Laparoscopic delivery of a novel enterotomy capture device between self-forming magnetic anastomosis in Roux-en-Y gastric bypass (RYGB) patients

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SRI AUROBINDO UNIVERSITY

VISION WITH ACTION

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MOHAK BARIATRIC AND ROBOTIC SURGERY CENTER INDORE, INDIA (MBRSC)

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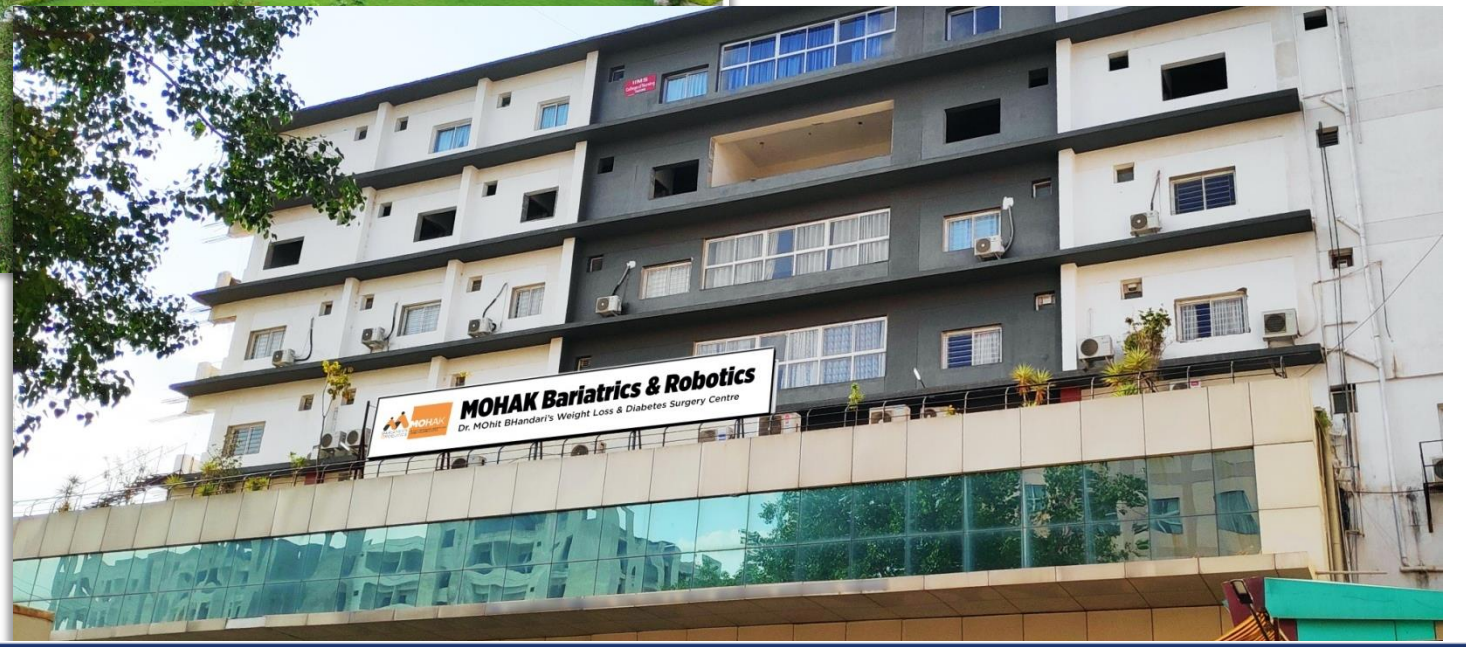

MOHAK BARIATRICS ROBOTICS WEIGHT LOSS & DIABETES SURGERY CENTRE

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Clinical Director- Dept Bariatric Endoscopy

Mohak Bariatric and Robotic Surgery Center

Indore- Mumbai- Hyderabad- Bangaluru


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DISCLOSURE

Mohit Bhandari MD

Consultant to:

- Johnson and Johnson
- Medtronic
- Bariatric Solution
- Intuitive Surgical
- Karl Storz
- Stryker
- Apollo Endo-surgery
- Pentax
- Olympus

