



BACKGROUND

Type IV hiatal hernias **are the rarest and most complex form of paraesophageal hernia**, involving herniation of multiple intra-abdominal organs — including the entire stomach, transverse colon, and omentum — into the mediastinum.

Surgical repair is technically demanding due to:

- Extensive mediastinal dissection required
- Risk of bilateral pleural violation
- Need for adequate esophageal length
- Minimizing operative morbidity

Robotic-assisted approaches may facilitate the precision dissection and suturing required in these highly complex cases.

CASE PRESENTATION

46-Year-Old Male — Type IV Hiatal Hernia

PMH: Asthma, GERD, chronic cough | Referred by GI | No prior surgery

Preoperative workup:

- Esophagogastroduodenoscopy (EGD) with biopsy
- Barium esophagram
- Esophageal manometry
- CT chest — coronal view shown below



Fig. 1 — Preop CT (coronal): entire stomach & transverse colon herniated into right hemithorax

Disclosures: S. Kilcullen: None. M.L. Inra: None.

OBJECTIVES

To demonstrate a stepwise robotic repair of a giant type IV hiatal hernia containing the entire stomach and transverse colon, highlighting key technical considerations for safe and effective repair.

- ▶ Demonstrate feasibility of robotic-assisted repair of massive type IV hiatal hernia
- ▶ Highlight complete hernia sac excision and mediastinal dissection to carina
- ▶ Illustrate primary cruroplasty technique without mesh reinforcement
- ▶ Demonstrate Toupet fundoplication and anterior gastropexy

METHODS

A 46-year-old male with a type IV hiatal hernia underwent EGD followed by robotic-assisted hiatal hernia repair using the da Vinci Xi surgical system.

- 1 Reduction of herniated colon, omentum, and stomach
- 2 Complete mediastinal hernia sac dissection and excision
- 3 Circumferential esophageal mobilization to carina
- 4 Posterior cruroplasty — running + interrupted sutures
- 5 Toupet (270°) fundoplication
- 6 Anterior gastropexy
- 7 Completion EGD — confirm wrap integrity & patency

ROBOTIC PLATFORM ADVANTAGES

Enhanced Visualization: 3D HD optics with magnification — precise tissue plane identification in the mediastinum

Wristed Instruments: Articulated instruments enable suturing at difficult angles for cruroplasty and fundoplication

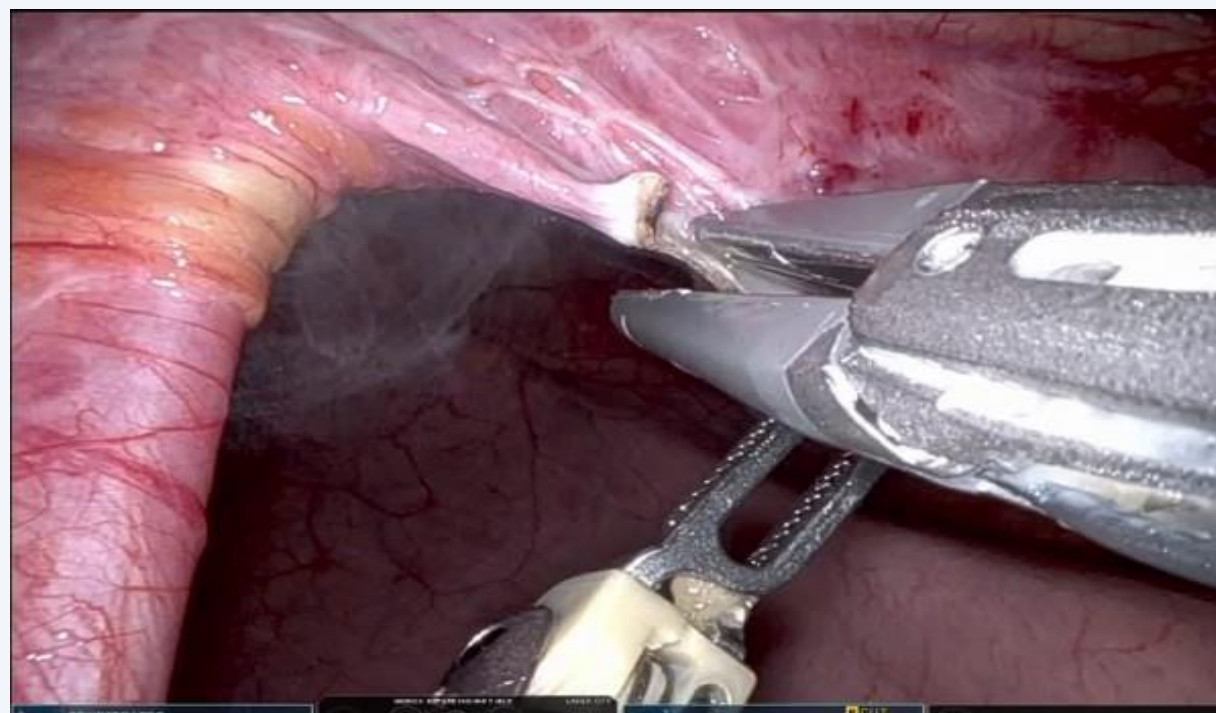
Tremor Filtration: Motion scaling reduces inadvertent injury risk near esophagus, vagus nerves, and aorta

