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CONSERVATIVE VERSUS SURGICAL INTERVENTIONS FOR PATIENTS WITH GRADE 2B CORROSIVE INGESTION

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ABSTRACT

Introduction: Chemical burns caused by ingestion of caustic substances, such as acids and alkalis, occur in about two-thirds of cases of accidental ingestion of these substances. Supportive treatment is performed in the Grade I and for Grade II and III explorative laparotomy is done that there is a risk of misdiagnosis and inappropriate treatment of such patients in endoscopy and surgery. In addition to acute phase problems, these types of injuries can cause chronic and complications, such as increasing the chance of malignancy and stenosis and dysphagia. Therefore, timely treatment of these patients can be effective in improving their prognosis. In this case, various therapeutic methods, including preservative and non-invasive treatments, or surgical treatments are used, the selective method depends on the severity of the initial injury, the underlying conditions of the patients, and the complications. Understanding the pathophysiology of the damage can also help in choosing a more effective treatment. **Objective:** Comparison of the results of medical treatment and surgical intervention in patients with Grade 2b esophagial burn due to ingestion of causative agent and identifying the method with the highest efficacy in order to be able to improve the treatment and reduce side effects by appropriate planning.

Methods: In this cohort observation study, 50 patients with grade 2b burns of esophagus due to caustic ingestion in Loghman Hospital of Shahid Beheshti University were selected and evaluated. Information about them is entered with a checklist containing variables including age, gender, type of substance, associated illness, hospital admissions and therapeutic outcomes including stenosis, dysphagia, fistula and mortality. Patients are divided into two groups: A for medical treatment and B for surgical intervention. Patients treated with these two methods are followed up and based on clinical examination and, if needed, imaging and endoscopy, the incidence of burn complications is determined. Finally, data analysis is performed using SPSS software version 24. Chi-Square and Fisher test and independent t test are used to compare the results and the significance level is considered 0.05. **Results:** The average age in group A was 23.4±6 and in group B was 22.7±3.4. In group A the sex ratio was 1.7:1 (for Male:Female) and in group B was 2.1:1, which did not have a significant difference. In group A, 11 (44%) were damaged by alkali and 14 (56%) were damaged by acid. For group B, these results were 15 (60%) and 10 (40%) respectively, Which did not have significant difference. The frequencies of patients' re-admissions were almost the same during the treatment and did not differ significantly. In group A, there was one case of esophageal stricture, one case of dysphagia and one case of esophageal fistula with no mortality In group B, these results were two cases of stricture, four cases of dysphagia and three cases of fistula with two cases of mortality. **Conclusion**: According to the findings of this study, it is suggested that laparotomy is not recommended at least in classes 2a and 2b, but more studies are needed to confirm this. In these patients, in the absence of clear clinical evidence of mediastinitis or peritonitis, and only on the basis of endoscopic grading, medical treatment, serial follow up and paraclinical test should be done and Appropriate treatment should be done if any complications occur.

INTRODUCTION

Caustic injury remains an important public health problem in the United States and the world despite various education and regulatory efforts to reduce its occurrence. In the United States, an estimated 5,000 to 15,000 caustic ingestions occur per year.[1] About half of the cases of corrosive ingestion, such as acids and alkalis, are seen in children, of which more than two thirds are accidentally swallowed, and half have been seen in adults, with the vast majority of them being suicide attempted.[2] Psychological problems, being single and addiction are some of the risk factors for suicidal caustic ingestion.[3]

In patients with ingestion of caustic substances, an endoscopy is required during the first 24 hours in order to determine the severity of burns. Subsequently, the patient undergoes the next step, based on the classification of visible mucosal damage (Table 1 and Figure 1), of which about 44% of the patients are first grade burns. But this severity depends on the amount of swallowed substances and its type, and it can be limited to the esophagus or extend to other lower parts, especially the stomach. In his study, Zargar et al[4] found that early major complications and death were confined to patients with grade 3 injuries. All patients with grade 0,1 and 2A burns recovered without sequelae. Majority of grade 2B and all survivors with grade 3 injury developed eventual esophageal or gastric cicatrization.[4] In general, the degree of esophageal injury at endoscopy is a predictor of systemic complication and death with a 9-fold increase in morbidity and mortality for every increased injury grade.