Mathias Fobi MD FACS, FICS, FACN

- Founding President, Bariatec Corporation

Manoel Galvao Neto

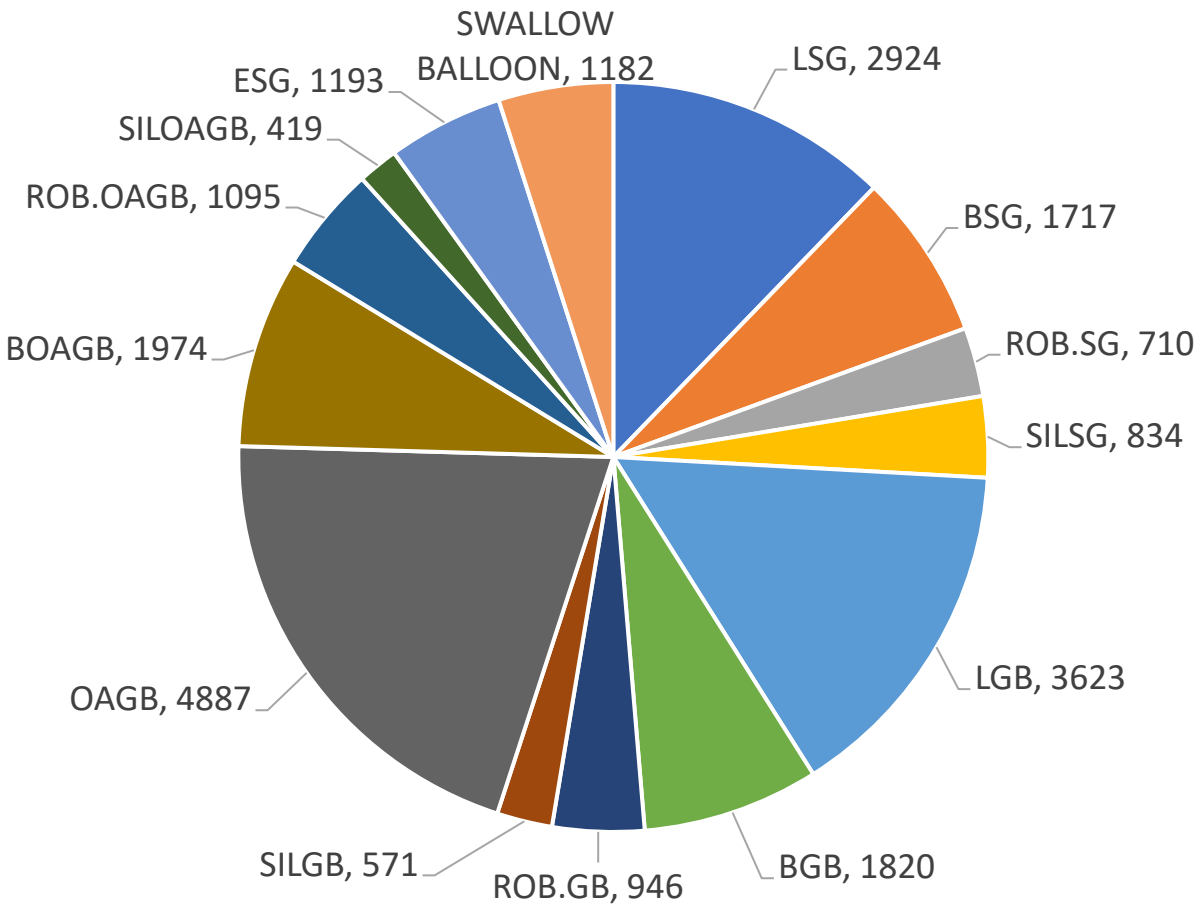
- Director Bariatric Endoscopy

CASE MIX DISCLOSURE

2010- 2024

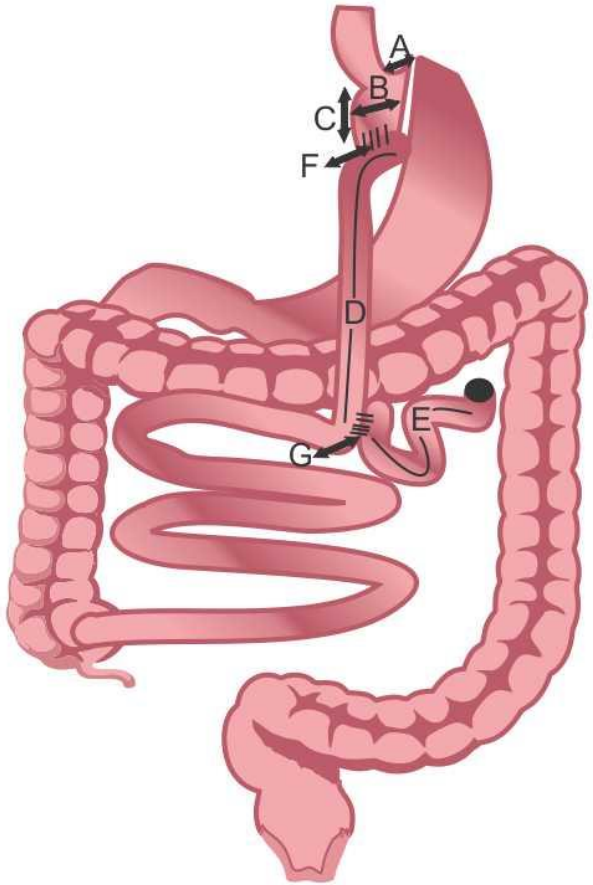
BARIATRIC PROCEDURES MIX DISCLOSURES MBRSC
January 2010 – July 2024

TOTAL	25400
LSG	6185
LGB	6960
OAGB	8375
ESG	1193
SWALLOW BALLOON	1182
Other	1505



Roux-en-Y gastric bypass (RYGB)

- RYGB is the **gold standard in bariatric surgery** due to its effectiveness in achieving significant and lasting weight loss.
- Patients typically lose **60-80%** of their **excess body weight** within **two years** and maintain this weight loss long-term.
- RYGB also improves or resolves many **obesity-related conditions**, such as type 2 diabetes and hypertension, often through **changes in gut hormones that enhance insulin sensitivity and glucose metabolism.**



Roux-en-Y Gastric Bypass (RYGBP)

Roux-en-Y Gastric Bypass (RYGBP)

A=1-2cm ----Distance from EG Junction

B=3cm--------Width of created gastric pouch (approx)

C=3-4cm ----Length of created gastric pouch

D=50-150 cm----Length of R-Y Limb

E=50-150cm----Length of Bilio-pancreatic limb

