

# Management difficulties of cervical esophagus perforations after endoscopic extractions of foreign bodies

C. Halwani<sup>1,4</sup>, F. Masmoudi<sup>1,4</sup>, IC. Zgolli<sup>1,4</sup>, H. Benabdallah<sup>2,4</sup>, MR. Bouali<sup>2,4</sup>, H. Gharsallah<sup>3,4</sup>, RB. Mhamed<sup>1,4</sup>, K. Akkari<sup>1,4</sup>

1 Departement of ENT and maxillofacial surgery. Military hospital of Tunis. Tunisia

2 Departement of hepato-gastroenterology. Military hospital of Tunis. Tunisia

3 Departement of anesthesia and resuscitation. Military hospital of Tunis. Tunisia

4 Faculty of Medicine of Tunis. University of Tunis Al Manar. Tunisia

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## ABSTRACT

**Objective:** to raise the therapeutic difficulties relating to perforations of the cervical esophagus occurring after extraction of foreign bodies.

**Observation:** We report the case of a 45-year-old female patient who presented with acute dysphagia following the ingestion of a chicken bone. She underwent an esophagoscopy with extraction of the foreign body. A sore on the posterior wall of the esophagus was noted. An extra-mucosal suture of the oesophagus was made with reinforcement by a flap of the left sternocleidomastoid muscle. The evolution was marked by the development of fistula and suppurative cervical and mediastinal collections. The patient was put on antibiotics with an absolute diet. Surgical suture of the esophageal wound and a strengthening with a flap of the left great pectoral was performed. A fortnight later, following a bronchitis, a cervical emphysema appeared. Perforation was suspected and confirmed by esophageal endoscopy. A surgical suture with a flap of the right major pectoralis was made. No recurrence was noted after a one year of follow up.

**Conclusion:** The success of surgical treatment of esophageal perforations is a function of its precocity. The main risk is losing the sutures. The contribution of endoscopic techniques is limited in the cervical localizations.

**Keywords:** Dysphagia, Esophageal Perforation, Foreign Body, Endoscopic Approach, Muscle Flap, Surgery Case.

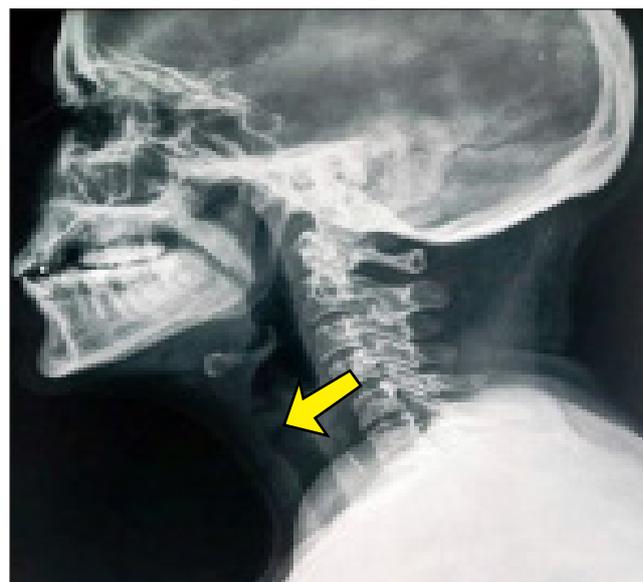
## INTRODUCTION

Iatrogenic esophageal perforation is a rare but serious complication. Its frequency is increasing with the development of endoscopy techniques. It is one of the most difficult emergencies that the surgeon is called upon to treat as it rarely occurs and the individual experience of operators is often low [1,3]. Its mortality is high, it varies from 11.9 to 30% [2,3] mainly related to rapidly extensive septic complications. The treatment remains controversial due to the variety of therapeutic means available; these difficulties are increased when the perforation sits at the cervical level. The objective of our work was to support the strategy of therapeutic management of endoscopic perforations of the cervical esophagus occurring after extractions of foreign bodies by raising the difficulties relating to the involvement of the cervical esophagus.

## OBSERVATION

45-year-old patient with no medical history consults for dysphagia with the emission of saliva mixed with blood following the accidental ingestion of a chicken bone. Her examination found: an afebrile, eupneic patient, the pulse and blood pressure were correct. She was very embarrassed by a sensation of a

foreign body on the cervical level, the palpation of the neck did not find crackles. The rest of the examination was normal. The lateral cervical X-ray showed a clear image at the level of the cervical esophagus evoking a sharp bony foreign body (Figure1).



**Figure 1:** Profile x-ray of the neck, sharp foreign body from the cervical esophagus (yellow arrow)

Corresponding author: Chiraz Halwani

Address: Otorhinolaryngologist at ENT departement of Military hospital of Tunis. Tunisia

E-mail: chirazhalwani@yahoo.fr



Chest X-ray did not show abnormalities. Esophagoscopy was performed under general anesthesia. Significant edema of the esophagus mucosa was noted. The extraction of the foreign body which was 11 cm from the dental arches was made (Figure 2).



