

Magnetic Anastomoses in Metabolic Bariatric Surgery (MagDI, MagGI and MagJI)

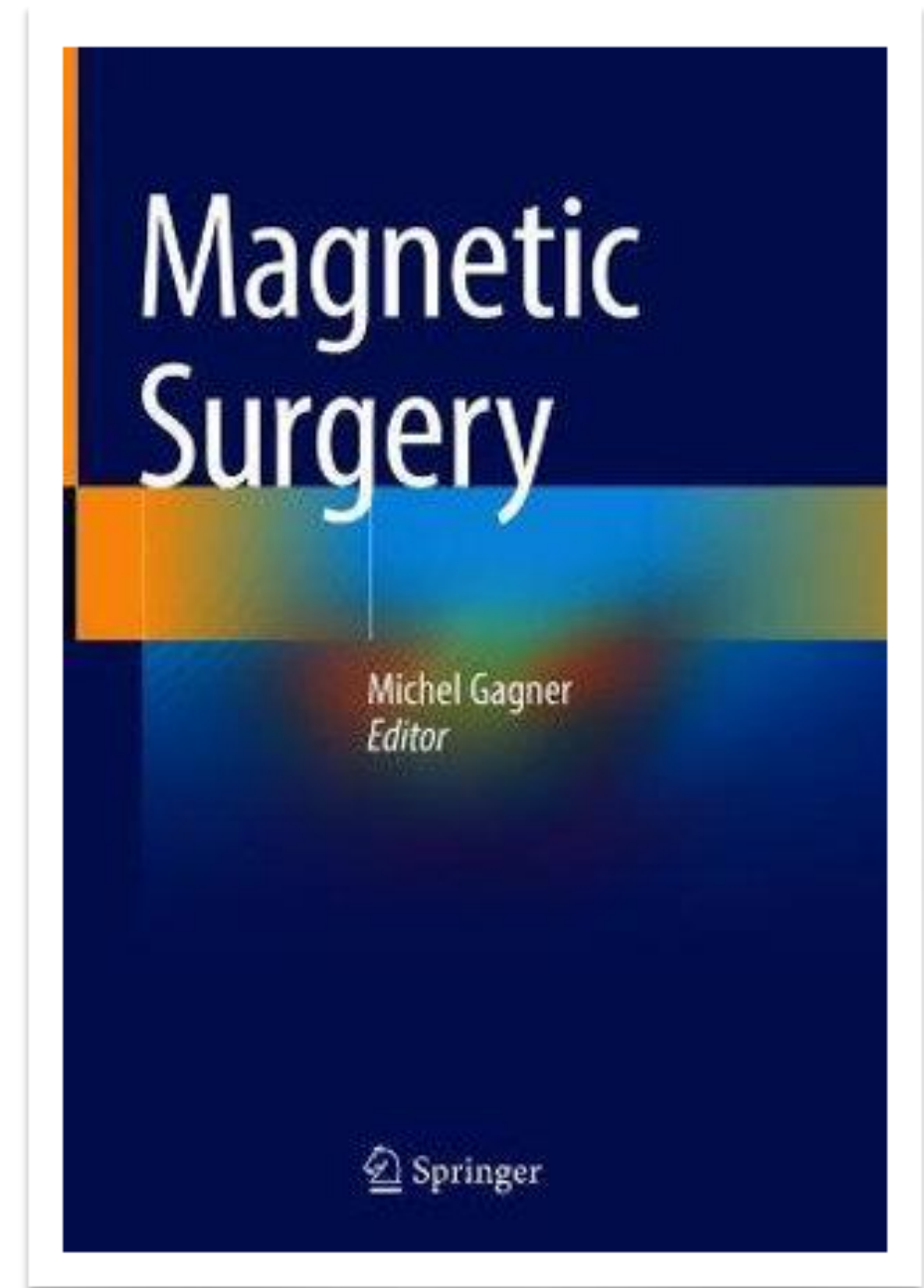
Michel Gagner MD, FRCSC, FACS

Chief of Surgery, Westmount Square Surgical Center

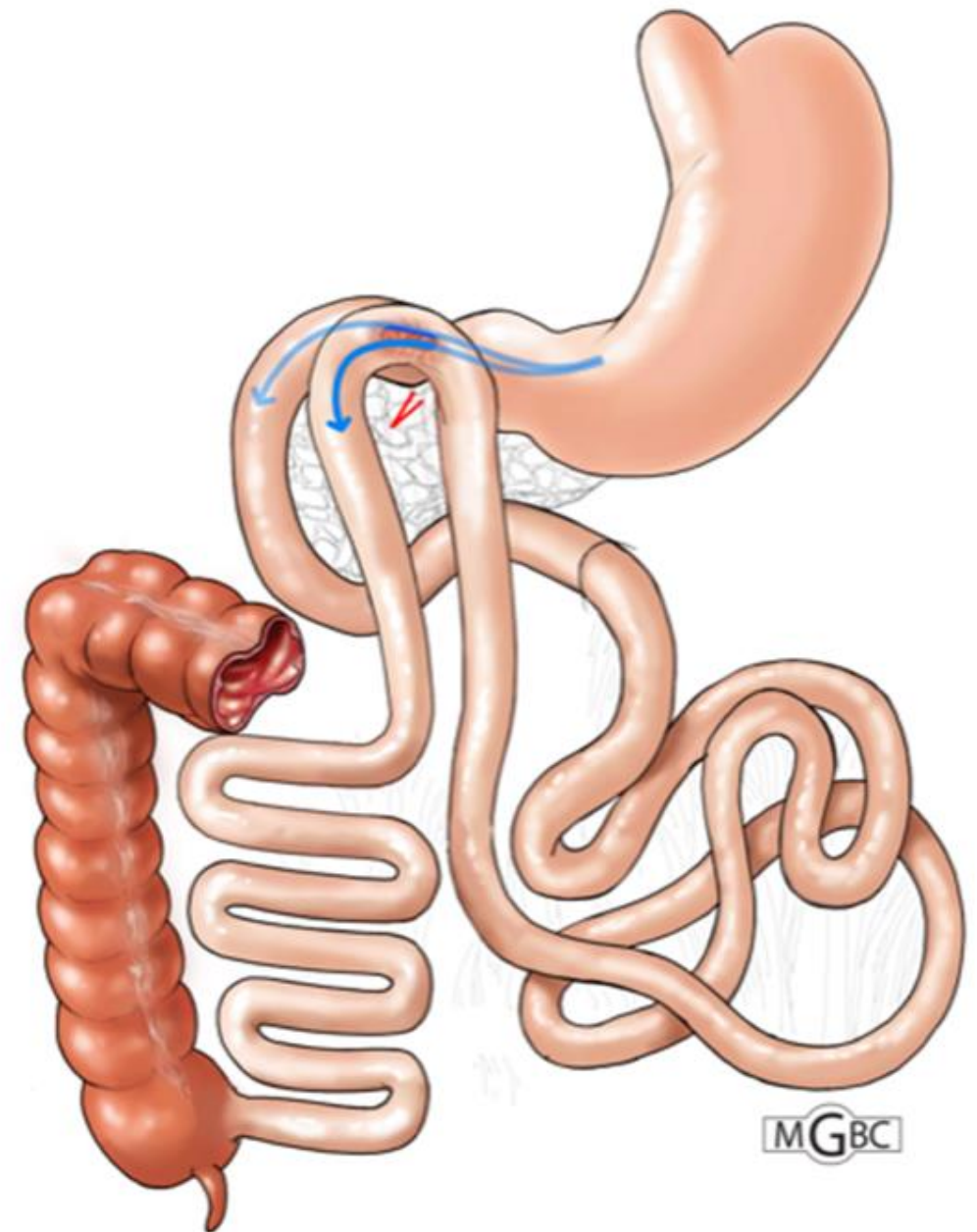
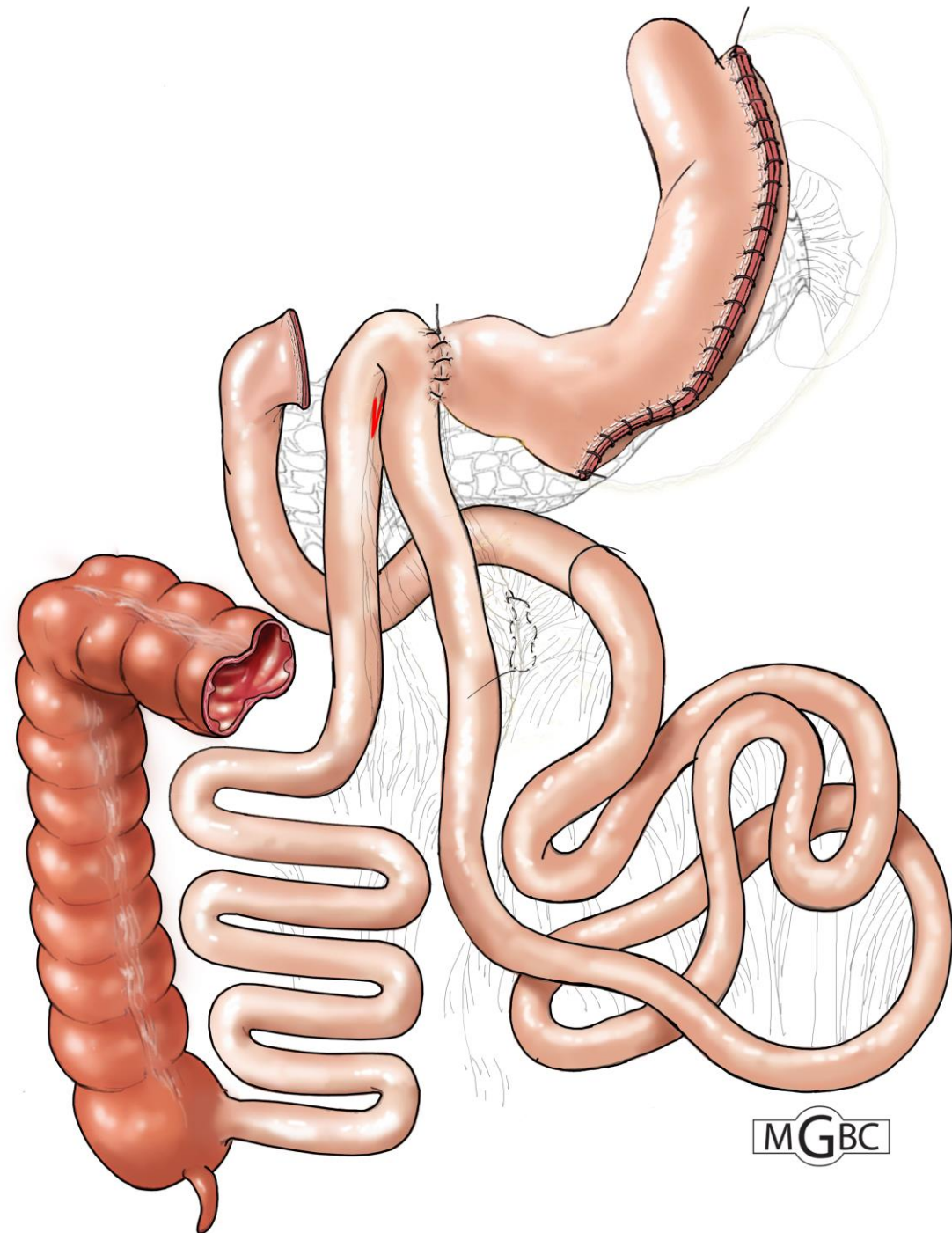
Senior Consultant, Department of Surgery
Hopital du Sacre-Coeur (University of Montreal)
Montreal, Quebec, Canada

Disclosures

- Stock ownership:
- Lexington medical
- GT Metabolic



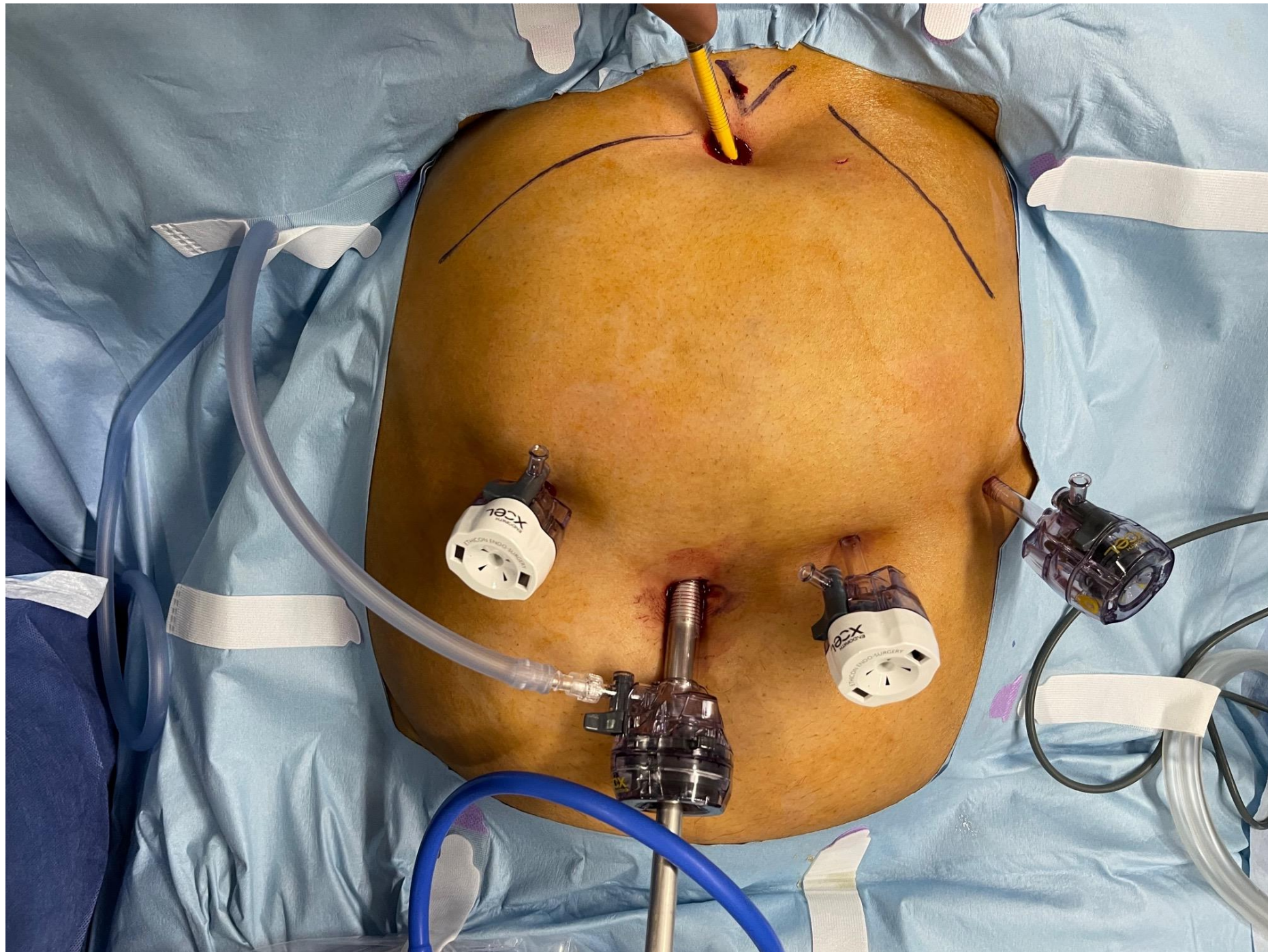
SADI vs MAGDI



Future revisions possibilities

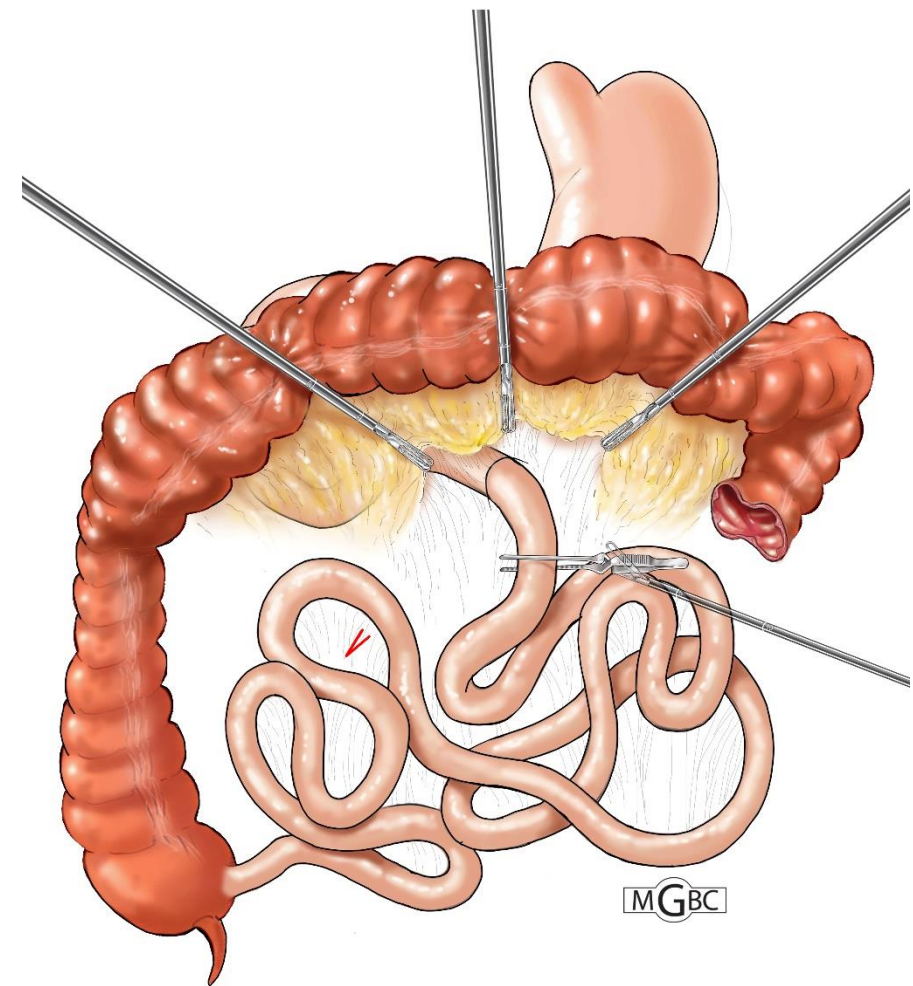
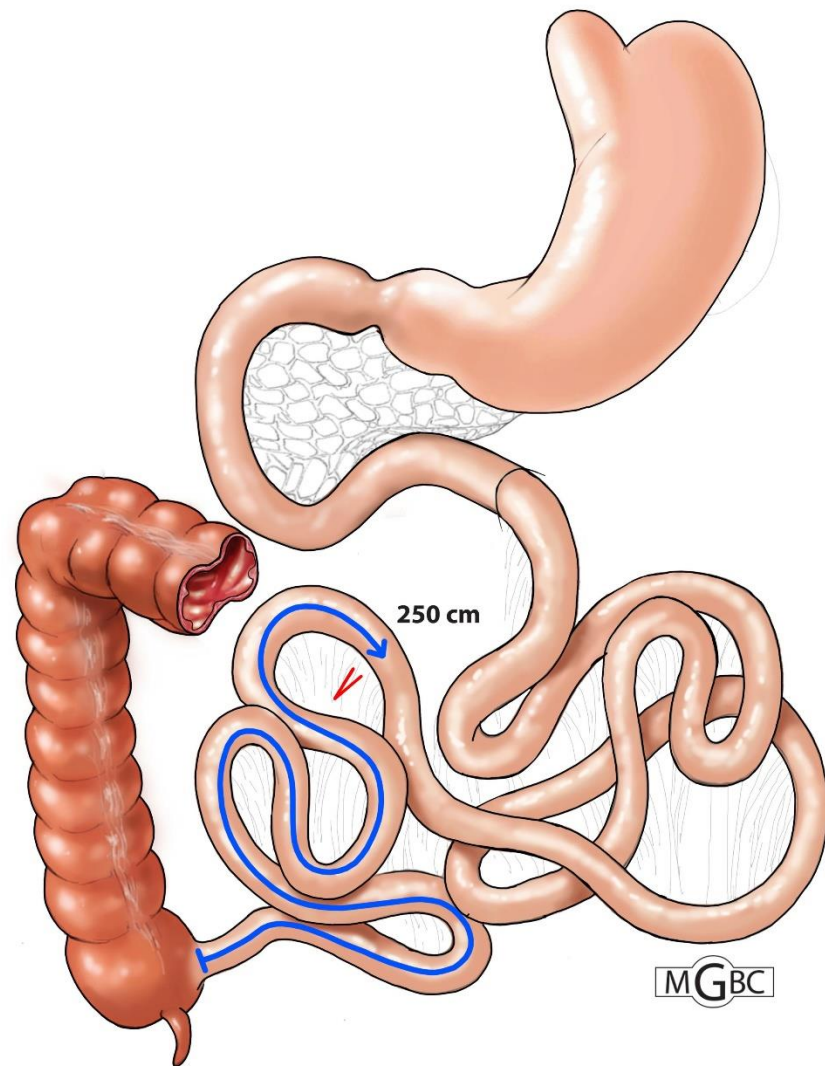
- Reversibility
- Possible laparoscopic linear stapling at Duodeno-ileostomy
- Revision to Full SADI-S
- Possible laparoscopic duodenal stapling below the side-to-side
- Revision to Full DS

