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Case Report

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Strangulated Diaphragmatic Hernia, Uncommon Surgical Emergency

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Abstract

Diaphragmatic hernia (DH) commonly presents as a congenital posterolateral defect, which can also be acquired due to trauma or iatrogenic factors and carries a mortality rate of up to 31%. We present a 35-year-old male with a history of substance abuse, prior surgeries, and trauma presented with severe abdominal pain, dyspnea, and absent bowel movements. CT imaging revealed a type IV hiatal hernia with gastric and duodenal protrusion into the thoracic cavity.

Keywords: Hiatal hernia; Gastrectomy; Herniotomy; Abdominal trauma; Thoracic trauma; Thoracic; Abdominal surgery

Introduction and importance

Diaphragmatic hernia is a multifactorial phenomenon with genetic and environmental contributions, most commonly occurring as a congenital diaphragmatic defect, its incidence ranges from 0.8 to 5 per 10,000 births, with a higher prevalence in males, it can also be acquired following blunt, penetrating trauma or iatrogenic causes. Survival rates have improved due to advances in medical management, but in the case of acquired DH, overall mortality rates are up to 31%.

Case Presentation

35-year-old male patient referred from his medical unit due to report of simple abdominal computed tomography for hiatal hernia type IV due to gastric protrusion to the left hemithorax through the hernial defect of the ipsilateral diaphragmatic dome with presence of duodenum, abdominal symptoms due to intense abdominal pain of three days of evolution, located in epigastrium, with retrosternal irradiation, together with absence of bowel movements and dyspnea, added to knowledge by non-pathological history of ethylism, smoking and methamphetamine consumption, In addition, pathological history for open cholecystectomy surgery, penetrating stab wound and transfusion of blood products, in a period of less than 5 years prior to the current admission, he is received in the emergency department with metabolic, hemodynamic and neurological integrity, same place where he is evaluated by the surgery department where he receives initial management for abdominal decompression with placement of nasogastric tube to derivation, for subsequent surgery with herniotomy plan, with prior anesthetic evaluation.

Paraclinics on admission reported as aspartate aminotransferase 223 U/L, lactate dehydrogenase 748 U/L, creatine phosphokinase 845 U/L, lactate dehydrogenase 651 U/L, creatine phosphokinase 919 U/L, prothrombin time 12.5 seconds, activated partial thromboplastin time 40 seconds, albumin 4. 1 gr/dl, serum electrolytes with sodium 141 mmol/L, potassium 4.8 mmol/l,

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calcium 9.40 mg/dl, phosphorus 8.2 mg/dl, chlorine 100 mmol/L and magnesium 2.20 mg/dL; lipid profile with total cholesterol 105 mg/dl, triglycerides 153 mg/dl, HDL 35 mg/dl, VLDL 30.6 mg/dl and LDL 39. 4 mg/dl; blood biometry with leukocytes 16 400, lymphocytes 1800, neutrophils 13 300, hemoglobin 17.7 g/dL, hematocrit 54.2%, glomerular sedimentation rate 92. 4 fl, platelets 364 000; 3-element blood chemistry with glucose 207 mg/dl, BUN 27 mg/dl, UREA 57 mg/dl and creatinine 3 mg/dl, liver function test with TGO/AST 198 U/L, TGP/ALT 267 U/L, alkaline phosphatase 105 U/L, total bilirubin 2. 7 mg/dL, indirect bilirubin 1.4 mg/dL and direct bilirubin 1.3 mg/dL; serum amylase 56 U/L, serum protein 450 mg/L, albumin 4.9 g/dL; computational tomography report of simple abdomen with hiatal hernia with complete gastric chamber herniation, stomach with protrusion towards left hemithorax through hernial defect of the ipsilateral diaphragmatic dome of approximately 4. 8 cm, observing distension of the gastric chamber with abrupt decrease of the caliber at the level of the pyloric antrum, identifying discrete amount of intestinal content at the level of duodenum, gastroesophageal junction below the diaphragm, dilation of distal esophagus up to 20 mm, related to report in pulmonary area, left basal fibro laminar fibro atelectasis is identified.

