Oesophagectomy for severe corrosive injuries: is it always legitimate?

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Abstract. Twenty total gastric resections were performed on 80 patients admitted to surgery for severe oesophago-gastric corrosive injuries, with immediate or delayed full thickness necrosis or perforation of the stomach. The duodenum, cardia and cervicothoracic oesophagus were sutured. A cervical oesophagostomy and a feeding jejunostomy were done. The oesophagus was thus excluded. All the corrosive agents were liquid. The ingested quantities were higher than 150 ml in 11 cases. Oesophagoscopy was performed in 12 patients: 4 lesions were stage III, 5 stage II, 2 stage I, while in 1 the mucosa appeared normal. Five patients died, but only 1 from an oesophageal complication. The formation of a mucocele in the excluded oesophagus is a rare event. We suggest that the low incidence of oesophageal complications in our series and the possible formation of a mucocele in the excluded oesophagus are arguments for a conservative attitude towards the oesophagus in most cases of emergency gastric surgery for corrosive lesions. Immediate oesophagostomy adds another traumatic factor to the effects of the burns. A subsequent oesophagectomy should be contemplated during coloplasty to prevent the formation of a mucocele.

Key words: Oesophagus Corrosive injuries Oesophagotomy – Oesophageal exclusion – Oesophageal mucocele

When ingestion of caustic agents provokes immediate or delayed full-thickness injury and perforation of the stomach, total gastric resection is a life-saving procedure. What is to be done with the oesophagus is not well established, as gastric and oesophageal corrosive burns may be different in depth in the same patient: resection, exclusion or a primary anastomosis? The purpose of this work is to give the results of oesophageal exclusion.

Material and methods

In a group of 80 patients treated for severe corrosive oesophago-gastric burns in attempted suicide, total gastrectomy had to be performed in 20 cases.

All of the corrosive agents were liquid. The ingested quantities were greater than 150 ml in 11 patients, less than 150 ml in 5 patients and unknown in 4. The agent was acid in 6 cases, alkaline in 7, bleach in 6 and formaldehyde in 1. The acids were hydrochloric and sulphuric, but their concentration could never be accurately determined. The bases were products used to clean drain pipes or ovens and they contained caustic soda, ammonia, detergent and wetting agents. No patient had to be operated on as an emergency after ingestion of plain caustic soda.

The clinical findings were as follows: chest and abdominal pain (14 cases), abdominal tenderness (13), vomiting (7), acidosis (6), shock (5), pneumoperitoneum (4), respiratory distress (3), confusion (1), renal insufficiency (1) and blood coagulation disorders (1).

Oesophagotomy was performed in 12 patients: the mucosa appeared normal in 1 case (formaldehyde), 2 lesions were grade I, 5 were grade II, and 4 were grade III.

An oesophagogram using a water-soluble contrast medium was performed in 11 patients: the oesophagus looked normal radiographically in 5 cases where it appeared ulcerated at endoscopy. The oesophagogram showed grade I mucosal abnormalities in the others (Table 1).

Total gastrectomy was performed within 24 h in 12 patients: 5 had ingested an acid (2 > 150 ml, 2 < 150 ml, 1 unknown quantity), 4 had ingested a base (1 > 150 ml, 1 < 150 ml, 2 unknown quantities), 2 had ingested bleach (> 150 ml) and 1 had ingested formaldehyde (< 150 ml).

Total gastrectomy was performed between post-injury days 1 and 20 in 8 patients: 1 had ingested an acid (< 150 ml), 3 had ingested a base (2 > 150 ml, 1 unknown quantity) and 4 had ingested bleach (> 150 ml).

At the time of total gastrectomy the duodenum, cardia and cervicothoracic oesophagus were hand-sutured. An end-cervical oesophagostomy was performed on the left side of the neck. The jejunostomy was performed using Witzel’s technique. The abdomen was drained and a suction drain was placed into the mediastinum through a cervical incision and removed after 3–4 days.

