

THE A, B, CS OF MAGNETIC ESOPHAGEAL COMPRESSION ANASTOMOSIS USING SPECIALLY DESIGNED, CURVED MAGNETS FOR MINIMAL INVASIVE REPAIR OF ESOPHAGEAL ATRESIA

Oliver J. Muensterer, MD, PhD¹, Alexander Sterlin², Lauren Evans³, Mohammad Sahlabadi³, Vamsi Arbindi³, Andreas Lindner⁴, Tatjana König², Michael Harrison³

¹Department of Pediatric Surgery, Dr. von Hauner Children's Hospital, Ludwig-Maximilians-University Munich, Munich, Bayern, Germany, ²Johannes Gutenberg University Mainz, ³UCSF, ⁴Ludwig-Maximilians-University

Purpose

Thoracoscopic esophageal atresia affords many benefits to the patient, but intracorporeally suturing the anastomosis is technically challenging. We designed specially curved magnets that can be deployed endoscopically to create an esophageal anastomosis in children born with esophageal atresia. The bi-radial shape produces a zone of maximal compression centrally and thereby allows the peripheral tissue to heal. This report describes our experience in 3 patients with Gross Types A, B, and C EA and reports the outcome at least 1 year thereafter.

Methods

Compassionate care ethics approval was obtained. Stable neonates with esophageal atresia and a previous gastrostomy were offered the technique using the new magnets. In a first operation, the pouches were thoracoscopically approximated (figure a.). After tension subsided several weeks later, the novel 8mm diameter magnets were placed and mated endoscopically from above and below (figure b.). Postoperative outcomes are reported.

Results

Magnet placement was accomplished without problems in type A and B cases (figure c.). In the last case, the magnets separated and required endoscopic repositioning. All procedures were carried out endoscopically, patients were extubated in the operating room. The magnets passed distally and were eliminated in the stool between 7 and 10 days postoperatively. Patients were followed-up for 18, 14, and 9 months, respectively. They required 4, 4, and 5 dilatations. Gastrostomies were closed after 6, 11, and 9 months. All are on full oral feeds.

Conclusion

Magnetic esophageal compression anastomoses using our specially curved magnets produces a secure, functional anastomosis with no morbidity. Some hurdles remain, particularly with caliber differences between the magnets and the esophagus, and when there is a tissue gap between the lumen.

Figure

Thoracoscopic approximation of the esophageal ends (a.), endoscopic deployment of the magnet in the lower esophageal pouch (b.), and postoperative chest radiograph with the magnets (arrows) in place (c.).