During the surgical act, the hernial defect is enlarged and the stomach is returned to the abdominal cavity, with abundant outflow of cloudy, non-foul-smelling liquid from the thoracic cavity, necrotic gastric fundus and body is observed (figure 1), proceeding to perform gastrectomy by clamping at the junction of the body and antrum, which is closed in fretwork, esophagus is identified, released and removed with penrose, consecutively proceed with hernioplasty and jejunostomy at 60 cm from the angle of Treitz, Witzel type with foley probe, it is externalized and fixed to the skin, during the second surgical time, the sternocleidomastoid muscle is incised medially vertically up to the manubrium of the sternum, the platysma is dissected and the sternocleidomastoid, omohiodeus and thyroid muscles are avulsed until reaching the cervical esophagus, which is released to perform esophagostomy placing a Thorek type T probe, at the conclusion of the surgical procedure (figure 2), a gastrectomy was performed to preserve the pyloric antrum, closure of the pyloric esophagus, closure of the distal esophagus, Witzel type jejunostomy (figure 3), hernioplasty without diaphragmatic mesh, Thorek type esophagostomy and placement of a left intrapleural probe, induced by the situation presented, chemical mediastinitis develops with high possibility of co-infection, in addition to alteration of the gastric and intestinal mucosa, which may condition bacterial translocation with high possibility of causing a primary bacterial process, and therefore, having developed a peritoneal process secondary to surgical manipulation, the surgical act is terminated without incident, and then requesting admission to the intensive care unit at the end of the surgical act, The patient is received serious, under residual effect of anesthesia, sedation by propofol, dexmedetodine and midazolam, ventilatory and aminergic support, metabolic state with fever peak related to leukocytosis of 28 000, which is given at the expense of neutrophilia, no evidence of thrombocytopenia or active bleeding, no hypoglycemia, elevated blood pressure, subclavian central venous access, pleurostomy tube, mediastinal drainage and jejunostomy tube, functional (figure 4); Specific complications associated with hiatal hernia surgery include late weaning from mechanical ventilation, failure of weaning and associated mnemonic processes, among others, delirium due to withdrawal syndrome caused by recreational use of sympathomimetic agents, infections associated with mechanical ventilator, acute respiratory failure, pressure ulcers, thromboembolic phenomena, cardiac arrhythmias, acute pericarditis and death.

Clinical Discussion

A diaphragmatic hernia (DH) is a protrusión of abdominal contents into the thoracic cavity due to a defect within the diaphragm [1]. It is common as a congenital phenomenon, most commonly occurring as a posterolateral defect (Bochdalek hernia), usually on the left side, the size of the defect varies, affecting lung development and resulting in hypoplasia and pulmonary hypertension [2-6]. However, it can also be acquired following blunt, penetrating trauma or iatrogenic causes, which result in a rupture of the diaphragm and herniation of abdominal content; it can also be spontaneous [1]. Acquired DH can be life-threatening, resulting in intestinal incarceration and strangulation, with complications such as late weaning from mechanical ventilation, failure of weaning, associated mnemonic processes, acute respiratory failure, thromboembolic phenomena, cardiac arrhythmias, acute pericarditis, myocardial infarction, peritonitis, mediastinitis, sepsis and death [2,6]. As a congenital phenomenon, it refers to a development defect of the diaphragm that will result in the herniation of abdominal viscera into the chest cavity, neonates present early signs in the first few hours with respiratory distress, which can be life-threatening, survival due to adequate neonatal care has improved, but there's is still a notable risk of morbidity and mortality [1,7].

Thoracic and abdominal injuries may develop into diaphragmatic injuries, although it remains rare with approximately 0.8 to 4% [1,8]. The most common etiology is secondary to trauma which results in diaphragmatic rupture and following herniation; the second most common cause has been associated with iatrogenic due to surgeries, such as liver transplant, liver resection, Nissen fundoplication, left colectomy, adrenalectomy, etc [1,7,9,10]. Patients with no history of trauma may develop breathlessness and chest pain, as initial symptoms, and therefore be misdiagnosed as pneumonic consolidation, thus being diagnosed with DH may be a discovery of further examination and imaging [2].

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As a congenital phenomenon immediate postnatal care includes careful ventilation strategies, management of pulmonary hypertension, and surgical repair but depends on the infant's stability and the severity of the condition [4]. Adults base their treatment on the same principles, currently, laparoscopic repair while less invasive, poses challenges such as difficulty in identifying anatomy due to the size of the hernia, potential for significant bleeding, and issues with closing large hiatal openings, also, associated with a high recurrence rate, with many recurrences being asymptomatic[5,8].

New methods such as using a pedicled vertical rectus abdominis myocutaneous flap as an alternative to conventional techniques like cruroplasty and mesh reinforcement show promise in reducing recurrence and complications, as demonstrated by a successful case study with no hernia recurrence at 12-month follow-up [3].

Patient perspective

A 35-year-old male who requested medical attention due to severe abdominal pain after four days of evolution, dyspnea, and absence of bowel movements, without improvement to the therapy applied based on analgesic, a report of simple abdominal computed tomography was requested, A report of simple abdominal computed tomography was requested, in which hiatal hernia with complete gastric chamber herniation, including portions of the duodenum, was found as a finding; pathological personal history of open cholecystectomy, previous hospitalization due to penetrating stab wound, transfusion of blood products, in less than 5 years; and recent diagnosis of untreated systemic arterial hypertension. He was referred to the emergency department with neurological, metabolic, and hemodynamic integrity, even referring to abdominal pain, with no report of other relevant abdominal symptoms or signs.

Figure 1: Necrotic gastric fundus and body, herniation content.

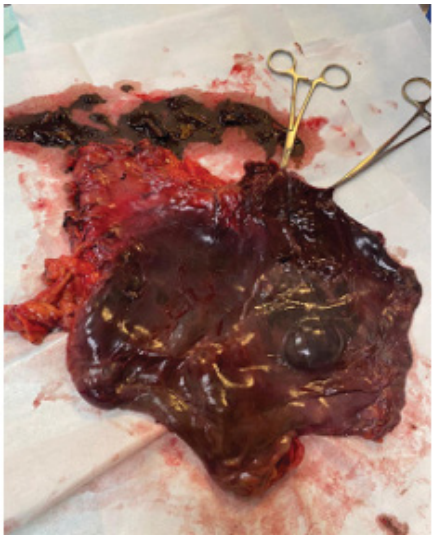

Figure 2: Gastrectomy and superior part of the duodenum.