Laparoscopic assisted procedure



The MAGNET System

Creation of Side-to-Side Compression Anastomosis Duodeno-Ileostomy



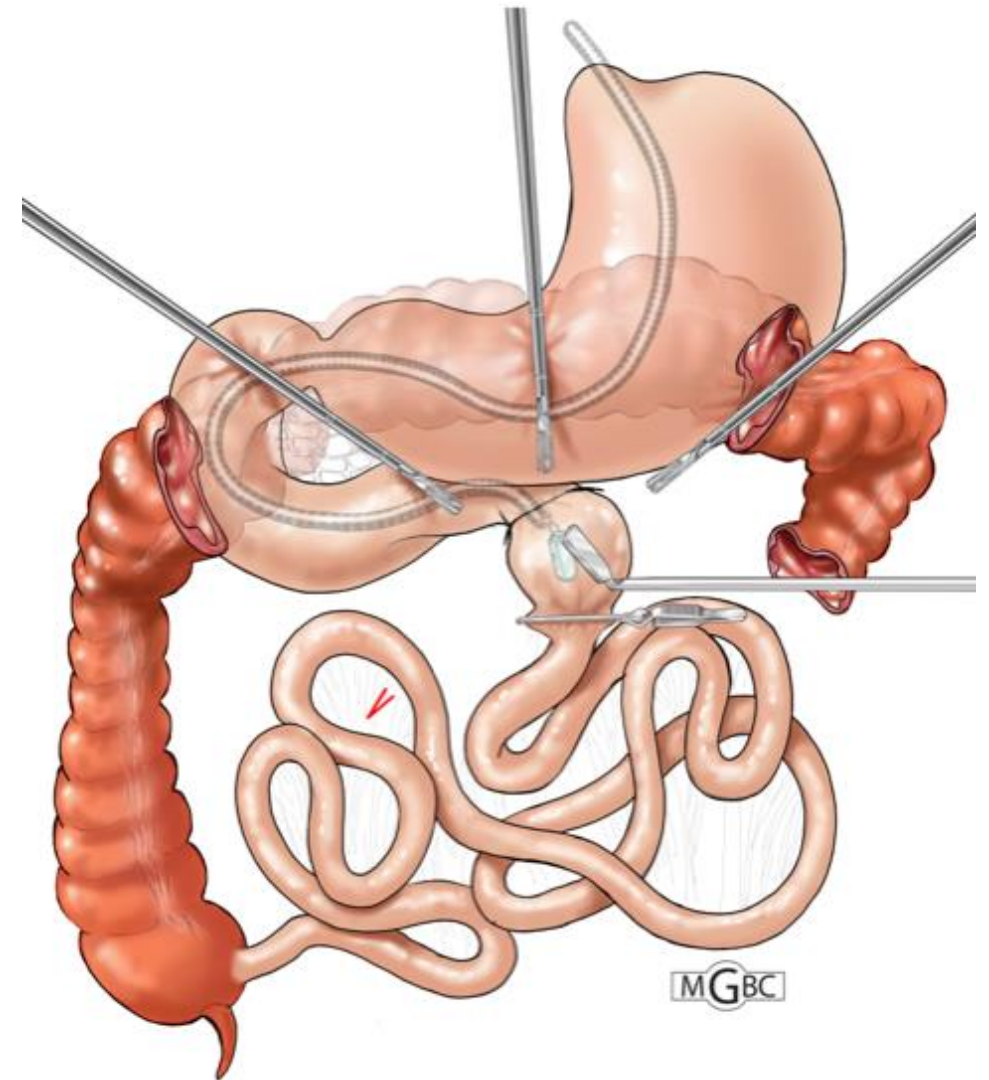
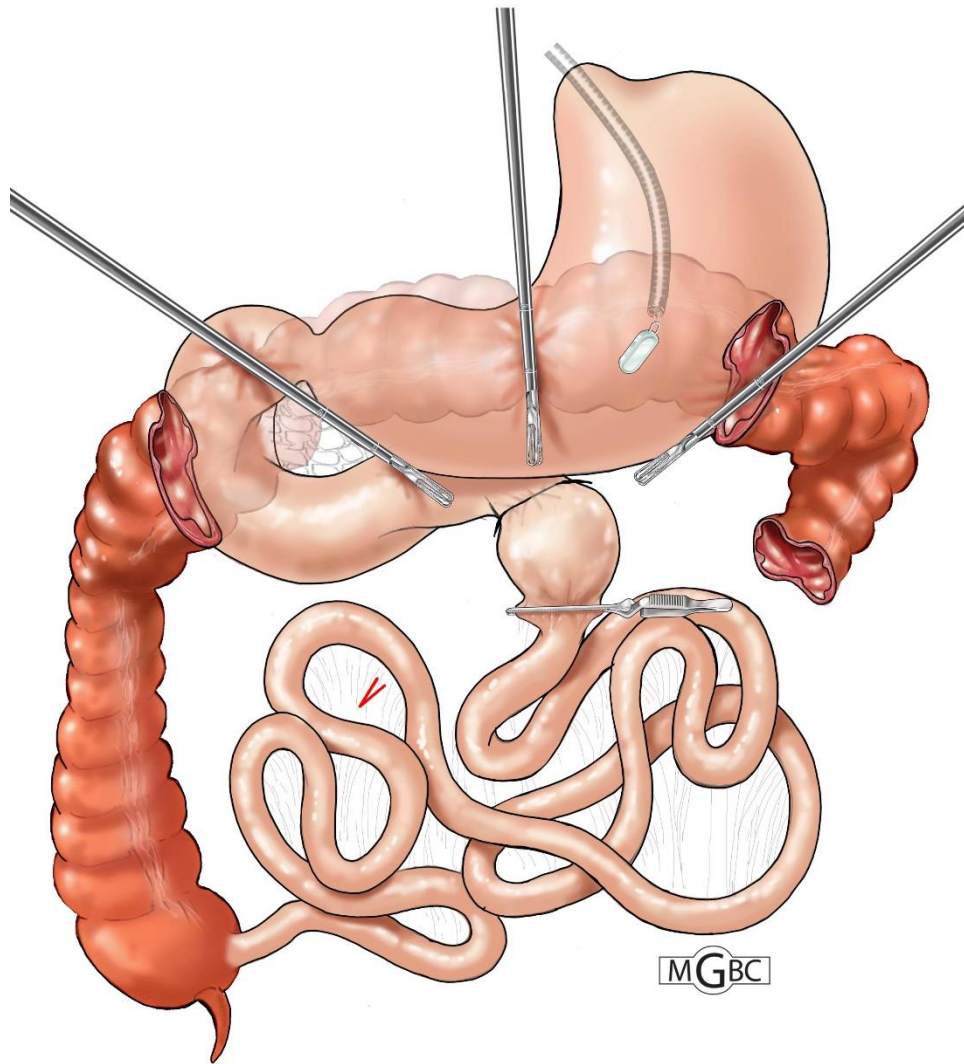
The MAGNET System

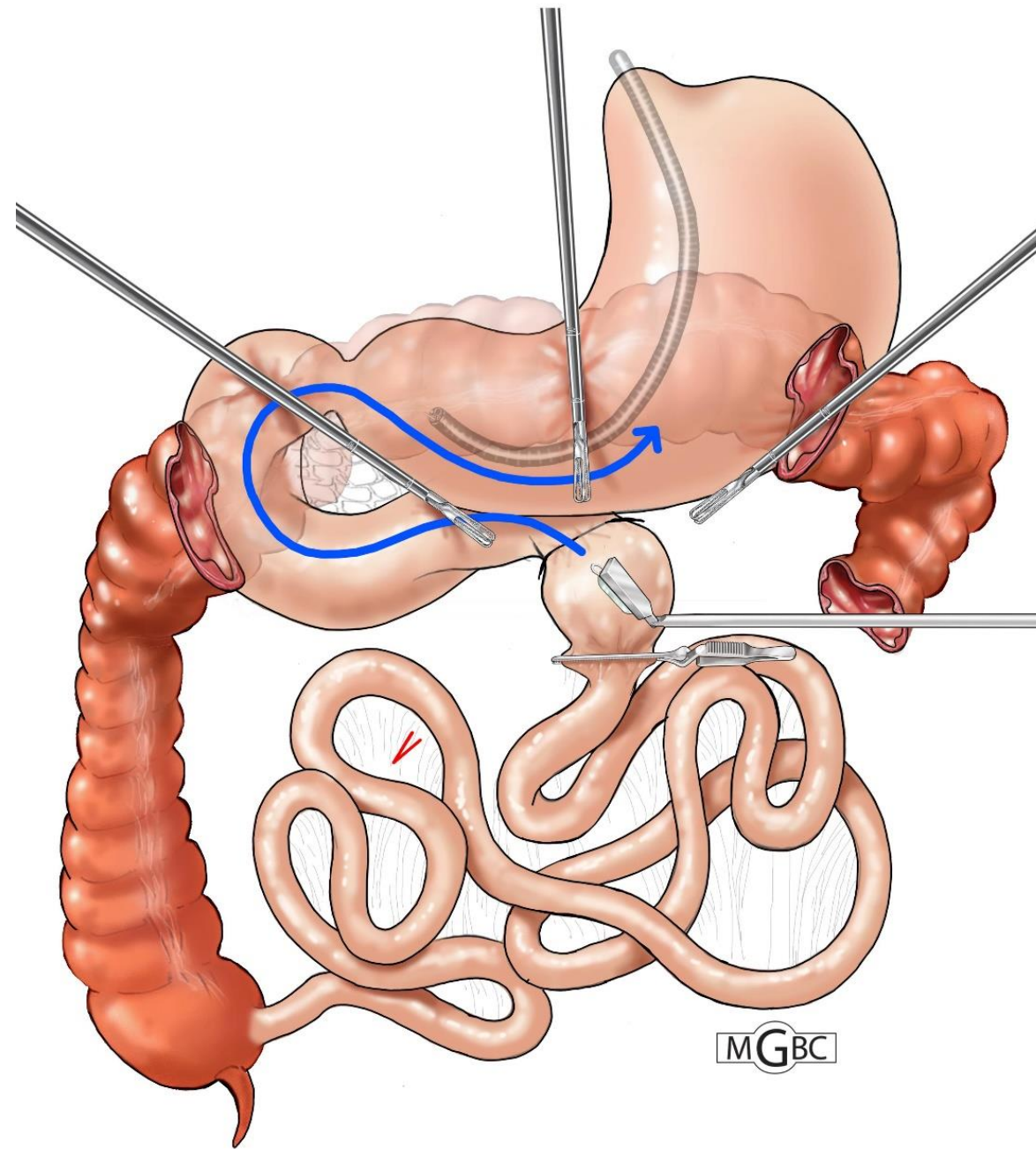
Creation of Side-to-Side Compression Anastomosis Duodeno-Ileostomy



The MAGNET System

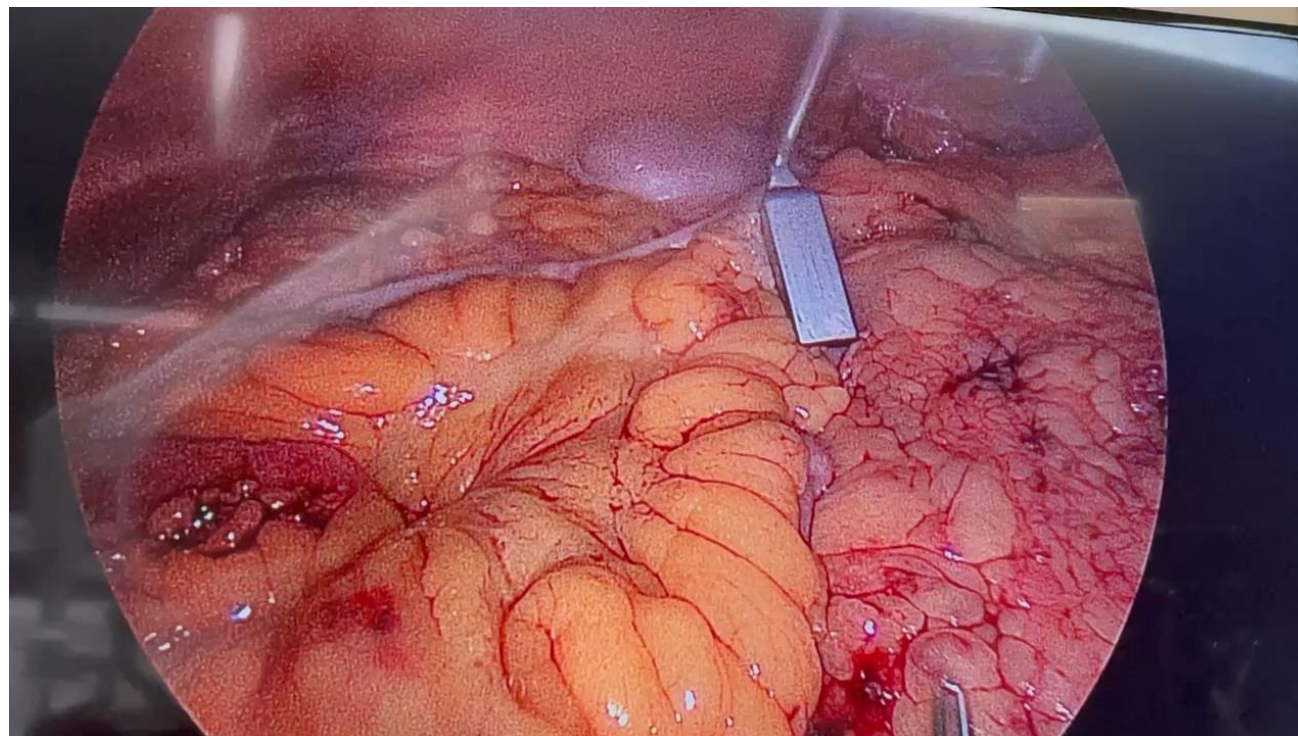
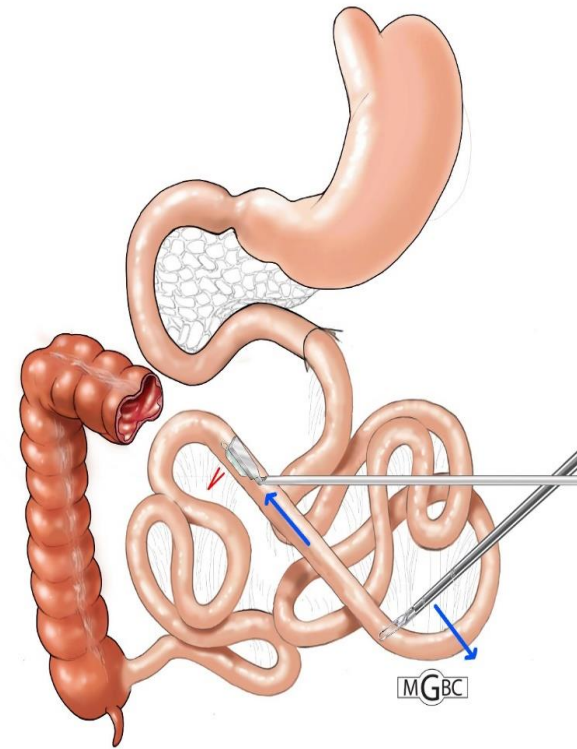
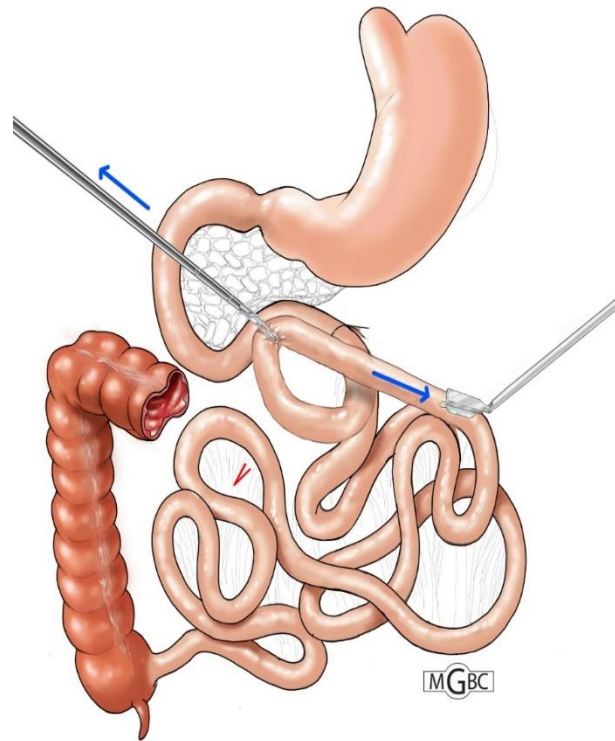
Creation of Side-to-Side Compression Anastomosis Duodeno-Ileostomy





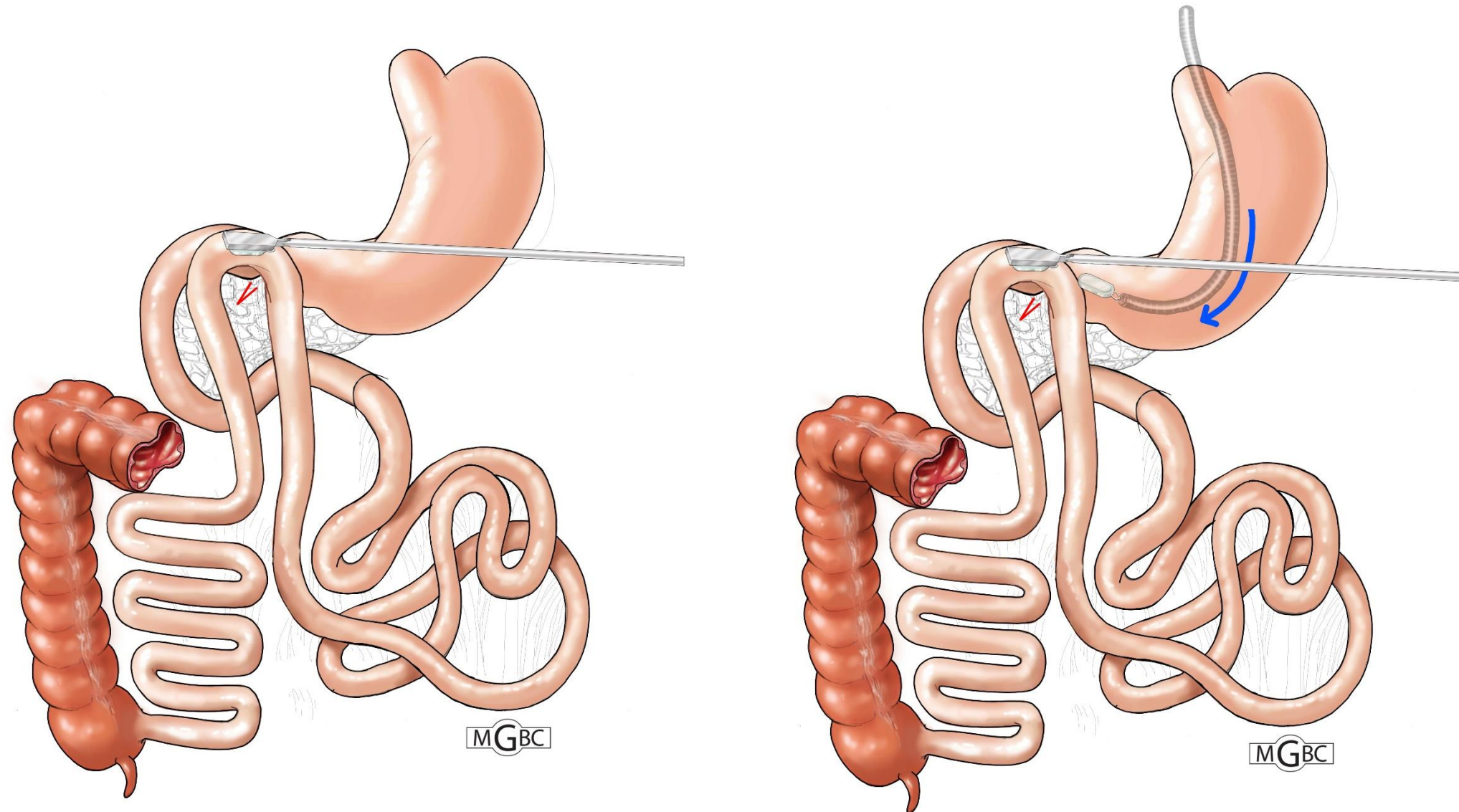
The MAGNET System

Creation of Side-to-Side Compression Anastomosis Duodeno-Ileostomy



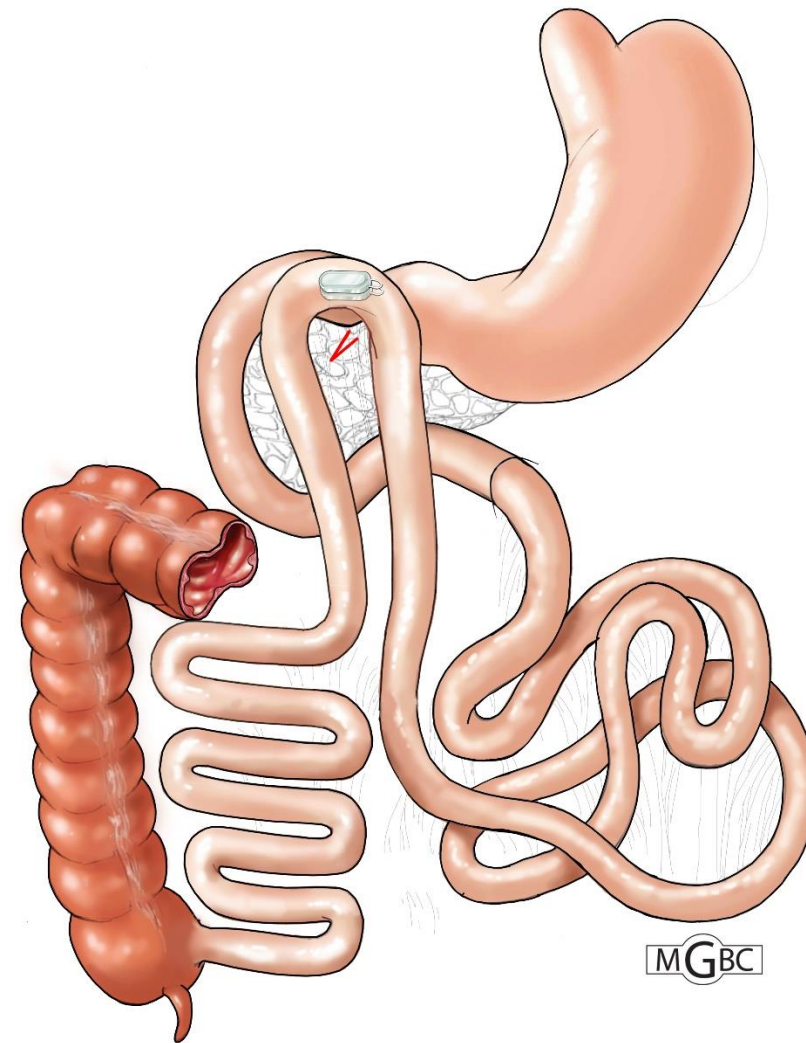
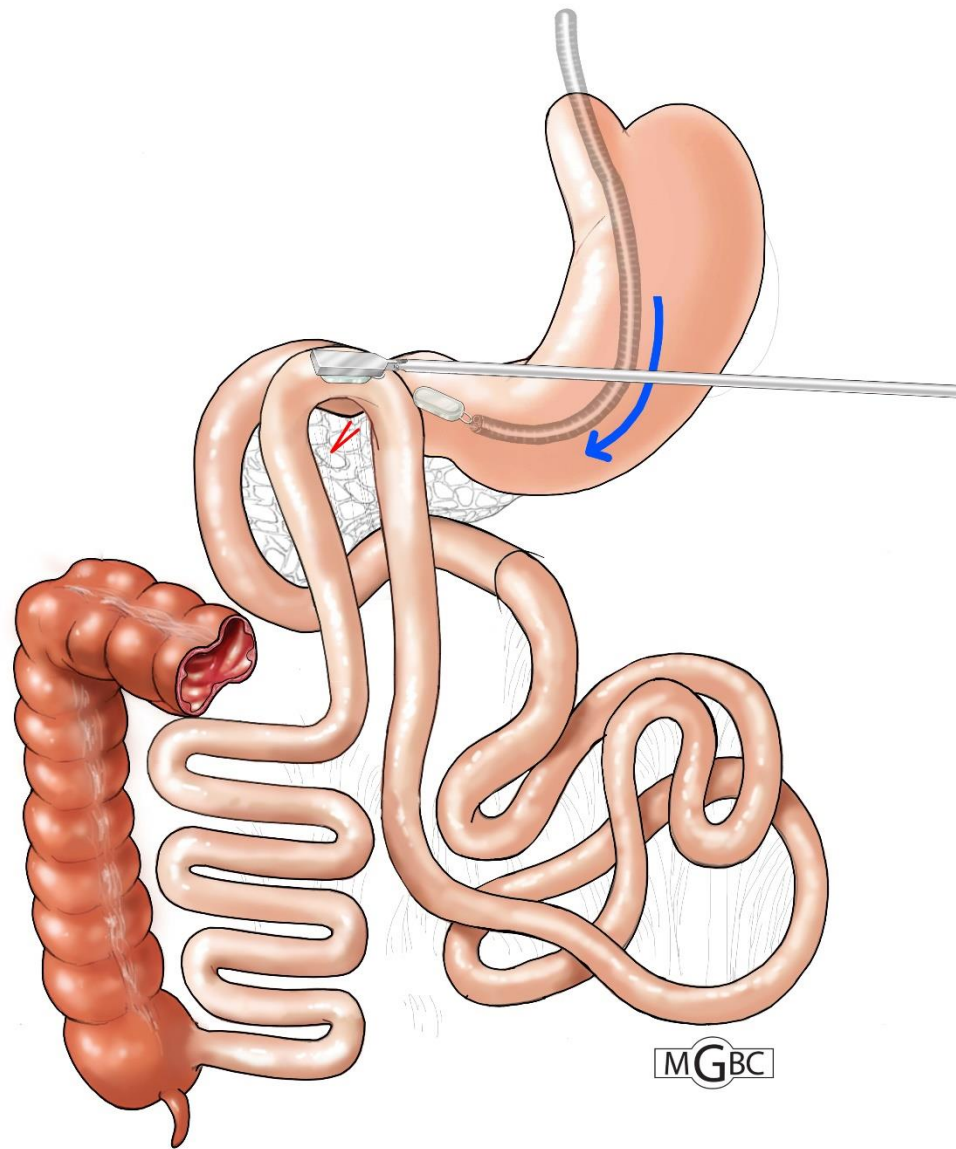
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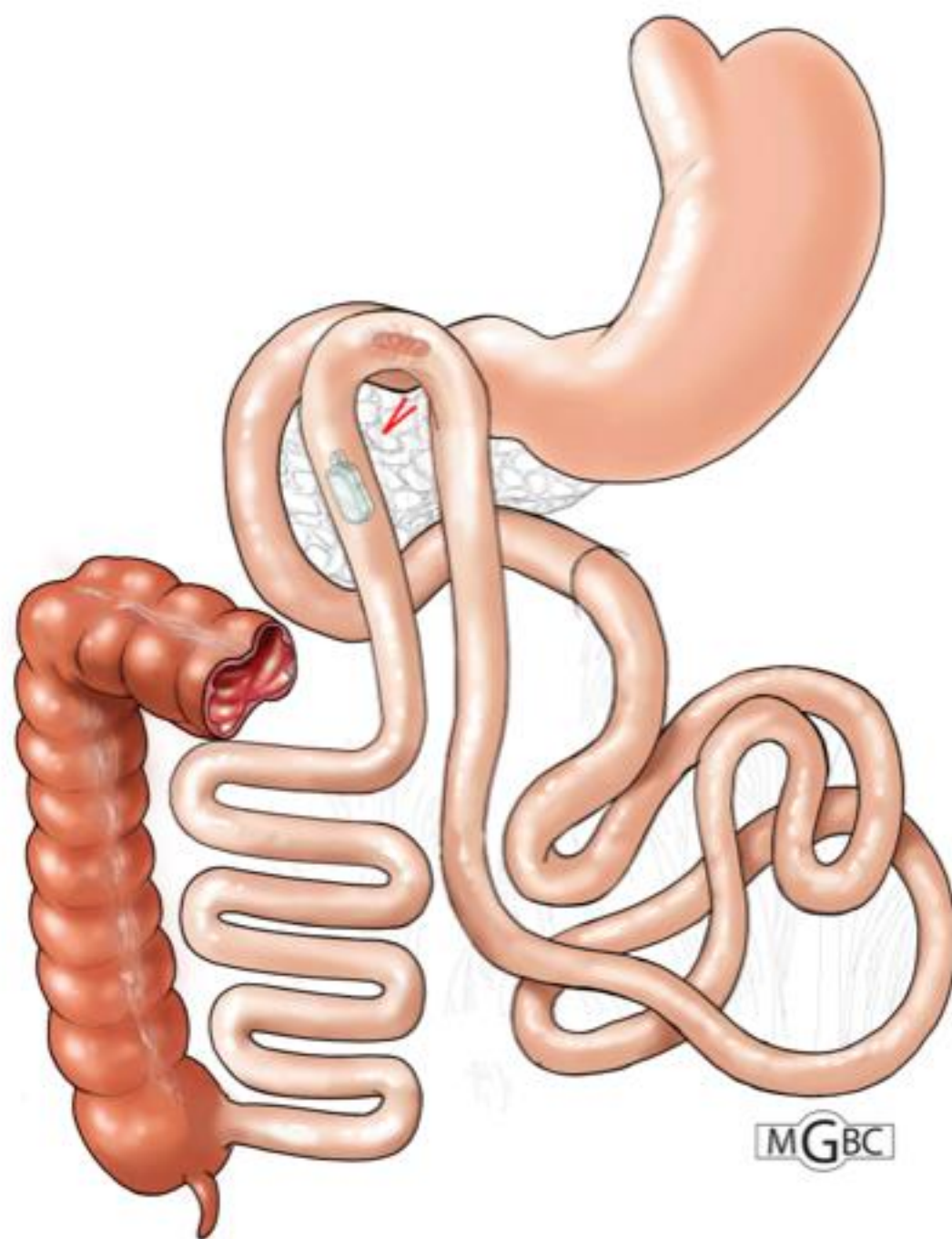
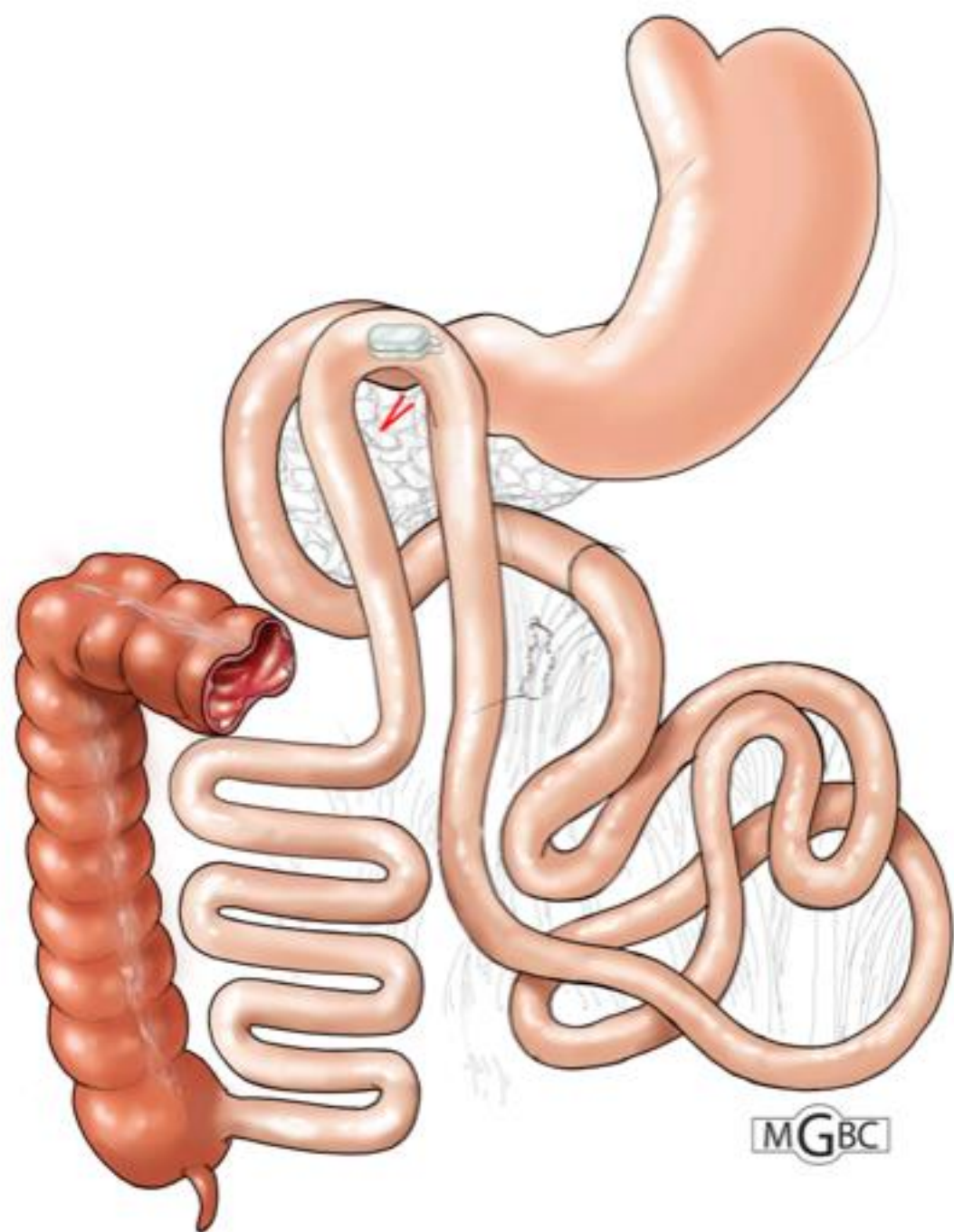
Creation of Side-to-Side Compression Anastomosis Duodeno-Ileostomy



