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Case Report Of Esophageal Perforation Secondary Due A Fundoplication For GERD

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When there is a rupture or weakness of the esophageal wall, the probability of material leakage into adjacent spaces is high, and it is considered a true emergency with mortality of 11-30%; Thus, it is considered one of the most serious emergencies, since it is a constant local inflammation followed by contamination that, depending on the etiology, can cause necrosis in nearby tissues or even extend to septic shock.

Boerhaave syndrome, also called esophageal perforation, is a pathological entity whose main characteristics are the rapidity of its progression, producing mediastinitis as well as reaching septic shock, even though the main processes associated with its etiology refer to increased pressure. intraluminal or increased negative chest pressure. There are special situations in the surgical field (iatrogenic) that, added to pre-existing risk factors, favor the weakness of the esophageal wall and in turn allow the escape of content that conditions the activation of processes that lead to inflammation, sepsis and shock. septic: For such complications, treatment strategies have been found focused on conservative, laparoscopic and endoscopic management. In this article we will seek to review a case of a patient with Boerhaave syndrome secondary to a fundoplication subsequently repaired with an endoprosthesis; in turn, discussing the differences in the treatment used in this particular case in contrast to the management and opinions of other authors.

Keywords: Mediastinitis, Boerhaave syndrome, endoprosthesis, Fundoplication, Esophageal perforation, pneumomediastinum, GERD.

INTRODUCTION:

When there is a rupture or weakness of the esophageal wall, the probability of material leakage into adjacent spaces is high, and it is considered a true emergency with mortality of 11-30%; Thus, it is considered one of the most serious emergencies, since it is a constant local inflammation followed by contamination that, depending on the etiology, can cause necrosis in nearby tissues or even extend to septic shock.

Perforation of the esophagus has different causes and origins, mostly due to iatrogenic results during endoscopy, although there is also a spontaneous perforation known as Boerhaave syndrome, perforation due to a foreign body or thoracic trauma. The term "spontaneous" does not fully explain the possible mechanism of an esophageal rupture, since the main mechanism by which the weakness of the wall is perpetuated will be caused by a sudden increase in pressure within the esophagus, in its Mostly caused by overexertion and stress from vomiting or negative pressure from the lower digestive tract. As previously described, the majority of esophageal perforations are performed iatrogenically during endoscopy with an incidence of 30%. Other causes of esophageal perforations are considered in a lower proportion, with an incidence of 15%. Boerhaave's, 12% produced by foreign body ingestion, 9% in trauma, intraoperative injuries in 2% and malignancy in 1%.

PATHOPHYSIOLOGY:

By definition, this pathology is referred to as a break in the continuity of the esophageal wall; When making a diagnosis, there is a wide variability of symptoms, depending on the location of the perforation site. On the other hand, typical patient presentations include tachycardia, respiratory distress, and fever. However, if there is contamination towards the mediastinum, sepsis can be established, as well as multiple organ failure in a period of 24 to 48 hours, which is why the time to establish diagnosis and start treatment is a fundamental point.

Initially, iatrogenic perforation is due to diagnostic or therapeutic endoscopic procedures, instrumentation such as the traumatic passage of a nasogastric tube, esophageal surgeries, thyroid surgeries or even spinal surgeries. There is also a risk of perforation in interventions to perform hemostasis when bleeding from the digestive tract occurs, extraction of a foreign object or even in palliative techniques for cancer or treatment of Barrett's esophagus.

Spontaneous perforation is directly related to Boerhaave Syndrome, it is the absence of instrumentation or trauma during perforation caused by an increase in internal esophageal pressure due to negative or mechanical pressure. The perforation is in the distal third in most cases, this phenomenon is mainly explained by the lack of anatomical continuity of the muscular layer in this area due to the presence of muscle fibers in the connective tissue of the submucosa. In addition, it is very There is a high probability that these patients present concomitant gastroesophageal reflux disease (GERD), which suggests the transmission of negative pressure from the abdomen to the thoracic esophagus as a mechanism of injury.

On the other hand, perforation due to trauma is mostly caused by penetrating trauma, sharp injuries or gunshot wounds. In turn, the diagnosis may lack precision when there are associated injuries that make the main perforation more serious.

Once perforation occurs, mostly gastric secretions, saliva, bile fluid and other secretions can enter the mediastinum and cause chemical mediastinitis as a pathological principle that can trigger the rest of the course of the disease, such as inflammation, pneumomediastinum and late mediastinal necrosis; possible polymicrobial bacterial establishment and invasion, sepsis and ultimately death if immediate management is not carried out.

