP. Caustic inges-

tions. Symptoms as predictors of esophageal injury. Am J Dis Child 1984; 138: 863-5.
22. Gaudreault P. PM. Predictability of esophageal injury from signs and symptoms. A study if caustic ingestion in 378 children. Pediatics 1983; 71: 767-70.
23. Panieri E, Rode H, Millar AJ, Cywes S. Oesophageal replacement in the management of corrosive strictures: When is surgery indicated? Pediatr Surg Int 1998; 13: 336-40.
24. Cattan P, Munoz-Bongrand N, Berney T, Halimi B, Sarfati E, Celerier M. Extensive abdominal surgery after caustic ingestion. Ann Surg 2000; 231: 519-23.

การรักษาผู้ป่วยบาดเจ็บกระเพาะอาหาร ระดับ 2 บี หรือ 3 จากสารกัดกร่อน มีความแตกต่างกันหรือไม่ ?

*จิตตินัดด์ หะวานนท์, พ.บ.**

วัตถุประสงค์ : เพื่อประเมินผลการรักษาผู้ป่วยกินสารกัดกร่อน ที่มีกระเพาะบาดเจ็บ ระดับ 2 บี หรือ 3

สถานที่ทำการศึกษา : คณะแพทยศาสตร์ มหาวิทยาลัยธรรมศาสตร์

รูปแบบการศึกษา : การศึกษาเชิงพรรณนา ชนิดย้อนหลัง

ประชากรที่ศึกษา : ผู้ป่วยกินสารกัดกร่อน ที่ได้รับการตรวจด้วยกล้องส่องตรวจกระเพาะ ภายใน 48 ชั่วโมง จำนวน 30 คน ในระยะ 5 ปี (พ.ศ. 2539 – 2543)

ผลการศึกษา : ผู้ป่วยกิน กรดแก่ต่างแก่ จำนวน 21 คน พบ การบาดเจ็บระดับ 2 บี จำนวน 5 คน และระดับ 3 จำนวน 2 คน ผู้ป่วยระดับ 3 ทั้ง 2 คนได้รับการผ่าตัดเนื้อตาย และผ่าตัดต่อด้วยลำไส้เล็กเจจูนัมและลำไส้ใหญ่ภายหลัง ผู้ป่วยระดับ 2 บี หนึ่งคนได้รับการผ่าตัดเปิดท้อง ที่เหลือรักษาแบบเฝ้าดูอาการ ผู้ป่วย 2 บี ทั้งหมดหายเป็นปกติ ในระยะแรก และเมื่อติดตามผู้ป่วย 3 ราย เป็นระยะเวลา 11, 16, 44 เดือนพบว่าไม่มีอาการผิดปกติ หนึ่งราย พบเป็นกระเพาะอักเสบเรื้อรัง เมื่อติดตามไป 5 เดือน และหนึ่งรายไม่สามารถติดตามได้

บทสรุป : การตัดเนื้อตายออกให้หมดและรวดเร็วมีความจำเป็น สามารถเพิ่มอัตราการมีชีวิตรอด ยังมีการโต้เถียงถึงวิธีการรักษาผู้ป่วยที่มีการบาดเจ็บต่ำกว่า ระดับ 3 การบาดเจ็บกระเพาะ ระดับ 2 บี สามารถรักษาโดยไม่ต้องทำการผ่าตัด

คำสำคัญ : การกินสารกัดกร่อน, การบาดเจ็บจากสารกัดกร่อน, หลอดอาหารตีบ, ตัดหลอดอาหารและกระเพาะอาหาร, ผ่าตัดทดแทนหลอดอาหาร

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