D+E = 200cm

F=1.2-1.5cm-Width of gastro-enterostomy

G=3-4 cm----Width of entero – enterostomy

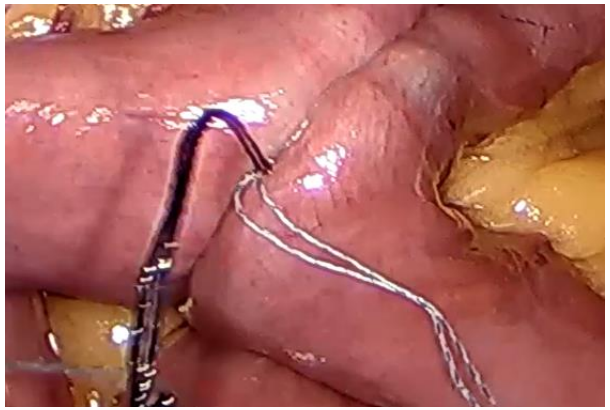
V=<30cc-----Volume of gastric pouch

GI tract anastomoses

- GI tract anastomoses are common procedures in abdominal surgeries.
- The current standard for anastomosis formation is the use of **sutures** by **hand-sewn techniques** or **surgical staples**.
- Creating GI anastomoses with **surgical staplers** has been the most popular technique that delivers dependable staple lines with consistent quality and rare technical failures.
- Staplers also provide operational advantages such as speed of performance, automation, and reproducibility.

Magnetic Anastomotic

- **Magnetic Compression Anastomosis (MCA)** is an innovative surgical technique that has been evolving since it was first pioneered by **Obora et al. in 1978**.
- This method utilizes the principles of magnetic attraction to create an anastomosis by dynamically compressing tissue between two magnets. As the magnets gradually converge, the compressive force intensifies, facilitating the formation of a secure and leak-resistant connection between the tissues.