The MAGNET System

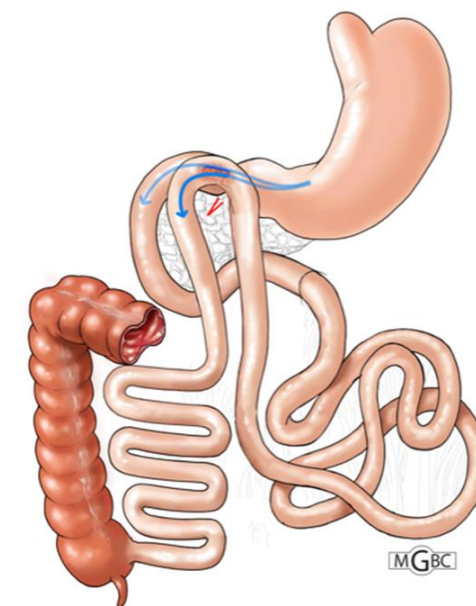
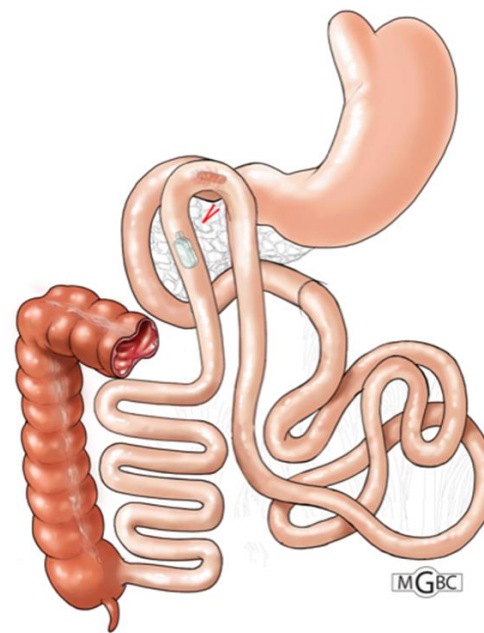
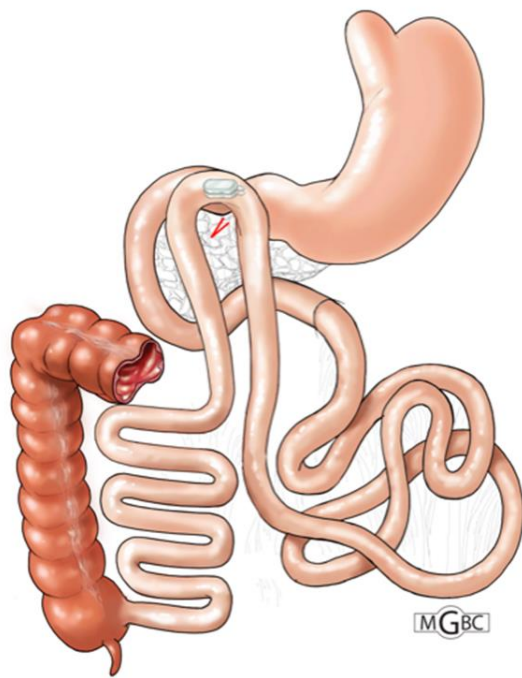
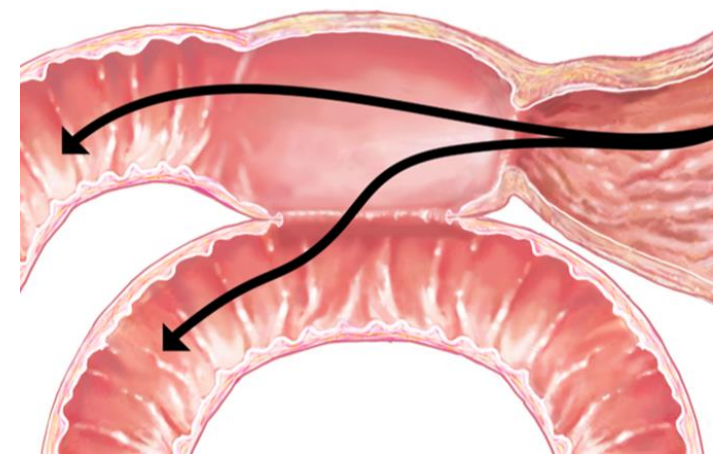
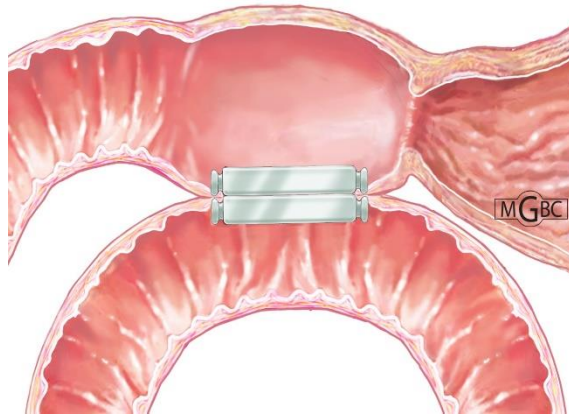
Creation of Side-to-Side Compression Anastomosis Duodeno-Ileostomy





The MAGNET System

Creation of Side-to-Side Compression Anastomosis Duodeno-Ileostomy



Dr. Gagner and Dr. David Abuladze started the DI Clinical Trial



Phase 1 Clinical Trial

- N=5
- Innovative Medical Center in Tbilisi, Georgia
- PI: David Abuladze, MD
- Enrollment: NOV 2021



First-in-Human Side-to-Side Magnetic Compression Duodeno-ileostomy with the Magnet Anastomosis System

Michel Gagner¹  · David Abuladze² · Levan Koiava² · J. N. Buchwald³ · Nathalie Van Sante⁴ · Todd Krinke⁵

Received: 20 February 2023 / Revised: 23 June 2023 / Accepted: 26 June 2023 / Published online: 2 July 2023
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Abstract

Purposes Classical gastrointestinal anastomoses are formed with sutures and/or metal staples, resulting in significant bleeding and leak rates. This study evaluated the feasibility and safety of the novel magnet anastomosis system (MS) to create a side-to-side duodeno-ileal (DI) diversion for weight loss and type 2 diabetes (T2D) resolution.

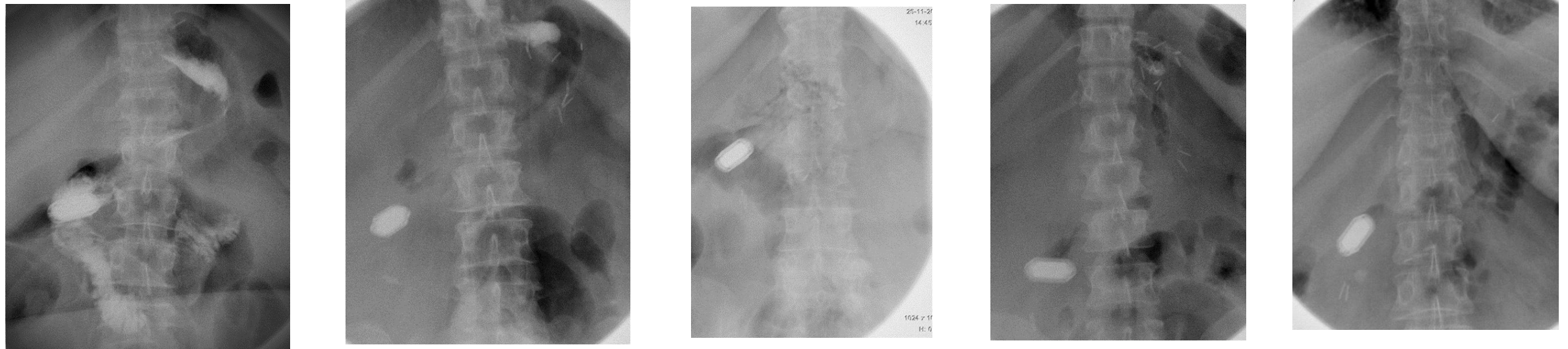
Materials and Methods Patients with severe obesity (body mass index (BMI) ≥ 35 kg/m² with/without T2D (HbA_{1c} $\geq 6.5\%$)) underwent the study procedure, a side-to-side MS DI diversion, with a standard sleeve gastrectomy (SG). A linear magnet was delivered by flexible endoscopy to a point 250 cm proximal to the ileocecal valve; a second magnet was positioned in the first part of the duodenum; the bowel segments containing magnets were apposed, initiating gradual anastomosis formation. Laparoscopic assistance was used to obtain bowel measurements, obviate tissue interposition, and close mesenteric defects.

Results Between November 22 and 26, 2021, 5 female patients (mean weight 117.6 ± 7.1 kg, BMI (kg/m²) 44.4 ± 2.2) underwent side-to-side MS DI + SG. All magnets were successfully placed, expelled without re-intervention, and formed patent durable anastomoses. Total weight loss at 12 months was $34.0 \pm 1.4\%$ (SEM); excess weight loss, $80.2 \pm 6.6\%$; and BMI reduction, 15.1. Mean HbA_{1c} (%) dropped from 6.8 ± 0.8 to 4.8 ± 0.2 ; and glucose (mg/dL), from 134.3 ± 17.9 to 87.3 ± 6.3 (mean reduction, 47.0 mg/dL). There was no anastomotic bleeding, leakage, obstruction, or infection and no mortality.

Conclusions Creation of a side-to-side magnetic compression anastomosis to achieve duodeno-ileostomy diversion in adults with severe obesity was feasible and safe, achieved excellent weight loss, and resolved type 2 diabetes at 1-year follow-up.

Trial Registration Clinicaltrials.gov Identifier: NCT05322122.

The MAGNET System - Stage 1- Primary endpoint Device Delivery Success-Safety Population



Procedure date	Duration of procedure mean in min (SD)	Placement of the magnet
22, 24, 25 and 26 November 2021	154 (24.48)	100%

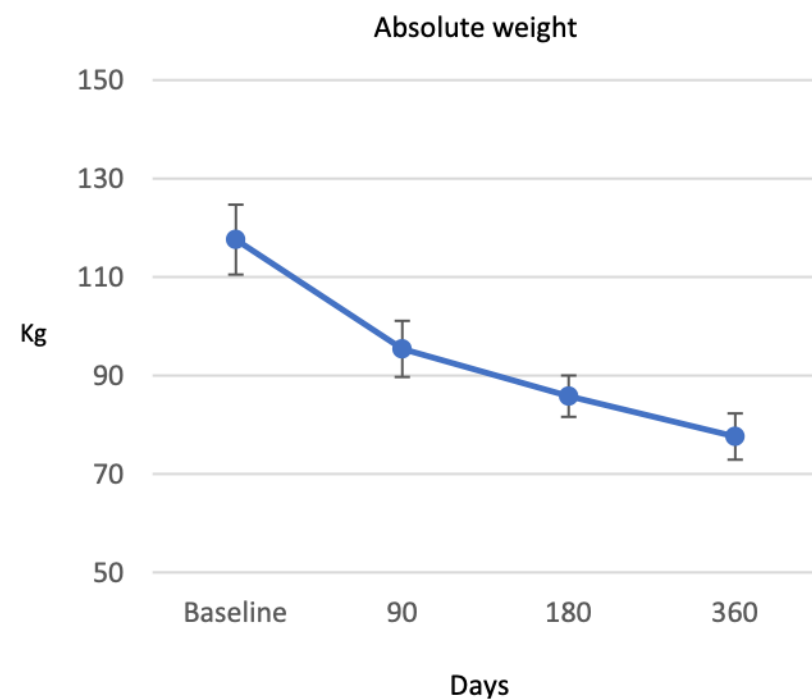
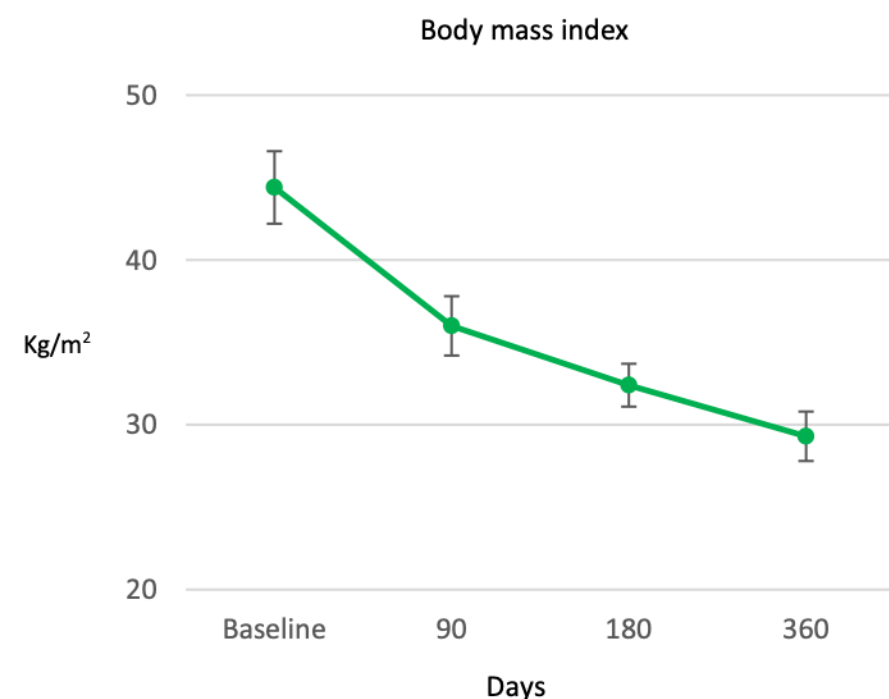
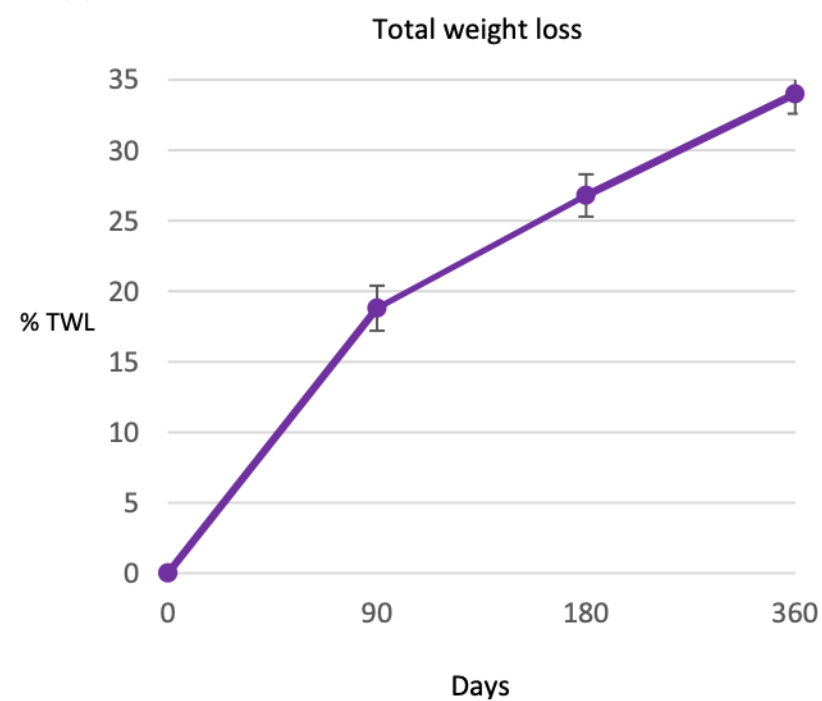
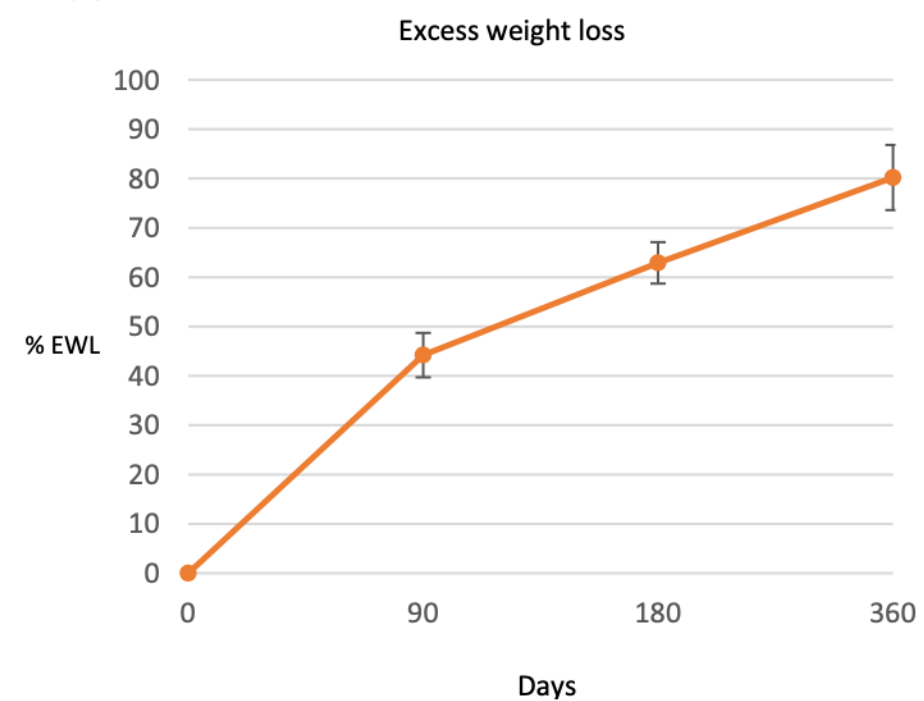
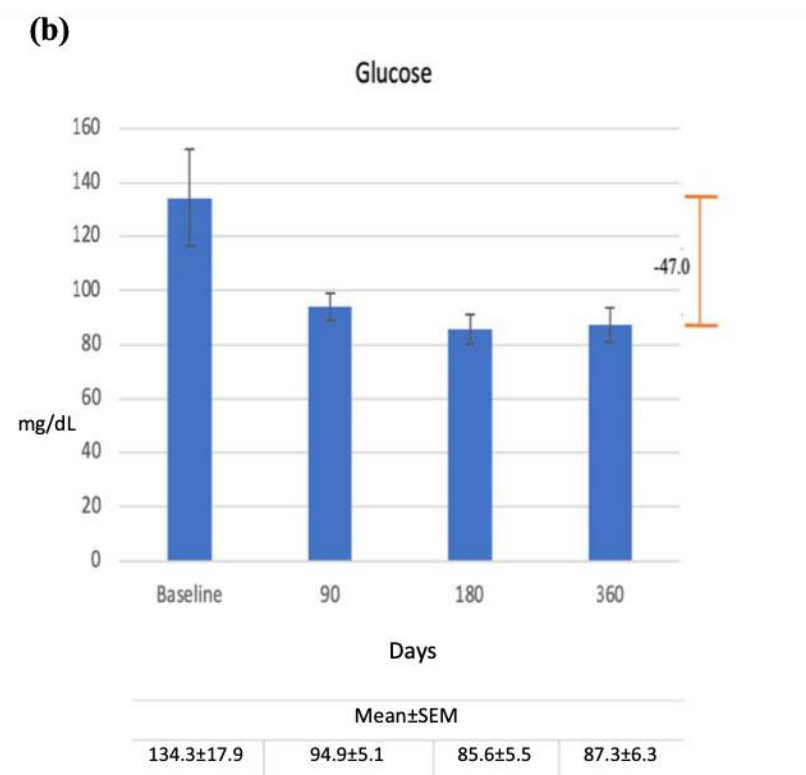
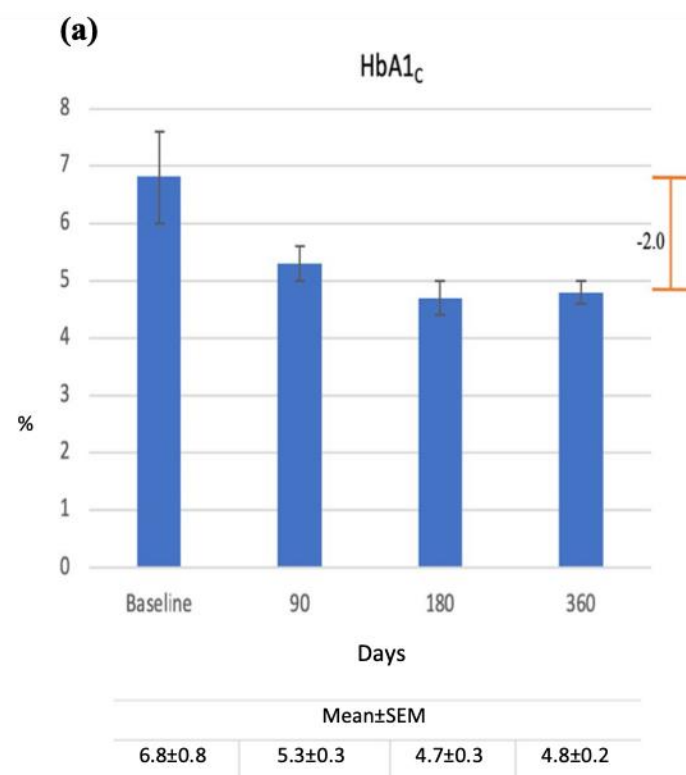
(a)**(b)****(c)****(d)**