Histological examination of the resected specimens showed the depth of the gastric corrosive lesions, away from the zones of complete necrosis or perforation, to involve the mucosa in 2 cases, the muscularis mucosae in 4 cases, the submucosa in 4 cases, the muscular wall in 5 cases and the serosa in 5 cases (Fig. 1).
Table 1. Classification of endoscopic and radiological grades

<table>
<thead>
<tr>
<th>Endoscopy</th>
<th>Radiology</th>
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<tbody>
<tr>
<td>Oesophagus &amp; stomach</td>
<td>Oesophagus &amp; stomach</td>
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<tr>
<td>I. Hyperaemia</td>
<td>Thick mucosal folds</td>
</tr>
<tr>
<td>II. Ulceration</td>
<td>Mucosal irregularities</td>
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<tr>
<td>Limited necrosis</td>
<td>Ulceration</td>
</tr>
<tr>
<td>Limited hemorrhage</td>
<td>Thickening of left pleural para-oesophageal border</td>
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<tr>
<td>Atony of lower oesophagus</td>
<td>Atony and wide pylorus</td>
</tr>
<tr>
<td>III. Wide necrosis</td>
<td>Mediastinal emphysema</td>
</tr>
<tr>
<td>Substantial hemorrhage</td>
<td>Leak</td>
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<td>Leak</td>
<td>Pneumoperitoneum</td>
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Fig. 1. Numbers on the **left** grade the depth of the burns of the stomach outside the perforations and necrotic areas. Numbers on the **right** show the numbers of cases relative to the depth of burn

Results

Five of the 20 patients died in the post-operative period, from multiple small bowel perforation day 9, from peritonitis day 18, from systemic sepsis days 2 and 18, and from a tracheo-oesophageal fistula day 33.

Of the 15 survivors, 14 had a second-stage retrosternal colon interposition bypassing the excluded oesophagus. The last patient is still waiting for surgery. Among the patients who underwent re-establishment of alimentary tract continuity there were 4 late deaths in the follow-up period: 1 patient died from an unknown cause at 6 months, 1 from pharyngo-oesophageal dysphagia associated with mental disorders at 1 year, 1 from complications of an oesophageal mucocele at 4 years and 1 from a bowel obstruction at 5 years. Ten are alive with a mean follow-up of 7.6 years. Four patients were found to have a nonsymptomatic oesophageal mucocele. One had a regressive mucocele. In 4 patients no mucocele was found. One patient could not be followed up.

Discussion

It has been observed that corrosive burns of the digestive tract are present with equal frequency and severity above and below the diaphragm after ingestion of caustic material [1-3, 5]. When necrosis is present in the abdomen, conservative surgery often leads to failure [6]; total gastric resection is almost always necessary [4]. If the burns extend to the bowel and pancreas, extended resections with delayed sutures and with stomies offer the only chance of cure [11]. There is general agreement on that matter. What is to be done with the oesophagus is much more debatable:

1. Oesophago-jejunal anastomosis may be attempted and has been performed with success in a minority of cases [1, 2, 6].
2. The oesophagus and duodenum can be sutured over drains [3].
3. The oesophagus can be closed at both ends and excluded [17].

It may be resected [13]. Usually, it is advisable to postpone its reconstruction to a second stage [12].

Immediate anastomosis is considered in selected cases where stage III (total necrosis) burns of the stomach are present together with stage II (ulcerations) or I (hyperaemia) lesions of the oesophagus and when the lower oesophagus retains an intact wall which bleeds when cut. In this case the danger of anastomotic leak seems to be small. Suture-drainage can provoke long-lasting and dangerous suppuration. Oesophageal exclusion has been accused of facilitating mediastinal abscess and tracheal necrosis [18], it can also produce a subsequent mucocele, as we observed.

Resection, while possibly being unnecessary, may provoke a tear in the membranous part of the trachea. Closed stripping or blunt dissection of the oesophagus has been advocated to stop extensive necrosis of the oesophagus reaching the trachea. However, the mortality after oesophageal resection remains high [7-9], especially when surgery is performed more than 12 h after the accident. Those who resect the oesophagus as a preventive measure also state that if endoscopy discloses necrosis of the oesophagus, one should not perform oesophageal resection.