Unlike traditional methods that rely on sutures or staples, MCA employs a non-contact mechanism, eliminating the need for tissue penetration and reducing trauma.

This breakthrough approach offers a minimally invasive alternative, enhancing healing and reducing the risk of complications

Category	Magnetic Anastomosis	Stapled Anastomosis	Handsewn Anastomosis
Invasiveness	Minimally invasive (endoscopic/laparoscopic)	Moderately invasive (laparoscopic/open)	Most invasive (laparoscopic/open)
Tissue Handling	Gentle, uniform tissue compression	Mechanical puncturing with staples	Needle puncture with high tissue tension
Foreign Material	No permanent foreign body	Permanent staples left in tissue	Permanent sutures left in tissue
Risk of Leakage	Low (uniform compression promotes secure seal)	Moderate (depends on staple alignment)	Variable (dependent on surgeon's skill and technique)
Operative Time	Shorter (standardized procedure)	Moderate (faster than handsewn)	Longest (time-consuming, meticulous stitching)
Healing Quality	Promotes natural tissue fusion	Healing dependent on staple precision	Healing varies, highly dependent on skill
Postoperative Complications	Lower complication rate (fewer leaks, strictures)	Moderate complication rate (risk of leaks/strictures)	Higher complication rate (risk of leaks/strictures if poorly executed)
Scar Tissue Formation	Minimal (less foreign material and trauma)	Moderate (staples can cause irritation)	Highest (multiple punctures increase scar tissue)
Skill Requirement	Easier, standardized approach	Moderate skill requirement	High skill requirement; surgeon-dependent outcome
Use in Complex Anatomy	Effective in difficult anatomies	Challenging in complex anatomies	Most challenging in complex anatomies
Patient Recovery	Faster (less invasive, lower tissue trauma)	Moderate recovery time	Slowest recovery (more invasive, higher tissue trauma)

- Among the challenges encountered in revisional RYGB procedures is the creation of effective jejunal-jejunal anastomoses.
- These anastomoses play a crucial role in restoring the continuity of the gastrointestinal tract, ensuring proper nutrient absorption, and facilitating weight loss.
- Traditional techniques for creating jejunal-jejunal anastomoses during revisional RYGB procedures often involve complex surgical tricks and may carry a risk of complications such as leakage and stricture formation.