Table 2 Adverse events by number and severity post side-to-side magnet system duodeno-ileostomy with sleeve gastrectomy through day 360 by Clavien-Dindo Classification

Adverse event	All patients (<i>N</i> =5) <i>n</i> (%)					Total
	Grade I	Grade II	Grade III	Grade IV	Grade V	
Mucosal tear of upper esophagus due to overtube insertion	1	0	0	0	0	1 (6.3)
Serosal tear of ileum (5 mm) due to laparoscopic forceps	0	0	1	0	0	1 (6.3)
Mild abdominal pain from procedure wounds	3	0	0	0	0	3 (18.8)
Intra-abdominal hematoma at sleeve staple line, upper left quadrant	0	1	0	0	0	1 (6.3)
Vitamin B ₁₂ deficiency	3	2	0	0	0	5 (31.3)
Vitamin D deficiency	0	1	0	0	0	1 (6.3)
COVID-19 positive	3	0	0	0	0	3 (18.8)
Constipation	0	1	0	0	0	1 (6.3)
Number of adverse events	10 (62.6)	5 (31.2)	1 (6.2)	0 (0)	0 (0)	16 (100)





Side-to-side magnet anastomosis system duodeno-ileostomy with sleeve gastrectomy: early multi-center results

Michel Gagner^{1,8} · Guy-Bernard Cadere² · Andres Sanchez-Pernaute³ · David Abuladze⁴ · Todd Krinke⁵ · J. N. Buchwald⁶ · Nathalie Van Sante⁷ · Marc Van Gossum² · Jana Dziakova³ · Levan Koiava⁴ · Maja Odovic³ · Mathilde Poras² · Lamees Almutlaq¹ · Antonio J. Torres³

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Abstract

Introduction Gastrointestinal anastomoses with classical sutures and/or metal staples have resulted in significant bleeding and leak rates. This multi-site study evaluated the feasibility, safety, and preliminary effectiveness of a novel linear magnetic compression anastomosis device, the Magnet System (MS), to form a side-to-side duodeno-ileostomy (DI) diversion for weight loss and type 2 diabetes (T2D) resolution.

Methods In patients with class II and III obesity (body mass index [BMI, kg/m²] ≥ 35.0–≤ 50.0 with/without T2D [HbA1C > 6.5%]), two linear MS magnets were delivered endoscopically to the duodenum and ileum with laparoscopic assistance and aligned, initiating DI; sleeve gastrectomy (SG) was added. There were no bowel incisions or retained sutures/staples. Fused magnets were expelled naturally. Adverse events (AEs) were graded by Clavien-Dindo Classification (CDC).

Results Between November 22, 2021 and July 18, 2022, 24 patients (83.3% female, mean ± SEM weight 121.9 ± 3.3 kg, BMI 44.4 ± 0.8) in three centers underwent magnetic DI. Magnets were expelled at a median 48.5 days. Respective mean BMI, total weight loss, and excess weight loss at 6 months (n = 24): 32.0 ± 0.8, 28.1 ± 1.0%, and 66.2 ± 3.4%; at 12 months (n = 5), 29.3 ± 1.5, 34.0 ± 1.4%, and 80.2 ± 6.6%. Group mean respective mean HbA1c and glucose levels dropped to 1.1 ± 0.4% and 24.8 ± 6.6 mg/dL (6 months); 2.0 ± 1.1% and 53.8 ± 6.3 mg/dL (12 months). There were 0 device-related AEs, 3 procedure-related serious AEs. No anastomotic bleeding, leakage, stricture, or mortality.

Conclusion In a multi-center study, side-to-side Magnet System duodeno-ileostomy with SG in adults with class III obesity appeared feasible, safe, and effective for weight loss and T2D resolution in the short term.

FDA approves GT Metabolic Solutions' 50mm magnet in MagDI System

The MagDI System is a self-aligning, incisionless, sutureless and staple-free technology for surgical linkage.

March 12, 2025

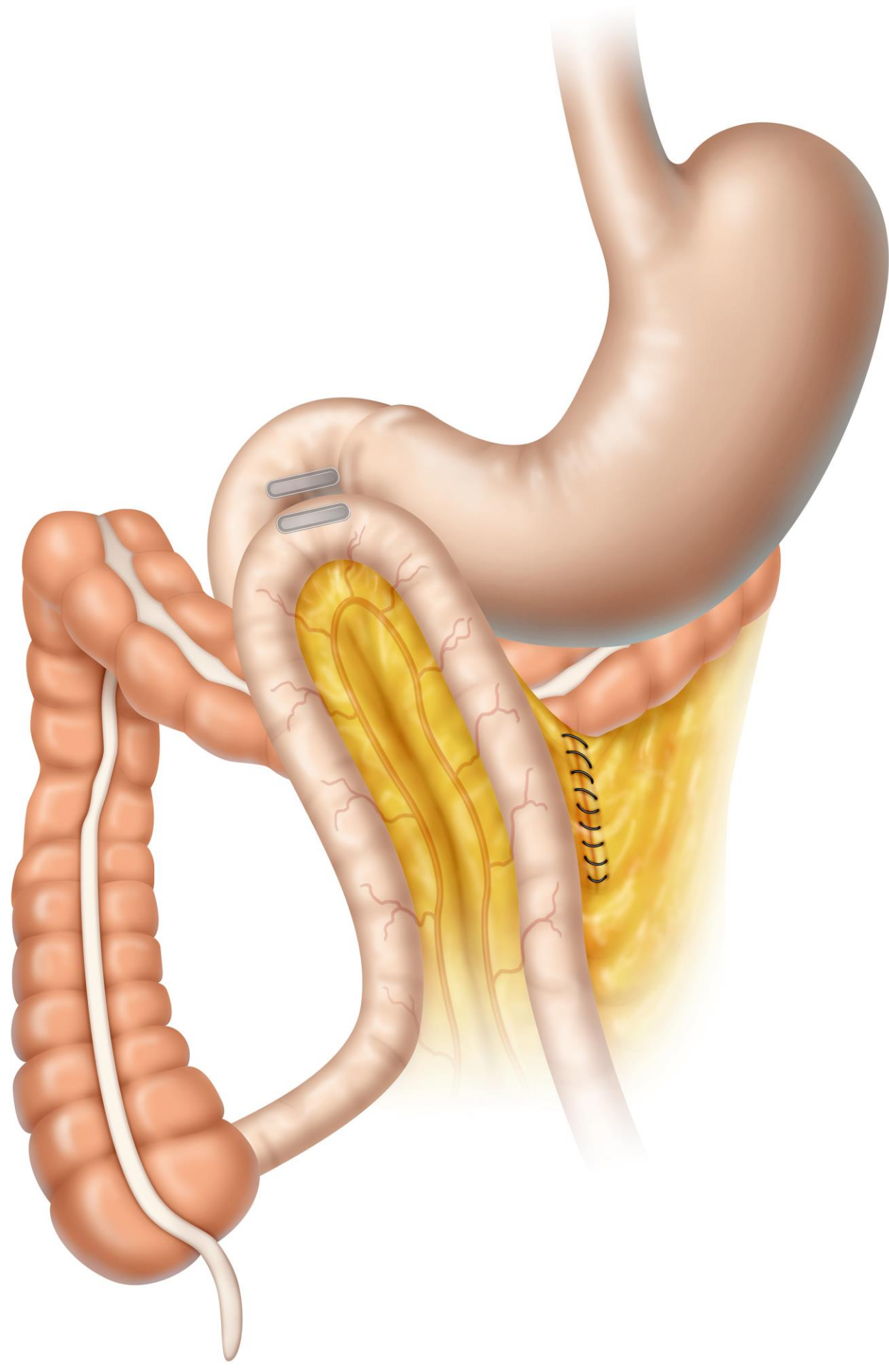
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The US regulator has cleared the 50mm MagDI System magnet to complement the existing 40mm magnet. Credit: GT Metabolic Solutions, Inc./PRNewswire.

Easy to Swallow



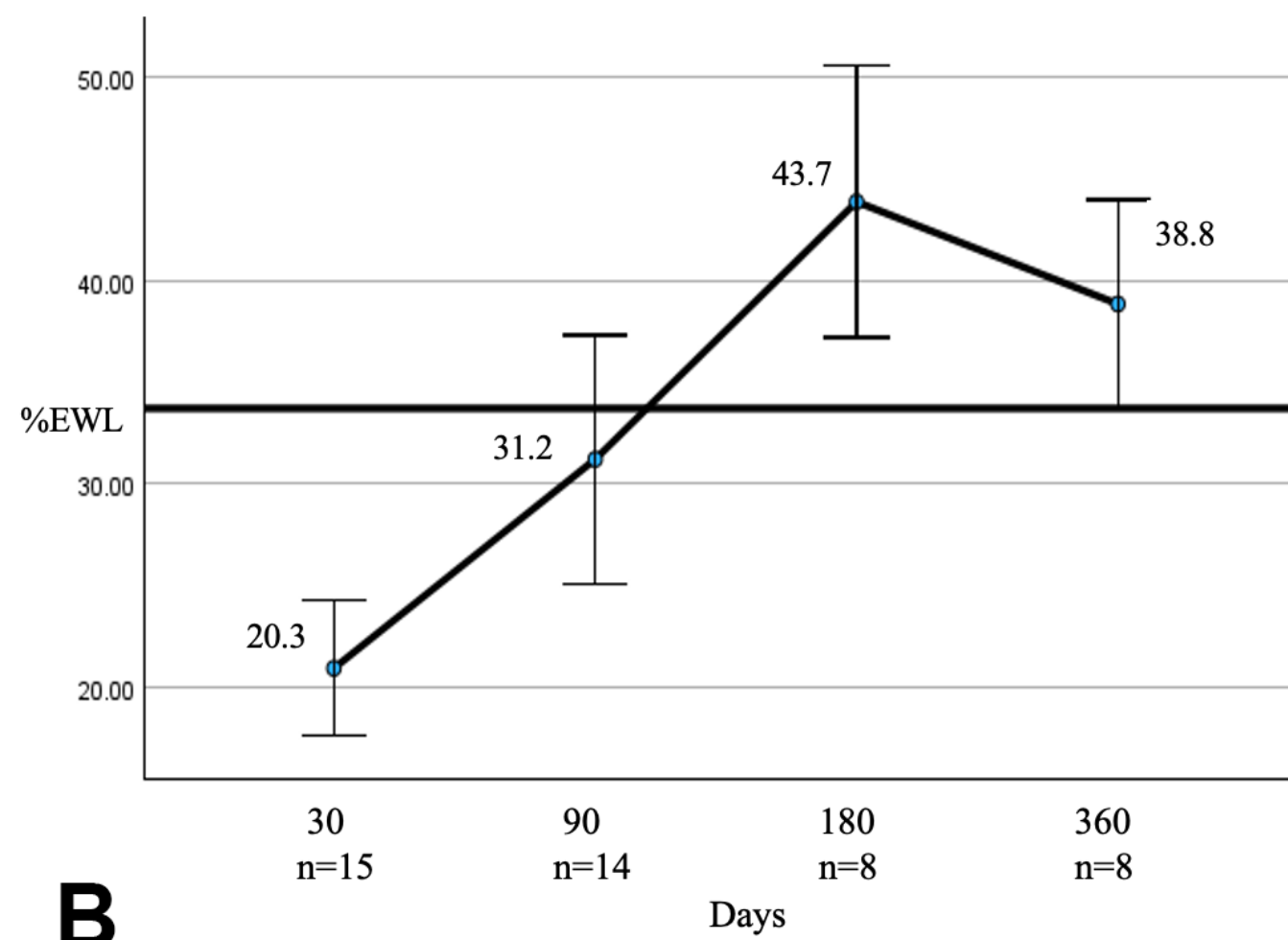
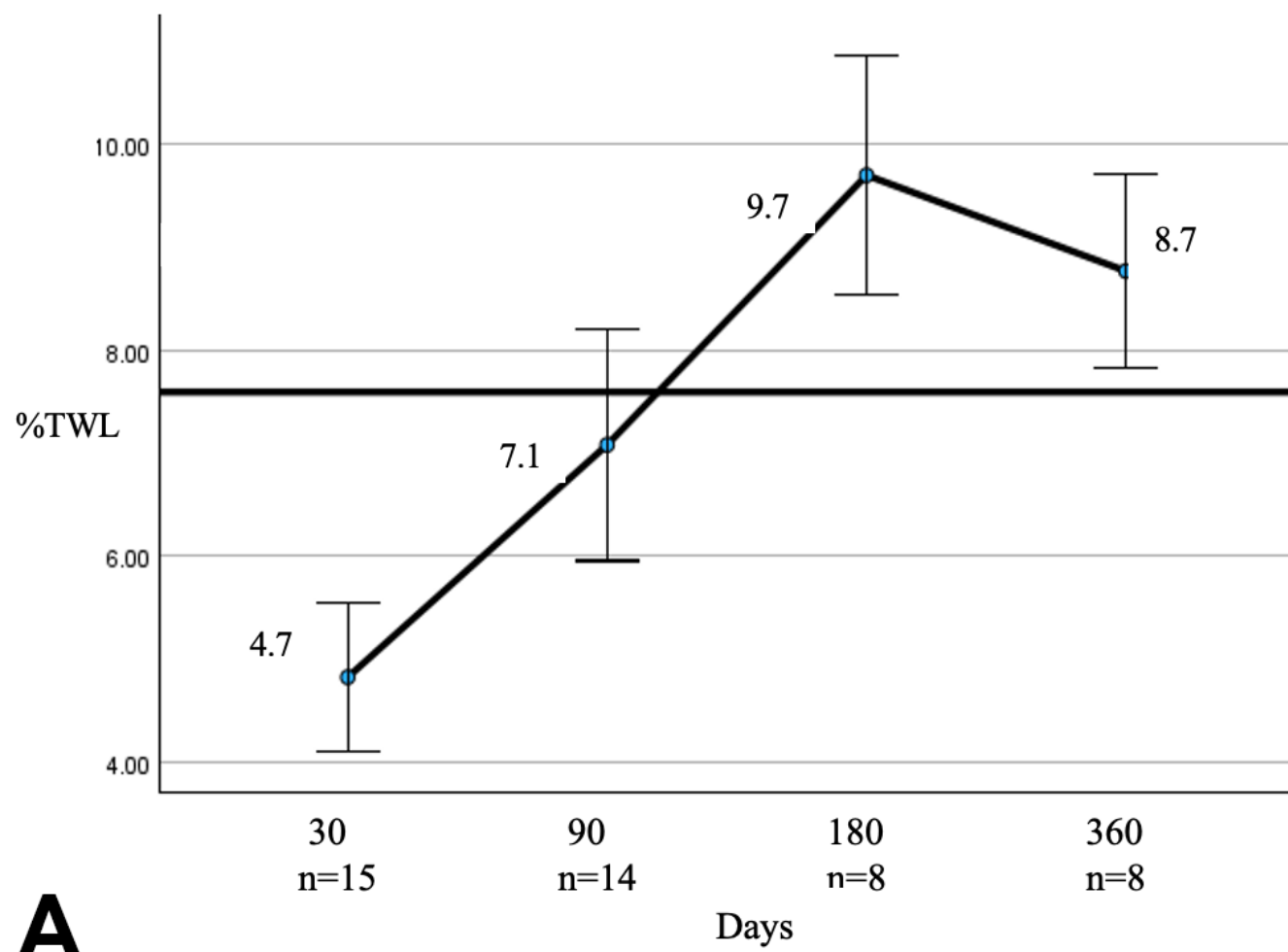


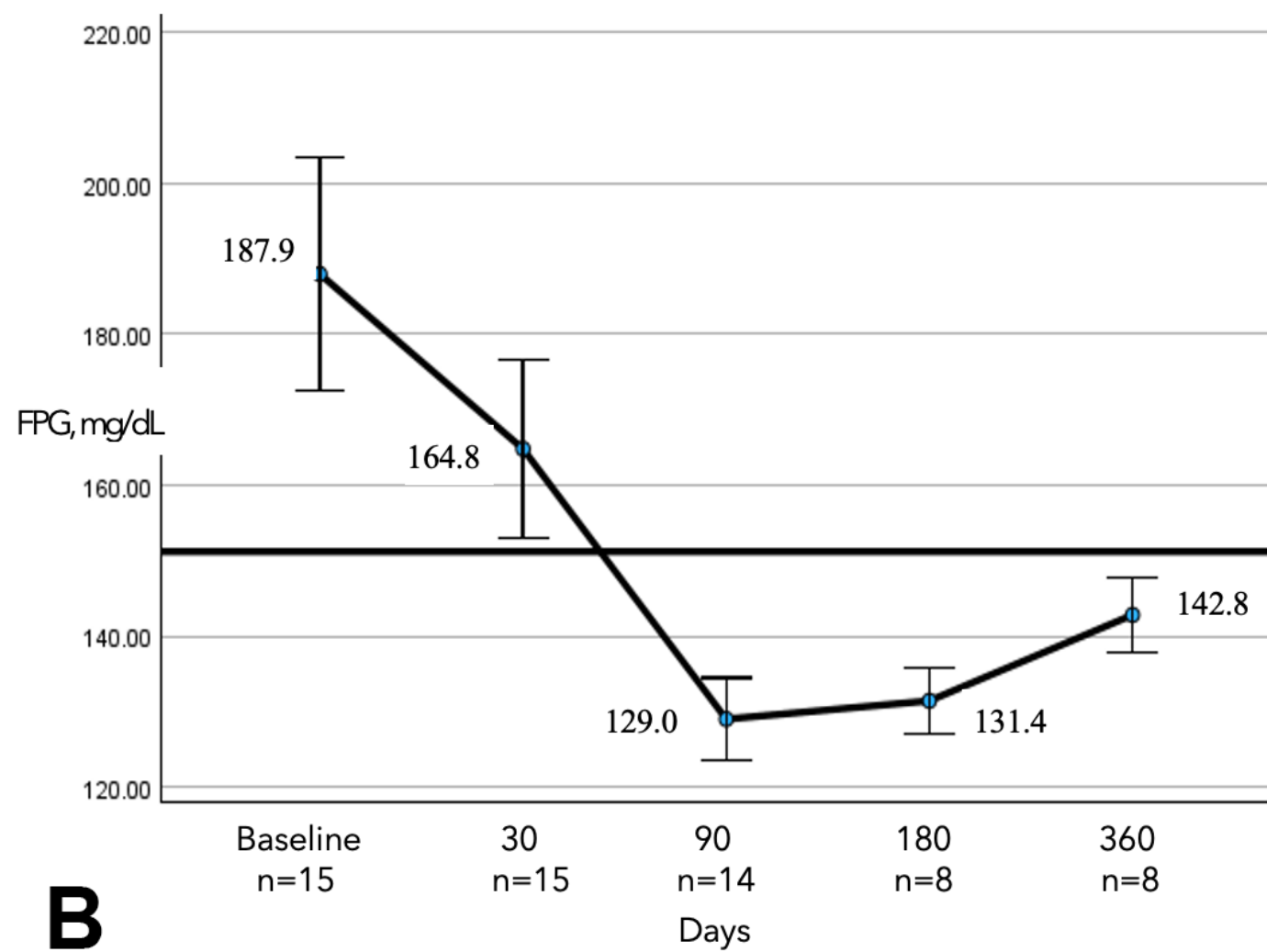
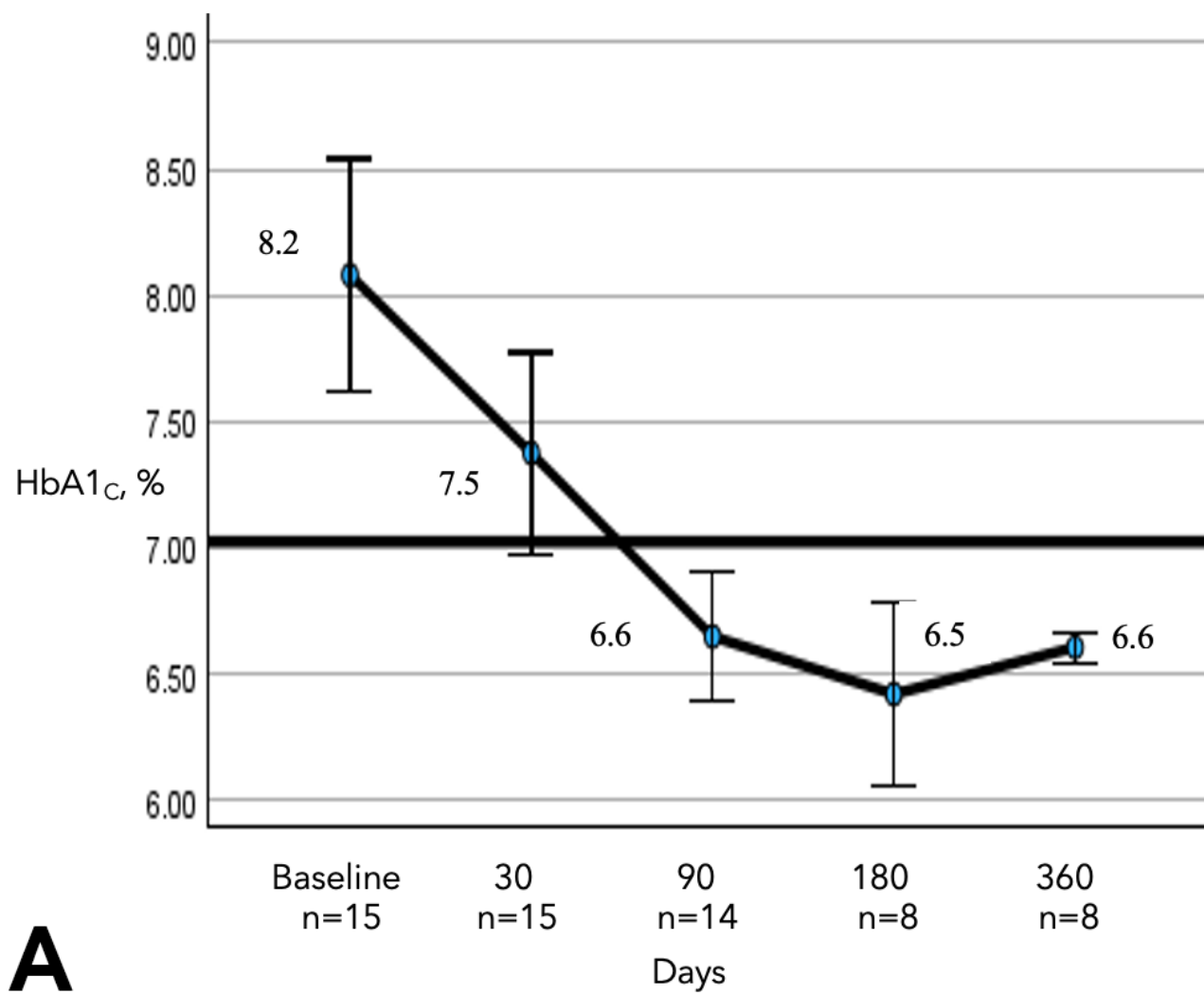


