AG-2022-115
doi.org/10.1590/S0004-2803.202204000-94

Robotic repair of Morgagni hernia in adult patient

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Received: 3 August 2022
Accepted: 15 August 2022

Morgagni hernia is a retrosternal defect between the sternum and the costal attachments of the diaphragm, first described in 1769[1,2]. The defect is congenital and occurs in childhood but is not diagnosed until later in life when pulmonary, gastrointestinal, or nonspecific thoracoabdominal symptoms such as pressure or pain occur[1]. Pulmonary symptoms may include shortness of breath or recurrent pneumonia. Gastrointestinal symptoms include gastroesophageal reflux, dysphagia, regurgitation, or obstruction[1-3]. These symptoms usually lead to diagnostic workup, including cross-sectional imaging, leading to elective repair. The rarity of the diagnosis makes it difficult to standardize recommendations for the method of repair. Recently, this rare condition has been treated with a robotic-assisted procedure[1-6]. This video demonstrates a robotic repair of a Morgagni hernia in an adult. We present the case of a 43-year-old woman who has been suffering from gastroesophageal reflux for a long time. Recently, she complained of dyspnea and was hospitalized for investigation of a possible pulmonary infection. CT and MRI showed a large Morgagni hernia with a major omentum herniating into the anterior mediastinum (FIGURE 1A). She was then transferred to our care. It was decided to correct the Morgagni hernia with primary closure followed by mesh insertion (E-VIDEO*). A robotic approach was proposed, and consent was obtained. The patient was placed in supine position and 30º reversed Trendelenburg position. Robotic-assisted surgery was performed using the da Vinci Xi robotic platform (Intuitive Surgical Inc., Sunnyvale, CA). Five trocars were used in this technique. A pneumoperitoneum was created using an open technique in the infra-umbilical port and maintained at 14 mmHg. The remaining trocars were inserted under direct vision. In this technique, the surgeon sits at the robotic console and the assistant surgeon stands at the left side of the patient. After docking the robotic system, her great omentum was found to have auto-reduced, but the defect was clearly visible (FIGURE 1B). The first step is to create a peritoneal flap, starting with the round and falciform ligaments. Dissection is performed in the preperitoneal plane until the hernial sac is reached. At this point, complete reduction of residual fat from the hernia is performed and the hernia sac is dissected (FIGURE 1C). The diaphragmatic defect (FIGURE 1D) is closed with a tension-

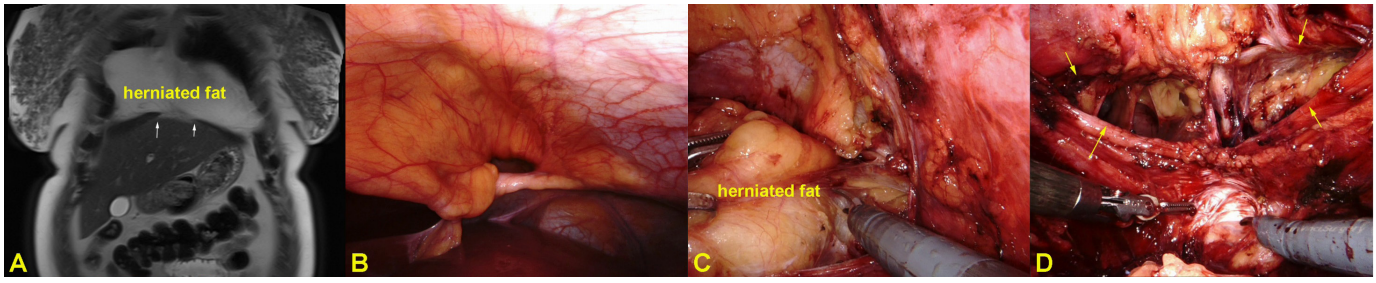

FIGURE 1. Robotic repair of Morgagni hernia. A) Preoperative magnetic resonance imaging shows a diaphragmatic defect (arrows) with intrathoracic fat hernia. B) Intraoperative view of the Morgagni hernia. C) Intraoperative view of dissection of the hernia sac. D) Intraoperative view after removal of the hernia sac and intrathoracic fat. A large diaphragmatic defect is seen (arrows).

Declared conflict of interest of all authors: none
Disclosure of funding: no funding received
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***E-VIDEO: https://youtu.be/V119D2b6hsI**

free, nonabsorbable barbed suture (FIGURE 2A). The defect is measured, and a mesh is inserted to cover the defect with adequate overlap. The mesh is secured with an interrupted absorbable suture (FIGURE 2B). The peritoneal flap is then closed with barbed absorbable running suture (FIGURE 2C). No drainage was left in place. The operative time was 216 minutes, with minimal bleeding and no need for blood transfusion. Intensive care was not required, and she was discharged on postoperative day 2. At 6 months after surgery, she is asymptomatic, and magnetic resonance imaging shows complete resolution of the diaphragmatic defect (FIGURE 2D). Robotic repair of Morgagni hernias is feasible and safe. The robotic platform provides additional degrees of freedom that make retrosternal surgery more ergonomic for the surgeon. This surgery benefits from the dexterity and wrist dexterity of the instruments. Suturing the diaphragmatic defect and mesh (on the "ceiling" of the surgical field) becomes a simple endeavor when performed with the robot. This video demonstrates the key steps (E-VIDEO) required to perform this complex procedure.

Authors' contribution

Machado MAC, Mattos BH and Makdissi FF carried out the operative procedure. Epstein MG and Lobo Filho MM edited the video. Epstein MG, Lobo Filho MM and Makdissi FF supervised and commented on the manuscript. All authors discussed the results and contributed to the final manuscript.

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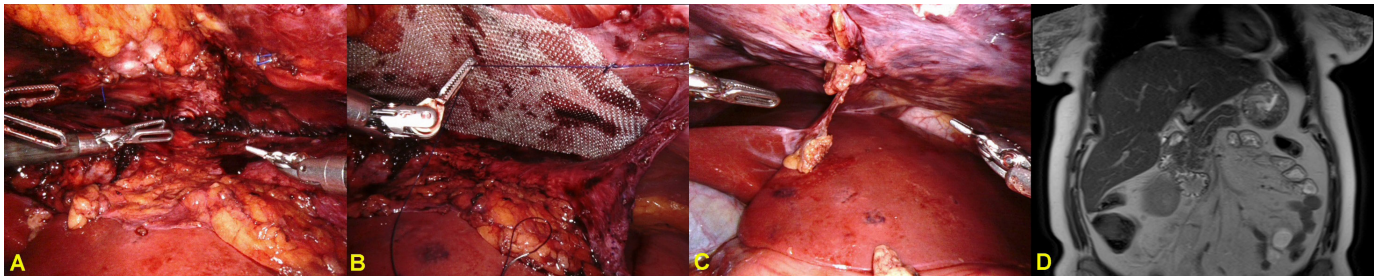

FIGURE 2. Robotic repair of Morgagni hernia. A) Intraoperative view after primary closure of the diaphragmatic defect with a nonabsorbable barbed suture. B) Intraoperative view: mesh is secured with interrupted absorbable sutures. C) Intraoperative view after completion of robotic repair of Morgagni hernia with closure of the peritoneal flap. D) Postoperative magnetic resonance imaging shows resolution of the Morgagni hernia.

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