



# Laparoscopic approach in chronic posttraumatic diaphragmatic hernia

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Chronic posttraumatic diaphragmatic hernia is an unusual disease with challenging diagnosis and treatment. Surgery represents the treatment of choice which can be transabdominal, transthoracic, or combined approach. The principles of surgery consist of herniated visceral organs reduction and diaphragmatic defect closure. This video demonstrates the steps of chronic posttraumatic diaphragmatic hernia repair via a laparoscopic approach and concerning points during the operation.

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## INTRODUCTION

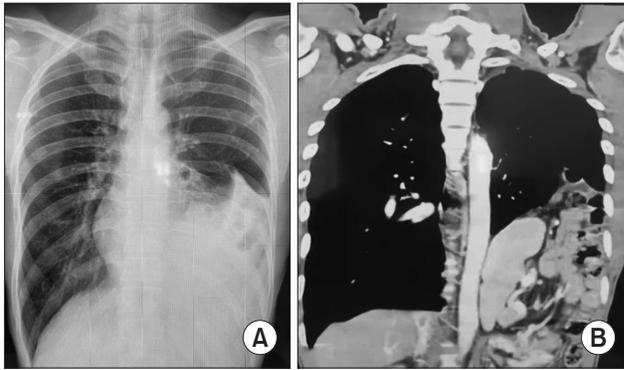
Chronic posttraumatic diaphragmatic hernia, as a result of undiagnosed and untreated diaphragmatic injury, is more frequent on the left side of diaphragm. Usual clinical presentation may range from asymptomatic cases to serious respiratory/gastrointestinal symptoms due to protrusion of visceral organ into thoracic cavity. Plain X-ray film and computed tomography (CT) scan are initial investigations to confirm the diagnosis. Surgery represents the treatment of choice which can be transabdominal, transthoracic, or combined approach using either open or minimally invasive techniques. Nowadays, there is no consensus approach for the treatment of chronic diaphragmatic hernia.

In general, a diaphragmatic hernia defect is directly repaired with a tension-free suture. The role of prosthesis mesh is recommended in case of very large defects or unfeasible tension-free

sutures [1]. Challenge in the laparoscopic approach is owing to intrathoracic adhesion, multiple organ migration, and difficulty of the technique to close the diaphragmatic defect.

## METHODS

A 37-year-old male patient, previously healthy, presented with dyspnea for a month. He had a history of blunt abdominal trauma 10 years ago. Chest X-ray and CT scan revealed herniated visceral organs, including small bowel, splenic flexure colon, and spleen, in the left thoracic cavity (Fig. 1). He was diagnosed with a left diaphragmatic hernia. Laparoscopic left diaphragmatic hernia repair was performed (Supplementary Video 1). The patient was placed in reverse Trendelenburg position under general anesthesia. A camera port (12 mm) was inserted in the left paraumbilical area and four working ports were inserted at the



**Fig. 1.** Chest X-ray (A) and computed tomography scan (B) revealed herniated visceral organs, including the small bowel, splenic flexure colon, and spleen in the left thoracic cavity.

epigastrium (Nathanson liver retractor; Cook Medical, Bloomington, IN, USA), right paraumbilical area (12 mm), right upper quadrant area (5 mm), and left upper quadrant area (5 mm), respectively. After reduction of herniated visceral organs, the diaphragmatic defect was measured (8 × 5 cm in size) and closed with a nonabsorbable interrupted suture. Composite mesh, 20 × 25 cm in size, was placed and fixed with absorbable tackers and suture fixation near the vulnerable area, such as pericardium or aorta.

## RESULTS

The operative time was 120 minutes with 20 mL of estimated blood loss. The patient was discharged on the third day after surgery, without any complications. The patient tolerated regular diet without difficulty. Two weeks after the surgery, he returned to work without any breathing or eating problems.

## DISCUSSION

The surgical approach in chronic posttraumatic diaphragmatic hernia includes transabdominal, transthoracic, and combined approach with an increasing role of minimally invasive techniques. There is no consensus on the preferred approach. In classical teaching, large chronic posttraumatic diaphragmatic hernias should be approached using thoracotomy to allow for lysis of intrathoracic adhesions [2]. According to a systematic review of chronic diaphragmatic hernia, the thoracic approach is 3 times higher than the abdominal approach (69% vs. 24%). Ten percent of abdominal approaches needed thoracic opening and 15% of thoracic approaches needed further abdominal opening. But there was no statistical difference between both groups [3]. The benefits of the abdominal approach over the thoracic approach

are assessment of both diaphragms and management of visceral organs incarceration. The choice of approach depends on the presence of associated injuries, surgeon expertise and preference [4,5].

In conclusion, the laparoscopic approach to chronic posttraumatic diaphragmatic hernia is feasible with favorable outcomes.

## NOTES

### Ethical statements

This study was approved by the Institutional Review Board of Chulalongkorn Hospital with a waiver of informed consent (No. 0303/65).

### Authors' contributions

Conceptualization: All authors

Writing—original draft: AA

Writing—review and editing: All authors

All authors read and approved the final manuscript.

### Conflict of interest

All authors have no conflicts of interest to declare.

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### Supplementary materials

Supplementary materials can be found via <https://doi.org/10.7602/jmis.2022.25.2.77>.

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