Cureus
Part of SPRINGER NATURE

Open Access Case Report

# A Decade After the Trauma: An Incarcerated Chronic Post-traumatic Diaphragmatic Hernia as a Cause of Acute Abdomen

**Review began** 11/10/2026
**Review ended** 11/13/2026
**Published** 11/16/2026

**© Copyright** 2026
Castro Mendoza et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**DOI:** 10.7759/cureus.119744

Alexa Maria Castro Mendoza [1], Julio Alexandru Zapata Vega [2]

1. Surgery, Hospital Militar Escuela Dr. Alejandro Davila Bolaños, Managua, NIC 2. Thoracic Surgery, Hospital Militar Escuela Dr. Alejandro Davila Bolaños, Managua, NIC

**Corresponding author:** Alexa Maria Castro Mendoza, almacasme@gmail.com

## Abstract

Traumatic diaphragmatic hernia is an infrequent complication of thoracoabdominal trauma, and its diagnosis is often delayed because of the absence of specific signs in the acute phase. We report a 44-year-old man with a history of penetrating chest trauma from a stab wound 10 years earlier, managed with bilateral chest tube placement, who presented with severe colicky left hypochondrial pain of eight hours' duration radiating to the back. Abdominal ultrasound suggested non-obstructive left nephrolithiasis, and urological evaluation led to a non-contrast CT of the urinary tract (pyelo-CT protocol), which instead showed a simple left renal cyst and, as an incidental finding, a left diaphragmatic hernia with protrusion of the splenic flexure of the colon and omental fat through a 22-mm defect. With suspected incarceration and risk of strangulation, urgent left posterolateral thoracotomy was performed 22 hours after symptom onset. Firm adhesions of the hernial sac to the pleura and lung were released, but the contents could not be reduced even after enlarging the defect with a 2-cm longitudinal phrenotomy (final defect 4 cm); the sac was opened and a partial omentectomy was performed, which allowed reduction and confirmed incarceration. The colonic segment was viable, so no bowel resection was required. The sac was resected, and the diaphragm was repaired by primary two-layer closure reinforced with polytetrafluoroethylene (PTFE) pledgets. The patient recovered without complications, was discharged on hospital day five, and showed no recurrence on a chest radiograph at one year. This case shows that delayed traumatic diaphragmatic hernia should remain in the differential diagnosis of acute abdominal pain in patients with a history of penetrating thoracoabdominal trauma, however remote, and that timely surgery can preserve bowel viability.

**Categories:** General Surgery, Cardiac/Thoracic/Vascular Surgery
**Keywords:** acute abdomen, delayed presentation, diaphragmatic plication, incarcerated hernia, penetrating chest trauma, thoracotomy, traumatic diaphragmatic hernia

## Introduction

Diaphragmatic hernias are classified as congenital or acquired, the latter being traumatic in origin in the vast majority of cases [1]. Delayed-presentation traumatic diaphragmatic hernia is an uncommon entity that is diagnosed months or even years after the initial trauma and poses a clinical challenge because acute diaphragmatic injuries often go unnoticed: the initial chest radiograph is frequently normal, and small, self-contained tears, especially when not accompanied by pneumothorax or hemothorax, may not be identified even on computed tomography (CT) performed in the acute setting [2-4]. These lesions remain silent until, owing to the pressure gradient between the abdominal (positive) and thoracic (negative) cavities, the defect progressively enlarges and allows abdominal contents to migrate into the chest, manifesting with digestive or respiratory symptoms [2]. The clinical presentation depends on the size and location of the defect and the herniated viscus (colon, stomach, small bowel), and it is related to a history of open or blunt thoracic or thoracoabdominal trauma, as well as high-energy polytrauma [5,6]. Contrast-enhanced CT remains the diagnostic reference standard, although a considerable proportion of traumatic diaphragmatic injuries (up to 66% in some reports) are not identified on the initial CT [4], and between 33% and 66% of traumatic diaphragmatic hernias are missed in the acute phase [7]; small tears from penetrating injuries are particularly easy to miss [7].