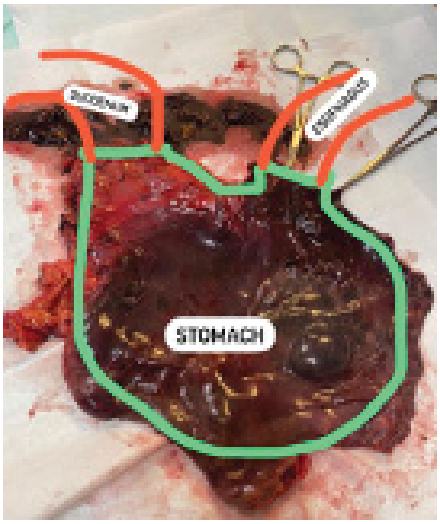

Figure 3: Gastric chamber (stomach), amount of intestinal content at the level of the duodenum and gastroesophageal junction involved.

Figure 4: Drainage directed to anastomosis

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Methods

This case report has been reported in line with SCARE criteria.

Conclusion

DH represents a significant medical challenge due to its multifactorial origins and varied presentations, despite advances in medical management, DH, particularly when acquired, continues to pose a considerable threat to patient survival, with mortality rates reaching up to 31%. Initial treatment focused on abdominal decompression which provides temporary relief and stabilization. However, the definitive management required a comprehensive surgical approach aimed at correcting the hernial defect, resecting necrotic tissue, and restoring gastrointestinal continuity. Despite the surgical intervention, the patient faces significant postoperative complications, including chemical mediastinitis and the risk of bacterial translocation, underscoring the inherent risks associated with DH and its treatment.

Laparoscopic repair has emerged as a preferred treatment option due to its minimally invasive nature, which reduces recovery time and postoperative pain. The incorporation of novel techniques, such as the use of a pedicled vertical rectus abdominis myocutaneous flap, offers promising alternatives by reducing recurrence and minimizing complications, as evidenced by successful case studies with no recurrence at 12-month follow-up.

DH remains a critical condition that requires a multifaceted approach for effective management, advances in surgical techniques and postoperative care are essential to improving patient outcomes. The case study of the 35-year-old male underscores the complexities involved in managing acquired DH and highlights the need for continued research and innovation in treatment methodologies to enhance survival rates and reduce complications. Future efforts should focus on refining surgical techniques, improving early diagnostic capabilities, and developing comprehensive care protocols to manage acquired DH effectively.

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Conflict of interest

The authors deny conflicts of interest related to this paper's writing.

Ethical considerations

Data's confidentiality: The authors state appropriate attachment to their workplace protocols related to the management of the patient's identity information,

People and data protection: The authors state that no animals or humans were affected by this research.

Right to privacy and informed consent

The authors declare total confidence related to the patient's identity information.

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Authors contribution

Gustavo Eduardo Sanchez-Martinez: patient care and clinical case.

Luis Ramón Szymański-Florencia: patient care and clinical case.

Daysi Lucia Figueroa-Cruz: writing and translating

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References

1. Spellar K, Lotfollahzadeh S, Gupta N. Diaphragmatic Hernia. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing (2024).
2. Katukuri GR. Delayed diagnosis of left-sided diaphragmatic hernia in an elderly adult with no history of trauma. Journal of clinical and diagnostic research (2016).
3. Abboud NM. A surgical alternative in the treatment of recurrent diaphragmatic hernia after total gastrectomy. Plastic and Reconstructive Surgery - Global Open 8 (2020).
4. Chandrasekharan PK, Rawat M, Madappa R, et al. Congenital Diaphragmatic hernia - a review. matern health, neonatol, and perinatol 6 (2017): 3.
5. Hashemi, Majid FRCS, Peters, et al. Laparoscopic repair of large type III hiatal hernia: objective followup reveals high recurrence rate. Journal of the American College of Surgeons 190 (2000): 553-560.
6. Lu J, Wang B, Che X, et al. Delayed traumatic diaphragmatic hernia: A case-series report and literature review. Medicine (Baltimore) 95 (2016): e4362.
7. Díaz Candelas DA, De la Plaza Llamas R, Arteaga Peralta V, et al. Complicated diaphragmatic hernia. Cir Esp (Engl Ed). 98 (2020): 238.
8. Simon LV, Lopez RA, Burns B. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Diaphragm Rupture (2023).

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9. Bocchini G, Guida F, Sica G, et al. Diaphragmatic injuries after blunt trauma: are they still a challenge? Reviewing CT findings and integrated imaging. Emerg Radiol 19 (2012): 225-235.

10. Kozak O, Mentes O, Harlak A, et al. Late presentation of blunt right diaphragmatic rupture (hepatic hernia). Am J Emerg Med 26 (2008): 638-642.

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