First-in-Human Side-to-Side Duodenoileal Bipartition for Weight Loss and Type 2 Diabetes with the Swallowable Biofragmentable Magnetic Anastomosis System

Michel Gagner, MD, FRCSC, FACS, FASMBS, FSSO, David Abuladze, MD, Jane Buchwald, BA, Levan Koiava, MD, Lamees Almutlaq, MD

-
- BACKGROUND:** Anastomosis creation using a novel magnetic compression technique may provide an alternative minimally invasive approach to gastrointestinal surgery. The biofragmentable magnetic anastomosis system (BMAS) is endolaparoscopically placed to effect magnetic duodenoileostomy (MagDI) bipartition for reduction of weight and type 2 diabetes (T2D). MagDI obviates major risks associated with enterotomy, stapling or suturing, and retained foreign materials.
- STUDY DESIGN:** This was a first-in-human prospective investigation of feasibility, safety, and efficacy in adults with BMI 30.0 or more to 35.0 or less kg/m². An initial BMAS magnet, swallowed by the patient or delivered under anesthesia by endoscopy, was guided laparoscopically to the distal ileum; a second magnet was endoscopically positioned in the postpyloric duodenum; magnets were aligned to fuse for 7 to 21 days forming the duodenoileostomy. Primary endpoints are feasibility and severe adverse event (AE) incidence by Clavien-Dindo grade. Secondary endpoints are weight and T2D reduction.
- RESULTS:** Between December 20, 2022, and May 21, 2024, 15 patients (mean BMI 33.0 ± 0.4 kg/m²), all with T2D (glycosylated hemoglobin 8.2% ± 0.4%, glucose 187.9 ± 15.5 mg/dL, on T2D medications) underwent MagDI. The mean operative time was 51.3 ± 5.3 minutes. Feasibility at 90 days was confirmed in 100.0% with 0.0% leakage, bleeding, infection, stricture, and mortality; 89.4% of AEs were mild; and 3 Clavien-Dindo-III severe AEs were resolved. At 1 year, 100.0% of anastomoses were patent, BMI was (8) 30.1 ± 0.9 kg/m², excess weight loss was 38.8%, glycosylated hemoglobin was 6.6% ± 0.1%, and glucose was 142.8 ± 9.5 mg/dL.
- CONCLUSIONS:** The novel swallowable, BMAS was feasible, safe, and effective in achieving incisionless, suture- or staple-free magDI. The device and procedure provide a promising minimally invasive option for moderate, clinically meaningful weight loss and T2D mitigation. (J Am Coll Surg 2025;241:146–159. © 2025 The Author(s). Published by Wolters Kluwer Health, Inc. on behalf of the American College of Surgeons. This is an open-access article distributed under the terms of the [Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 \[CCBY-NC-ND\]](#), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.)





The MAGDI Study Overview

- Use of GT Metabolic MagDI System to Achieve Magnetic Duodeno-Ileostomy (MAGDI) in Adults with Obesity with or without Diabetes
 - Two (2) **DI Magnets (32mm or 40mm or 50mm)** for side-to-side duodeno-ileal anastomosis
 - Patients with prior Sleeve Gastrectomy (SG $\geq$ 1 year) or no prior SG and no concurrent SG
 - An open-label, multicenter study – by site and Magnet Cohort:

Study Site (PI)	32mm n	40mm n	50mm n	TOTAL n (%)
Australia , Sydney	0	25	0	25 (17.5%)
Canada , Montreal	24	11	20	55 (38.5%)
Chile , Santiago	0	1	9	10 (7.0%)
Georgia , Tbilisi	0	15	0	15 (10.5%)
Italy , Naples, Zingonia, Cotignola	0	28*	0	28 (19.6%)
Mexico , Mexico City	0	10	0	10 (7.0%)
TOTAL (%)	24 (16.8%)	90 (62.9%)*	29 (20.3%)	143 (100%)

*90 consented, one procedure not completed for enrollment.

Baseline Characteristics

Baseline Characteristics	32mm n=24	40mm n=90*	50mm n=29	TOTAL n=143
Clinical				
Prior Sleeve Gastrectomy (SG) ≥ 12 months: n (%)	24 (100%)	60 (66.7%)	24 (82.8%)	108 (75.5%)
Body Weight: Mean (SEM)	105.3 (4.3) kg	95.9 (1.6) kg	103.3 (3.8) kg	99.0 (1.5) kg
Body Mass Index (BMI): Mean (SEM)	39.4 (1.3) kg/m ²	34.5 (0.4) kg/m ²	36.5 (1.2) kg/m ²	35.7 (0.4) kg/m²
Type 2 Diabetes: n (%)	1 (4.2%)	36 (40.0%)	5 (17.2%)	42 (29.4%)
Baseline HbA1c: Mean (SEM)	5.3 (0.1) %	6.2 (0.2)%	5.7 (0.2)%	6.0 (0.1)%
Age				
Mean (SEM)	44.9 (1.5) years	45.5 (1.0) years	43.9 (1.4) years	45.1 (0.7) years
Min, Max	33, 57 years	21, 65 years	34, 59 years	21, 65 years
Gender				
Female: n (%)	23 (95.8%)	64 (71.1%)	22 (75.9%)	109 (76.2%)
Male: n (%)	1 (4.2%)	26 (28.9%)	7 (24.1%)	34 (23.8%)

*90 consented, one procedure not completed for enrollment.

Natural Device Expulsion Profile

- Device expulsion time was based on subject self-report, though not all are aware of device passage (50%).
- For those aware of passage, time to expulsion was estimated as day of imaging confirmation (worst-case):

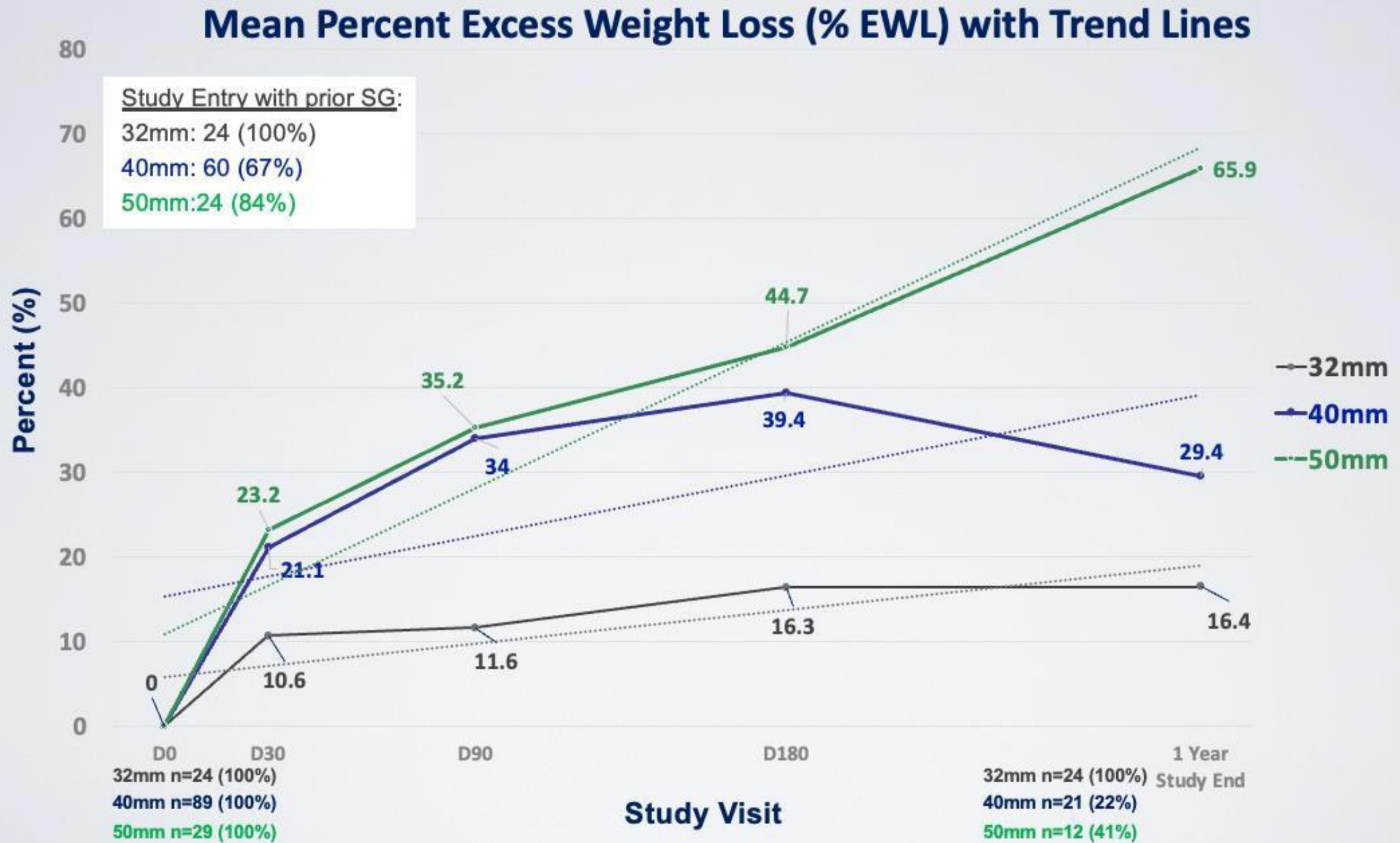
Expulsion Characteristics	32mm n=24	40mm n=88/89 ^a	50mm n=27/29 ^b	TOTAL n=139/142 ^{a,b}
Mean (SEM) (days)	42.2 (4.7)	33.7 (1.6)	34.3 (2.2)	35.3 (1.4)
Median (days)	36.5	30.0	31.0	30.0
Range (days)	14 – 93	11 – 97	17 - 67	11 - 97
Magnet Retrieval (n)	0	0	2 ^b	2 ^b

^a1 subject withdrew consent prior to device expulsion

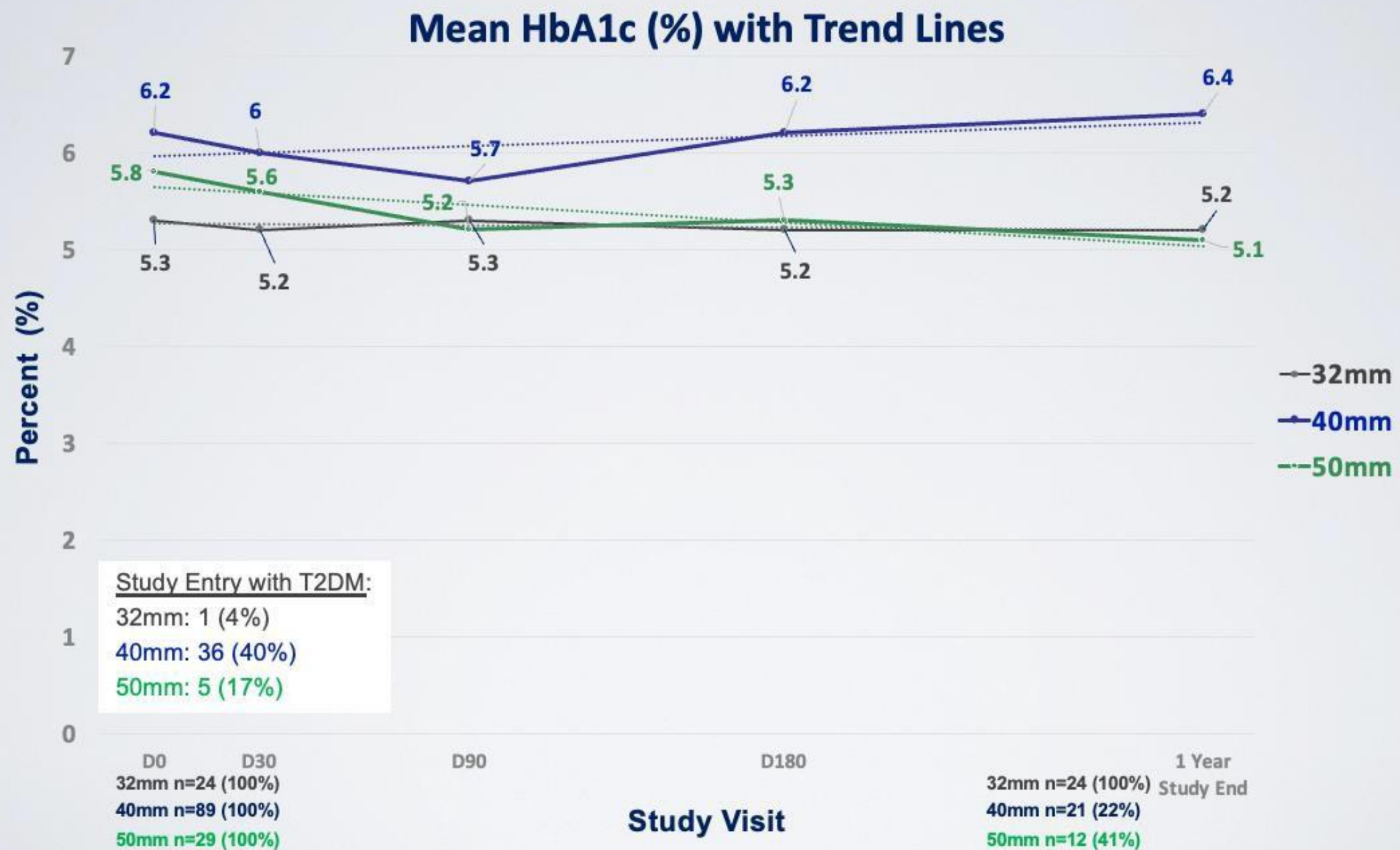
^bIn 2 cases, the Magnets were retrieved (see previous slide).

- Hospitalization time across Magnet sizes: Median 1.0 day; Mean 1.2 days

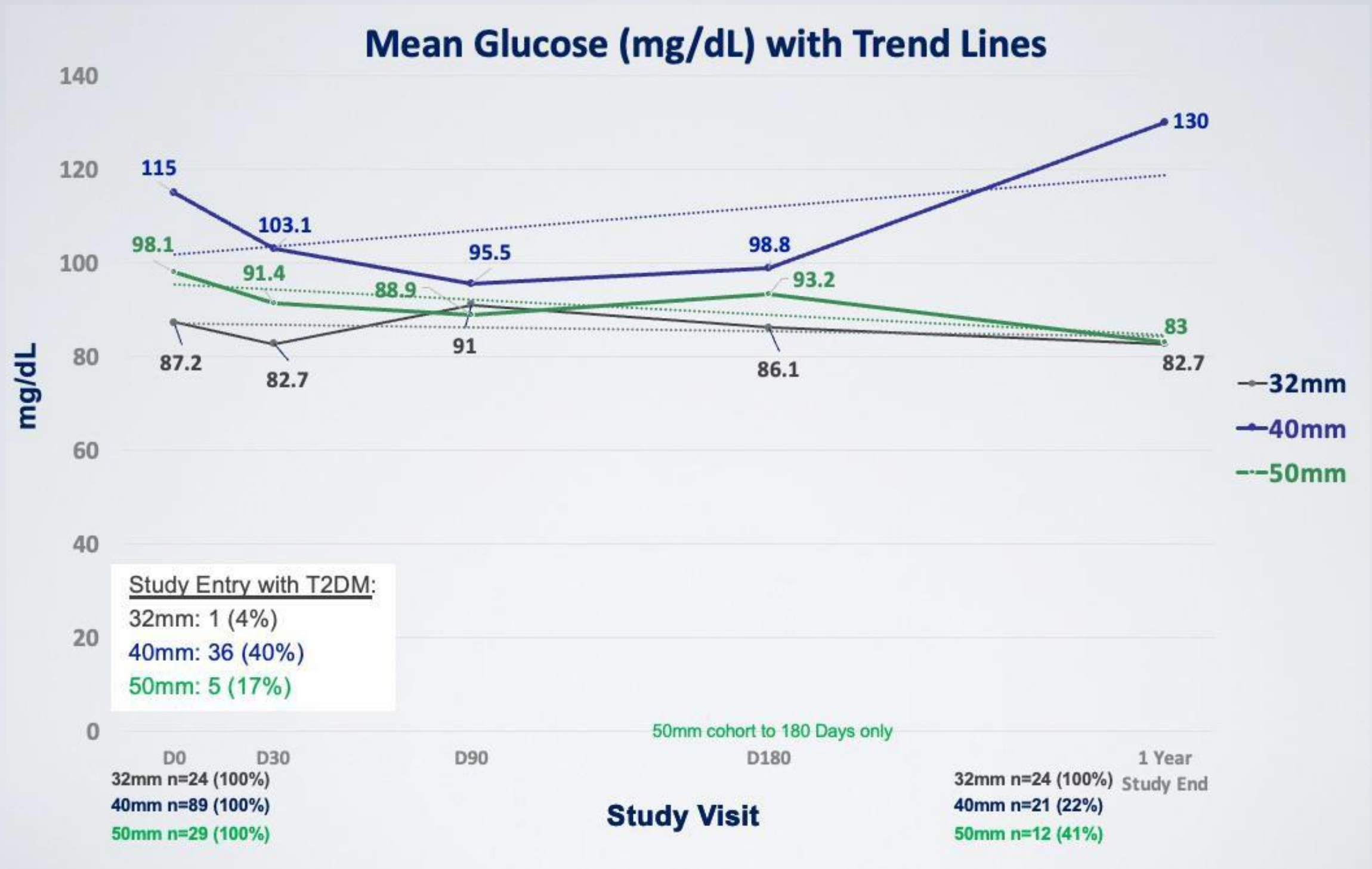
MAGDI for Anastomosis in Duodeno-Ileostomy for Obesity Control



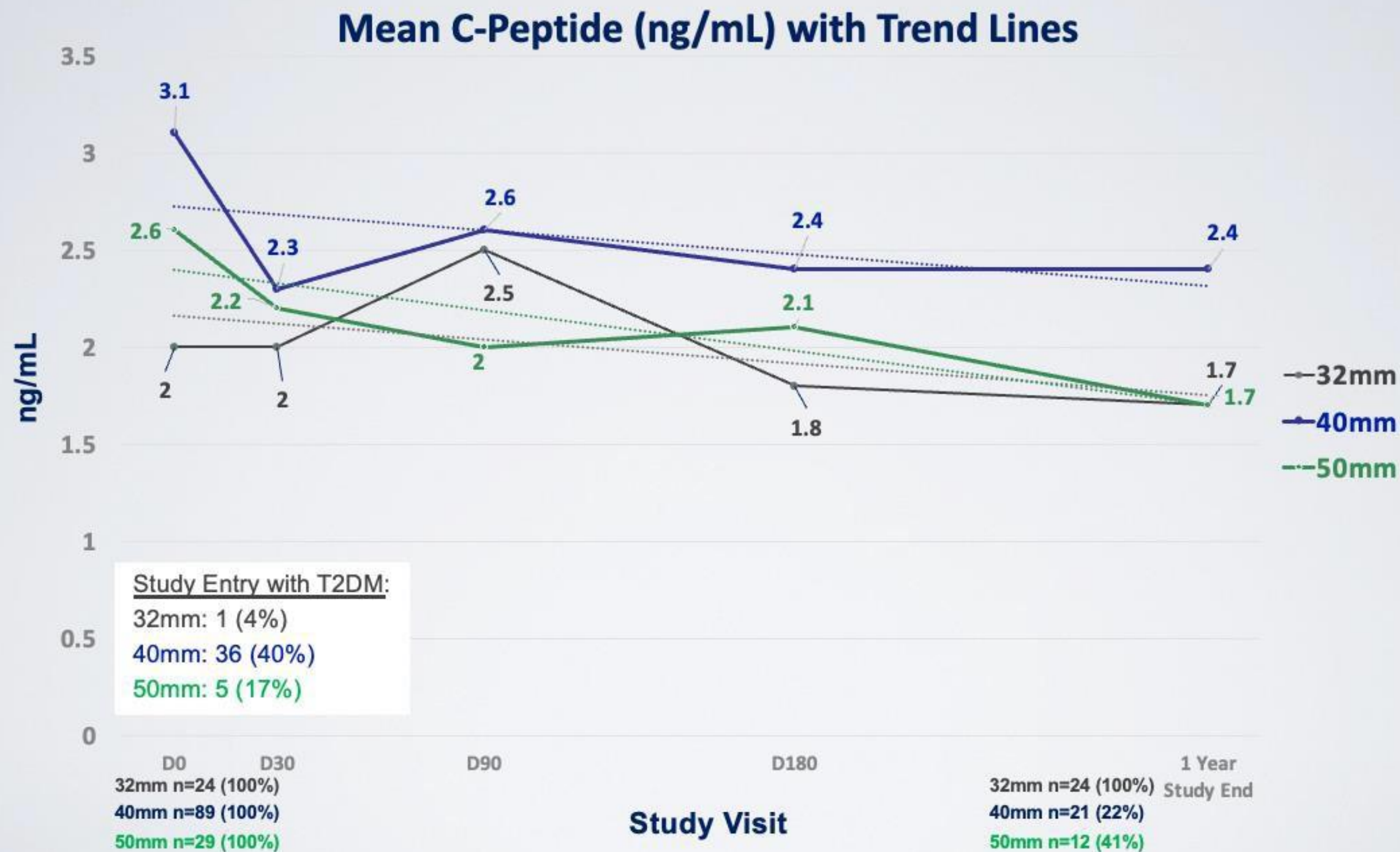
MAGDI for Anastomosis in Duodeno-Ileostomy for Metabolic Control



MAGDI for Anastomosis in Duodeno-Ileostomy for Metabolic Control



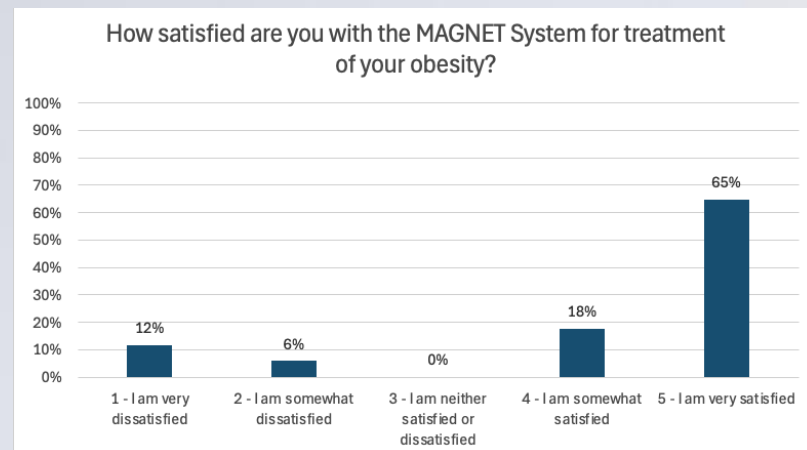
MAGDI for Anastomosis in Duodeno-Ileostomy for Metabolic Control



