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# Spontaneous Rupture of the Esophagus – Boerhaave's Syndrome

**Conflict of interest:** nothing to declare.
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**Abstract**

**Introduction.** Spontaneous rupture of the esophagus is a complex and difficult to diagnose pathology that requires early surgical intervention to avoid the development of possible serious complications.
**Purpose.** To study the possibilities of early diagnosis and choice of method of surgical treatment of spontaneous rupture of the esophagus, complicated by purulent mediastinitis and pleuritis.
**Materials and methods.** We observed 6 patients with spontaneous esophageal rupture complicated by mediastinitis and pleuritis. The diagnosis was established on the basis of a comprehensive anamnestic, radiological, computed tomographic and endoscopic examination.
**Results.** 1 patient refused surgery. Surgical treatment was performed in 5 patients, 4 of whom recovered, 1 patient died.
**Conclusion.** Spontaneous rupture of the esophagus is a rare pathology, which without the necessary early diagnosis and timely surgical treatment leads to serious complications, with inevitable death.
**Keywords:** rupture of the esophagus, mediastinitis, pleuritis, diagnosis, surgical treatment

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# Спонтанный разрыв пищевода – синдром Бурхаве

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**Резюме**

**Введение.** Спонтанный разрыв пищевода является сложной и трудно диагностируемой патологией, требующей раннего хирургического вмешательства для предотвращения развития возможных грозных осложнений.
**Цель.** Изучить возможности ранней диагностики и выбора метода хирургического лечения спонтанного разрыва пищевода, осложненного гнойным медиастинитом и плевритом.
**Материалы и методы.** Проведено наблюдение за 6 пациентами со спонтанным разрывом пищевода, осложненным медиастинитом и плевритом. Диагноз установлен на основании комплексного анамнестического, рентгенологического, компьютерно-томографического и эндоскопического исследований.
**Результаты.** Один пациент отказался от операции. Оперативное лечение выполнено 5 пациентам, 4 из которых выздоровели, 1 – умер.
**Заключение.** Спонтанный разрыв пищевода является редкой патологией, которая без необходимой ранней диагностики и своевременного хирургического лечения приводит к грозным осложнениям с неминуемым летальным исходом.
**Ключевые слова:** разрыв пищевода, медиастинит, плеврит, диагностика, хирургическое лечение

## ■ INTRODUCTION

Loss of integrity of wall of the esophagus because of various causes (penetration from inside by foreign bodies, iatrogenic injury, stab and gunshot wounds) results in leakage of its content to the posterior mediastinum and severe septic complications. One of the causes of these complications is a rare condition of spontaneous rupture of the esophagus, which early diagnosis is quite challenging.

The rare transverse spontaneous (without any injury) rupture of the esophagus after copious consumption of food, alcoholic and other beverages was first described by Herman Boerhaave, a physician from the Netherlands, in 1724. This pathological condition was later named after him as "Boerhaave's syndrome". The term "spontaneous rupture" is probably not correct, once wall of the esophagus is not ruptured itself, but because of

significant increase of intraluminal pressure. In 1778 A.E. Dryden reported a longitudinal rupture of esophageal wall, which was relatively more common than the transverse one. The described above cases of spontaneous rupture of wall of the esophagus were all found at autopsy only.

First clinical diagnosis of spontaneous rupture of wall of the esophagus in a living patient was done by K. Myers in 1858. In 1947 N. Fink reported about survived patient with spontaneous rupture of the esophagus after drainage of pleural cavity. These rare cases built a ground for comprehensive study of spontaneous rupture of the esophagus [2, 3]. The following mechanism of spontaneous rupture of the esophagus was specified by experimental and clinical studies: after consumption of large amounts of food, alcoholic drinks, and other beverages a sudden vomiting happens at a time when the function of contractor muscles of gastroesophageal (open) and esophago-pharyngeal (closed) junctions is discoordinated, resulting in reflux of large volume gastric content to esophagus, significant increase of intraluminal pressure, and rupture of muscles of esophageal wall in its weakest place which is the lower thoracic part [1, 5, 7]. Carrot P.V., Low D.E. (2011) reports that differently from other injuries, the spontaneous rupture of wall of the esophagus is usually 4–6 cm length, and occurs at points of entry of vessels and nerves into the wall with relation to weakness of circular muscle fibers in those points.