In our series the patients who died from infection on day 2 and day 18 had an oesophagus which appeared normal in one case and showed a stage I lesion in the other. The patient who died from multiple bowel perforations on day 9 had no endoscopy but oesophageal disease was not the cause of death. The patient who died of peritonitis on day 18 had a stage I oesophageal injury. The oesophago-tracheal fistula occurring on day 33 had been associated with a stage III lesion; late bronchoscopy showed total abrasion of the respiratory mucosa and
this was the only case where we regret not having performed oesophagectomy. Among the survivors there were 4 patients with endoscopic stage II and 2 with stage III lesions.

Two patients underwent emergency bronchoscopy because of respiratory disorders associated with stage III oesophageal burns: 1 of them had a white area on the posterior surface of the trachea and left bronchus. I had no lesion. Both survived with their oesophagus left in place and we could follow the healing of the tracheal lesion. The patient who died from oesophago-tracheal fistula with persisting fever had evidence of scarring at endoscopy.

Thus, in our experience, the excluded oesophagus did not invite immediate danger. However, 1 patient died from a compressive mucocele at 4 years and 5 asymptomatic mucoceles were discovered on chest films and computed tomography scans. Three of those patients had oesophageal burns: 1 of them had a white area on the posterior surface of the trachea and left bronchus. I had no lesion. Both survived with their oesophagus left in place and we could follow the healing of the tracheal lesion. The patient who died from oesophago-tracheal fistula with persisting fever had evidence of scarring at endoscopy.

Thus, in our experience, the excluded oesophagus did not invite immediate danger. However, 1 patient died from a compressive mucocele at 4 years and 5 asymptomatic mucoceles were discovered on chest films and computed tomography scans. Three of those patients had stage II oesophageal burns and 1 stage III, while 2 had no endoscopy. It is interesting to note that stage II or even III injuries of the oesophagus can produce a secondary mucocele, which serves as retrospective proof that emergency oesophagography may be inaccurate for staging [15], or that stage II or III burns may not completely destroy the mucosa and therefore do not constitute an immediate threat to the mediastinum and trachea.

Mucocele formation is less frequent when late exclusion and bypass for undilatable stricture are performed: in 16 patients with no immediate surgery and with subsequently excluded oesophagus and coloplasty we observed only 2 mucoceles.

Thus, the immediate exclusion and retention of a burned oesophagus may present a late threat of compression or infection if not of malignancy [10, 14], and secondary resection could be contemplated during subsequent coloplasty or if a growing mucocele appears later.

Conclusion

In our experience immediate oesophageal resection may be avoided in most cases of corrosive injuries with total necrosis of the stomach necessitating total gastric resection. Oesophageal exclusion, however, exposes the patient to late development of an oesophageal mucocele.

References


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Discussion

Dr. A. Foote (Aberdeen, UK). I am interested in this paper since we had a recent case. I would like to know what was done in the emergency treatment of these patients to try to limit the amount of burning. Was there any emergency cleaning or giving of milk or something like that to keep the burning to a minimum? One little comment: I am amazed that you were able to persuade people who wanted to commit suicide to have all these operations.

Dr. Ribet: We do not give anything to drink to those patients, as we feel it may be dangerous, especially in acid ingestion, because they may have an immediate perforation. We feel that lavage of the stomach has only one indication, and that is potassium permanganate. But we restrain from giving anything.

You asked how we are able to operate on these patients who have tried to commit suicide. Well, they suffer so much, that they will accept everything. Also, they are in a state of shock, most of them, and not quite ready to discuss. And, as you know, when people have tried to commit suicide, whatever the method of suicide, most of them become sorry they did it. They may do it again later on, but just after they did it, usually they are not very happy with themselves and they are quite ready for help. Because after all, if they committed suicide, it is probable that they need help.

Dr. J. Vogt-Moykopf (Heidelberg, FRG). Which technique do you employ to exclude the oesophagus? Do you use staplers?

Dr. M. Ribet (Lille, France). Hand sutures in the cardia and the neck. We don't use clips. We suture, with separate stitches, as high as possible in the cardia, as low as possible in the neck. But the point I want to make is that it is impossible to know what exactly is the state of the mucosa: we thought in some cases that the mucosa was completely destroyed and then we had a mucocele 4 years later. So I don't think we should resect the oesophagus systematically like some people said one should do, because I think that's an added trauma with no purpose. Really, perforation extending to the mediastinum and trachea is observed in only a minority of cases: 1 out of our 20 patients.