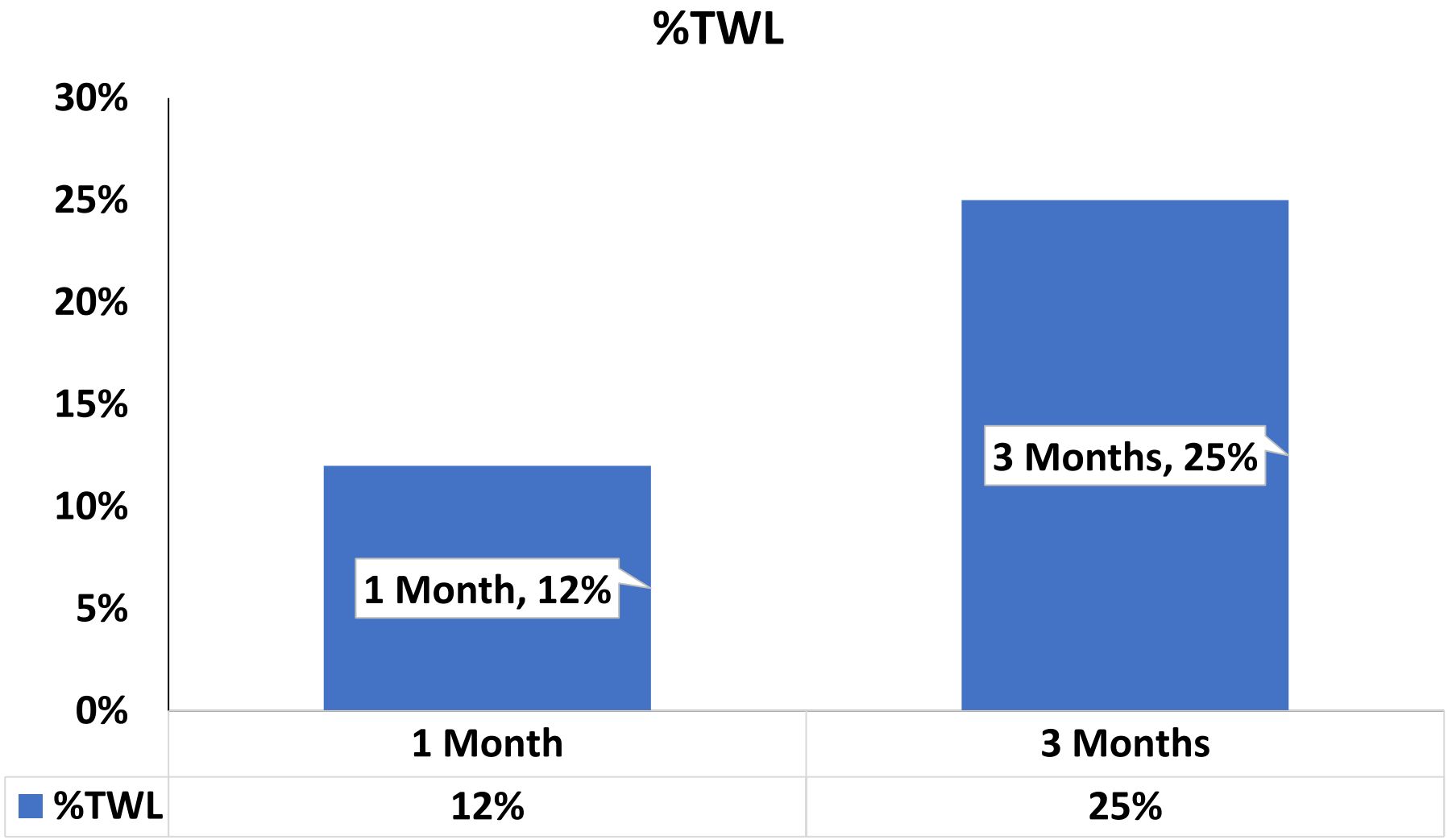
- Innovations in surgical technology and techniques have paved the way for novel approaches to address these challenges.
- One such innovation involves the use of self-forming magnetic anastomosis devices, which offer the potential to simplify the creation of jejunal-jejunal anastomoses and enhance procedural outcomes.
- Coupled with advancements in laparoscopic instrumentation, these devices enable minimally invasive revisional RYGB procedures with reduced operative times, shorter hospital stays, and improved patient recovery.

We report the procedure feasibility and early results of a new novel surgical technique that eliminates the need to close the enterotomies via conventional methods (Hand-sew/Stapled) after creating the anastomosis and facilitates an immediate lumen opening between two new coupled self-forming magnets (SFM, GI Windows Surgical) in RYGB patients.