This report is relevant because it documents a left-sided traumatic diaphragmatic hernia with delayed presentation, a decade (10 years) after a penetrating stab-wound trauma managed initially only with bilateral chest tube placement, without targeted diaphragmatic exploration. The hernia presented as an acute abdomen with suspected incarceration of the splenic flexure of the colon and risk of strangulation, and it was identified incidentally during the workup of a pain syndrome initially interpreted as renal in origin. Reports of this nature remain scarce in the Latin American literature [8]. The aim of this report is to describe the clinical presentation, diagnostic approach, and surgical resolution of this case.

## Case Presentation

A 44-year-old man with no significant personal medical history had a surgical history of bilateral chest tube

placement for penetrating chest trauma from a stab wound 10 years earlier (in 2014, at another hospital; the present episode occurred in 2024); it is not known whether any imaging at that time suggested a diaphragmatic injury. He was an occasional alcohol consumer with no other relevant history.

Pain onset was at 8:00 am. He presented to the emergency department at 4:00 pm with colicky abdominal pain of eight hours' duration, of sudden onset, localized in the left hypochondrium with radiation to the ipsilateral dorsal region, progressing to an intensity of 10/10, not relieved by analgesics, and associated with nausea without emesis and anorexia. On physical examination he was hemodynamically stable, with severe tenderness to palpation in the left hypochondrium and no signs of peritoneal irritation. The initial diagnosis was inflammatory-type abdominal pain. Laboratory tests showed leukocytosis of 18,180/mm³ (reference range: 4,000-10,000/mm³) with neutrophilia of 76.2% (reference range: 40-70%), serum creatinine of 0.84 mg/dL (reference range: 0.7-1.2 mg/dL), and serum amylase of 51 U/L (reference range: 0-100 U/L); urinalysis was normal. C-reactive protein was not measured.

The chest radiograph (Figure *1*) showed no pneumoperitoneum or pleural effusion. An abdominal radiograph showed no bowel loop distension or air-fluid levels, with normal gas distribution and distal gas. Upper abdominal ultrasound (8:30 pm) showed biliary sludge and left nephrolithiasis without obstructive repercussion. Because of the ultrasound finding, urological evaluation was requested, and a non-contrast CT of the urinary tract (pyelo-CT protocol, without oral or intravenous contrast) was performed at 10:30 pm (Figures *2*, *3*); the timing of imaging depended on the availability of the radiology service. It ruled out nephrolithiasis and obstructive uropathy, showing instead a simple left renal cyst (Bosniak I), and revealed, as an incidental finding, a left diaphragmatic hernia with protrusion of the splenic flexure of the colon and omental fat through a 22-mm defect. On the authors' review, the CT also showed a dilated colonic loop within the thoracic cavity passing through a small defect, with a collar (hourglass) sign. Incarceration was suspected because of the disproportion between the small defect and the intrathoracic contents, persistent pain unrelieved by analgesics, and leukocytosis; there were no clinical or radiological signs of obstruction. Given the high risk of strangulation, thoracic surgery evaluation was requested and urgent surgery was indicated.

