Management of intrathoracic oesophageal perforation: analysis of 16 cases

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SUMMARY Intrathoracic oesophageal perforation remains a life-threatening lesion that requires early diagnosis and the appropriate intervention in order to reduce morbidity and mortality. Management depends largely on the cause of the perforation, the integrity of the oesophagus and the time lapse between the perforation and the commencement of treatment. Our aim was to evaluate the management options that were employed in the treatment of patients with oesophageal perforation and the outcome. The records of 16 patients (11 males and 5 females) who had been operated on from 1994–2009 were retrospectively reviewed. Their ages ranged between 2–66 years (mean 36.4). Malignant oesophageal perforations were excluded from the study. The aetiology was iatrogenic in 10 (62.5%), foreign bodies five (31.2%) and spontaneous one (6.2%). Six patients (37.5%) presented within 24 h of their injury and 10 (62.5%) presented after 24 h. Thoracotomy and intrathoracic primary repair was possible in five (31.2%) cases. Oesophagegectomy, cervical oesophageostomy and feeding gastrostomy were carried out in 11 (68.8%). Oesophageal substitution was by colon, routed retrosternally. One patient (6.2%) died after oesophagegectomy from overwhelming sepsis. Oesophageal perforation is a life-threatening condition. Early diagnosis and the institution of prompt and appropriate treatment ensure good outcome.

Introduction Perforation of the oesophagus remains the most devastating disease of the gastrointestinal tract. The high morbidity and mortality associated with delay in diagnosis and the institution of appropriate treatment continues to affect the outcome in many centres.

The most well-known case of perforation of the oesophagus was first described in 1724 by Dr Herman Boerhaave. Several causes of oesophageal perforation have been documented and, currently, the major cause is iatrogenic and caused mostly by oesophageal instrumentation. This can occur in a normal or diseased oesophagus. These perforations may affect the cervical, thoracic and the abdominal oesophagus. Delay in diagnosis, which frequently occurs in intrathoracic perforations, gravely affects prognosis in these patients. Once a perforation occurs, saliva retained gastric contents, bile and acid enter the mediastinum resulting in mediastinitis, pneumomediastinum and pleural collections. The negative intrathoracic pressure aids the extravasation of gastric contents and saliva into the mediastinum and the pleural space. Mediastinitis must be considered the most dangerous complication of thoracic oesophageal perforation and without therapy it leads to death in over 50% of patients. The import of this study is to evaluate the management, management strategies and outcome in terms of morbidity and mortality. Malignant perforations were excluded from the study.

Patients and methods

The records of 16 patients who were treated in our facility from 1994–2009 with intrathoracic oesophageal perforations were reviewed retrospectively. The case notes were reviewed focusing on the interval between oesophageal injury and management, management strategies and outcome in terms of morbidity and mortality. Malignant perforations were excluded from the study.

Results Of the 16 patients, 11 were males and five were females. The mean age was 36.4 (range 2–66 years). The aetiology was iatrogenic in 10 (62.5%), foreign bodies five (31.2%) and spontaneous one (6.2%). Six patients presented within 24 h of their injury and 10 (62.5%) presented after 24 h. Thoracotomy and intrathoracic primary repair was possible in five (31.2%) cases. Oesophagegectomy, cervical oesophageostomy and feeding gastrostomy were carried out in 11 (68.8%). Oesophageal substitution was by colon, routed retrosternally. One patient died after oesophagegectomy from overwhelming sepsis. Oesophageal perforation is a life-threatening condition. Early diagnosis and the institution of prompt and appropriate treatment ensure good outcome.

Treatment Of the six patients who presented less than 24 h before surgery, three with a normal oesophagus benefited from primary repair with a right thoracotomy. The remaining three had concomitant oesophageal stricture. An open oesophagegectomy was performed for these patients with cervical oesophageostomy and a feeding gastrostomy. This procedure was also carried out in six patients who presented more than 24 h after the injury. Oesophageal substitution with a left colon pedicled on the left colic artery was possible...
after 3–6 months. The retrosternal route was used in all cases. The patient who presented with spontaneous perforation was diagnosed after 28 days but had successful primary closure with reinforcement. Two other patients who presented more than 24 h after the injury also benefited from primary closure.

**Mortality**

One (6.2%) patient died seven days after oesophagectomy from overwhelming sepsis. He presented after two days of perforation which occurred after a chest tube insertion. There was severe mediastinitis with extensive necrosis of the oesophagus. He was the oldest (66 years) among the patients studied.