Some chronic conditions like hiatal hernia, esophagitis, gastritis, and esophageal varices are the background for spontaneous rupture [9].

The rarity of spontaneous rupture of the esophagus, lack of experience and information on this disease in healthcare workers make its early diagnosis challenging, bringing to severe complications and poor outcomes. Delayed hospitalization, diagnosis and treatment result in 25–85% postoperative mortality [8].

Spontaneous rupture of the esophagus is clinically presented by vomiting, chest pain, especially between the shoulder blades, and subcutaneous emphysema in chest and neck. Diagnosis is specified according to clinical signs, contrast X-ray, CT scan and endoscopic investigations. The radical treatment of spontaneous rupture of the esophagus is surgery. The ways of surgical management: suturing of esophageal wall, reinforcement of the suture line by different methods, resection of esophagus is a subject for discussion.

## ■ PURPOSE OF THE STUDY

To study the possibilities of early diagnosis and choice of method of surgical treatment of spontaneous rupture of the esophagus, complicated by purulent mediastinitis and pleuritis.

## ■ MATERIALS AND METHODS

We had 6 patients aged 45–65 (2 females and 4 males) with Boerhaave's syndrome under our control. Leakage of contrast medium out of esophagus to posterior mediastinum and pleural cavity (in 2 patients to the right side, and in 4 patients to the left side) was found at X-ray. Collection of air in posterior mediastinum in tissues around esophagus was detected in the early period at CT scan. Enlargement of borders of mediastinum, accumulation of air, tension of pleural sheets, hydrothorax, collapse of lung, and collection of oral contrast medium in posterior mediastinum and pleural cavity few days after rupture confirms the rupture, its level and spread of the inflammatory process.

Endoscopic investigation revealed 2–8 cm length longitudinal ruptures in the middle (2 patients) and lower (4 patients) parts of the esophagus. After the diagnosis has been confirmed 5 patients underwent urgent surgery. After thoracotomy and removal of pathologic content of the pleural cavity, the inflamed mediastinal pleura was longitudinally cut, and rupture wound of the esophagus was visually evaluated according to its condition and size, followed by single layer suturing of the wound in 4 patients. The surgery was completed by pleural lavage and drainage of the anterior and posterior mediastinum by large bore tubes. One patient admitted to hospital 7 days after the onset of the disease in severe general condition and scleral icterus. At surgery a necrosis of wall of the esophagus around rupture was found, and resection of thoracic part of the esophagus, esophagostomy and gastrostomy applied. The patient died 3 days later because of severe sepsis and multiorgan failure. Another patient refused from surgery, got only conservative treatment, and died after 20 days. The overall mortality was 33%.

4 patients recovered after surgery and were followed-up by us. Here is an example of clinical records of one of these patients.

M., 55-year-old male patient, admitted to the Scientific Surgical Center named after M.A. Topchubashov on 08.06.2012 with complaints on chest pain, dyspnea, and dry mouth. According to patient's information he was sick for 2 days. The disease started from eating too much food and drinking a lot of alcohol, followed by nausea and vomiting. During the vomiting he felt sudden pain between the shoulder blades. In the next 2 days the general condition of the patient significantly deteriorated: body temperature raised to 39 °C, dyspnea and weakness progressed. At admission to hospital the general condition of the patient was evaluated as very severe. The skin was pale, tongue dry and covered with fur, air exhaled at respiration was foul-smelling. Diminished respiratory sounds were heard over the left half of chest at auscultation, dullness below left scapula at percussion, blood pressure 100 mmHg, and pulse rate 110 beats per minute.