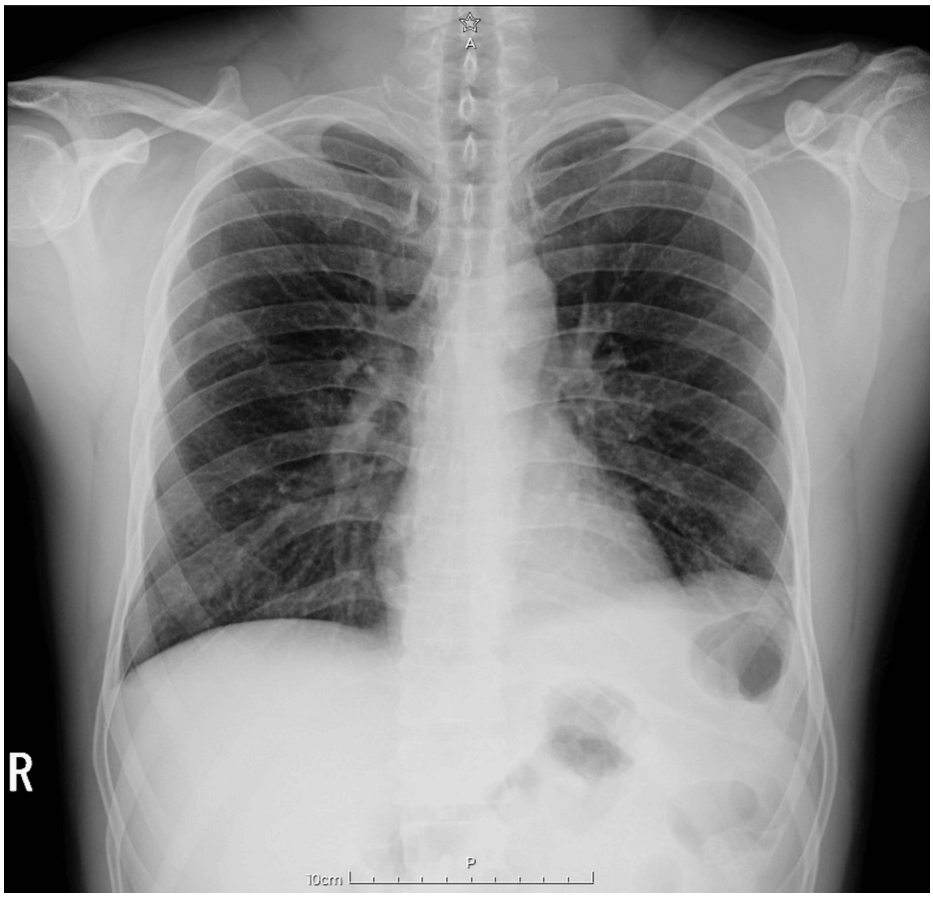



**FIGURE 1: Chest radiograph**

Chest radiograph, anteroposterior view. Both lung fields show no evident consolidations. The cardiomediastinal silhouette appears preserved, with no pneumothorax or significant pleural effusion and no signs of pneumoperitoneum in this projection.



**FIGURE 2: Non-contrast CT (pyelo-CT protocol)**

Non-contrast CT (pyelo-CT protocol), sagittal view. Air-containing image above the level of the left hemidiaphragm (circle), corresponding to the colonic segment herniated into the thoracic cavity, with a collar (hourglass) sign on the authors' review.

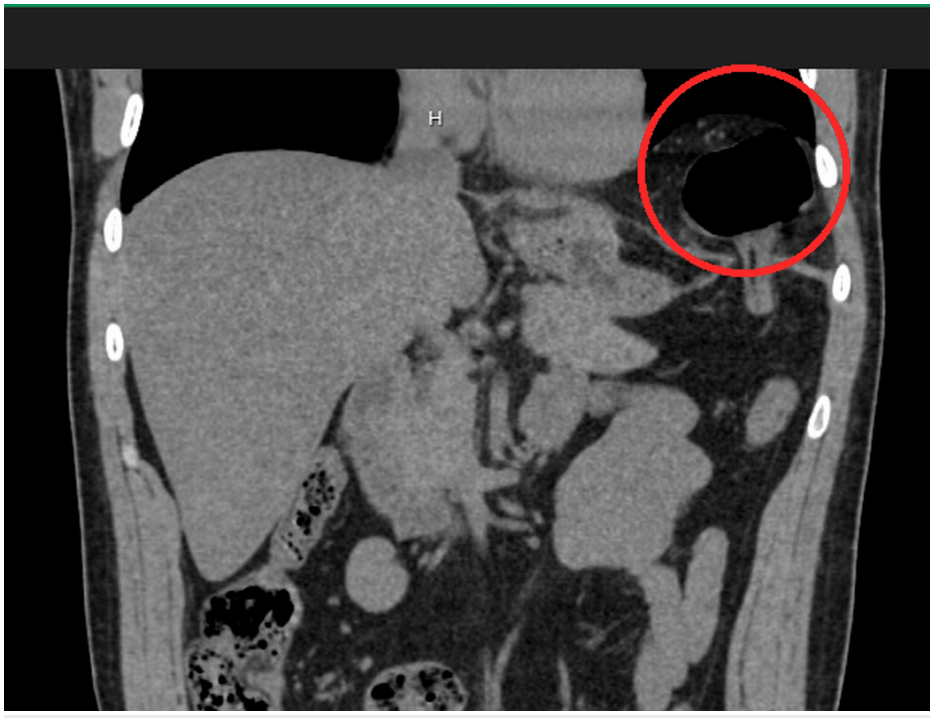



**FIGURE 3: Non-contrast CT (pyelo-CT protocol), coronal view.**

Non-contrast CT (pyelo-CT protocol), coronal view. Passage of intra-abdominal contents through the left diaphragmatic defect into the chest (circle), consistent with the splenic flexure of the colon and omental fat described in the radiology report. No renal lithiasis is seen; a simple cyst is identified in the left kidney (Bosniak I) [9].