**Discussion**

Thoracic oesophageal perforation regardless of the cause remains a devastating disease of the gastrointestinal tract. In this study, the aetiology of oesophageal perforation was predominantly iatrogenic accounting for up to 62.5% of cases. A further 31.5% were attributable to foreign bodies and 6.2% from spontaneous perforation. The predominance of iatrogenic causes and foreign bodies are similar to those reported in several studies. Iatrogenic perforations have become more common as a result of the increased oesophageal instrumentation. There have been rapid increases in the use of upper gastrointestinal endoscopies in recent times for the diagnosis and treatment of oesophageal diseases. In this study rigid oesophagoscopy alone was the cause of perforations in nine out of the 10 patients who presented with iatrogenic oesophageal perforations. Our hospital is the main referral centre for oesophageal perforations and no patient was referred following flexible diagnostic endoscopic procedures. About 1500 flexible diagnostic endoscopies are performed every year in our teaching hospital alone but there has been no record of oesophageal perforation during the period of this study. In a study by Fenandez et al., diagnostic endoscopy accounted for 2.7% of iatrogenic perforations.

The diagnosis of intrathoracic oesophageal perforation can be difficult because clinical findings are not pathognomonic and often may mimic other disorders. A high index of suspicion is, therefore, imperative. The prognosis of an intrathoracic oesophageal perforation largely depends on early diagnosis and management. Once a perforation occurs, retained gastric contents, bile, saliva and other substances may enter the mediastinum causing mediastinitis. The degree of mediastinal contamination determines the clinical presentation. Within a few hours, a polymicrobial invasion of bacteria supervenes which can lead to sepsis and eventual death if the patient is not treated. The time factor is of critical importance in the management of the perforation of the oesophagus and must be taken into account when deciding on various treatment options.

The success of primary repair within the first 24 h of oesophageal perforation is evidenced in several studies. From our results 50% of patients who presented within the first 24 h benefited from primary repair with excellent results. The other 50% had concomitant diseased oesophagus necessitating oesophagectomy since repair was not ideal. Eighty percent of patients who presented after 24 h did not benefit from primary repair due to extensive necrosis and oedema. The remaining 20% who presented 24 h after perforation had thoracotomy and debridement. Primary closure and re-enforcement was possible in these patients. The delay in diagnosis and treatment leads to tissue oedema and necrosis and prevents the successful primary repair but in some selected cases with limited tissue oedema and necrosis, primary repair yielded satisfactory results regardless of the time from injury to repair.

This highlights the individualization of the method of therapy to each patient. Intraoperative evaluation of the oesophagus and the area of perforation helped in the choice of the appropriate procedure for each patient.

In this review, primary oesophagectomy was not employed in patients who presented after 24 h of oesophageal perforation with extensive oedema and necrosis and also in patients with perforations after dilatation of corrosive oesophageal stricture even though the perforation at presentation had occurred within 24 h. Hrbarty et al. in their article have supported the choice of this method with better chances to save the patient in the case of delayed diagnosis of oesophageal perforation. We elect to perform oesophagectomy in the presence of concomitant obstructive disease irrespective of the time at presentation. A primary repair, even if successful, still leaves a diseased oesophagus that necessarily has to be dilated again in the future with a greater danger of perforation. In a review article by Michel et al. it was suggested that resection of perforated oesophagus and the original lesion is better than primary repair and drainage.

Colon was used as an oesophageal substitute in all the cases after three months in patients who benefited from primary oesophagectomy. This procedure is similar to other studies and some have also used jejunal substitutes. In some instances, after primary oesophagectomy the stomach was used as an immediate substitute.

The management of oesophageal perforation is still controversial in spite of recent advances made in thoracic surgery. Currently, there appears to be a shift from an early aggressive operative intervention to a prudent non-operative management of selected cases of oesophageal perforation. In this category of patients, careful monitoring should be observed and if the condition of the patient deteriorates, prompt surgical intervention is instituted. The principle involved in the management of oesophageal disease shows clearly that it is a surgical disease. Non-operative management is effective when infection is controlled and the extravasation from the oesophageal lumen is limited to the wall or contained within the mediastinum and drains back into the oesophageal lumen. The use of drainage alone with antibiotics and total parenteral nutrition, whether diagnosed early or late, reported in a study by Skinner et al. cannot be advocated as a safe or effective method for the treatment of this condition. However, Cameron et al. introduced the criteria for considering non-operative management after successfully managing eight cases.

These include the following: disruption contained in the mediastinum or between the mediastinum and visceral lung pleura; drainage of the cavity back into the oesophagus; minimal symptoms; and minimal signs of clinical sepsis. Altojay et al. also suggested a similar criteria for selection of non operative cases. Vogel et al. recommended aggressive conservative management of oesophageal perforation and, in their series, the mean duration of hospitalization was 41 days and prolonged chest drainage and antibiotics were used. Cases of oesophageal perforations that are unsuitable for non-operative management tend to
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Conclusion
We are fortunate that in our study mortality is low compared with other series. Oesophageal perforation remains a life-threatening condition and early diagnosis and the institution of appropriate management is the key to a better outcome. However, the choice of the appropriate management still remains controversial. We concur with the fact that oesophageal perforation is a surgical disease and only a few cases may qualify to be managed non-operatively.

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