Prise en charge et indications de la chirurgie d'urgences dans les brûlures caustiques graves de l'œsophage de l'adulte

Conservative versus Surgical Management of Severe Caustic Injuries of the Esophagus in Adults

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Mots clés

- Ingestion caustique
- Oesophagectomie en urgence
- Patch pulmonaire
- Pancréatico duodénectomie
- Endoscopie gastroduodénale
- Scanner

Résumé

Objectif : L'ingestion de caustiques avec ses complications vitales reste une question de santé publique, cependant trop peu rapportée. La conduite à tenir chez ces patients est mal définie et la littérature médicale courante sur les brûlures caustiques du segment initial du tube digestif manque de méthodologie prospective. L'incapacité de l'endoscopie pour mesurer avec précision la profondeur de la nécrose intrapariétale aboutit souvent à une chirurgie inappropriée. Bien plus, l'endoscopie d'urgence est inutile chez près de 30% des patients qui n'ont pas une lésion du tube digestif initial à la suite de l'ingestion d'agents détersifs ou corrosifs autres que des produits acides ou alcalins forts.
Méthodes : Une revue systématique de la littérature publiée entre 1990 et 2015 a été faite par un groupe d'experts de la World Society of Emergency Surgery. Le niveau d'évidence a été calculé selon les critères d'Oxford suivi d'une discussion étendue sur toutes les questions cliniques qui s'y rapportent, dans le but d'atteindre un consensus sur une conduite à tenir appropriée.
Résultats : Le scanner compense les insuffisances des algorithmes basés sur l'endoscopie; il est utile pour sélectionner les patients dont on peut préserver l'œsophage. Œsophagectomie trans hiatale avec préservation gastrique et gastrectomie totale avec œsophagojejunostomie peuvent être réalisées si la nécrose transmurale est limitée à l'œsophage ou à l'estomac respectivement. Une chirurgie étendue doit être réalisée en cas d'atteinte d'organes associés car les lésions caustiques progressent toujours. La nécrose trachéobronchique nécessite une œsophagectomie transthoracique et un patch pulmonaire. Les facteurs ayant un impact négatifs sur la survie concernent: l'œsophagectomie d'urgence - l'âge avancé- les lésions trachéobronchiques et la nécessité de résections étendues.
Conclusion : Les nouvelles recommandations ont un potentiel pour diminuer la nécessité d'une chirurgie d'urgence, pour augmenter le taux de préservation d'organes et pour améliorer la survie chez les patients qui ont des lésions caustiques aiguës du tube digestif initial.

Keywords

- Caustic ingestion
- Emergency esophagectomy
- Pulmonary patch
- Pancreaticoduodenectomy
- Upper gastrointestinal endoscopy
- CT scan

Abstract

Objective. Caustic ingestion along with its life-threatening complications remains a largely unreported public health issue. The work-up of these patients is poorly defined and current literature on foregut caustic injuries lacks prospective methodology. Inability of endoscopy to predict accurately the depth of intramural necrosis often results in inappropriate surgery. Moreover, emergency endoscopy is futile in up to 30% of patients who do not have injuries of the upper digestive tract following ingestion of bleach or corrosive agents other than strong acids or alkali.
Methods. A systematic review of the literature published between 1990 and 2015 was performed by expert panel members of the World Society of Emergency Surgery. The level of evidence was graded using the Oxford criteria, and extensive discussion of the relevant clinical questions followed with the aim to reach a consensus on appropriate management.
Results. Computed tomography compensate for the shortcomings of endoscopy-based algorithms and is useful to select patients for esophageal preservation. Transhiatal esophagectomy with gastric preservation and total gastrectomy with esophagojejunostomy can be performed if transmural necrosis is limited to the esophagus or the stomach, respectively. Extended surgery should be attempted in case of associated organ injuries as caustic lesions invariably progress. Tracheobronchial necrosis requires transthoracic esophagectomy and pulmonary patch. Factors with a negative impact on outcome include emergency esophagectomy, advanced age, tracheobronchial injuries, and the need for extended resections.
Conclusions. The novel recommendations have the potential to reduce the need of emergency surgery, increase the rate of organ preservation, and improve survival in patients with acute foregut caustic injuries.