Patients undergo supportive care in the presence of Grade I, but in the case of Grade II and III, Explorative laparotomy is performed, which is likely to detect and treat inappropriately such patients in endoscopy and surgery.[2&5]

Table 1 Zargar classification and its corresponding endoscopic description

Zargar classification	Description
Grade 0	Normal mucosa
Grade Ⅰ	Edema and erythema of the mucosa
Grade ⅡA	Hemorrhage, erosions, blisters, superficial ulcers
Grade ⅡB	Circumferential lesions
Grade ⅢA	Focal deep gray or brownish-black ulcers
Grade ⅢB	Extensive deep gray or brownish-black ulcers
Grade Ⅳ	Perforation

These types of lesions can cause problems in the acute phase, the most common of which are throat pain and painful ingestion, as well as chronic problems and complications such as increased chance of malignancy, stenosis and dysphagia.[3,6-9] Therefore, timely treatment of these patients can be effective in improving their prognosis. Various therapeutic methods are used in this regard, including medical and non-invasive treatments, or surgical treatments, the choice of which depends on the severity of the primary injury, the underlying conditions of the patients, and the complications[1,9,10] Recognizing the pathophysiology of the damage can also help in choosing a more effective treatment.[11]

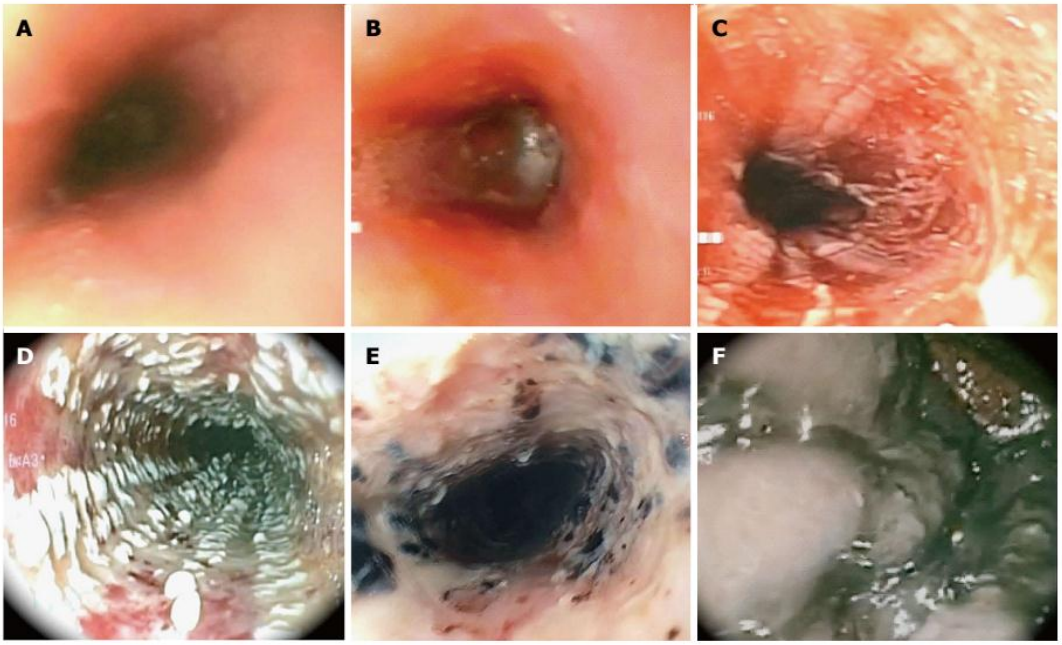


Figure 1 Endoscopic pictures of Zargar classification 0 to ⅢB. A: Zargar Grade 0: Normal mucosa; B: Zargar Grade Ⅰ: Edema and erythema of the mucosa; C: Zargar Grade ⅡA: Hemorrhage, erosions, blisters, superficial ulcers; D: Zargar Grade ⅡB: Circumferential bleeding, ulcers. Exudates; E: Zargar Grade ⅢB: Focal necrosis, deep gray or brownish black ulcers; F: Zargar Grade ⅢB: Extensive necrosis, deep gray or brownish black ulcers.

Complications of surgical intervention can include infection, Anastomosis stenosis, leak, esophageal rupture, and respiratory problems.[12] For this reason, due to the importance of the issue, we decided to study the results of medical treatment and surgical intervention in patients with Grade 2b esophageal burns with Caustic substances.