The patient was hemodynamically stable, surgical materials and an operating room were requested, and the operation was performed at the first hour of the next morning (6:00 am), 22 hours after pain onset and 14 hours after admission. A left posterolateral thoracotomy was chosen because chronic hernias usually have

firm pleuropulmonary adhesions that cannot be released through an abdominal approach and are difficult to manage thoracoscopically. Under general anesthesia with right selective intubation and in right lateral decubitus, the thorax was entered through the fifth intercostal space. The defect was located in the central portion of the hemidiaphragm and contained only colon and omentum; the hernial sac was very firmly adherent to the pleura and lung parenchyma. The adhesions were released, but the contents could not be reduced even after enlarging the defect with a 2-cm longitudinal phrenotomy (the defect, 2 cm intraoperatively, became 4 cm). The sac was therefore opened, and a small, congested portion of omentum was resected (2-0 silk ligation), which allowed reduction; incarceration was thus confirmed intraoperatively. The colon was pink, with pulsation of the vasa recta adjacent to the colonic segment and peristalsis, so no resection was required, and the sac was resected. There was no pleural effusion, contamination, or lung injury. The defect was closed primarily with four interrupted 1-0 polypropylene mattress sutures, each reinforced with four 4 x 4 mm PTFE pledgets (two at each edge), followed by a second continuous 2-0 polypropylene layer. Pledgets were used because the defect had reached 4 cm, to prevent suture cut-through and reduce the risk of recurrence. No mesh was used because it was not available at our hospital. A 33-Fr left chest tube was placed.

The patient had a favorable course without postoperative complications. The left chest tube was removed on postoperative day four because of no output and no signs of air leak, with a chest radiograph showing no pneumothorax. Pain control was adequate, and he was discharged on hospital day five. He attended follow-up visits at 15 days, monthly for three months, and at one year with a control chest radiograph, which showed no recurrence.

## Discussion

Traumatic diaphragmatic hernia predominates in males and in the left hemidiaphragm, consistent with the present case; this location is explained by the protective effect of the liver over the right hemidiaphragm [10].

With a penetrating mechanism, as in our patient's history of trauma, the initial diaphragmatic defect is usually smaller than in blunt trauma, which favors visceral herniation as a progressive and clinically silent process over years, until the defect enlarges enough to allow the passage of larger viscera, as occurred with the splenic flexure of the colon in this case [4,7].

It is of interest that the diagnosis was established incidentally during a non-contrast CT requested for suspected urological disease, which illustrates the nonspecific clinical presentation of complicated traumatic diaphragmatic hernia. Other series have likewise documented incidental or late diagnoses in the setting of imaging studies requested for indications unrelated to the diaphragmatic injury [5,11].

Regarding surgical management, the choice of approach, thoracic or abdominal, is individualized and depends on hemodynamic stability, suspected bowel ischemia, associated abdominal pathology, and expected pleuropulmonary adhesions, which are more likely in chronic hernias [7,12,13]. A systematic review with proportional meta-analysis comparing thoracotomy with laparotomy found no significant differences in morbidity and mortality, although it recognizes that the thoracic approach offers better exposure in chronic defects, particularly when pleuropulmonary adhesions are suspected [14]. More recent series have described favorable results with minimally invasive techniques (laparoscopic, combined thoracoscopic, and even robotic) in hemodynamically stable patients without significant adhesions [5,12,15]. The World Society for Emergency Surgery (WSES) position paper recommends an abdominal approach first when there are signs of strangulation or perforation, and accepts thoracotomy or thoracoscopy in chronic herniation because of visceropleural adhesions [7]. In our patient there were no peritoneal signs or evidence of obstruction, and the chronicity of the defect and the history of bilateral pleural instrumentation 10 years earlier led us to expect firm pleuropulmonary adhesions, which cannot be released through an abdominal approach and are difficult to manage thoracoscopically. An open left posterolateral thoracotomy was therefore chosen, a decision confirmed intraoperatively by the finding of very firm adhesions of the sac to the pleura and lung.