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Accidental or intentional ingestion of corrosive substances is a largely under-reported public health issue. Primary prevention was first advocated in the United States with the Federal Caustic Act (1927) which mandated proper labeling of corrosive agents. Subsequent acts have enforced proper labeling, antidote instructions, concentration restrictions, and child-resistant packaging, leading to a decreased incidence and severity of caustic ingestions in the United States (1,2). The frequency of foregut caustic injuries is still high in countries where legislation is less restrictive or even absent, such as Africa, Turkey, India, Eastern Europe, and Southeast Asia (3). Adults in the fourth decade of life who have usually ingested strong corrosives with suicidal intent, account for about 20% of caustic ingestion cases (4).

The degree of injury is related to the volume, concentration, viscosity, and duration of exposure to the caustic agent. Liquid bleach, although often reported, does rarely cause severe injuries. Strong acids (pH<2) and alkali (pH<11), readily available as household cleaners, cause the most severe corrosive damage. Acids cause coagulation necrosis, whereas alkali cause liquefaction necrosis which penetrates deep into tissues and may lead to full-thickness damage of the esophageal/gastric wall and adjacent organs (5,6). Strong alkali cause the most severe injuries in Western Europe (7,8).

Injuries caused by caustic ingestion range in severity from mild oral burns to mucosal erythema or transmural necrosis of the esophagus and stomach with visceral perforation. Emergency surgery should only be indicated in patients with hemodynamic instability, free perforation, peritonitis, mediastinitis, and hemorrhage. Full-thickness esophagogastric necrosis is the most severe form of injury, generally due to ingestion of a large amount or highly concentrated corrosive substance, and is associated with high morbidity and mortality. The transmural extent of necrosis may also involve adjacent thoracic and abdominal structures (airways, aorta, pericardium, duodenum, small intestine, colon, gallbladder, and pancreas) (9-15).

Current therapeutic algorithms for the management of patients with acute caustic injuries rely on the findings of upper digestive endoscopy. Patients with severe endoscopic lesions (grade 3b, diffuse necrosis according to Zargar's classification) (16), are considered for surgical exploration, while patients with low grade injuries are generally offered non-operative treatment (17). Although the establishment of poison control centers and the improvement in intensive care and damage control surgery have improved the emergency management of these life-threatening injuries, the overall survival is poor and no consensus exists yet on the criteria for aggressive versus conservative surgery in these patients due to the lack of a reliable and reproducible therapeutic algorithm (18-25).

Methods

Two independent MEDLINE and EMBASE searches were performed to identify papers with full-text in English published between 1990 and 2015. The following medical subject headings terms were used in the searches: caustic ingestion, caustic lesions, corrosive injuries, esophagus, stomach, esophageal dilatation, gastric outlet obstruction. The search terms were identified in the title, abstract, or medical subject heading (26). The level of evidence for each recommendation statement was assigned by using the grading system proposed by the Oxford Centre for Evidence-Based Medicine (27). A preliminary manuscript was prepared by an international panel of 12 experts including anesthesiologists, endoscopists, surgeons, and toxicologists. The key recommendations and proposed management algorithms were discussed at a dedicated meeting held in Milan in April 2015, and at the 3rd Congress of the World Society of Emergency Surgery (WSES) held in Jerusalem in July 2015. Finally, evidence based guidelines for the management of foregut caustic injuries were developed to outline clinical recommendations. The final manuscript was reviewed and approved by all the authors and by the WSES council.

Results

Initially, 2143 abstracts of the retrieved studies were reviewed and screened for exclusion criteria. At the end of the search, 1113 abstracts that fulfilled the inclusion criteria were selected. Finally, 147 full papers which addressed the relevant clinical questions of the research were admitted to the consensus conference. Forty-four papers related to the initial therapeutic approach, including emergency surgery, were used as the basis for further discussion, drafting of key recommendations, and proposal of management algorithms. The main recommendations and clinical practice guidelines resulting from the final consensus conference were approved by the WSES council and are shown below. The level of evidence (LOE) for these recommendations based on the Oxford classification ranged from 3 to 5.

