

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Traumatic diaphragmatic hernia in rural Nepal: A rare case report illuminating diagnostic challenges and healthcare discrepancies [☆]

Shailendra Katwal, MD^{a,*}, Aastha Ghimire, MBBS^b, Kusum Shrestha, MBBS^c

^a Department of Radiology, Dadeldhura Subregional Hospital, Dadeldhura, Nepal

^b Patan Academy of Health Sciences, Kathmandu, Nepal

^c Kist Medical College and Teaching Hospital, Kathmandu, Nepal

ARTICLE INFO

Article history:

Received 23 August 2023

Accepted 26 August 2023

Keywords:

Case report

Traumatic diaphragmatic hernia

Rural Nepal, Recurrent epigastric

pain

Proton pump inhibitor

ABSTRACT

Traumatic diaphragmatic hernia (TDH), a rare condition, often presents with diverse symptoms and can be undiagnosed for a long time. This case study underscores the significance of considering uncommon ailments, particularly in underserved regions with limited medical access. A woman with recurring epigastric pain and respiratory issues, self-treated for gastritis, was eventually diagnosed with a large diaphragmatic hernia caused by prior trauma. This highlights challenges faced by rural patients due to inadequate healthcare access. Timely diagnosis, even for prolonged symptoms, is crucial. Improved health care and education in underserved areas are essential for timely treatment and better outcomes.

© 2023 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

Traumatic diaphragmatic hernia (TDH) is an uncommon disease, encountered in 0.8%–6% of blunt trauma and more than 17% of thoracic-abdominal-penetrating trauma [1]. A wide spectrum of different mechanisms of injury, timing in presentation, size of the diaphragmatic defect, types and amount of abdominal viscera herniated into the chest cavity and clinical symptoms are observed in chronic diaphragmatic hernia [2]. An unidentified rupture can enlarge when intra-abdominal pressure rises. Because of the natural pressure differential be-

tween the abdomen and thorax, and the continuous movement of the diaphragm, the rupture may not heal spontaneously [3]. Carter et al. noted that patients can experience an asymptomatic period, referred to as the “latent phase,” for decades before finally manifesting symptoms, sometimes with severe complications [4]. Here, we present a case of a lady in her late 40s suffering from long-standing gastrointestinal and respiratory symptoms and self-medicating with proton pump inhibitors diagnosed with a large traumatic chronic diaphragmatic hernia. This case report has been reported in accordance with the CARE criteria [5].

[☆] Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

* Corresponding author.

E-mail address: shailendrakatwal@gmail.com (S. Katwal).

<https://doi.org/10.1016/j.radcr.2023.08.115>

1930-0433/© 2023 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Case details