No mesh was used in this case because it was not available at our institution; the defect, which reached 4 cm after phrenotomy, could be closed primarily and was reinforced with PTFE pledgets to prevent suture cut-through and reduce the risk of recurrence. Mesh is generally reserved for larger defects or when tension-free primary closure is not possible, and the supporting evidence is of low quality [7,16]. Recurrence rates of up to 42% have been reported after primary repair [7].

In contrast to other series in which delayed diagnosis culminated in perforation, visceral necrosis, tension pneumothorax, or mandatory surgical resection [17-20], we relate the favorable outcome in our case, at least in part, to the timeliness of surgical intervention: the interval between symptom onset and surgery (22 hours), which probably contributed to visceral viability.

Limitations of this report include its descriptive nature and the inherent limitations of a single unusual case; the impossibility of establishing definitive causality between the penetrating trauma that occurred a decade earlier and the diaphragmatic defect identified, since no diaphragmatic injury was documented at that time;

the CT was performed without contrast, which limited the assessment of bowel wall enhancement and ischemia; C-reactive protein was not measured; no intraoperative images were obtained; mesh was not available; and follow-up was limited to one year because the patient lost his health insurance.

## Conclusions

Delayed-presentation traumatic diaphragmatic hernia must remain in the differential diagnosis of acute abdominal pain (upper abdomen) in any patient with a history of penetrating thoracoabdominal trauma, regardless of the interval since the initial injury, and a high index of clinical suspicion should be maintained for atypical pain syndromes or those with a torpid course in this population. Timely recognition of the signs of incarceration led to urgent surgery that preserved the viability of the herniated colonic segment, avoided bowel resection, and favored an uncomplicated postoperative course, a short hospital stay, and no recurrence at one year. This report adds to the scarce Latin American evidence on chronic complicated traumatic diaphragmatic hernia and suggests that diaphragmatic evaluation be considered in the long-term follow-up of patients with a history of penetrating thoracoabdominal trauma.

## Additional Information

### Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

**Concept and design:** Alexa Maria Castro Mendoza, Julio Alexandru Zapata Vega

**Acquisition, analysis, or interpretation of data:** Alexa Maria Castro Mendoza, Julio Alexandru Zapata Vega

**Drafting of the manuscript:** Alexa Maria Castro Mendoza, Julio Alexandru Zapata Vega

**Critical review of the manuscript for important intellectual content:** Alexa Maria Castro Mendoza, Julio Alexandru Zapata Vega

**Supervision:** Alexa Maria Castro Mendoza, Julio Alexandru Zapata Vega

### Disclosures

**Human subjects:** Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **AI use statement:** The authors used Claude Sonnet 5.5 (Anthropic, San Francisco, CA, USA) as follows: language polishing, translation, extensive copy editing or writing support in Abstract, Introduction, Case presentation, Discussion, Conclusions (editing and translation from Spanish to English); References (search, verification, and formatting). I provided all the clinical data from the patient's medical record and my direct involvement in his care; the AI tool did not generate any clinical data. I reviewed every section of the manuscript, merged the AI-assisted text with my own independently written text, and corrected it against the clinical record. Dr. Zapata, the surgeon who operated on the patient, also reviewed the full manuscript and verified the operative description and clinical details. No statistical analysis was performed. I checked the references against their original sources (DOIs and publisher or PubMed pages) and reviewed the final reference list and in-text citations. I did not alter the original images other than adding the annotation circles. The authors confirm that they have reviewed and verified all AI-assisted content and take full responsibility for the work. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

## References

1. Tapias L, Tapias-Vargas L, Tapias-Vargas LF: Hernias diafragmáticas: desafío clínico y quirúrgico . Rev Colomb Cir. 2009, 24:95-105.
2. González Flores JE, Orozco Obregón P, Orozco Hidalgo JP, et al.: Chronic post-traumatic diaphragmatic hernias: diagnostic pitfalls, surgical strategies, and long-term outcomes. Cureus. 2025, 17:e95504. 10.7759/cureus.95504
3. Suraj KC, Lamichhane S, Khanal B, Kumar A, Gupta RK: A delayed presentation of traumatic diaphragmatic hernia in a young male: a unusual case report and comprehensive review of literature. J Surg Case Rep. 2024, 2024:rjae613. 10.1093/jscr/rjae613
4. Giangrosso GV Jr, Cassier T, Nakao Y, Denning D, Weaver AJ: Delayed traumatic diaphragmatic hernias: tomorrow's emergency. Cureus. 2025, 17:e91424. 10.7759/cureus.91424
5. Abu Halimah J: Laparoscopic management of large bowel obstruction caused by late post-traumatic