Although the symptoms are variable and are individualized depending on the presentation and evolution of the disease in the patient, for the most part the usual symptoms address a complex of vomiting, chest pain and subcutaneous emphysema, commonly called Mackler's triad, in addition to presenting dyspnea, pneumomediastinum, sepsis and finally shock if not diagnosed in time. (Borraez, 2021)

The immediate mediastinitis resulting from the perforation will entail a host of antigen recognition processes and inflammatory processes mediated by microorganisms, that is, polymicrobial mediastinitis. Initially, the primary infection is caused by a single etiological agent, mostly a facultative aerobic streptococcus; The conditions of the location of the perforation, such as oxygen consumption, enzyme production or cellular invasion, will benefit subsequent bacterial colonization and advanced septic processes. There are multiple microorganisms present in the resulting mediastinitis and despite the lack of knowledge about whether any microorganism is involved, the most predominant are those of the staphylococcus and streptococcus type. (Nazario 2018)

COMPLICATIONS:

In relation to esophageal perforation due to gastroesophageal reflux disease (GERD), there are different complications directly related to the constant passage of gastric material into the esophageal lumen, which lead the patient to suffer different complications with all types of serious problems.

Among the main complications that can be mentioned is Boerhaave Syndrome, which typically occurs after constantly repeated vomiting and forced retching. It is considered a barogenic injury generated by the sudden increase in intraluminal pressure. Because of this, the pressure overwhelms the wall of the esophagus at its weakest point, which can lead to an esophageal rupture. (Turner, Anisha R.2023) Likewise, we can find other complications such as esophagitis, which is chronic inflammation due to the constant contact of acid reflux with the wall of the esophagus, which leads to wear and erosion of the wall, generating ulcers and hemorrhages in more serious cases. (Alkhowaiter, Saad.2023)

Esophageal stenosis is considered a serious complication due to the patient's inability to swallow or swallow, since the constant damage to the esophageal epithelium leads to excessive scarring. Respiratory complications, in which the constant passage of acid near the

respiratory tract can exacerbate conditions such as chronic asthma or bronchitis. (Sanivarapu, Raghavendra R. 2024) Esophageal foreign bodies, in many cases, the constant passage of hydrochloric acid into the esophagus can cause the patient to experience the sensation of a foreign body stuck in the esophagus, a product of chronic inflammation. due to the constant passage of caustic material from the stomach. (Chirica M, Bonavina L. 2022)

METHOD

A case of a 28-year-old male patient treated at the National Siglo XXI Medical Center in charge of the gastrosurgery service is presented.

Case of a 28-year-old male patient treated at the Centro Médico del Siglo XXI in charge of the gastrosurgery service. He has a history of hiatal hernia, which entered the surgical protocol in a private hospital. The operation was performed without apparent complications. After two days, the patient began to present with a fever of up to 39.9°C, abdominal distension, and later generalized abdominal pain. Due to this, the patient decided to go to a different private hospital. In which an abdominal x-ray was taken, which showed dilation of intestinal loops and air-fluid levels, and an orogastric tube was placed with the expenditure of bile secretions and later on coffee grounds. After this, the patient was discharged home with outpatient treatment based on ceftriaxone, omeprazole, furosemide, metamizole, sennosides and metoclopramide.

At home, the patient reported pain in the left hemithorax and difficulty breathing, requiring supplemental oxygen. For this reason, he was admitted again to the National Medical Center, where a chest x-ray was performed, which showed a complex left pleural effusion, and in the same way, an angiotomography was performed, which showed an esophageal perforation, with a pleural collection. complex, complication of pneumomediastinum, complication of left pneumothorax, bilateral pleural effusion with left predominance, passive subsegmental collapse, pneumoperitoneum, perisplenic free fluid, for which he underwent a surgical procedure, where an exploratory laparotomy was performed, which showed a perforation in the lesser curvature of the stomach. A primary closure was performed, a fundoplication reinforcement was applied, and an endopleural tube placement was chosen. In the immediate postoperative period, an endopleural probe with purulent output can be observed, combined with a pulmonary tomography imaging study, showing a lesion with irregular edges at the level of the lung parenchyma, with partial re-expansion of the lung, so at that time esophageal perforation was suspected, proceeding to perform endoscopy on the same day with findings of esophageal perforation 40 cm from the upper dental arch below the esophagus-gastric junction, for which a 23mmx150mm covered stent was placed, as well as an orogastric tube.