A 48-year-old woman visited our hospital's outpatient department with complaints of recurring epigastric pain over the past 10-12 years. She resided in a rural area of Nepal and had not sought medical attention before this visit. Her family member recommended that she visit a healthcare facility due to her prolonged symptoms, which had not improved despite trying home remedies and over-the-counter medications. The patient began experiencing mild, intermittent epigastric pain around 12 years ago. However, over the years, both the frequency and severity of the pain have increased. She described the pain as a gnawing sensation that lasts for approximately 30 minutes to an hour during each episode, without radiating to other areas. The pain primarily occurred when her stomach was empty, although she also noted that it did not completely subside after eating and instead caused significant discomfort. The discomfort was more pronounced with increased quantities of food consumed which had led her to decrease her food intake and resulted in a significant weight loss. Her pain was associated with symptoms of dyspepsia but she did not have a history of vomiting or alteration in bowel habits. She had also been experiencing shortness of breath after meals which were not associated with any chest pain, chest discomfort, or cough and it lasted approximately for an hour. She and her family members believed that her symptoms were due to gastritis, which is commonly perceived as a prevalent issue among the general population in Nepal. Consequently, she had been self-medicating with over-the-counter antacids and proton pump inhibitors for the past 5 years, but these medications did not alleviate her symptoms. The patient had no known comorbidities as this was her initial visit to the hospital. She did not mention any significant events that required medical attention before this episode, and none of her family members were known to have any diseases. The patient's physical appearance indicated a thin build during the examination, with a recorded BMI of 19. Her blood pressure was measured at 90/60 mmHg, pulse rate at 95 beats per minute, respiratory rate at 22 breaths per minute, and oxygen saturation on room air at 93%. Upon auscultation of the chest, diminished breath sounds were observed on the left side, while distant heart sounds were noted. The rest of the physical examination yielded normal findings. As part of the symptom evaluation, laboratory investigations including a complete blood count (CBC), serum amylase, and serum lipase were ordered (Table 1). Additionally, a chest X-ray was performed, which revealed a significant lucent lesion occupying the left hemithorax and causing a shift of the trachea and mediastinum towards the right side (Fig. 1). Based on the assessment of the symptoms and the diagnostic findings, a provisional diagnosis of a diaphragmatic hernia was made. A comprehensive history was reacquired from the patient, encompassing her birth and childhood details. However, she affirmed having a regular birth and childhood. Nonetheless, she did disclose a fall from a cliff with height of approximately 200 m that occurred 15 years ago and reported having this symptoms a few years following the incident. Surprisingly, the patient only received some first aid from a local health post and she believed the incident did not result in any serious injuries.

Table 1 – Hematological and biochemical findings of the patient.

Examination	Result	Reference range
CBC		
Total Leucocyte Counts	8.5 thou/ul	4.5-11.0 × 10 ⁹ /L
Neutrophil	65	40%-70%
Lymphocyte	30	20%-45%
Monocyte	3	2%-10%
Eosinophil	2	1%-6%
Hemoglobin	13.4 g/dl	12-14 g/dl
RBC count	5.02 mill/cumm	4.5-5.5 mill/cumm
PCV	41	35-54
M.C.V	82 fl	80-100 fl
M.C.H	27 pg	26-34pg
M.C.H.C	33%	32%-36%
RDW	12.3%	11%-16%
Platelets count	291,000 thou/ul	150,000-450,000
Serum		
Serum amylase	58 U/L	25-125 U/L
Serum lipase	40 U/L	0-160 U/L



Fig. 1 – Chest X-ray postero-anterior view showing large lucent lesion occupying left hemithorax with shifting of trachea and mediastinum to the right side. The lucent lesion is continuous in the abdominal cavity.

To identify the defect properly, a contrast-enhanced computerized tomography (CECT) was ordered which showed a diaphragmatic defect measuring about 6.4 cm with the herniation of the stomach and transverse colon; transverse colon lying anterior to the stomach (Figs. 2A-C). A diagnosis of chronic diaphragmatic hernia, secondary to blunt abdominal trauma, was established. The patient was informed about the diagnosis and how it accounted for all of her symptoms. Furthermore, she received counseling regarding the surgical treatment options available, which would help alleviate her persistent symptoms and prevent complications like strangulation and incarceration. Corrective surgery was performed which