Surgeon Ergonomics: Console-based platform reduces fatigue during lengthy mediastinal dissections

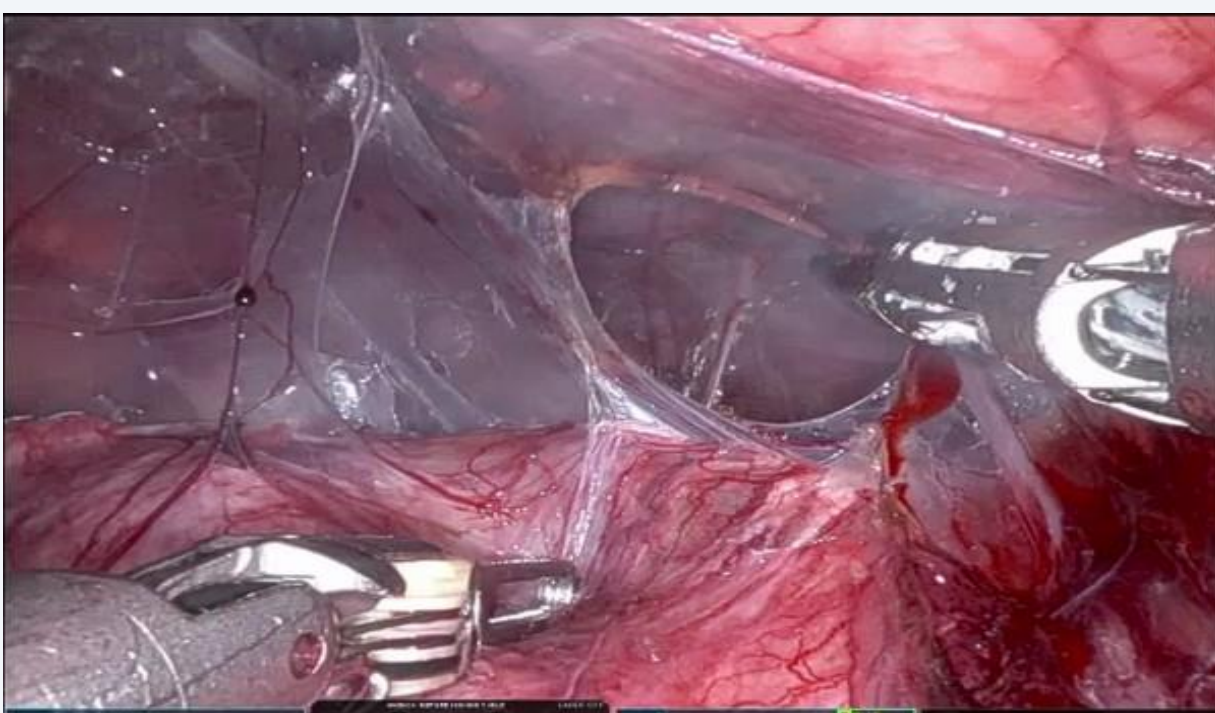
INTRAOPERATIVE FINDINGS



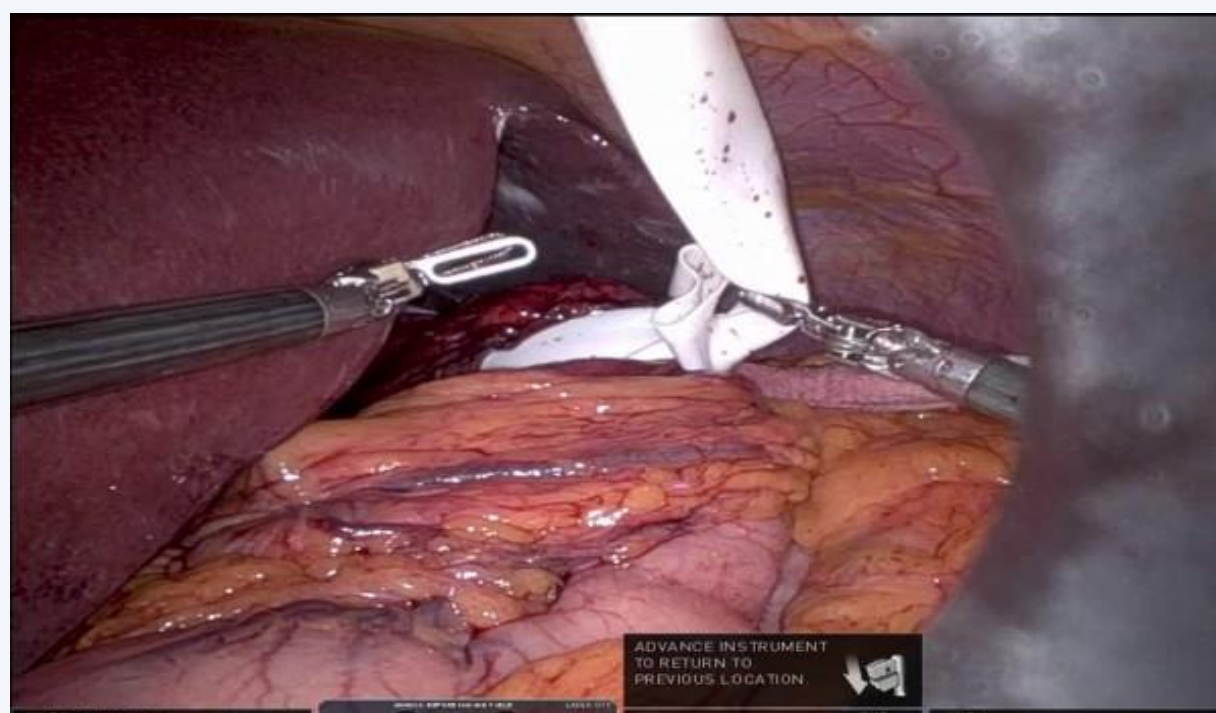
(A) Herniated Colon Reduction



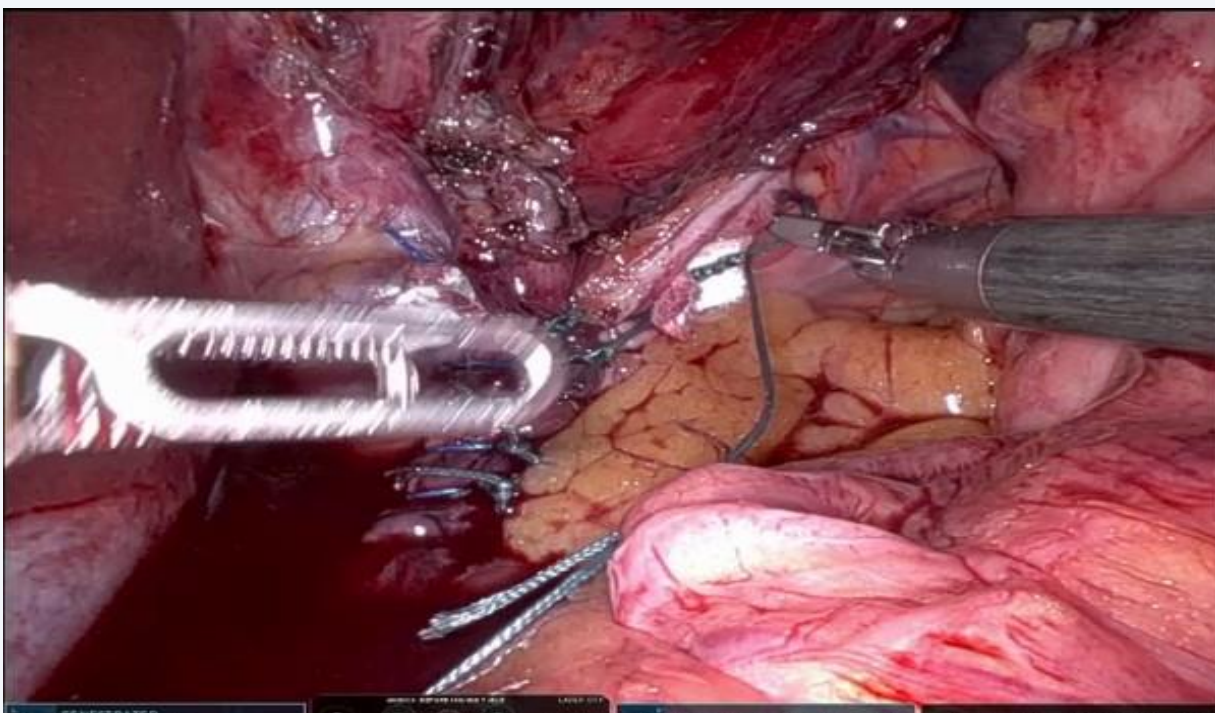
(B) Hernia Sac Dissection



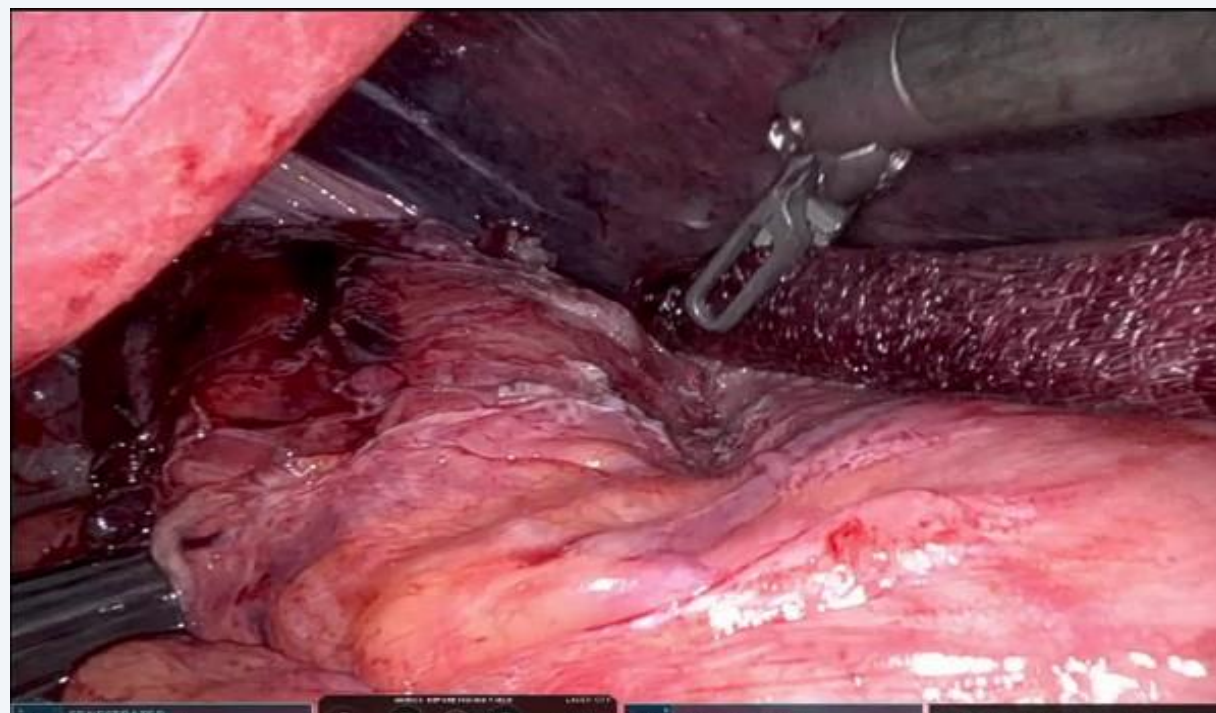
(C) Mediastinal Dissection



(D) Esophageal Mobilization



(E) Posterior Cruroplasty



(F) Toupet Fundoplication

RESULTS

Successful Reduction

Entire stomach and transverse colon reduced to abdominal cavity. No conversion to open surgery required.

No Lengthening Required

Adequate intra-abdominal esophageal length achieved without Collis gastroplasty.

Mesh-Free Closure

Complete hiatal closure without mesh. Completion EGD confirmed intact fundoplication with no obstruction.