MATERIAL AND METHODS

In this cohort observation study, 50 patients with grade 2b burns of esophagus due to caustic ingestion in Loghman Hospital of Shahid Beheshti University were selected and evaluated. The exit criteria of the study are the inability to track patient outcomes and grade higher or lower than 2b.

Information about them is entered with a checklist containing variables including age, gender, type of substance, associated illness, hospital admissions and therapeutic outcomes including stenosis, dysphagia, fistula and mortality (Assesment of dependent variables Conducted by clinical examination and follow-up with imaging and endoscopy during and after hospitalization).

Patients are divided into two groups: one for medical treatment (Patients who did not consent to surgery, freely, despite the recommendation for surgery) and the other for surgical intervention (Patients who are satisfied with surgery).

Conservative treatment include administration of corticosteroids, antacids, antibiotics and fluid therapy, and surgical procedures include laparotomy for insertion of esophageal stent or esophagectomy, gastrectomy, or both.

Patients treated with these two methods are followed up and based on clinical examination and, if needed, imaging and endoscopy, the incidence of burn complications is determined.

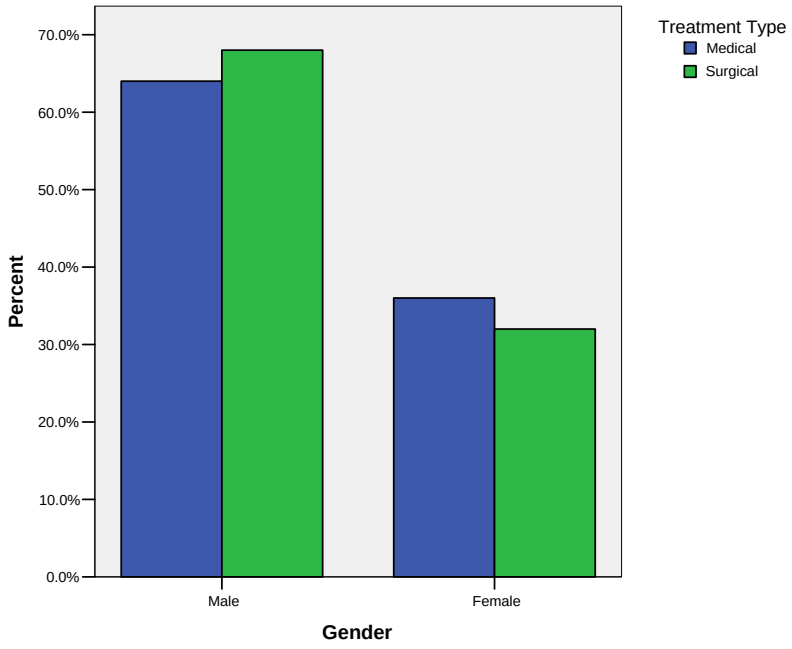
Finally, data analysis is performed using SPSS software version 24. For quantitative variables, the mean and standard deviation are recorded, and for qualitative variables, the absolute and relative frequency will be recorded.

Chi-Square and Fisher test and independent t test are used to compare the results and the significance level is considered 0.05.

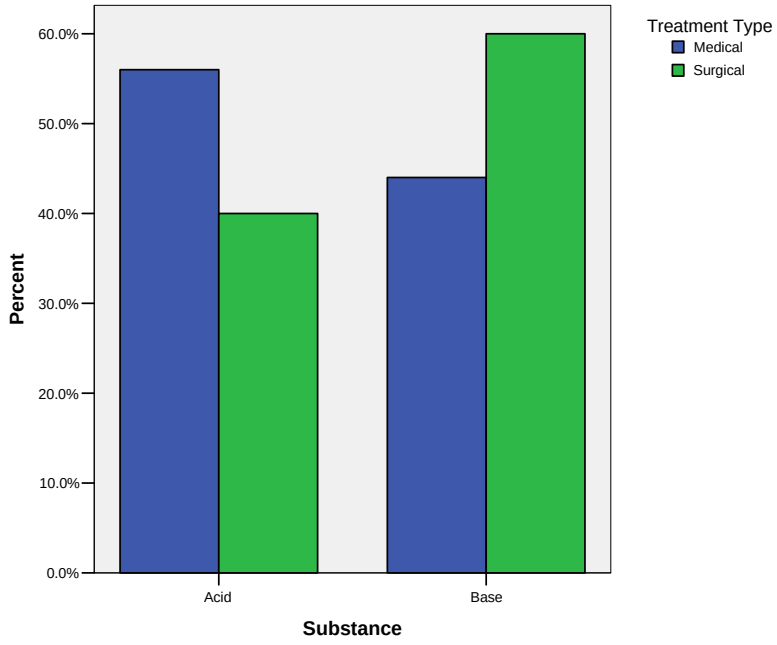
RESULTS

In this study, 50 patients with grade 2b burns of esophagus due to caustic ingestion were divided into two groups:

A for medical treatment (Patients who did not consent to surgery, freely and on the basis of personal basis, despite the recommendation for surgery) and B for surgical intervention (Patients who are satisfied with surgery). The average age in group A was 23.4±6 and in group B was 22.7±3.4. In group A, 36% were female and 64% were male and In group B, 32% were female and 68% were male, which did not have a significant difference (Chart 1).



In group A, 11 (44%) were damaged by alkali and 14 (56%) were damaged by acid. For group B, these results were 15 (60%) and 10 (40%) respectively, which did not have significant difference (Chart 2).



The frequencies of patients' re-admissions due to development of complications such as stricture, dysphagia, esophageal fistula, etc were almost the same during the treatment and did not differ significantly (Table 2).

Crosstab

			Admission Times				Total
			1.00	2.00	3.00	4.00	
Treatment Type	Medical	Count	6	11	6	2	25
		% within Treatment Type	24.0%	44.0%	24.0%	8.0%	100.0%
	Surgical	Count	5	12	5	3	25
		% within Treatment Type	20.0%	48.0%	20.0%	12.0%	100.0%
Total		Count	11	23	11	5	50
		% within Treatment Type	22.0%	46.0%	22.0%	10.0%	100.0%

In group A, who received medical treatment, there was one case of esophageal stricture, and In group B, treated with multiple dilation and surgical treatments, two cases of stricture were observed (Table 3).

Crosstab

			Stricture		
			Pos	Neg	Total
Treatment Type	Medical	Count	1	24	25
		% within Treatment Type	4.0%	96.0%	100.0%
	Surgical	Count	2	23	25
		% within Treatment Type	8.0%	92.0%	100.0%
Total		Count	3	47	50
		% within Treatment Type	6.0%	94.0%	100.0%

Dysphagia was one case in group A and four cases in group B (Table 4).

Crosstab

			Dysphagia		
			Pos	Neg	Total
Treatment Type	Medical	Count	1	24	25
		% within Treatment Type	4.0%	96.0%	100.0%
	Surgical	Count	4	21	25
		% within Treatment Type	16.0%	84.0%	100.0%
Total		Count	5	45	50
		% within Treatment Type	10.0%	90.0%	100.0%

In group A, there was a case of esophageal fistula in the trachea. In group B, leakage after reconstruction was observed in three cases (Table 5),

Crosstab

			Fistula		
			Pos	Neg	Total
Treatment Type	Medical	Count	1	24	25
		% within Treatment Type	4.0%	96.0%	100.0%
	Surgical	Count	3	22	25
		% within Treatment Type	12.0%	88.0%	100.0%
Total		Count	4	46	50
		% within Treatment Type	8.0%	92.0%	100.0%

and in this group, there were two cases of mortality and there was no mortality in group A (Table 6).

Crosstab

			Mortality		
			Pos	Neg	Total
Treatment Type	Medical	Count	0	25	25
		% within Treatment Type	.0%	100.0%	100.0%
	Surgical	Count	1	24	25
		% within Treatment Type	4.0%	96.0%	100.0%
Total		Count	1	49	50
		% within Treatment Type	2.0%	98.0%	100.0%

DISSCUSSION

In the evaluation of esophageal burn patients, apart from history and clinical examination, endoscopy can be used as a golden standard method, as well as CT scan and ABG (13-15). In a study in 2014, Haji Nasrollah et al. reported the sensitivity of endoscopy was 63% in the correct diagnosis of Grade II and 95% in Grade 3 (with pathologic confirmation after laparotomy).[13] Also, in the study of Bahrami et al. In 2017, CT scan results for classification of esophageal caustic injury were slightly similar to endoscopy (14). In the study of Haji Nasrallah et al., in 2015, ABG was confirmed as a reliable prognostic factor for patients with caustic injury, with a lower pH of 7.2 predicting the need for surgery and incidence of motility.[15]