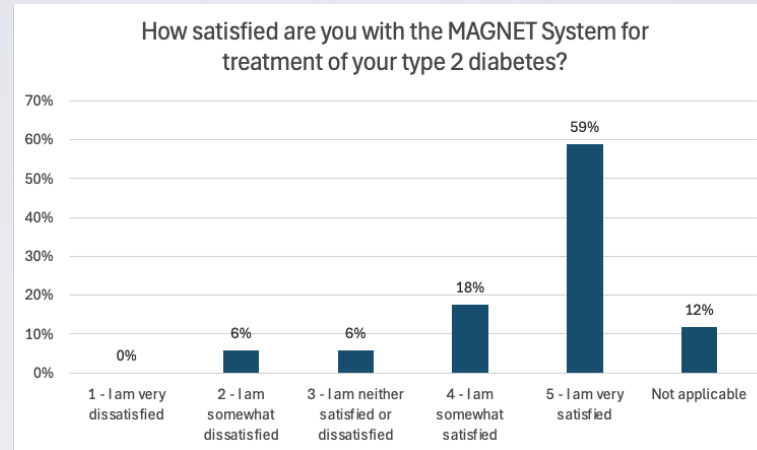
Patient Satisfaction at 1 Year

Note: small sample responses

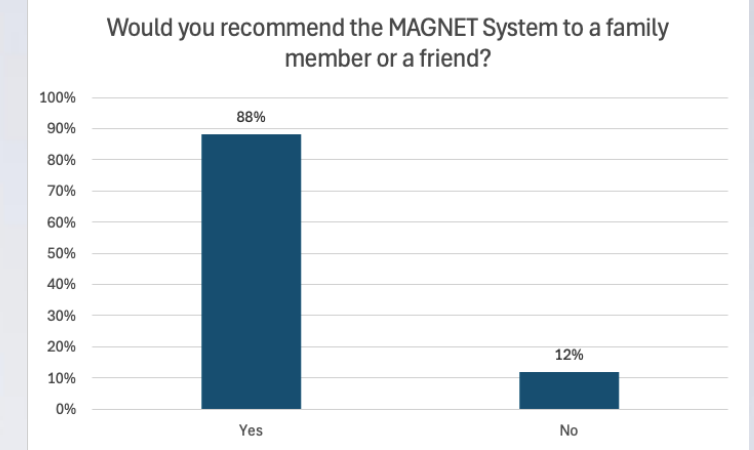
MagDI System (40mm)



Responses: n=17

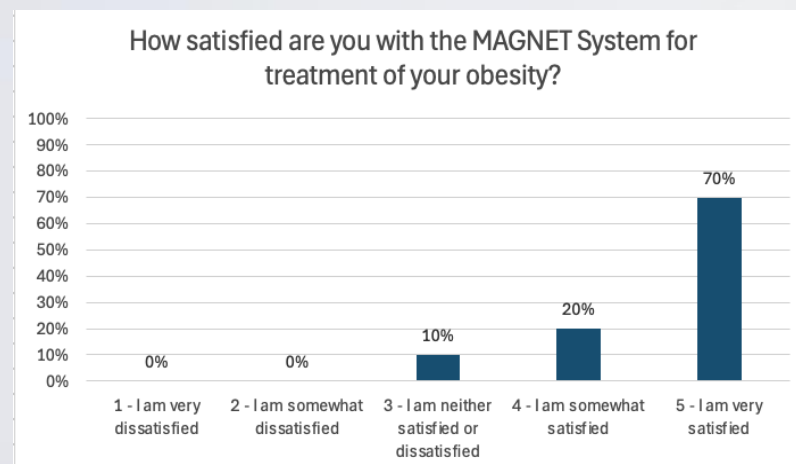


n=15 (2=N/A)

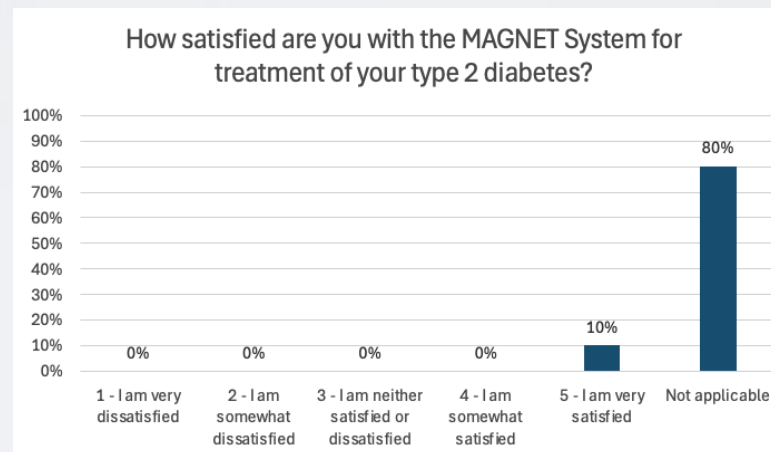


n=17

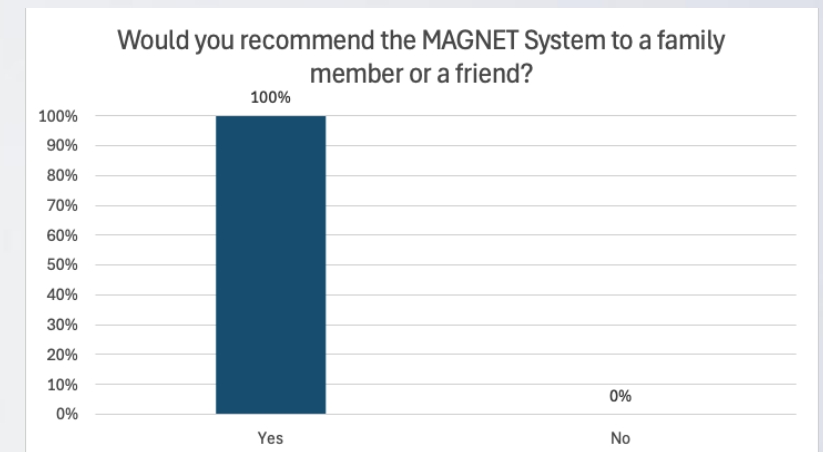
MagDI System (50mm)



Responses: n=10



n=9 (8=N/A)

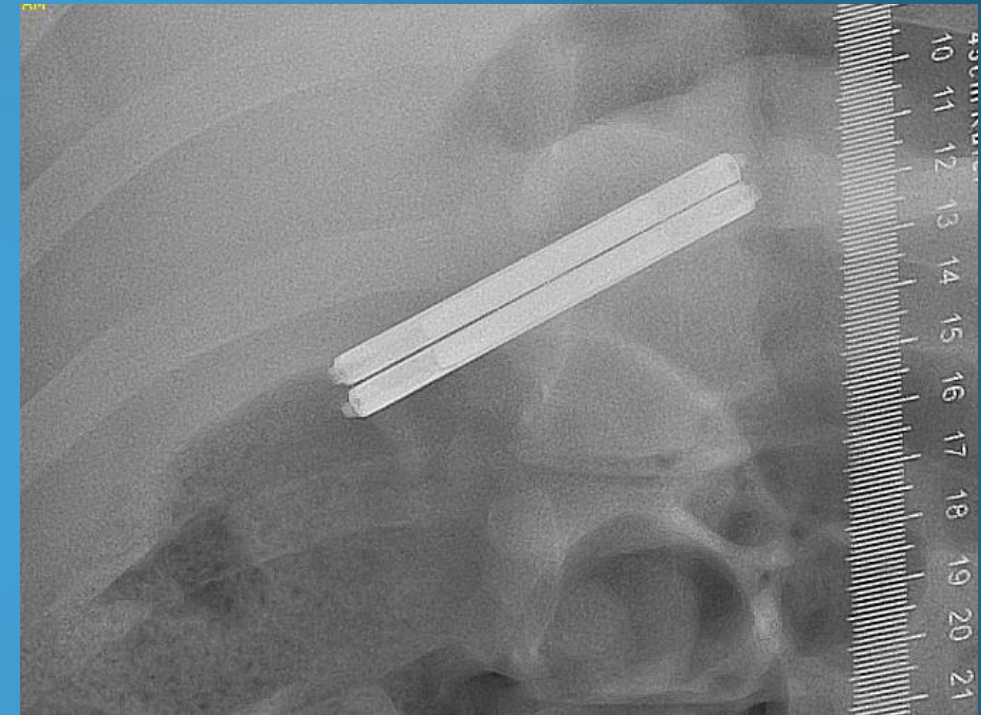


n=10

Magnetic Gastro-Ileostomy (MAGGI)



In patients post Sleeve Gastrectomy
weight regain or failure to lose adequate weight
Lower antrum and ileum at 250 cm (SASI)



POD #06





Original article

Magnetic compression anastomosis gastrojejunostomy: feasibility and efficacy of a novel device in a swine model

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Abstract

Background: Means of addressing technical challenges in forming gastrojejunostomy (GJ) anastomoses and maintaining their patency are sought.

Objectives: Evaluation of preclinical feasibility and healing efficacy of a novel linear magnetic compression anastomosis (MCA) device to form a patent GJ versus sutured jejunal enterotomy (JE) sites in swine.

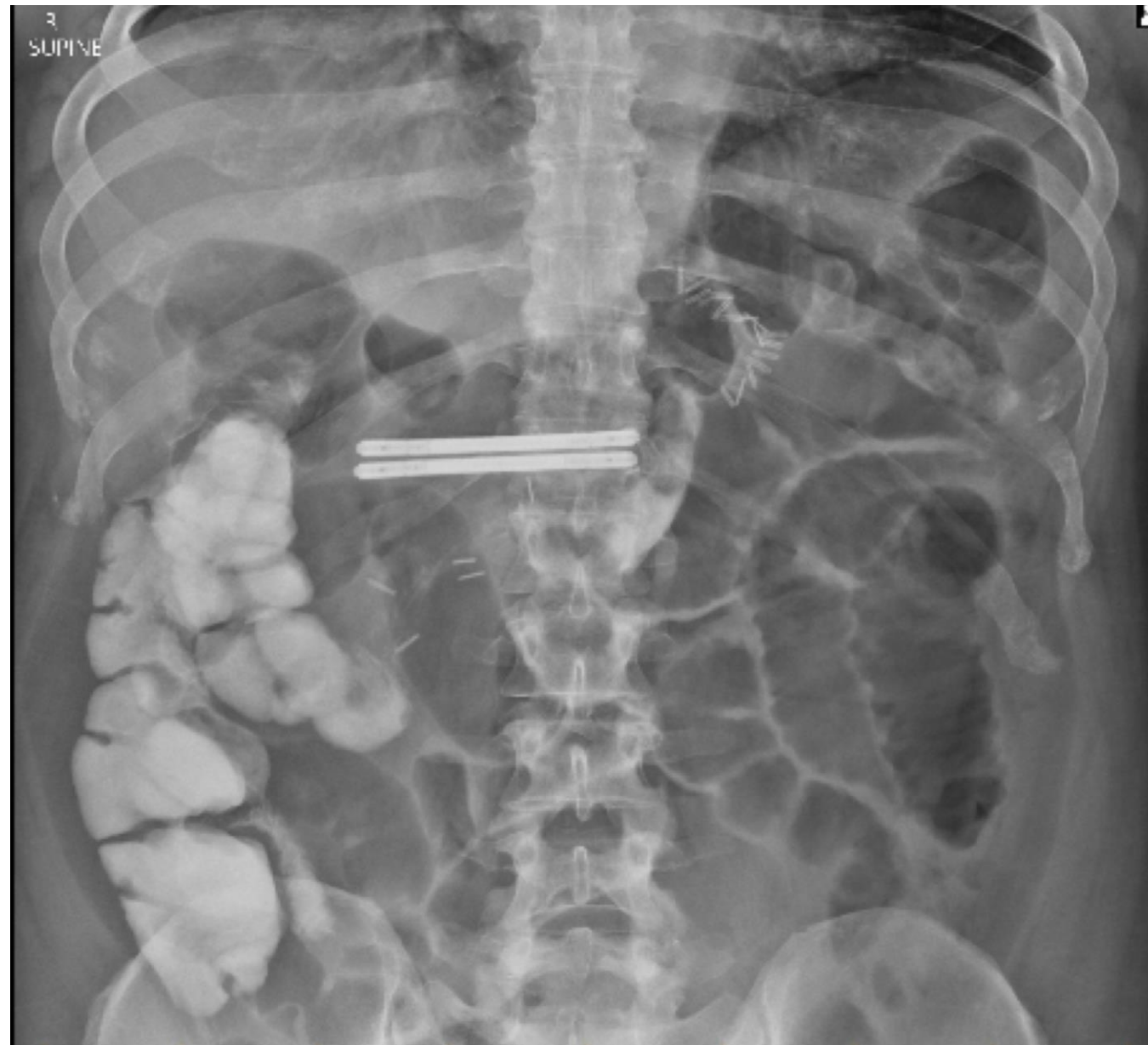
Setting: Single-center veterinary testing facility.

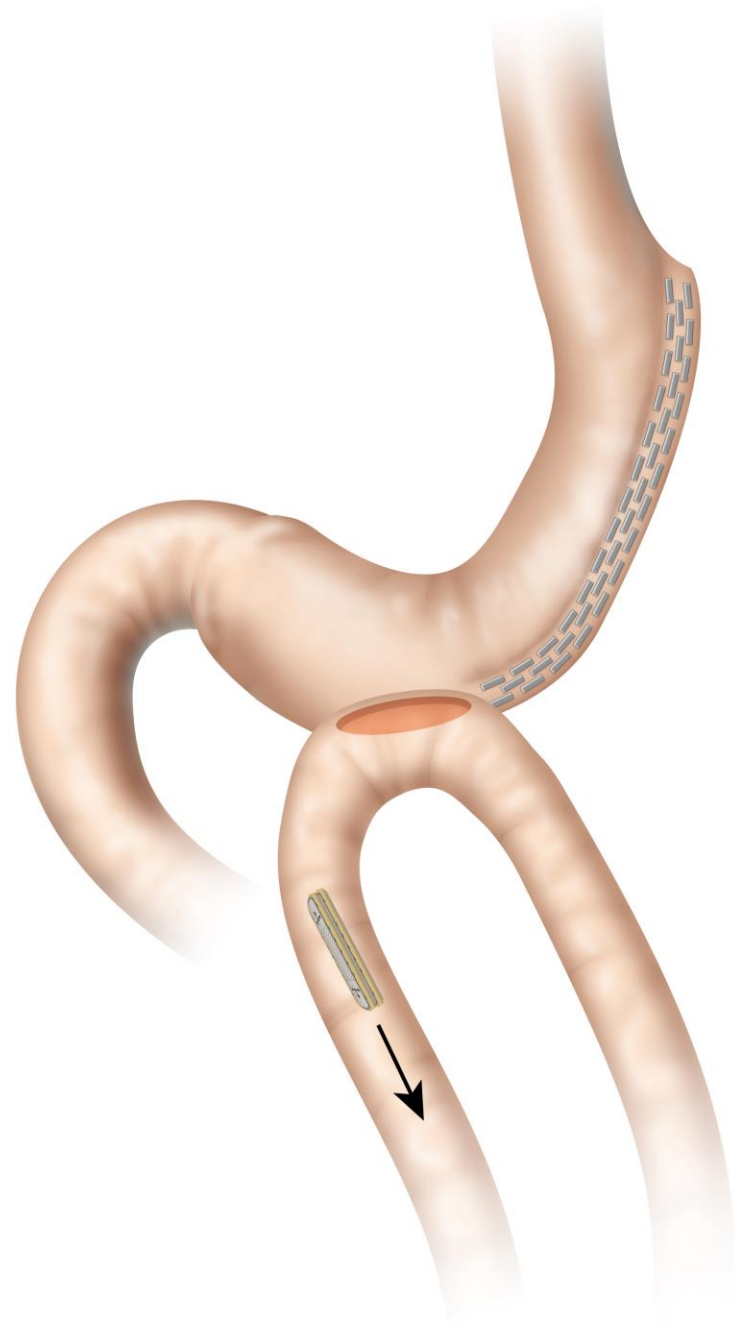
Methods: Feasibility of 3 prototype sizes (4, 6, and 8 cm) of a metal MCA device (MCAD) to form a patent GJ was evaluated over 6 weeks. A distal magnet was laparoscopically inserted in the jejunum, a proximal magnet was placed gastroscopically in the stomach; magnets were aligned to gradually form an anastomosis, self-detached, and be expelled. At necropsy, MCAs were assessed for patency and compared with JE tissues to evaluate wound healing.

Results: MCADs aligned at the GJ location without complications. In 5/6 MCAD pairs, dislodgement occurred between 7 and 26 days; expulsion 13–31 days; 1 MCAD pair was retained in the stomach. At necropsy, all pigs were healthy, gaining a mean 15.0 kg. Anastomoses were not adequately patent in 2/4 pigs receiving the 4-cm or 6-cm MCADs because their linear length was too small. But, anastomoses of both pigs receiving the 8-cm MCADs maintained full patency. Minimal inflammation and fibrosis were seen in MCA specimens versus sutured enterotomies.

Conclusions: A novel linear MCA device was feasible and effectively created a patent GJ anastomosis in swine with minimal inflammation and fibrosis. The MCAD may be appropriate for









The MAGGI Study

- 4 Sites:
 - Westmount Square Surgical Center, Montreal, Quebec **Canada** (Dr. Michel Gagner) – 80mm, 70mm, 60mm Magnets
 - Hospital Luisfadas Amadora, Lisbon, **Portugal** (Dr. Rui Ribeiro) – 70mm, 60mm Magnets
 - Cleveland Clinic Abu Dhabi, **UAE** (Dr. John Rodriguez) – 70mm Magnets
 - Clinica MEDS La Dehesa, Lo Barnechea, **Chile** (Dr. Marcos Berry) – 60mm Magnets
- Total n=47 enrolled; n=46* treated between Nov 6, 2023, and Dec 18, 2025
- March 2024, n=5 first-in-human (Stage 1, 80mm Magnet) 90-day safety data evaluated by independent DSMB >> approved to proceed
- 90-day follow up for the primary performance endpoint completed for all n=46 subjects
- Follow up progression by Magnet size (n=46 treated):

Visit	80mm Magnet n (% cohort)	70mm Magnet n (% cohort)	60mm Magnet n (% cohort)	MAGGI TOTAL N (% Total)
Treated	7 (100%)	16 (100%)	23 (100%)	46 (100%)
Day 30	7 (100%)	16 (100%)	23 (100%)	46 (100%)
Day 90	7 (100%)	16 (100%)	23 (100%)	46 (100%)
Day 180	7 (100%)	13 (81.2%)	3 (13.0%)	23 (50%)
Day 360	7 (100 %)	9 (56.2%)	1 (4.3%)	17 (37.0%)

*n=1 subject swallowed first 60mm Magnet without issue, became anxious about surgery/anesthesia and withdrew consent. Magnet passed naturally at day 4.

The MAGGI Study – Baseline Characteristics

Baseline Characteristics	All subjects (N=46)
Clinical	
Prior Sleeve Gastrectomy $\geq$ 12 months: n (%)	42 (91.3%)
Body Weight: Mean (SEM)	105.3 (2.5) kg
Body Mass Index (BMI): Mean (SEM)	38.4 (0.7) kg/m ²
Type 2 Diabetes: n (%)	6 (13.0%)
HbA1c (%): Mean (SEM)	5.7 (0.2) %
Glucose (mg/dL): Mean (SEM)	94.2 (3.7) mg/dL
Age	
Mean (SEM)	44.6 (1.3) years
Min, Max	25, 65 years
Gender	
Female: n (%)	38 (82.6%)
Male: n (%)	8 (17.4%)
Self-Reported Race	
White or Caucasian	41 (89.1%)
Black	2 (4.3%)
Métis and “Other”	3 (6.5%)

MAGGI System Meets Primary Performance Endpoint

- All 46 subjects have been confirmed of device expulsion or retrieval and followed to Day 90 for the protocol-defined primary endpoint:

Performance Criteria	Device Expulsion n (%)
Placement and alignment of Magnets	46 (100%)
Passage of the device without re-intervention	44 (95.6%) ^a
Creation of a patent anastomosis	46 (100%)
Meets all Criteria for SUCCESS:	44 (95.6%)

^a In one case (02-003-04; 70mm Magnets), the Magnets **created a patent anastomosis**, but the fused devices remained at the site. The patient experienced no clinical adverse effects. The set of connected devices was **retrieved endoscopically without issue at day 168**; no anastomosis or significant clinical issues through one-year follow up.

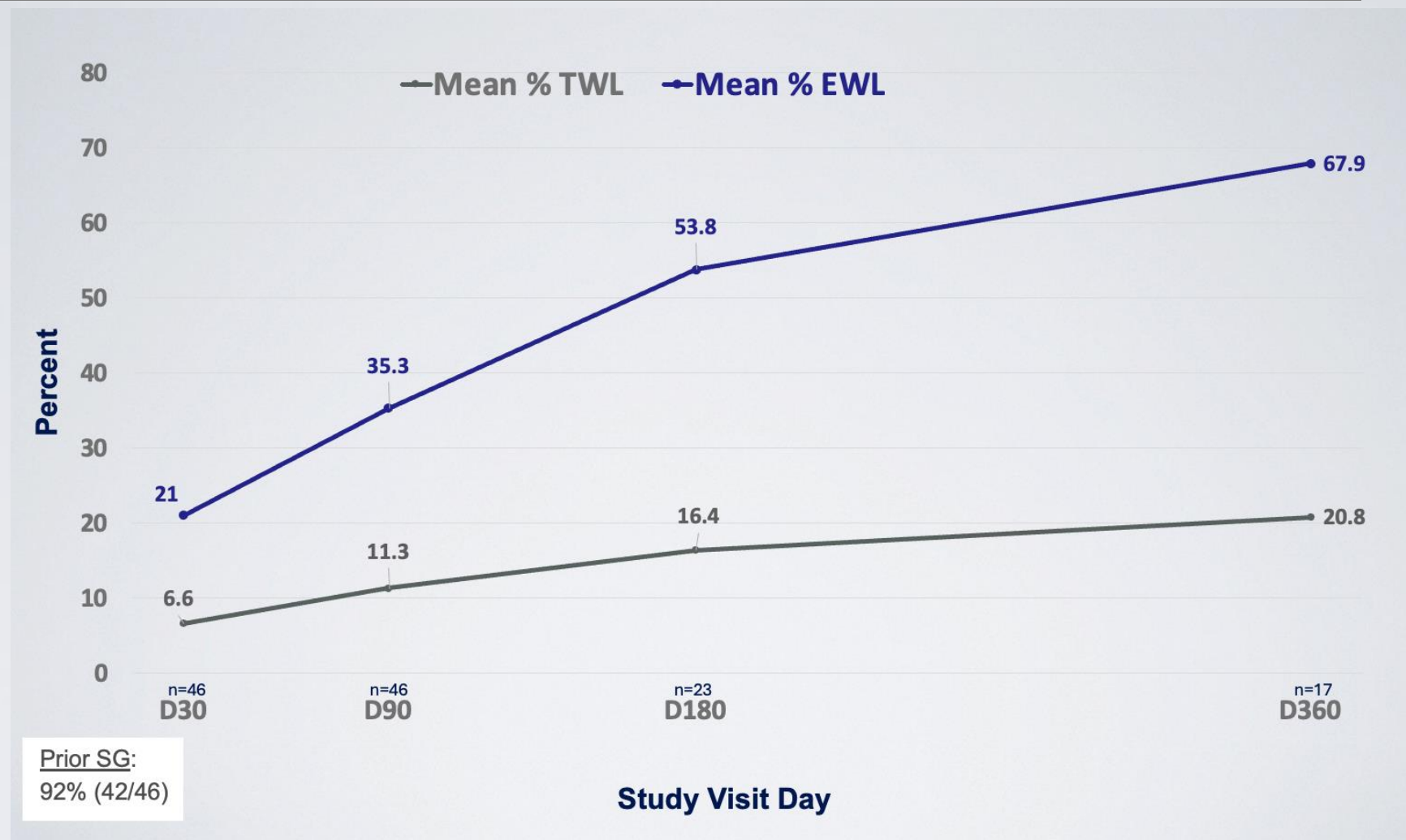
In the second case (05-003-09; 60mm Magnets), the Magnets dropped and were visible on X-ray to have **progressed approximately to the cecum. The patient experienced no clinical adverse effects**. The connected devices were **removed successfully by colonoscopy on day 92** without clinical issues; follow-up endoscopy revealed a patent anastomosis of good size (approx. 15mm).