1. Establish the diagnosis of caustic agent ingestion by identifying the involved agent. pH testing may help in case the product is not identified (LOE 4-5).
2. Evaluate the ingestion scenario by ascertain ingestion, determine the intentional or unintentional mechanism, detect concomitant ingestion of alcohol/drugs, try to assess ingested volume and delay from ingestion (LOE 4-5).
3. Identify additional risk factors such as pregnancy, underlying disease, and the form of the ingested agent (solid, liquid, gel, vapors-concomitant aspiration) (LOE 5).
4. Focus on supportive care rather than specific antidotes. Secure airway patency and stabilize hemodynamics. Prevent vomiting and aspiration by intravenous metoclopramide, use seated 45° position during transport, avoid gastric lavage, induced emesis, and any diluent (water, milk) (LOE 5).
5. Avoid attempts at pH neutralization with either weak alkali or acid (LOE 5).
6. Provide adequate pain relief while waiting to evaluate the severity of injuries. If airway support is required, favor fiberoptic laryngoscopy over blind intubation; perform tracheotomy if necessary (LOE 5).
7. Laboratory tests should include WBC, hemoglobin, platelet count, CRP, pH, serum levels of electrolytes, urea, creatinin, LDH, CPK, AST, ALT, lactates, alcohol (LOE 5).
8. Contact Poison Control Center to evaluate systemic toxicity of the ingested agent (LOE 4-5).
9. Avoid nasogastric tube positioning (LOE 5).
10. The efficacy of proton-pump inhibitors and H2 blockers in minimizing esophageal injury has not been proven (LOE 5). The utility of corticosteroids for stricture prevention is controversial. Steroids should be reserved only for patients with airway symptoms (LOE 3).
11. Broad-spectrum antibiotics are advised in grade 3 injuries if corticosteroids are initiated or if lung involvement is identified (LOE 5).
12. Patients with clinical signs of peritonitis and hemodynamic instability require immediate surgical exploration. Symptoms such as chest pain, dysphagia, odynophagia, drooling, hemorrhage are usually associated with severe injuries after intentional ingestion; the absence of oropharyngeal damage does not exclude severe esophagogastric injuries (LOE 4).
13. Results of laboratory tests such as WBC, platelet count, CRP, pH, AST, ALT, creatinin, and lactate can help decision making in difficult situations (LOE 5).
14. Endoscopy should be performed within 6 hours after ingestion, and injuries should be graded according to the Zargar's classification. Patients with severe (grade 3b) esophagogastric injuries are considered for surgery while patients with low