The patient's evolution is torpid, so a panendoscopy is requested where an unresolved post-surgical esophageal perforation is observed with a 4 mm long defect on the already fistulized right lateral surface, so the endoprosthesis is removed by the gastroenterology service and the patient is scheduled for thoracotomy, obtaining findings of a 300cc retained hemothorax, frozen mediastinum, residual pleural cavity, abdominal surgical site infection. Therefore, radical treatment is proposed, however family members do not accept treatment, an

esophagogastroduodenal series is requested 7 days later without observing contrast medium exit through the esophagus, so it is decided to start a liquid diet.

RESULTS

It is stipulated that the success of the treatment of this pathology is strictly related to the patient's age history, comorbidities, history of previous esophageal disease, time of evolution from the perforation to the start of treatment, size and location of the perforation (mortality at cause of perforation).

Complications of perforation such as mediastinitis and the use of expandable metal stents have favored healing and limited sepsis for a period. (esophageal perforation in laparoscopic surgery)

Adequate nutrition and adequate metabolic control of patients lead us towards a better prognosis, since correct metabolic management always offers us a better outlook.

DISCUSSION:

Among the most widely accepted procedures for treating gastroesophageal reflux disease, laparoscopic fundoplication is most widely accepted.

Risk factors such as GERD and increased pressure weaken the wall, early timely diagnostic determination is necessary.

Perforation of the esophagus during this procedure has a low incidence; however, it is considered a true emergency and a challenge for the surgeon, since mediastinitis has a short period for the onset of septic shock. The article: “High mortality rate of esophageal perforation is associated with delayed hospital admission: a prospective observational case series study” (S. Petousis, et al.) in which it is described that a period of less than 24 hours has a better prognosis (2020). It is necessary to mention that the absence of the serous layer in the esophagus predisposes to weakness of the wall and less resistance to intraluminal tension, which favors an increase in negative pressure in the thorax, as is the case of emesis or chronic cough, may result in injury to the lower third of the esophagus (Shibuya, Hitoshi et al. 2019).

In addition to the relative symptomatology of the development of the disease caused by Boerhaave syndrome. The article: “Boerhaave's syndrome – over 290 yrs of surgical experiences. Epidemiology, pathophysiology, diagnosis” (Rokicki et al. 2016) describes specific symptomatology that may accompany or be the apparent cause of Boerhaave syndrome that may make the diagnosis difficult, such as: bronchial asthma, epileptic seizures, labor, prolonged cough, hiccups. , laughter attacks, during the heimlich maneuver; and even in the presence of other diseases that can lead to an erroneous diagnosis, such as: myocardial infarction, acute pancreatitis, pneumothorax, renal colic, acute appendicitis, pericarditis or splenic hemorrhage; thus demonstrating the importance of a correct differential diagnosis.

In contrast to the information presented, the esophageal perforation in this patient was due to iatrogenesis when undergoing a fundoplication, in turn the article: “Endoscopic Ultrasound-guided Drainage of a Mediastinal Abscess [...].” (Shibuya, Hitoshi et al.) reinforces the argument that Gastroesophageal Reflux Disease is one of the most relevant risk factors due to the weakness of the chest wall and emptying of contents into the mediastinum (2019).

Treatment is controversial but viable options are conservative and placement of a stent or endoprosthesis.

Esophageal perforation is known as a medical/surgical emergency, which is why there must be specific management depending on what the cause was and where the perforation is located. It must be analyzed if there is an underlying esophageal pathology, damage to the esophagus. as well as nearby structures, the time in which the diagnosis was made and what condition the patient is in. (South DC, 2023).

Primary surgical intervention is one of the most used strategies, and it can even be used even if 24 hours have passed before the diagnosis of PE. This intervention is performed in such a way that a posteriorly based intercostal muscle flap is prepared to reinforce the primary repair before entering the thoracic cavity, with the help of a thoracotomy, with mobilization of the pleural fold and the inferior pulmonary ligament, this helps to mobilize the lung forward. Cleaning and debridement of the pleural space and mediastinum is performed (5). The esophagus should be rotated from its proximal side and hung with a Penrose drain to aid dissection. The muscle fibers above and below where the perforation is located are cut longitudinally (Atilla Eroglu, 2018). Finally, the mucous membranes and muscle layers are sutured separately, in two layers whenever this is possible (M. Chirica, et al. 2010).

In the case presented, the patient underwent open thoracotomy for drainage of loculated empyema, and with prior placement of an expandable endoprosthesis; It is known that the endoprosthesis helps us contain the material to prevent leakage into adjacent spaces. In this way, if the pleura remains intact, mediastinitis occurs due to the containment of the material there, and if the pleura ruptures due to the inflammatory process gives rise to a pleural effusion. There are authors mention that stent placement also prevents the development of infections to allow repair of the esophagus, although the main risks of these are migration and stenosis, which can cause an interruption in healing and allow leaks (Ioannidis, O. et al 2021).