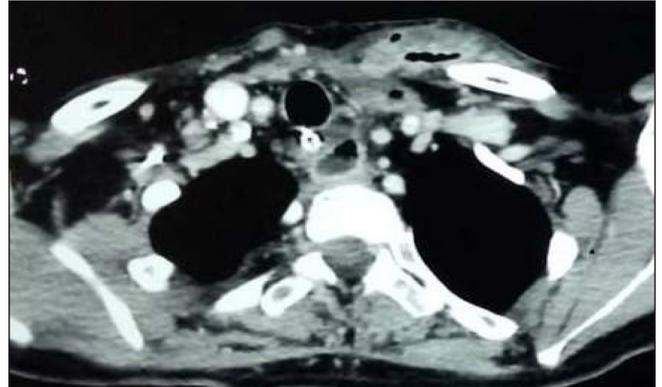
**Figure 2:** Endoscopic view, foreign body of the cervical esophagus

A one cm wound in the posterior wall of the esophagus was noted with the appearance of minimal crackling postoperatively. The patient was kept under surveillance, she was eupneic no pneumo mediastinum was noticed on the chest X-ray. The next day, a fever developed at 38 ° C, neck pain with an elevation of C-Reactive Protein. The cervical CT scan showed no signs of mediastinitis. The patient was operated, a lateral approach to the visceral axis of the neck was made with a left lateral cervical incision, the presence of abundant infected saliva, with inflammatory reaction of the soft parts, was noted. Exploration of the cervical esophagus found the perforation (Figure 4).



**Figure 4:** Perforation of cervical esophagus with inflammatory reaction of the surrounding tissues

An extra-mucosal suture was made with reinforcement by a flap of the sternocleidomastoid muscle and placement of a wavy blade for drainage. Daily washes were done. The evolution was marked by the release of the sutures and the abundant leakage of saliva. The CT scan after 7 days showed a double path fistula with the presence of collections (Figure 5).



**Figure 5:** CT Scan showing: fistulous path arriving at the level of the mediastinum, on the control scanner with collection note the hydro-aeric level (arrow).

The patient was kept on antibiotics (Tigecycline) with an absolute diet, an exclusive parenteral diet until C-Reactive Protein became negative and regression of inflammatory signs. A surgical resumption was carried out by the same way, initially with suturing of the esophageal wound and reinforcement by a flap of the left pectoralis major, a placement of a nasogastric probe and closing of the skin (figure 6).



**Figure 6:** Esophageal suture with flap reinforcement of the pectoralis major.

The patient was fed by nasogastric tube, and put on Teicoplanine. A good evolution was obtained. Fifteen days later the patient presented with bronchitis with profuse cough after which a cervical emphysema appeared. A re-perforation was suspected and confirmed by an esophageal endoscopy. We planned to close the residual perforation with a stent, but the position of the perforation near the mouth of the esophagus did not allow it. The patient was thus surgically resumed, a suture with flap of the right pectoralis major was made. At the control, good healing was obtained, the esophageal transit made on the 10th postoperative day returned to normal (Figure 7), allowing the nasogastric tube to be removed; resumption of solid food was allowed after 3 weeks. The patient has been followed for 1 year with no recurrence.



**Figure 7:** Esophageal transit from the showing normal passage of the contrast agent with absence of fistula after surgery.

## DISCUSSION

Perforation of the esophagus results in a tear or rupture of the esophagus following instrumentation, vomiting, ingestion of a foreign body, surgical procedure or external trauma [4]. The iatrogenic origin currently represents half of the etiologies of esophageal perforations. Foreign bodies are responsible for one in six perforations and are represented by bones or ridges. Some cases of dentures fragments have been reported [5].

The usual mechanism of perforation after endoscopy is by impaction of the tip of the instrument inserted into the esophagus or any other instrumental maneuver without visual control [5]. Anatomical features of the esophagus make it fragile: it does not have a serous coat, it does not have an own mesentery and its vascular supply is poor, which exposes it to the risk of dropping surgical sutures. An area of weakness is particularly exposed to instrumental perforation. It corresponds to the crico-pharyngeal region where a triangular parietal weakness, called Lannier triangle, is delimited at the top by the criss-crossing of the constrictor muscle of the pharynx and below by the crico-pharyngeal muscle [3].

Factors favoring perforation have been described in the literature such as vertebral osteophytes, extrinsic deviations, limited opening of the mouth or previous irradiation [6]. In our case, the factors promoting perforation were kyphoscoliosis and rigidity of the cervical spine.

The interval between the perforation and its diagnosis is a fundamental element in the management and prognosis. Immediately after the breach, the passage of saliva, gastric secretions and ingested material contaminate the tissue around the esophagus. Local chemical inflammation followed by bacterial contamination leads to necrosis of surrounding tissue [4]. Thus, a rapid diagnosis makes it possible to quickly refer the patient to surgical treatment before complications arise, which was not the case in our observation.