In a study by chibishev et al., Published in 2012, different treatments for esophageal burns were studied and surgical treatment is recommended in case of high-grade burn or perforation. The benefit of treatment with corticosteroids and antibiotics is not conclusive in this study.[16]

Surgical options include esophagectomy followed by Gastric pull up, Colon Interposition during severe burn episodes or the insertion of an esophageal stent along with jejunostomy fidings. However, dilatation of Delayed stenosis of the esophagus is also performed as needed and the most commonly used method is using bougie.[12,17]

In a study by Peyvandi et al. In 2015, it has been concluded that the insertion of the esophagial stent, especially in Grade 2A, has greatly prevented the formation of tightness.[18]

In a study by Boukthir et al. In Tunisia, 26 patients with burns of esophagus were examined and supportive treatment was performed, it was observed that in Grade 2 burns supportive treatment were effective and could reduce stenosis in patients.[19] Compared to that, the results of the study by Mazigh et al. In Tunisia showed that this method was effective and the time and dosage used had no effect on the therapeutic outcomes, especially the stenosis.[20] Also, Mrad et al. in Tunisia, with a survey of 28 children with burns of esophagus, who received supportive treatment, showed that 46% of them had stenosis.[21]

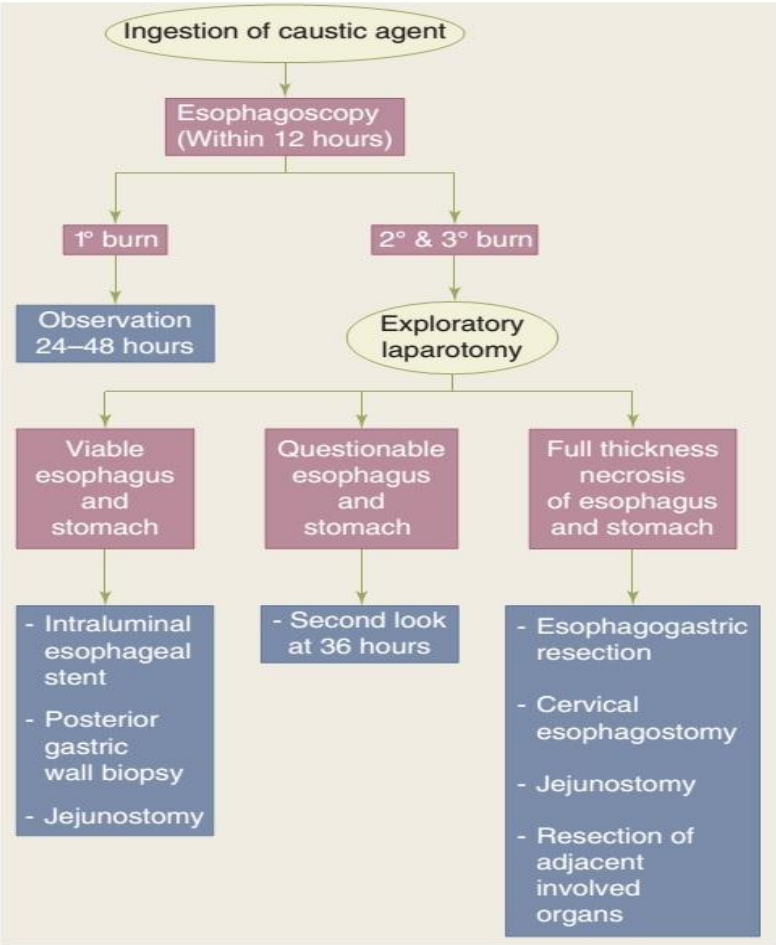


Figure 2: Algorithm summarizing the management of acute caustic injury. (Based on schwartz principles of surgery 10th edition)

According to the findings of this study, it is suggested that laparotomy is not recommended at least in classes 2a and 2b, but more studies are needed to confirm this. in these patients, in the absence of clear clinical evidence of mediastinitis or peritonitis, and only on the basis of endoscopic grading, medical treatment, serial follow up and paraclinical test should be done and Appropriate treatment should be done if any complications occur.

Given the fact that this is in contrast to the current algorithm (Figure 2), other studies are needed with more patients in order to prove its correctness.

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