At X-ray investigation a leakage of oral contrast medium to posterior mediastinum and left pleural cavity from 2 cm size defect in lower thoracic part of the esophagus as well as free air, edema, and inflammatory induration of tissues of mediastinum were found (Fig. 1). At CT scan a significant enlargement of borders of mediastinum, accumulation of gas, leakage of oral contrast medium to posterior mediastinum and left pleural cavity, hydrothorax and collapse of inferior lobe of lung were detected.

At endoscopic investigation 15–20 mm length rupture of anterior wall of lower thoracic part of the esophagus was found.

According to patient's anamnesis, X-ray, CT and endoscopic investigations the diagnosis of spontaneous rupture of the esophagus – Boerhaave's syndrome, mediastinitis, and left side pneumopleuritis was confirmed, being an indication to urgent surgical operation.

**Surgical Intervention**

On 09.06.2012 a left antero-lateral thoracotomy through V intercostal space was done. Up to 400 ml of serous turbid foul-smelling fluid was found in the pleural cavity and aspirated. At following inspection 3 cm length defect of posterior mediastinal pleura with necrotized edges was visualized. Thickened pleura sheet was longitudinally cut, and 2 cm length longitudinal rupture of anterior wall of lower thoracic part of the esophagus was found. Approximation sutures with 3/0 vicryl were applied to the rupture wound. Lavage of mediastinum and pleura with antiseptics, and their drainage completed the surgery.

A feeding nasogastric tube was inserted to stomach. Intensive treatment, pleural lavage with antiseptics, and tube feeding were applied in the postoperative period. General condition of the patient gradually improved, signs of mediastinitis, pleuritis, and sepsis diminished, and patient recovered.

At control X-ray 2 months after surgery contrast medium did not leak out of the esophagus, passing swiftly to the stomach (Fig. 2). At 8-year follow-up the patient did well, having no complaints.