diaphragmatic hernia: a case report. Int J Surg Case Rep. 2023, 111:108816. 10.1016/j.ijscr.2023.108816
6. Shaban Y, Elkbuli A, McKenney M, Boneva D: Traumatic diaphragmatic rupture with transthoracic organ herniation: a case report and review of literature. Am J Case Rep. 2020, 21:e919442. 10.12659/AJCR.919442
7. Giuffrida M, Perrone G, Abu-Zidan F, et al.: Management of complicated diaphragmatic hernia in the acute setting: a WSES position paper. World J Emerg Surg. 2023, 18:43. 10.1186/s13017-023-00510-x
8. Beltrán MA: Presentación tardía de hernia diafragmática traumática con necrosis gástrica: revisión de la literatura científica. Rev Colomb Cir. 2013, 28:54-63.
9. Silverman SG, Pedrosa I, Ellis JH, et al.: Bosniak classification of cystic renal masses, version 2019: an update proposal and needs assessment. Radiology. 2019, 292:475-88. 10.1148/radiol.2019182646
10. Senbu MF, Gudissa DG, Habtamu HT, Desalegn AB: Right side traumatic diaphragmatic hernia presented after 20 years with shortness of breath; a rare case presentation, and literature review. Int J Surg Case Rep. 2024, 121:109973. 10.1016/j.ijscr.2024.109973
11. Yunus Shah M, Abdrabou AA, Obalappa P: Delayed presentation of post-traumatic multiorgan left diaphragmatic hernia: a case report and literature review. Cureus. 2022, 14:e26814. 10.7759/cureus.26814
12. Hashimoto H, Miyazaki Y, Kuroda K, et al.: Safe repair of a delayed right-sided traumatic diaphragmatic hernia using combined thoracoscopy and laparoscopy: a case report. Asian J Endosc Surg. 2025, 18:e70166. 10.1111/ases.70166
13. Jones EK, Andrade R, Bhargava A, Diaz-Gutierrez I, Rao M: Surgical management of delayed-presentation diaphragm hernia: a single-institution experience. JTCVS Tech. 2022, 13:263-9. 10.1016/j.xjtc.2022.04.012
14. Silva GP, Cataneo DC, Cataneo AJ: Thoracotomy compared to laparotomy in the traumatic diaphragmatic hernia. Systematic review and proportional methanalysis. Acta Cir Bras. 2018, 33:49-66. 10.1590/s0102-865020180010000006
15. Holder P, Bakeer MA: Robot-assisted repair of delayed traumatic diaphragmatic hernia: a case report . J Surg Case Rep. 2024, 2024:rjae197. 10.1093/jscr/rjae197
16. Filosso PL, Guerrera F, Sandri A, et al.: Surgical management of chronic diaphragmatic hernias . J Thorac Dis. 2019, 11:S177-85. 10.21037/jtd.2019.01.54
17. Sóti Á, Nagy G, Győri Z, Vass T, Hetzman L, Fenyves BG, Varga C: Tension pneumothorax from large bowel herniation and perforation as a late presentation of traumatic diaphragmatic hernia during pregnancy: a case report. Int J Emerg Med. 2025, 18:40. 10.1186/s12245-025-00843-1
18. Yadav KK, Ghimire R, Rauniyar R, et al.: Delayed presentation of traumatic diaphragmatic hernia complicated by bowel obstruction and perforation: a case report. Ann Med Surg (Lond). 2023, 85:4608-12. 10.1097/MS9.0000000000001091
19. Guevara-Kissel MF, Gumbs S, Andrade J, Donaldson B: Strangulated gastric hernia following a missed traumatic diaphragmatic injury: a case report. Cureus. 2023, 15:e46273. 10.7759/cureus.46273
20. Brito G, Iraizoz AM: [Catastrophic traumatic diaphragmatic hernia with subtotal section of the pylorus: case report]. An Sist Sanit Navar. 2020, 43:411-5. 10.23938/ASSN.0915