- The MAGGI System meets the primary performance endpoint in this powered study with 44 (95.6%) of all subjects meeting all three success criteria.
- Time to expulsion is based on patient self-report or X-ray confirmation:
Median 36 days (Range: 14, 99 days)

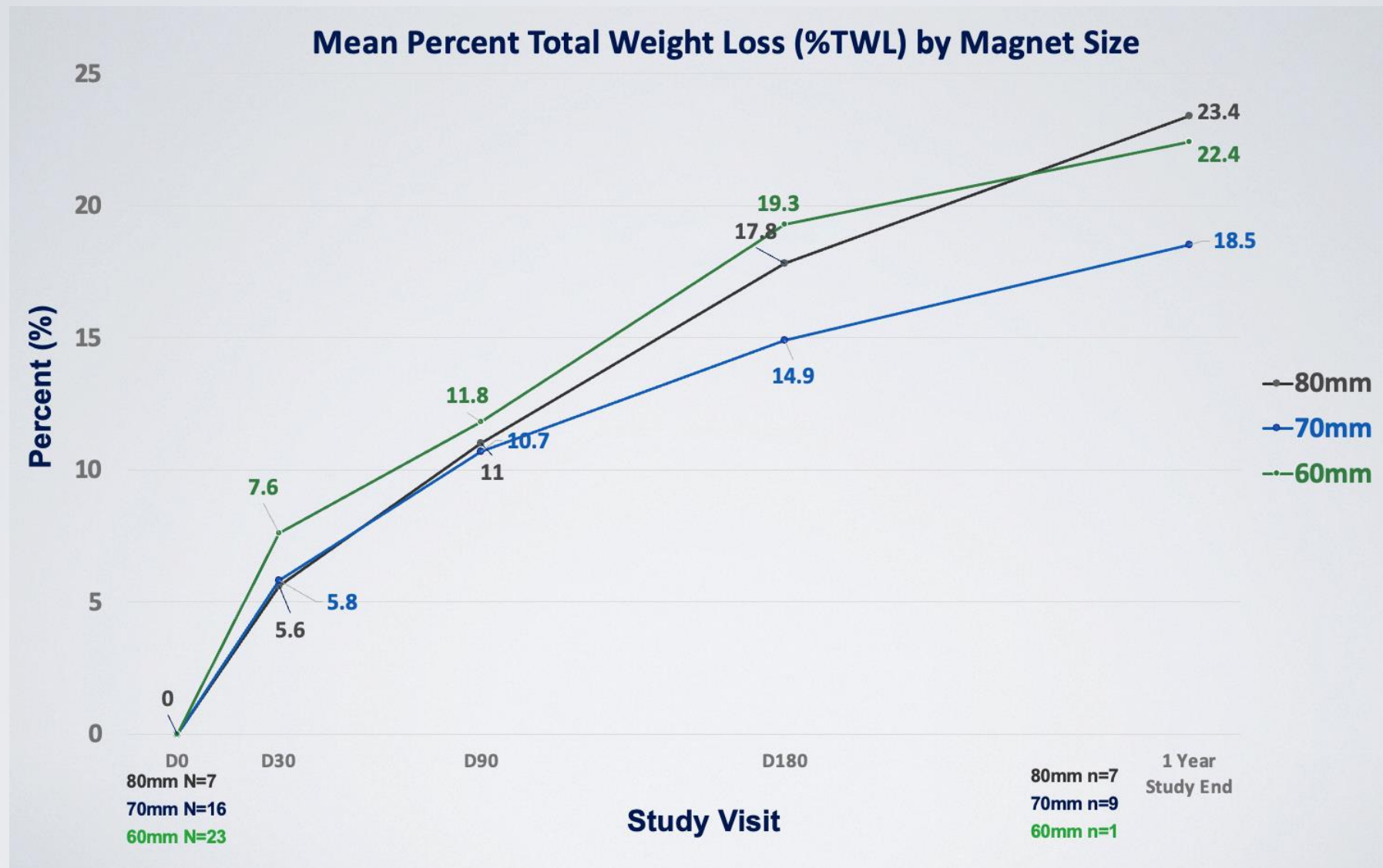
Adverse Events by Clavien-Dindo Classification

Clavien-Dindo Classification	All Subjects (N=46) n (% of Total AEs) ALL FOLLOW	All Subjects (N=46) n (% of Total AEs) 30D POSTOP
Grade I: Deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic, and radiological interventions. Antiemetics, antipyretics, analgesics, diuretics and electrolytes, and physiotherapy allowed.	40 (36.4%)	24 (55.8%)
Grade II: Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition included.	52 (47.3%)	13 (30.2%)
Grade III: Requiring surgical, endoscopic, or radiological intervention.	14 (12.7%)	4 (9.3%)
Grade IV: Life-threatening complication (including certain CNS complications) requiring Intermediate Care/Intensive Care Unit-management.	4 (3.6%)	2 (4.6%)
Grade V: Death of a patient.	0 (0%)	0 (0%)
Totals Adverse Events	110 (100%)	43 (39.1%)

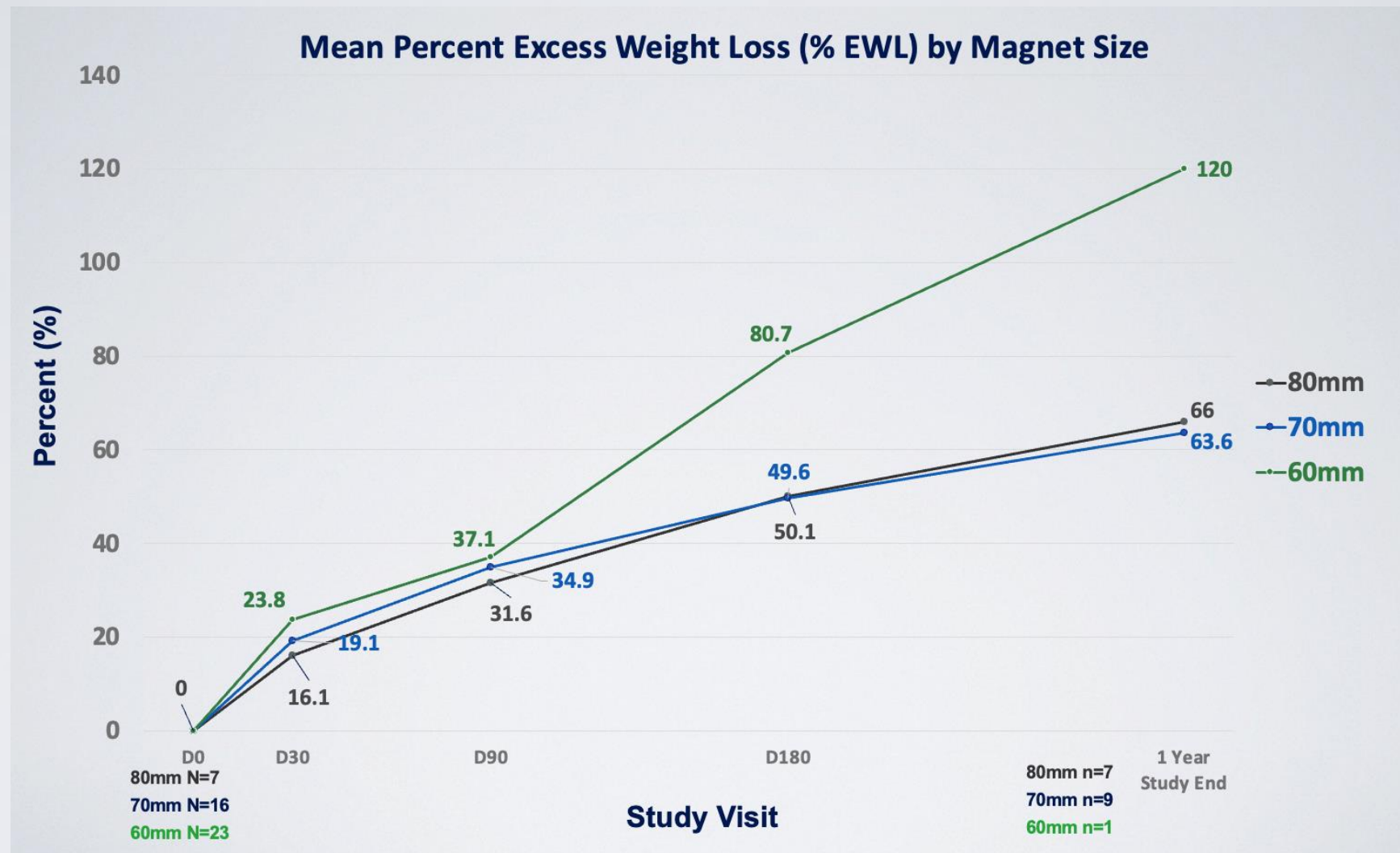
Secondary Endpoints: % Total and Excess Weight Loss



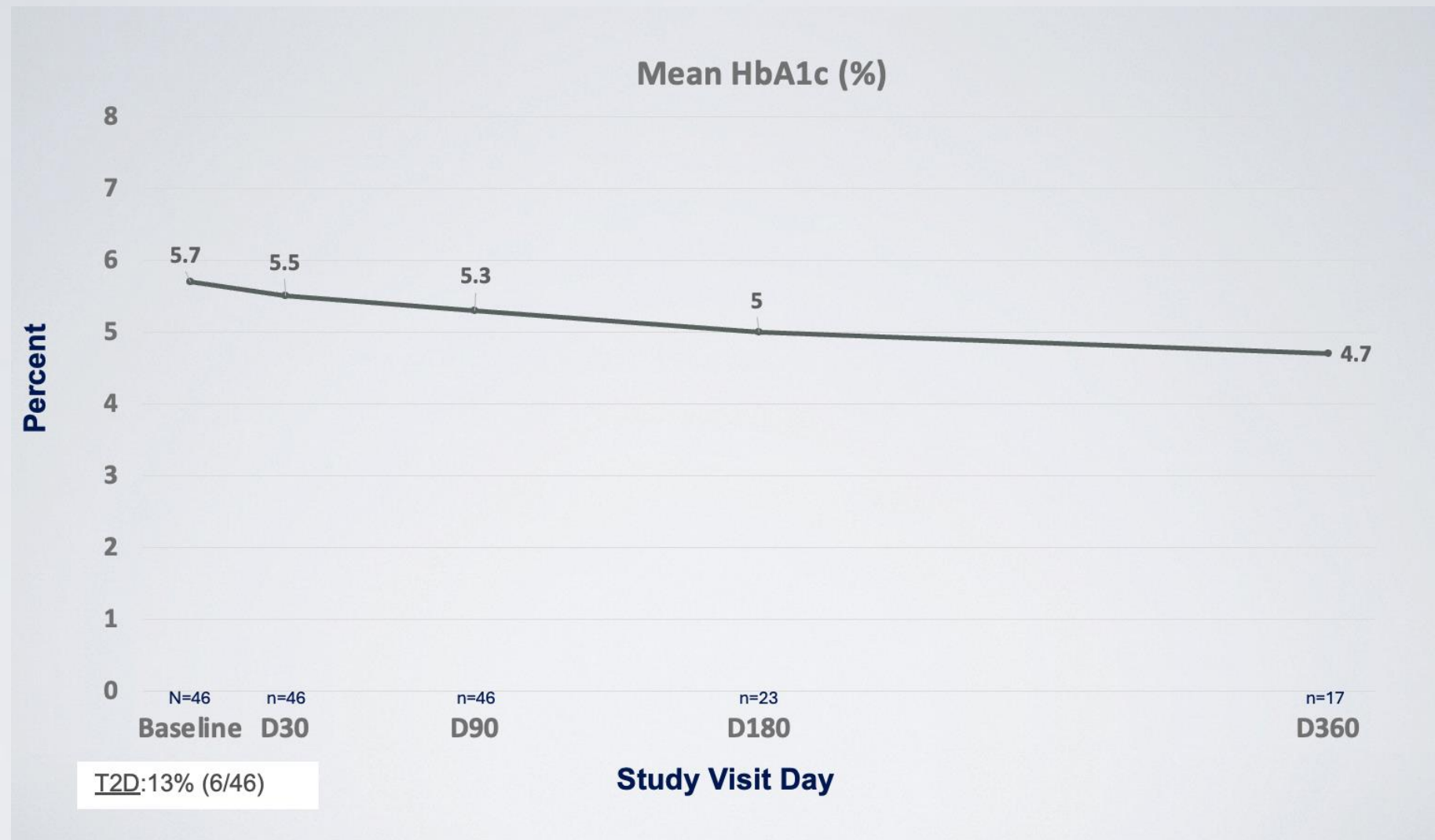
MAGGI for Anastomosis in Gastroileostomy for Obesity Control



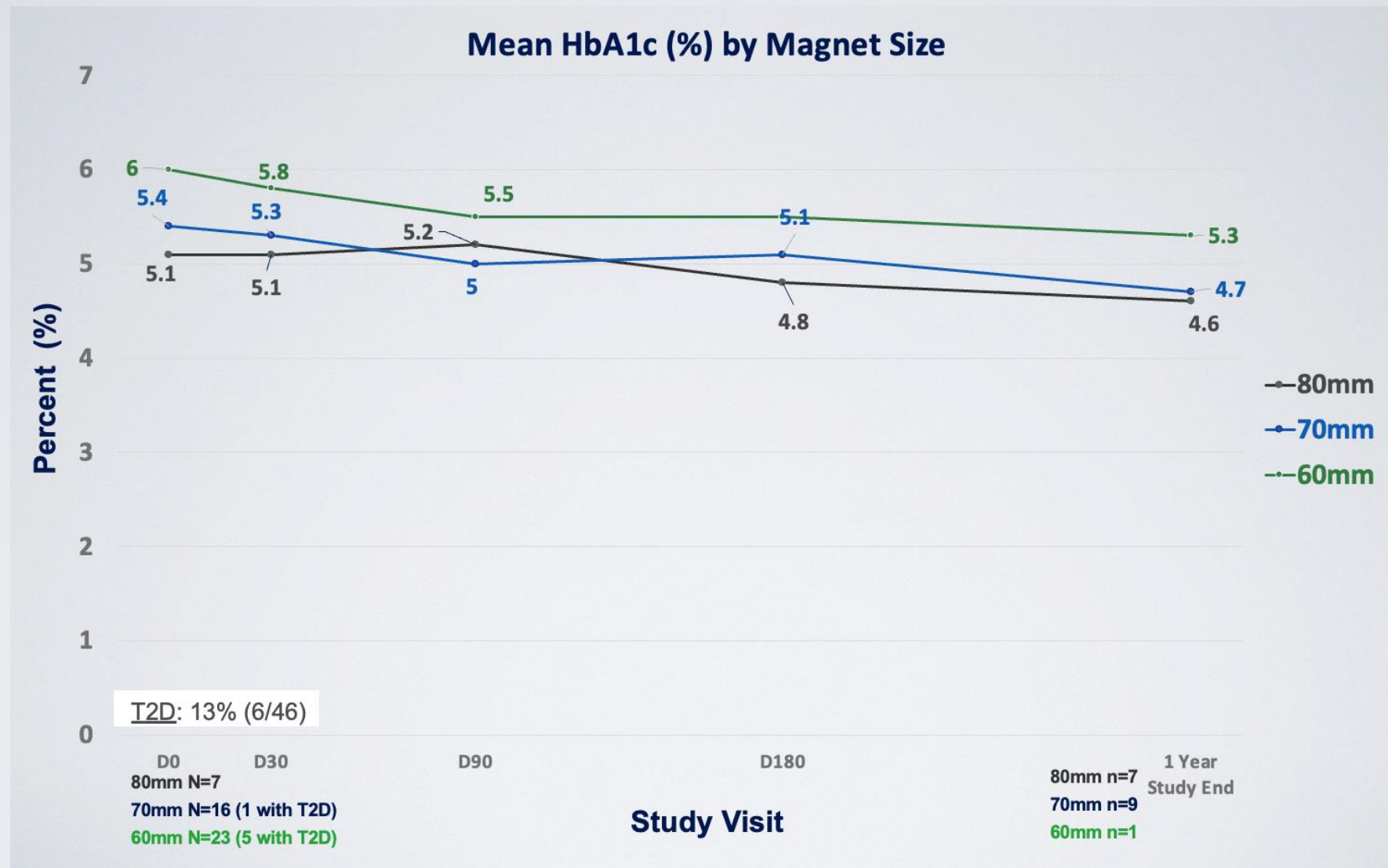
MAGGI for Anastomosis in Gastroileostomy for Obesity Control



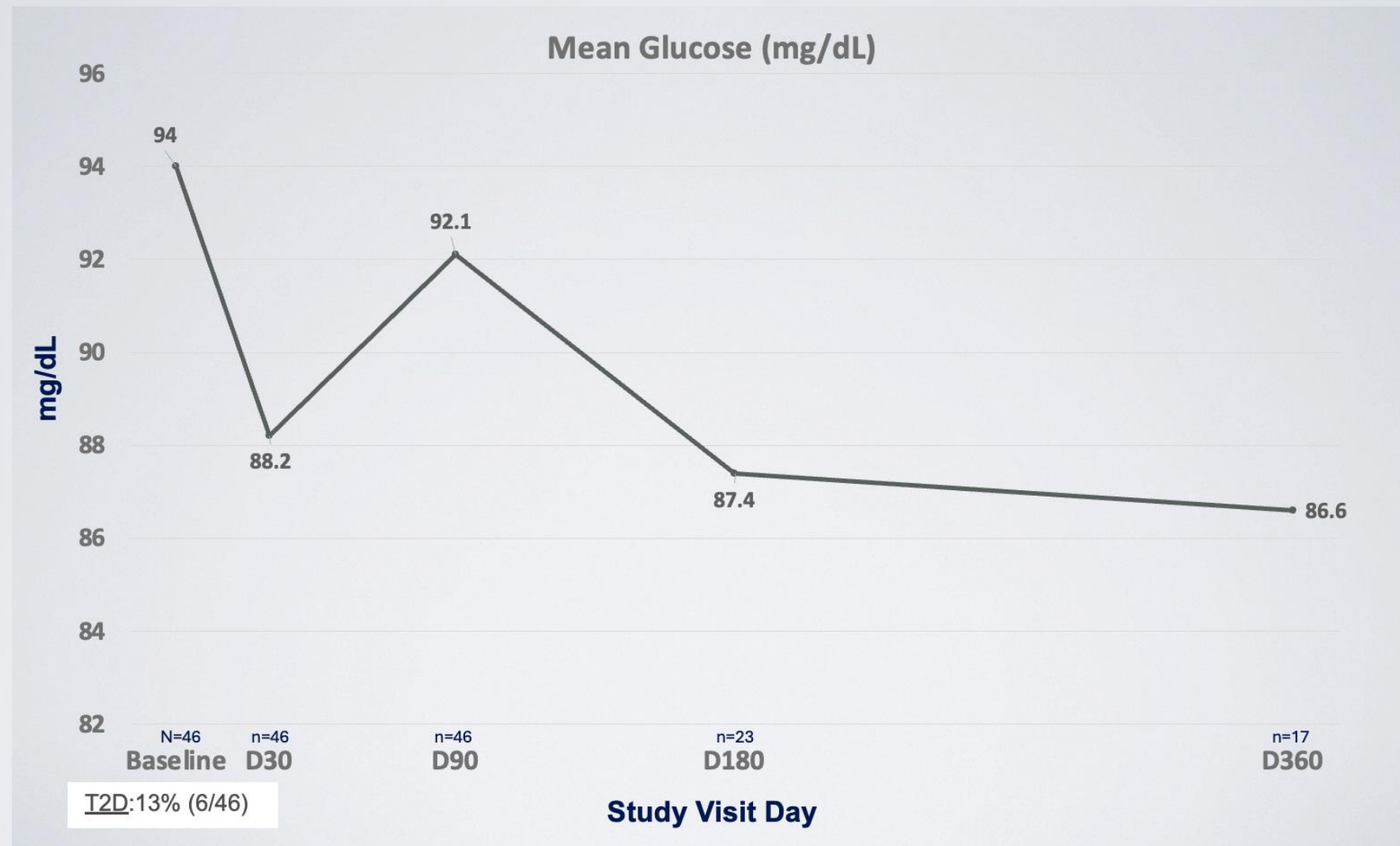
Early Metabolic Indicators (MAGGI)



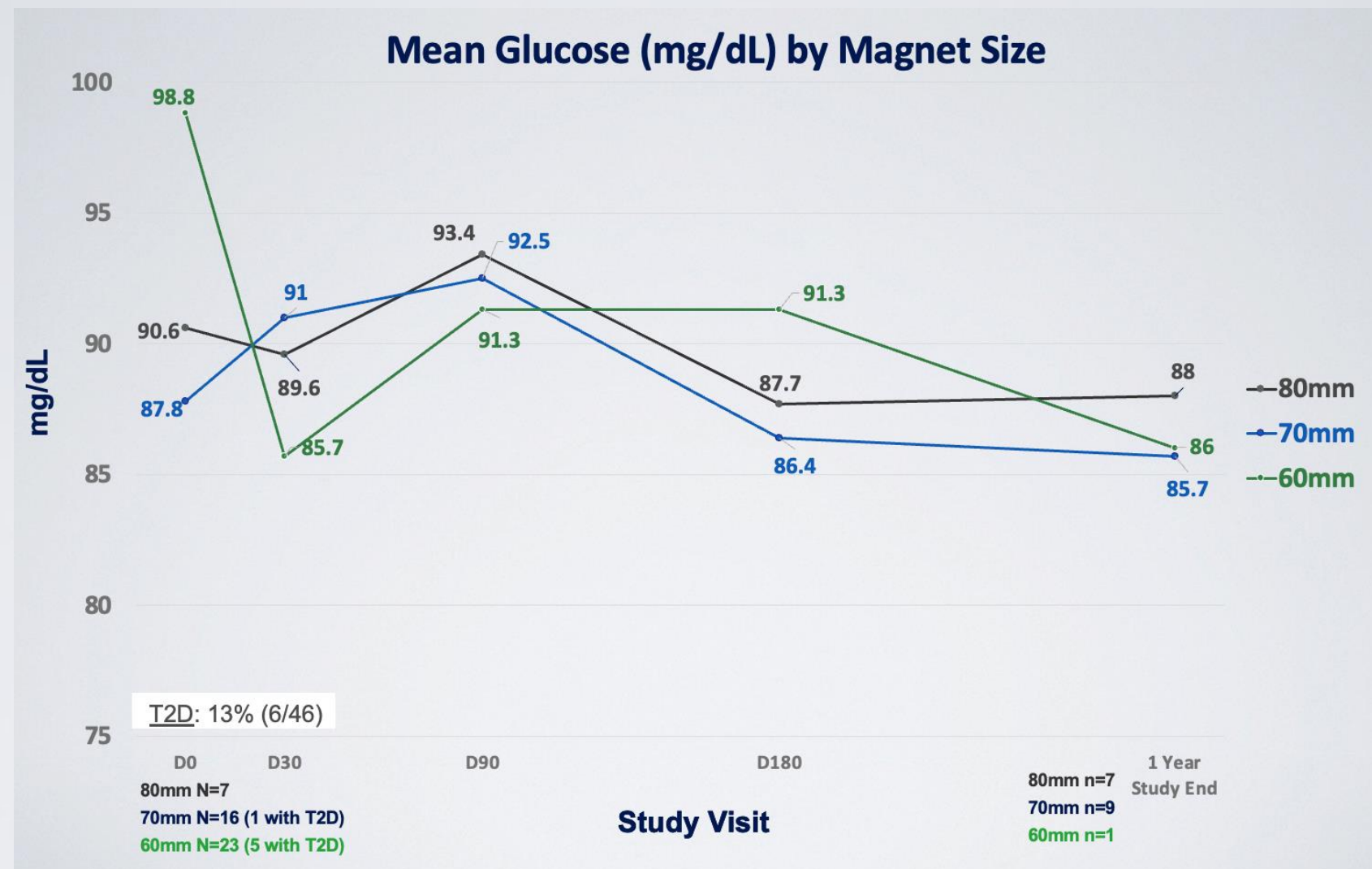
MAGGI for Anastomosis in Gastroileostomy – Metabolic Control



Early Metabolic Indicators (MAGGI)



MAGGI for Anastomosis in Gastroileostomy – Metabolic Control



HERE'S *WHERE* THINGS GET INTERESTING



Pink



RESEARCH

First-in-Human Linear Magnetic Jejuno-Ileal Bipartition: Preliminary Results with Incisionless, Sutureless, Swallowable Technique

Michel Gagner^{1,2} · Martin Fried³ · David Michalsky^{3,4} · Karen Dolezalova³ · Petra Sramkova³ · Jan Brezina^{3,5} · Dasa Baliarova⁴ · Lucie Hlavata³ · Michal Novak³ · Jaroslav Bartos³ · Sarka Mullerova³

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Currently reimbursed in the Czech Republic as an established, efficacious metabolic surgical procedure