grade injuries (≤ grade 3a) are offered non-operative treatment. Inability of endoscopy to predict accurately the depth of intramural necrosis may result in either futile surgery, with negative effects on survival, quality of life and costs, or in patient death due to inappropriate non operative treatment. Moreover, emergency endoscopy is futile in up to 30% of patients who do not have injuries of the upper digestive tract following ingestion of bleach or corrosive agents other than strong acids or alkali (LOE 4).
15. Computed tomography can compensate for the shortcomings of endoscopy based algorithms. The use of CT is helpful in selecting patients with grade 3b caustic injury who may need esophagectomy. CT has been shown to be superior to endoscopy in selecting patients for surgery or non-operative treatment, suggesting that CT may replace endoscopy in the management of caustic injuries. CT criteria of transmural esophageal necrosis include esophageal-wall blurring and periesophageal-fat blurring on unenhanced images, and absence of post-contrast esophageal-wall enhancement; transmural necrosis of the stomach is defined as the absence of post-contrast gastric-wall enhancement (LOE 3).
16. Emergency surgery is eventually required in a small number of patients with transmural necrosis to avoid involvement of adjacent organs. Laparotomy is usually performed but laparoscopic exploration has been reported as feasible and safe (LOE 4).
17. Transhiatal esophagectomy and total gastrectomy are the most frequently employed surgical procedures in the acute setting. Esophagectomy with gastric preservation and total gastrectomy with esophagojejunostomy can be performed if transmural necrosis is limited to the esophagus or the stomach, respectively (LOE 4).
18. Extended surgery (beyond esophagogastrectomy) should be attempted in case of injuries spread to adjacent abdominal organs. All severely injured organs should be resected during the first operation as caustic lesions invariably progress. Mortality rates are high, but surgery may be the only choice for these patients (LOE 4).
19. Feeding jejunostomy should be systematically constructed at the end of the operation, regardless of the type of surgical procedure performed (LOE 4).
20. Massive intestinal necrosis should be a reasonable limit to extensive surgery due to inability of later reconstruction and enteral nutrition (LOE 5).
21. If the patient's conditions allow, immediate biliary and pancreatic reconstruction could be attempted after pancreatoduodenectomy for caustic necrosis (LOE 5).
22. Transmural esophageal necrosis can lead to tracheobronchial involvement. Preoperative bronchoscopy should be performed in all patients considered for surgery. In the presence of tracheobronchial necrosis, esophagectomy combined with a pulmonary patch should be performed through a right thoracic approach (LOE 4).
23. Despite the high mortality rates, surgery may be only choice for these patients. Factors which have a negative impact on outcome include advanced age, tracheobronchial injuries, emergency esophagectomy, need for extended resections and severe alterations of laboratory tests (pH<7.2, AST>2N, renal failure, etc.) (LOE4).
24. The need to perform emergency surgery for caustic injuries has a persistent long-term negative impact both on survival and functional outcome. Moreover, esophageal resection is an independent negative predictor of survival after emergency surgery (LOE 4).
25. Caustic ingestion may induce systemic inflammatory response syndrome or sepsis. Negative nitrogen balance and weight loss are related to injury severity (LOE 3-4). Enteral nutrition should be provided as soon as possible. Patients with low grade injuries should resume oral alimentation as soon as they are able to swallow. In patients with severe injuries, enteral feeding through jejunostomy or nasojejunal tube is recommended rather than a gastrostomy due to the possibility of a hidden gastric outlet obstruction (LOE 5).

Discussion

The criteria for aggressive versus conservative surgery in patients with foregut caustic injuries are still widely debated due to the lack of a reliable and reproducible management algorithm. Until the year 2000, the scenario has been dominated by an endoscopy-based algorithm and by an early and aggressive surgical approach in patients with grade 3 lesions. The major limitation of endoscopy has been its inability to predict accurately the transmural extension of necrosis, which is the primary element driving the choice of the therapeutic approach. The WSES recommendations are based on expert opinions and extensive literature review including mainly retrospective studies with a low level of evidence. Unfortunately, the majority of published data lack homogeneous classification systems and prospective methodology.
Of special note is that the WSES has endorsed the usefulness and reproducibility of CT scan evaluation in the grading of acute foregut caustic injuries. The new combined endoscopy-CT scan decision-making algorithm, which allows to avoid endoscopy in selected patients and to increase the rate of esophageal preservation, has the potential to improve long-term patients outcome and quality of life (28). Limitations in the use of CT may be renal failure and contrast agent allergy. An esophagectomy may be planned at a later stage to prevent mucocele and cancer of the excluded esophagus in survivors who require reconstruction of the alimentary tract (29).
Another important message is the need for close multidisciplinary cooperation and the adoption of standard management algorithms in the management of foregut caustic injuries. Interestingly, a recent WSES survey found that 80% of the responders to a questionnaire treat fewer than 10 cases of caustic ingestion per year, <60% use Zargar's classification, 72% use a nasogastric tube, and only 29% perform CT scan (30), indicating the utility to apply and share clinical practice guidelines to improve patients' care worldwide.

Conclusion

On the light of this consensus conference, the World Society of Emergency Surgery will be promoting a World Registry of foregut caustic injuries (www.clinicalregisters.org). This could be useful to collect a homogeneous data-base for prospective clinical studies that may help improving the current clinical practice guidelines.

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