One aspect that contributes to this idea is that the authors of “Successful Late Endoscopic Stent-Grafting […] Boerhaave Syndrome.” (Śnieżyński J, et al.) establish that the main disadvantage of Stenting is inadequate drainage and impeded healing, subsequently presenting erosion. In contrast to this idea, it is mentioned that the possibility of developing sepsis and isolating contamination is lower when the gastric contents are isolated with endoprostheses early, thus reducing the need for esophagectomy (2021).

Italo braghetto M, et al say that in extreme cases of hemodynamic instability it is advisable to perform esophageal exclusion and diversion, which is based on an esophagostomy, closure of the distal esophagus and gastric decompression gastrostomy together with a feeding jejunostomy, however They mention to us that there are groups that do not agree with carrying out exclusion, since they propose that stasis and bacterial growth in the excluded esophageal segment could lead to continuous mediastinal inflammation and sepsis, with a mortality of approximately 40% (2005).

In our case presented, the patient was maintained with parenteral nutrition support, maintaining his metabolic status, after 3 weeks a barium swallow study was performed where no contrast medium leak was reported. The authors of the article: "Conservative treatment of Boerhaave syndrome [...] stenting." They affirm that total Parenteral Nutrition, antibiotic therapy, thoracostomy and drainage of the contents is the treatment of choice to avoid the risk of complications, such as infection (2021).

In the article "Clinical experience and update of the topic" (Braghetto M, et al.), surgical treatment of esophageal perforation offers us several options which are simple drainage of the contaminated area, debridement with primary repair of the perforation, esophageal diversion and delayed repair or esophagectomy. (2005)

In contrast to the findings of the case and cited sources, the article "Esophageal perforations" (M. Chirica, et al.) establishes that simple drainage is carried out when it is not possible to perform the suture or even the esophageal perforation is not visible. , this type of drainage aims to limit the extent of contamination, however it is only advisable to perform it when it comes to cervical PE, in thoracic or abdominal perforations it is not recommended because this type of management does not prevent further dissemination of the infection (2010).

When conservative treatments fail, esophagectomy is usually used; it is often used when there is a perforation that can complicate a diseased esophagus (peptic ulcer, tumor, caustic burn, etc.) or when there is significant destruction of the esophagus (Chirica 2010). . Proximal esophagestomy is performed with an incision in the left neck. The proximal length of the esophagus should be as long as possible. A subcutaneous tunnel must be formed which reaches the chest wall passing over the sternocleidomastoid, the clavicular muscle and the pectoral muscle. This process must always be carried out in a lateral position to avoid any complications that require any other intervention. Separate the skin between 1 to 2 cm, seeking to obtain a round shape, since it will help us avoid the distal point of the tunnel from narrowing. The proximal end of the esophagus must be removed from the tunnel and the skin is firmly joined with absorbable sutures. , the neck incision must be irrigated with physiological saline and then closed. Finally, a drain must be placed from the neck to the upper mediastinum, this is done so that drainage of mediastinal contamination occurs (Eroglu 2018).

There are cases in which esophageal repair is not possible, this may be due to various situations, including that the patient is unstable, has a history of esophageal disease or even the disease, in these cases esophageal diversion can be carried out in which a part of the damaged esophagus is resected and a proximal esophagectomy is performed (Eroglu 2018).

CONCLUSION

Initially, the idea of total parenteral nutrition, the possible use of endoprostheses or stents, will be directly related to the normal functioning of the esophagus despite the perforation and its respective healing, in addition to that, it seeks to reduce the perpetuation of the surgical site as much as possible to facilitate recovery and avoid complications or, failing that, the progression of perforation. Regarding treatments, the literature has not yet found a consensus on the ideal treatment for Boerhaave Syndrome, but thanks to the case presented, a positive effect of the use of endoprostheses has been demonstrated to prevent leaks of gastric contents after their placement; However, the treatment and evolution will depend on the patient, so it must have an individualized approach. Without forgetting that one aspect that all authors come to is that the period of time is short to reach complications such as sepsis and shock, therefore a period of less than 24 hours is appropriate for addressing this pathology.

Primary reason why immediate attention to the repair of esophageal perforation entails more than a surgical approach, greater attention to cellular damage and its impact on the body, since effective diagnosis and timely management through recognition of symptoms and support of auxiliaries, is directly related to a higher rate of healing and recovery.

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