Clinically, approximately 7% of the perforations remain asymptomatic and the immediate clinical manifestations allow an early diagnosis within 6 hours only in 33% of the cases [4]. Certain clinical signs allow us to suspect a perforation of the esophagus during an endoscopy: the appearance of significant mucous bleeding during endoscopy, the postoperative worsening of dysphagia, the appearance of regurgitation, swallowing noises or any other unexplained manifestation such as back pain or chills or stiff neck. Subcutaneous emphysema is a very suggestive sign of an esophageal perforation and appears between 4 and 12 hours. Respiratory signs are present only in 40% of cervical perforations. They are characterized by dyspnea, cyanosis and sometimes acute respiratory distress [4]. Septic shock sets in after 24 hours in the absence of any treatment and is already present at the time of diagnosis in 15% of cervical perforations. It is characterized by a rapid pulse, low blood pressure and tachypnea. [4]. Our patient presented with crepitations immediately after the first endoscopy but was still eupneic. The appearance of these signs should lead to an esophageal morphological assessment. In our practice, any patient suspected of damaging the esophagus should have a chest x-ray and a water-soluble transit. Conventional radiographs are normally enough. Pictures of the cervical region may show, in early cases, the presence of air in the pre-vertebral region and, in late cases, an abscess may be suspected by an enlarged retropharyngeal space, disappearance of cervical lordosis or displacement anterior esophagus and trachea [5].

Chest x-ray is also mandatory because one in six cervical perforations has an intrathoracic extension. They allow the diagnosis of a hydropneumothorax associated with a pneumomediastinum. Often, the pneumomediastinum is discreet and results in a double contour image of the left edge of the heart. In late cases, an empyema is visible.

The esophageal transit confirms the diagnosis and the precise location of the perforation. Water-soluble products are used. The opacification of the esophagus must also make it possible to verify the absence of an underlying obstacle or of gastroesophageal reflux and this is the reason why it must be performed in a vertical and horizontal position. The CT scan performed after opacification of the esophagus identifies a small perforation that is not visible on the esophageal transit, but also helps to refine the spread of the infection in the para-esophageal spaces.

The inflammatory tests (white blood cells, reactive protein C) are all the higher as the infection is widespread and the late diagnosis, abnormalities of the ionogram accompanied by hypoalbuminemia are signs of malnutrition.

The treatment is medico surgical. The medical component includes stopping oral feeding with exclusive parenteral feeding, prohibiting swallowing of saliva and antibiotherapy active on anaerobic and aerobic germs of ENT sphere.



Vital functions are kept stable with intensive care monitoring for 24 to 48 hours. Enough nutritional intake is ensured through parenteral nutrition. Any collection or any pleural effusion is drained. A computed tomography examination is performed before the appearance of any clinical deterioration.

Our attitude is medical and surgical. The lack of immediate surgical management only makes things worse, since the chemical burn will continue and septic contamination in the absence of drainage will accelerate the progression towards sepsis.

The treatment options are diverse. Endoscopic closure particularly concerns perforations in the thoracic and abdominal esophagus. For cervical localization, endoscopic treatment is difficult: stents are often hardly tolerated [8,9]. It is especially indicated in the case of a perforation visualized immediately during the endoscopic gesture and can be done by clips or biological glue in patients who present perforations involving a non-pathological esophagus, of smaller size or equal to 2 cm [9]. In the case of perforations larger than 2 cm or of late discovery, treatment with a metallic or plastic stent, fully covered, can be offered [10]. The prosthesis must be placed to cover 3 to 5 cm upstream and downstream of the perforation. A nasogastric tube, or even a gastrostomy, are useful the first few days to then allow a rapid resumption of enteral nutrition [8,11]. Surgical treatment depends on the location of the perforation, the time to diagnosis, the presence of an underlying esophageal pathology, the general condition of the patient and the experience of the surgical team [6]. Several procedures are possible: simple suturing, suturing reinforced with a muscle flap or simple drainage of collections in the event of

late diagnosis or if the perforation is not identifiable. The skin incision is made along the anterior edge of the left sterno-cleido-mastoid muscle. In the event of a recent perforation, dissection of the cellulose-fatty tissue from the tracheoesophageal groove is easy, but, in late cases, the dissection is difficult. Before any mobilization of the esophagus, debridement of all the membranes is performed as in the posterior mediastinum with bacteriological sampling. The suture is made in two planes, a mucous plane by an overlock with an absorbable thread and a muscular plane by separate points with a non-absorbable thread. A methylene blue test ensures the good quality of the suture. If the wound is large, strengthening with a muscle flap is essential. The best is the flap of the pectoralis major muscle [3] which was the case for our patient.

## CONCLUSIONS:

The prognosis for esophageal perforation depends mainly on the speed of treatment. Releasing the sutures after surgery is the main problem. Strengthening the suture reduces this risk. Because of the rarity and the seriousness of this problem, an interdisciplinary concertation associating gastroenterologists, surgeons, anesthesiologists and radiologists makes it possible to obtain the best results.

## Compliance with ethical standards

**Conflict of interest:** The authors stated that there is no conflict of interest.

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