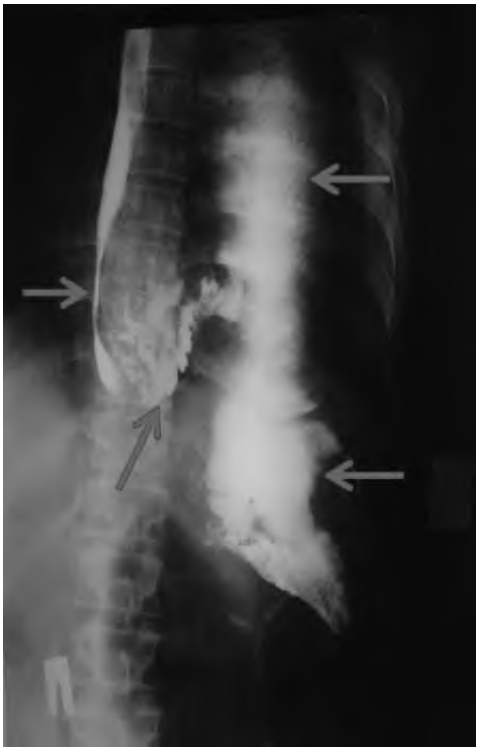

**Fig. 1. Radiogram. Contrast medium leaks out of the esophagus to mediastinum and left pleural cavity**

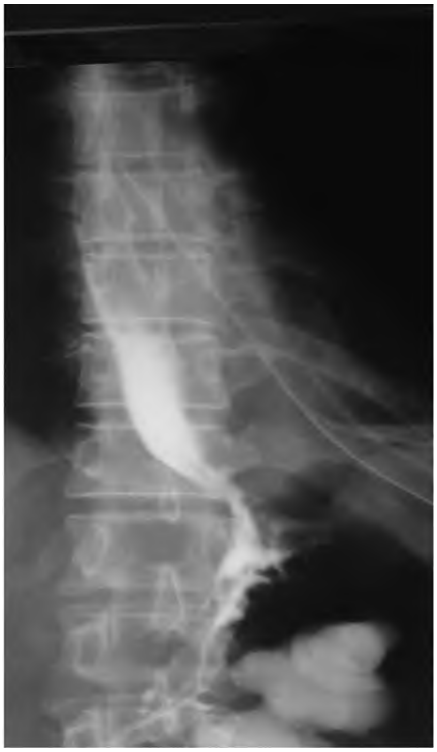

**Fig. 2. Radiogram. 2 months after surgery contrast medium does not leak ot of the esophagus**

The presented experience states that after consumption of large amounts of food and alcoholic beverages a vomiting happening at the moment of discoordination of function of contractor muscles of the esophagus may result in excessively high intraluminal pressure and rupture of wall of the esophagus, clinically presented with severe pain between the shoulder blades during the vomiting. A suspicion on rupture of the esophagus must be kept in mind for patients admitting to hospital in severe general condition with complains on increasing dyspnea, dry tongue and foul smell from the mouth. A rupture of the esophagus complicated with mediastinitis and pneumopleuritis, and confirmed by imaging investigations can be successfully managed by surgical intervention.

## RESULTS AND DISCUSSION

After contacting the clinic, within a short period of time, based on a detailed examination, the diagnosis was confirmed in 6 patients. 5 patients underwent emergency surgical treatment followed by intensive therapy in the postoperative period, of which 4 recovered with complete restoration of free food intake, and 1 patient died. One patient refused the operation, and he also died soon after. Mortality rate was 33%.

Early diagnosis of spontaneous rupture of the esophagus is very difficult [1, 6]. Leakage of oral contrast medium out of esophageal lumen to posterior mediastinum and pleural cavity confirms the diagnosis. Unfortunately, the vast majority of patients admit to hospital late in severe septic condition. The early diagnosis of the disease and its early surgical management are very important [3, 4]. While early suturing of defect of wall of the esophagus in case of spontaneous rupture is successful [5, 7], risk of wound dehiscence in delayed cases is high [8]. Results of resection of thoracic part of the esophagus because of extensive necrosis of its wall at the background of diffuse mediastinitis are often poor. However, mediastinitis, pleuritis, and severe sepsis may result in death in some cases even after early surgery [6].

Thus, the early diagnosis and management of spontaneous rupture of the esophagus remain an important issue.

## CONCLUSION

In patients complaining on vomiting, accompanying with sudden acute pain in chest and between scapulae, with anamnesis of consumption of large amounts of food and alcoholic beverages, and with progressive deterioration of general condition a rupture of the esophagus is highly susceptible. The diagnosis must be ruled out or confirmed by means of X-ray, CT and endoscopic investigations, and according urgent surgical management started. Patients without surgical management have unfortunately no chance on recovery.

## REFERENCES

1. Abakumov M.M., Pogodina A.M. Emergency esophageal surgery. *Surgery.* 1992;4:3–8.
2. Kochukov V.P. Spontaneous rupture of the esophagus (Boerhaave's syndrome). *Surgery*. 2012;7:83–84.
3. Rabadanov K.M. Spontaneous rupture of the esophagus. *Surgery*. 2014;6:81–83.
4. Carrot P.W., Low D.E. Advances in the management of esophageal perforation. *Thorac. Surg. Clin*. 2011;21(4):541–555.
5. Emmanouilidis N., Jager M.D., Winkler M., Klempnauer J. Boerhaave syndrome as a complication of colonoscopy preparation; a care report. *J. Med. Case Rep.* 2011;5(5):544.
6. Grigorovici F., Burcoveanu C., Padureanu S., et. al. Spontaneous esophageal rupture in three patients. *Chirurgia (Bucur).* 2005;100(1):57–62.
7. Mclean M.M., Tilney P.V. Esophageal rupture in a 25-year old man. *Air. Med. J.* 2012;31(5):199–202.
8. Vana J., Celec J., Kaco L., Bizik L. Undiagsed primary Boerhaave syndrome. *Rozhl Chir.* 2002;81(2):51–53.
9. Veno S., Escardt J. Boerhaave s syndrome and tension pneumothorax secondary to norovirus induced forceful emesis. *J. Thorac Dis.* 2013;5(2):38–40.