DISCUSSION

- ▶ **Hernia sac management:** Complete excision of the mediastinal sac is critical to reducing recurrence risk in type IV repairs.
- ▶ **Esophageal length:** Circumferential mobilization to the carina achieved adequate intra-abdominal length, avoiding the need for a Collis gastroplasty.
- ▶ **Cruroplasty technique:** A combined running and interrupted non-absorbable suture technique was used for a durable primary closure without mesh.
- ▶ **Fundoplication choice:** Toupet (270°) fundoplication was selected to minimize dysphagia risk following extensive mediastinal dissection.

CONCLUSION

Robotic-assisted repair of giant type IV hiatal hernias is feasible and safe, allowing for:

- Meticulous mediastinal dissection
- Secure primary hiatal closure without mesh
- Precise fundoplication construction

*This video highlights key considerations including management of extensive hernia sacs, pleural entry, and restoration of normal anatomy. **The robotic platform enhances ergonomics and visualization in complex paraesophageal hernia repair.***

LIMITATIONS

- ▶ Single case video — larger series needed to draw definitive conclusions
- ▶ No prospective comparison to laparoscopic or transthoracic approach available
- ▶ Long-term recurrence data not captured in this video presentation

REFERENCES

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4. Elissavet S, Ioannis G, Panagiotis P, Konstantinos M, Apostolos K. Robotic-assisted versus laparoscopic paraesophageal hernia repair: a systematic review and meta-analysis. J Minim Invasive Surg. 2023;26(3):134-145