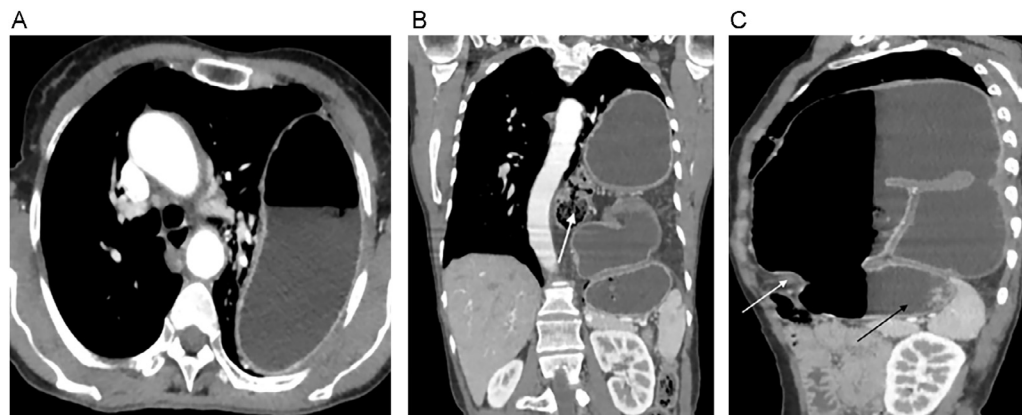


Fig. 2 – (A) Contrast-enhanced CT axial view at the level of arch of the aorta showing the stomach lying in left hemithorax with air-fluid level within. (B) CECT coronal view at the level of descending abdominal aorta showing herniated stomach and transverse colon (white arrow) lying in left hemithorax. (C) CECT sagittal image showing diaphragmatic defect with distension of the herniated stomach and greater curvature lying superior to lesser curvature in an inverted position. Fundus (black arrow) is directed posteroinferiorly. The intact part of the left anterior hemidiaphragm is shown by the white arrow.

involved thoracotomy followed by separation of abdominal organs from lung and chest wall. The stomach and transverse colon were then reduced into the abdominal cavity and the defect in the diaphragm was closed with sutures. The postoperative course of the patient was uneventful and the patient has been visiting for regular follow ups. Her appetite has significantly increased and her pain has subsided. She reported to have stopped using the over the counter medications and her shortness of breath has resolved. The patient's quality of life has remarkably improved.

Clinical discussion

A diaphragmatic hernia is a protrusion of abdominal contents into the thoracic cavity due to a defect within the diaphragm. Although it is most frequently a congenital phenomenon, there have been rare instances where it can be acquired [6]. The most frequent cause of acquired diaphragmatic hernia is forceful or penetrating trauma, which leads to a ruptured diaphragm and subsequent herniation of abdominal contents [6]. Additionally, it has been reported that DH may occur spontaneously or as the outcome of iatrogenic causes [6]. An abrupt increase in the pleuroperitoneal pressure gradient can lead to herniation of abdominal viscera into the thorax leading to traumatic diaphragmatic hernia [7]. Diaphragmatic hernia's distribution after blunt trauma is as follows: 50%-80% are isolated to the left hemidiaphragm and 12%-40% to the right one; 1%-9% are bilateral. This preponderance for left-sided injuries is thought to be related to the protective effect of the bare area of the liver in contact with the diaphragm on the right, dissipating some traumatic forces [1]. Herniation occurs early, but it is asymptomatic for many years, the patient is apparently well but might perhaps be suffering from chronic and rather non-specific symptoms of upper abdominal or lower chest pain. These symptoms may occur particularly after eating or drinking [8]. In our case, the patient was

a 48-year-old female who presented with prolonged duration of gastrointestinal symptoms for 12 years which was aggravated after feeding, and also had a history of trauma 15 years back. Since the patient lacked adequate knowledge and access to the health care facility, she was unaware of the condition she was suffering from. She had made assumptions about her diagnosis based on the commonly "prevalent" conditions and she solely relied on over-the-counter medications such as proton pump inhibitors for a long period. The initial trauma may be long forgotten and its importance may not be appreciated when symptoms of delayed herniation occur [7]. Our patient was diagnosed with a diaphragmatic hernia after she was evaluated for her long-standing symptoms with radiological investigations. This highlights the importance of both the current as well as remote history of the patient which might be the key to a diagnosis like in our case. Chronic TDH should be diagnosed promptly because obstruction and strangulation of the intra-abdominal organs increase morbidity and mortality [1] and hence surgical treatment should be an immediate approach to management.