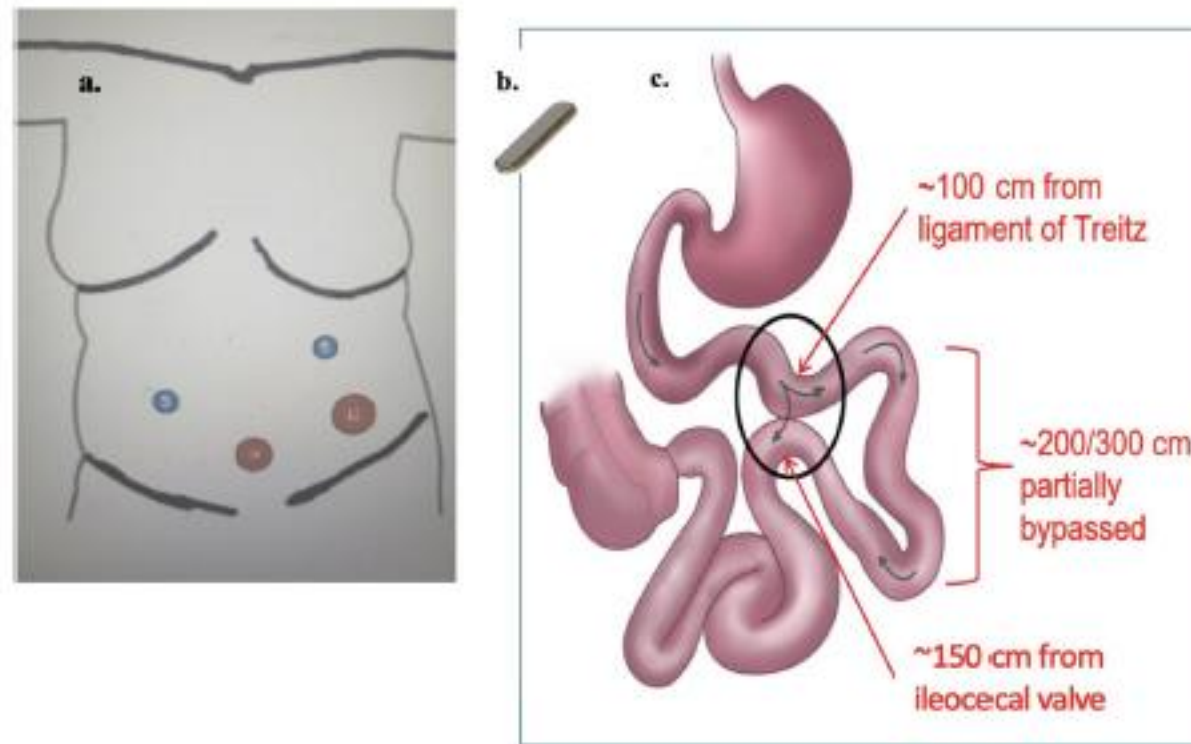
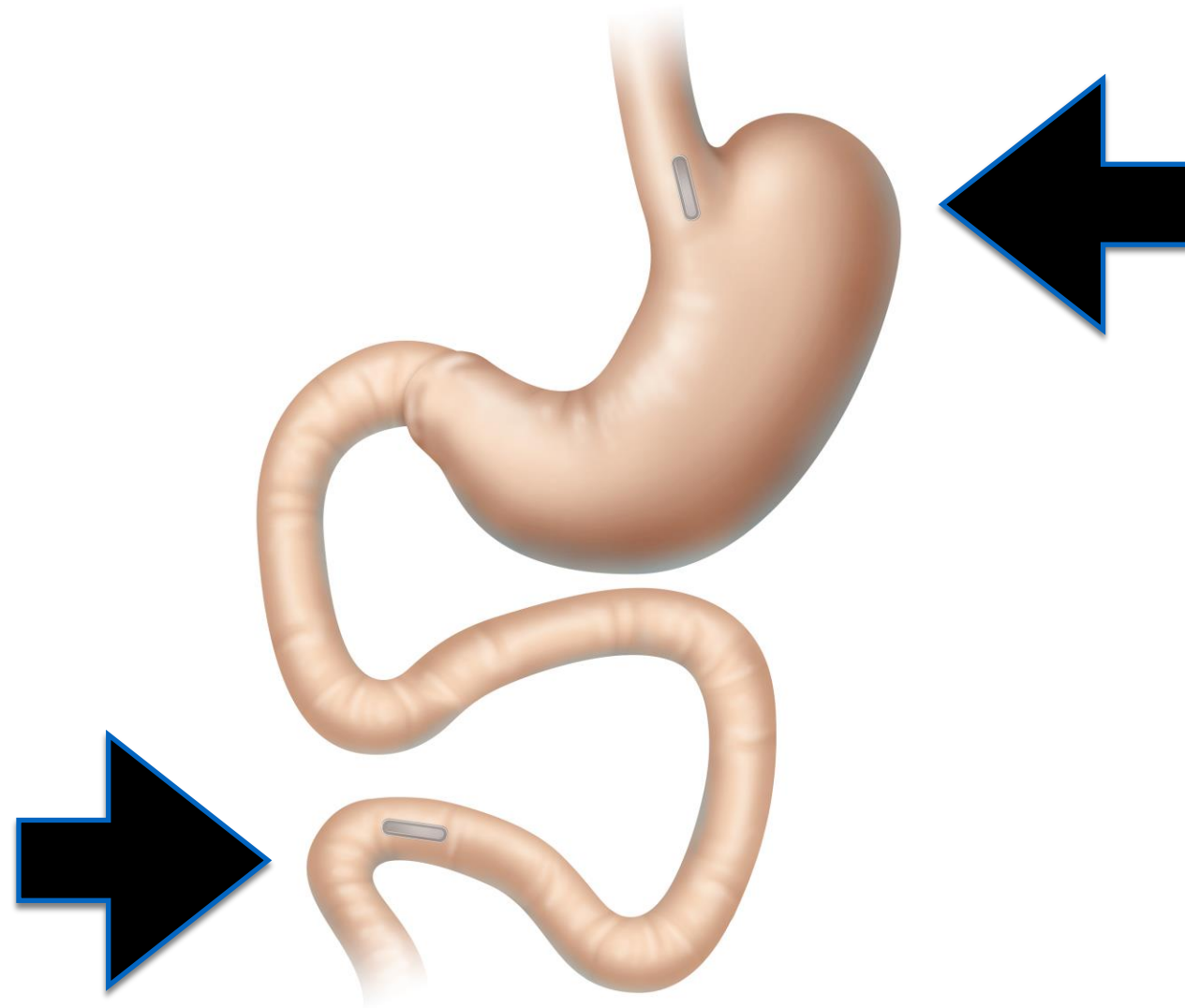


Fig. 1 **a** Three or four 5–12-mm trocar sites are employed to facilitate laparoscopic assistance to place the swallowed and/or endoscopically introduced magnets; **b** A single magnet of the dual-magnet Biofragmentable Magnet Anastomosis System (BMAS); **c** If performing the magnetic jejunio-ileal (MagJI) bipartition procedure with two magnet swallows (instead of 1, or 0 swallows): After the first magnet is swallowed, it is observed by x-ray until it passes the ligament of Treitz. Laparoscopically, the magnetic positioning device is brought into extraluminal connection with the magnet and, by traction, 'surfs' it

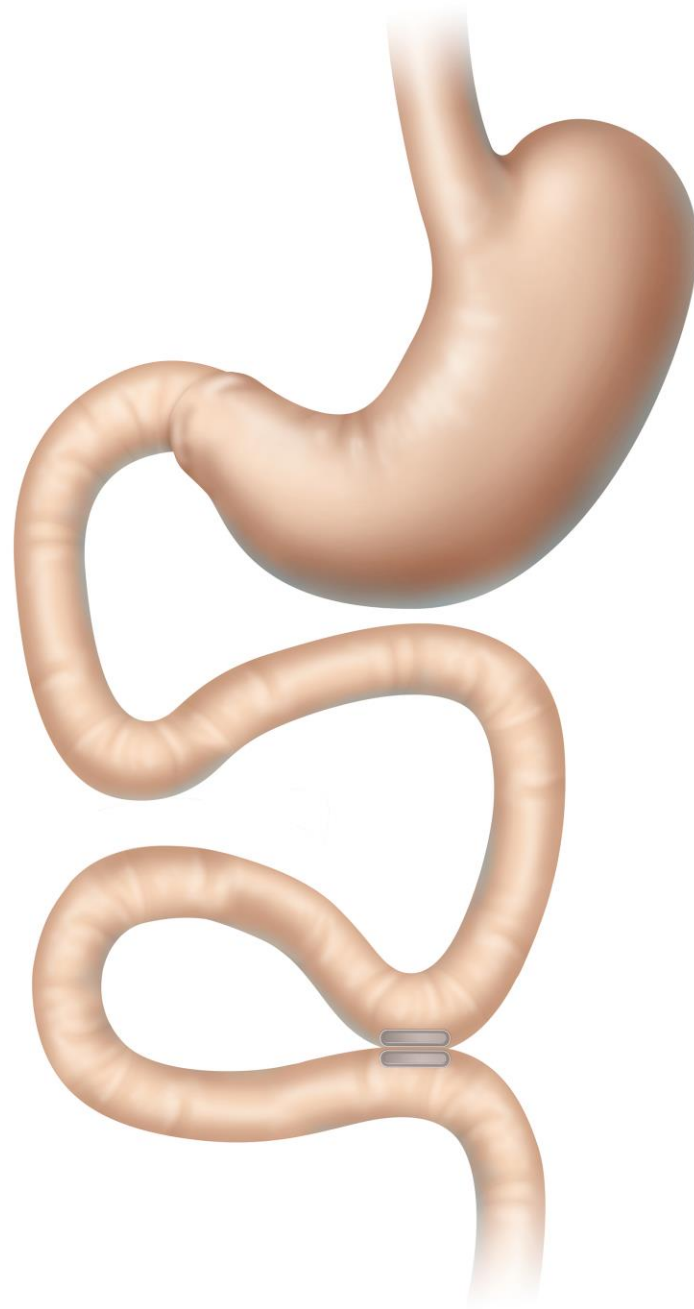
through the lumen to the target ileal position. The second swallowed magnet is similarly positioned and surfed to the target jejunal position. The magnet in the ileal loop is lifted into apposition with the magnet in the jejunal loop; they self-align across the luminal walls, initiating the gradual process of compression and necrosis of the tissue between them to form an anastomosis. In 7–21 days, the fused BMAS drops into the intestine and is expelled by peristalsis. The patent anastomotic bipartition facilitates isoperistaltic flow of alimentary contents through two channels of small intestine



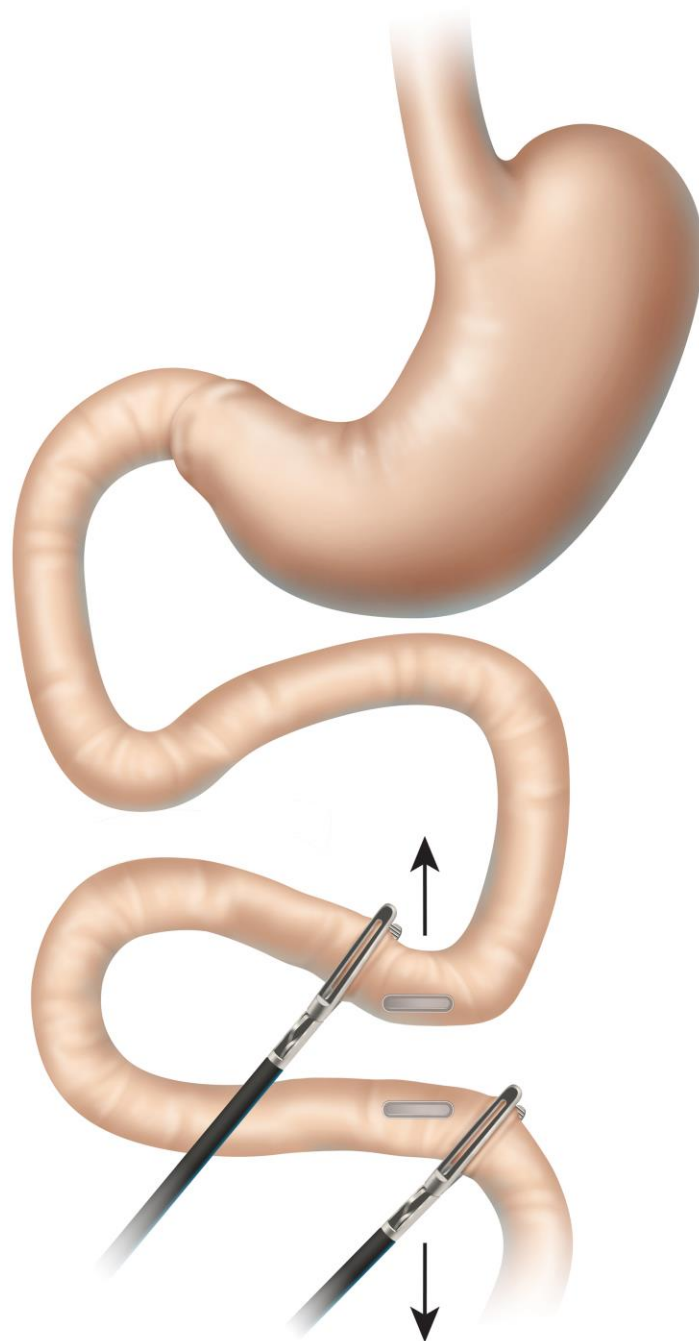
- Double Trouble = Double Swallow
-



Self-Docking



Undocking



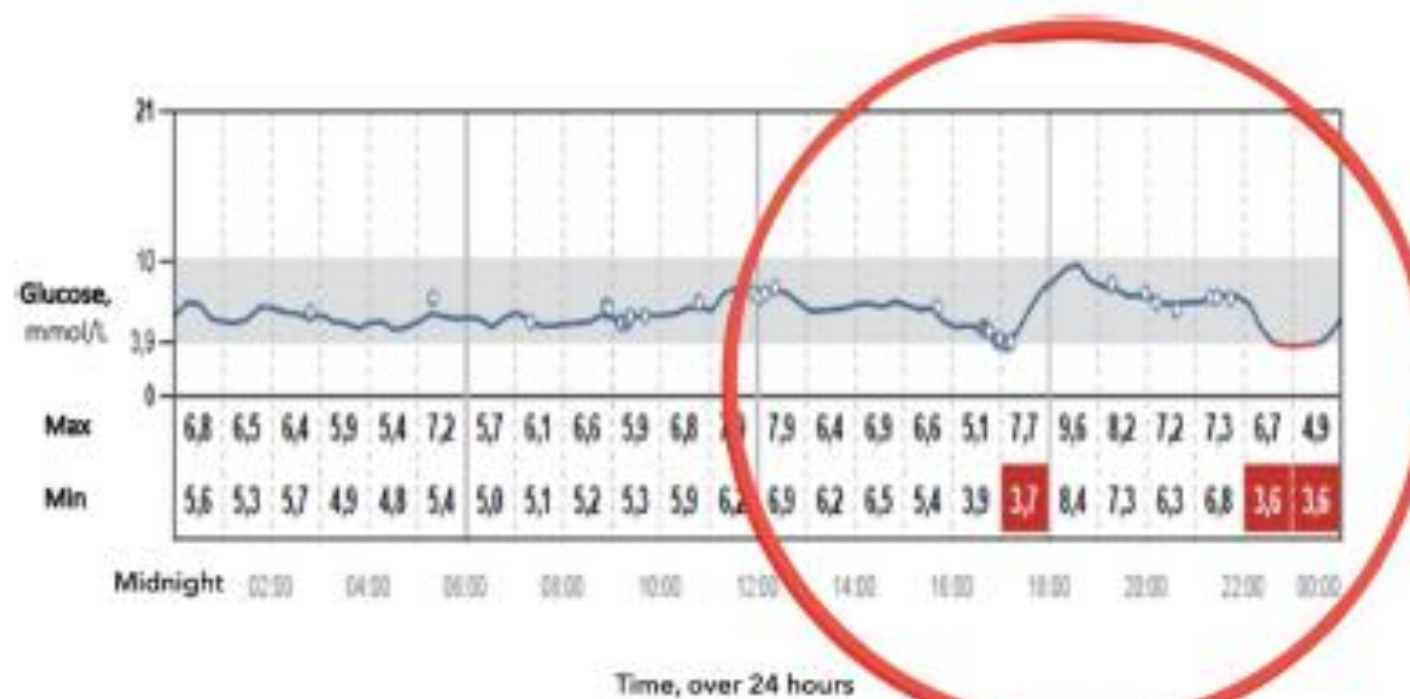


Fig. 6 Continuous monitoring of glucose levels; a drop to ≤ 4.0 mmol/L, indirectly confirmed completion of anastomosis formation by magnetic compression

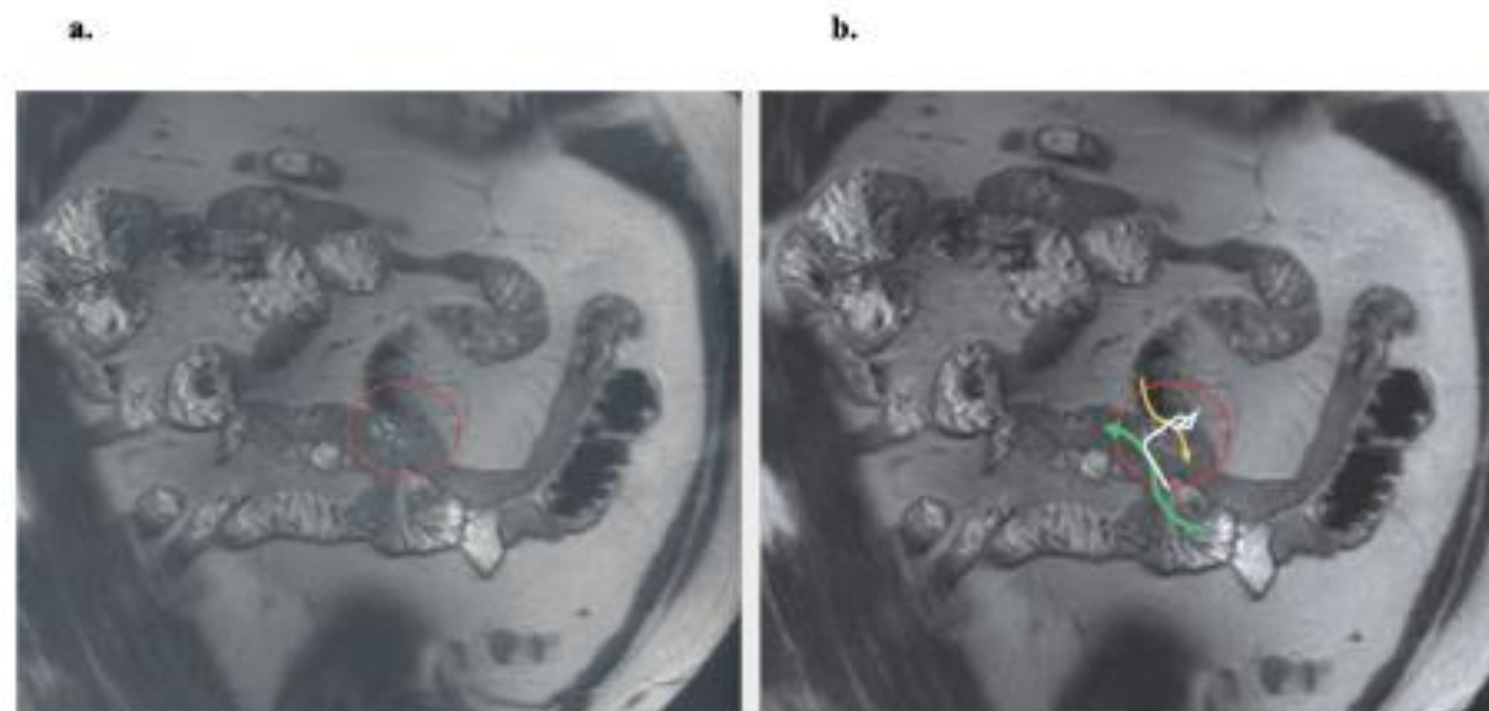


Fig. 7 a, b At 90 and 180 days post procedure, MRI enterography visualized patent jejunum-ileal anastomosis site in all patients

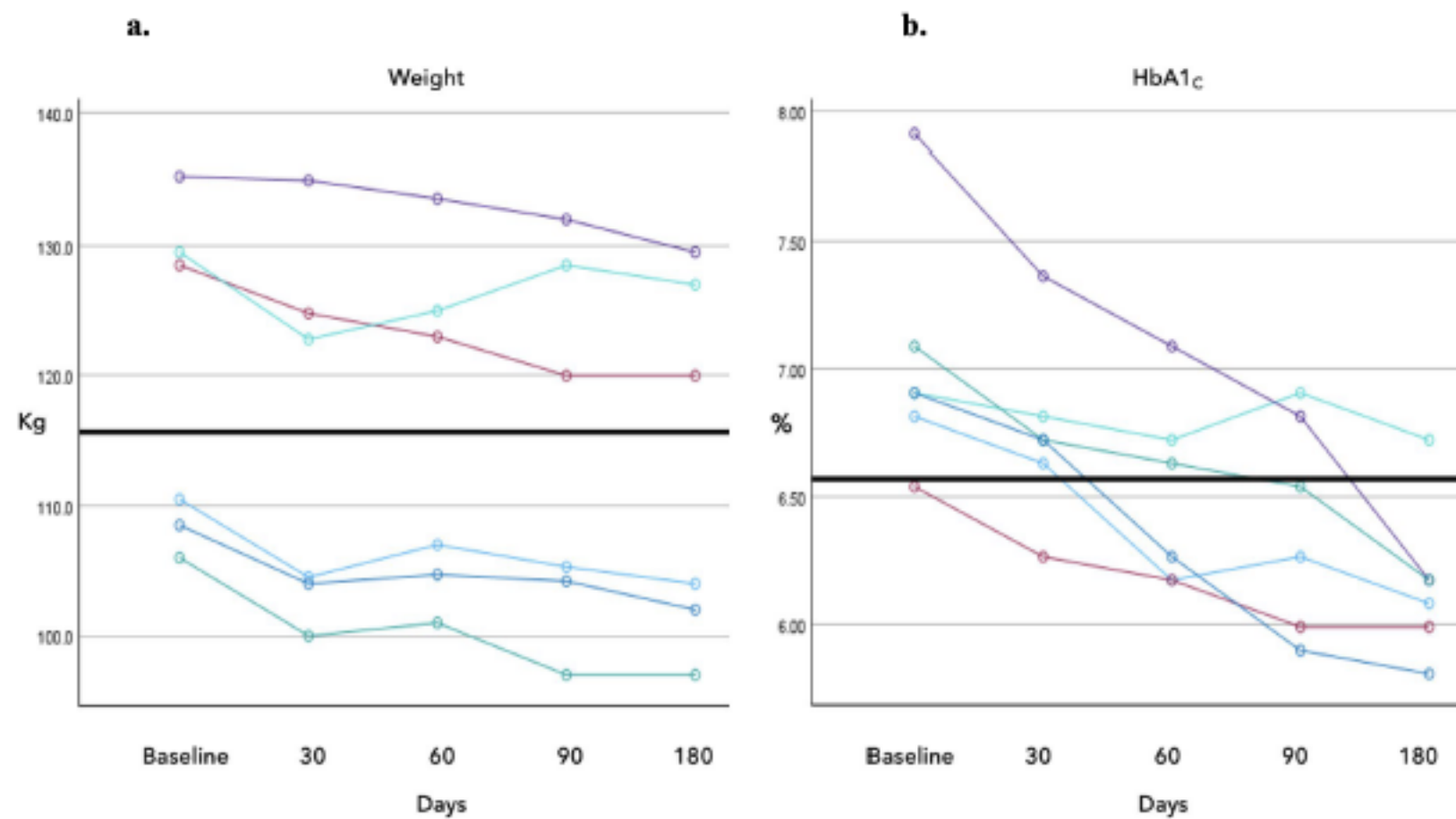


Fig. 8 **a** Individual patient ($n=6$) weight trajectories from baseline through 180-day follow-up; **b** individual patient ($n=6$) HbA1c trajectories from baseline through 180-day follow-up

Conclusions

Anastomosis creation with a miniature magnetic compression device that exits the body leaving no foreign materials will likely provide metabolic benefit and reduce the already low rate of MBS complications. The incisionless and sutureless side-to-side MagII procedure using biofragmentable magnets was minimally invasive and feasible, and appeared to be safe. Introduction of both magnets by swallowing followed by laparoscopic positioning, or, by swallowing one magnet followed by endoscopic delivery of the second magnet, was effective. There was no severe adverse event or reintervention. At 6-month interim follow-up,

significant improvement in weight loss and T2D reduction was observed.

The End

Thank You!