This case serves as a noteworthy example, highlighting a rare occurrence while shedding light on one of the many similar cases in rural Nepal. It reveals that patients in these areas may be diagnosed with uncommon conditions during their first-ever visit to a healthcare facility, often at an advanced age. Both limited knowledge and accessibility can be considered contributing factors in such situations. The prevalent practice of seeking medical attention only when there is an obvious life-threatening condition is not uncommon in rural Nepal, further exacerbating the burden of disease. This case emphasizes the importance of physicians considering past medical histories and rare diagnoses in patients like this, while also urging authorities to take appropriate measures to address the significant disparities in healthcare knowledge and access among different populations in Nepal. The healthcare seeking behavior and knowledge can be influenced by the community norms, values, socioeconomic background of the patient, cost as well as perceptions of the community toward

health care. These factors can be addressed from a grass root level only by incorporating the healthcare education from the early years in school, including healthcare education in informal education, trainings of relevant group in the community like mothers group and female community health volunteers in the context of Nepal. The geography remains as a major factor in limiting the accessibility which has to be addressed from the level of policy makers. Also since specialist care is not available in many parts of the country, it is important for all the healthcare professional to get regular refresher trainings, academic sessions on rare cases, etc. so that it adds to their knowledge as well as increases diagnosis or at least timely suspicion and referral of rare cases such as this one.

Conclusion

In conclusion, this case report highlights the significance of considering rare diagnoses, such as traumatic diaphragmatic hernia, in patients with prolonged and unexplained symptoms. The patient's long-standing gastrointestinal and respiratory symptoms were initially attributed to gastritis, leading to self-medication and delayed diagnosis. A comprehensive medical history and radiological investigations were essential in identifying the diaphragmatic hernia and guiding appropriate management. This case emphasizes the importance of healthcare providers being vigilant, particularly in underserved areas, and underscores the need for improved healthcare resources and education to ensure timely and accurate diagnoses for patients.

Authors' contribution

Shailendra Katwal: Conceptualization, mentor and reviewer for this case report and for data interpretation. **Aastha Ghimire:** Contributed in performing literature review, writing the paper and editing. **Kusum Shrestha:** Contributed in writing the paper. All authors have read and approved the manuscript

Patient consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.radcr.2023.08.115](https://doi.org/10.1016/j.radcr.2023.08.115).

REFERENCES

- [1] Gu P, Lu Y, Li X, Lin X. Acute and chronic traumatic diaphragmatic hernia: 10 years' experience. *PLoS One* 2019;14(12):e0226364.
- [2] Filosso PL, Guerrera F, Sandri A, Lausi PO, Lyberis P, Bora G, et al. Surgical management of chronic diaphragmatic hernias. *J Thorac Dis* 2019;11(Suppl 2):S177–85.
- [3] Petrone P, Asensio JA, Marini CP. Diaphragmatic injuries and post-traumatic diaphragmatic hernias. *Curr Probl Surg* 2017;54(1):11–32.
- [4] Carter BN, Giuseffi J, Felson B. Traumatic diaphragmatic hernia. *Am J Roentgenol Radium Ther* 1951;65(1):56–72.
- [5] CARE Case Report Guidelines [Internet]. [cited 2023 Jul 14]. CARE Checklist. Available at: <https://www.care-statement.org/checklist>.
- [6] Spellar K, Lotfollahzadeh S, Gupta N. Diaphragmatic hernia. *StatPearls* [Internet], Treasure Island (FL): StatPearls Publishing; 2023. Available at: <http://www.ncbi.nlm.nih.gov/books/NBK536952/>.
- [7] McHugh K, Ogilvie BC, Brunton FJ. Delayed presentation of traumatic diaphragmatic hernia. *Clin Radiol* 1991;43(4):246–50.
- [8] Lu J, Wang B, Che X, Li X, Qiu G, He S, et al. Delayed traumatic diaphragmatic hernia: a case-series report and literature review. *Medicine (Baltimore)* 2016;95(32):e4362.