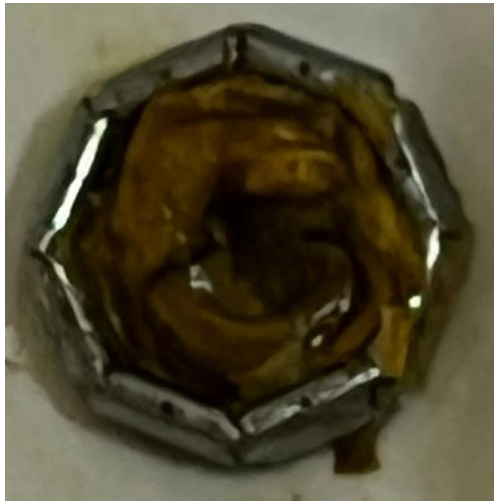
RYGB J–J with OTOLoc ™

MOHAK on Magnetic Anastomoses N=10

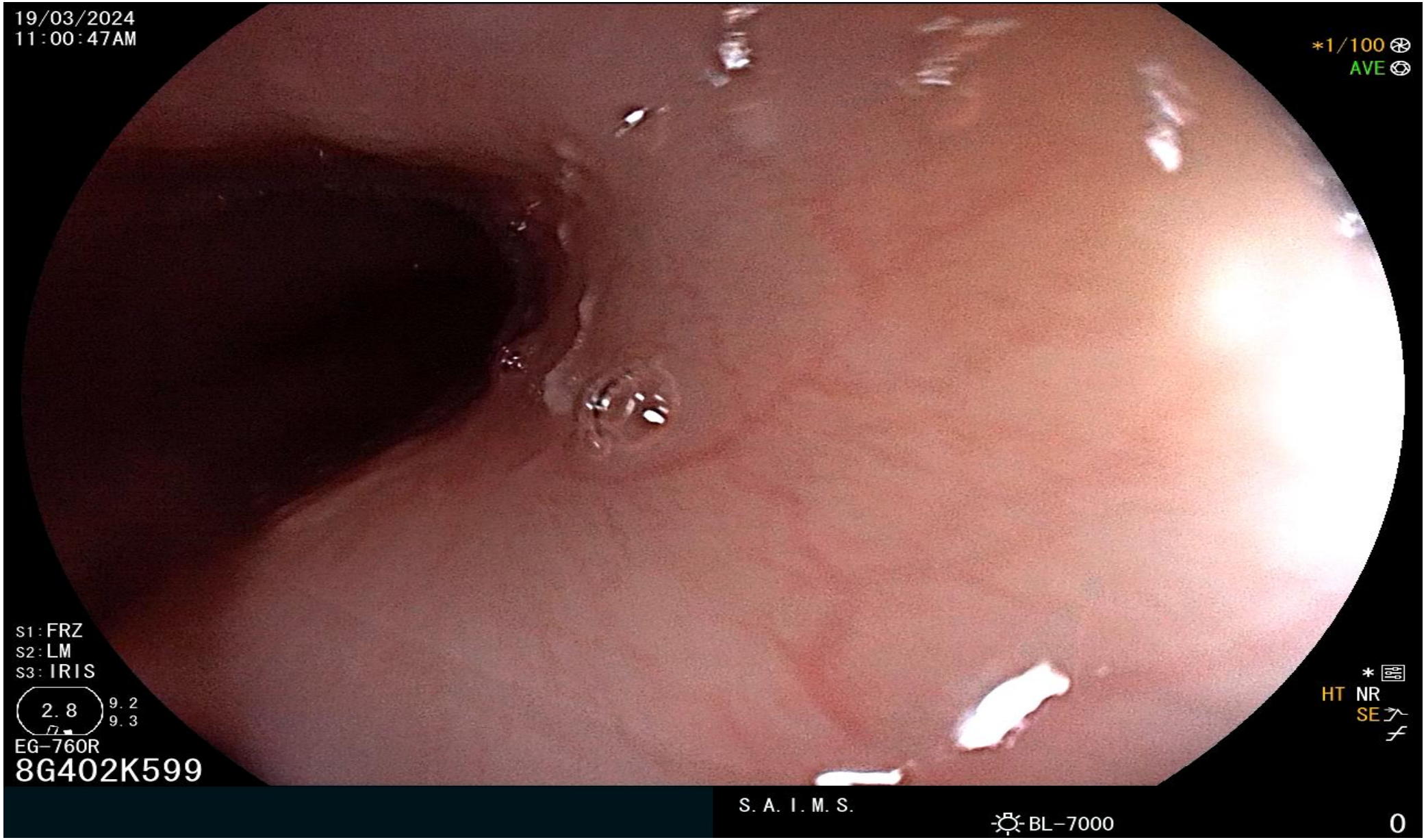
	(N=10)
Age	48.02±10.54
Height	1.64±0.10
Weight	121.00±23.34
BMI	40.5±6.09
Hemoglobin A1c	10.6±0.9


%TWL
30%
25%
20%
15%
10%
5%
0%
1 Month, 12%
3 Months, 25%
1 Month
3 Months
%TWL
12%
25%

- All SFM's were delivered and connected with no delivery malfunctions and completed in an anastomosis creation time of **14 minutes** (enterotomy to magnet coupling).
- All SFM's passed on **average 10-12 days** with no retentions or patient self-reported pain.
- All the patients were followed, and **significant (p=0.001)** weight loss was observed, with HbA1c levels decreasing (-3.6±0.2).
- No procedure adverse events (AE) occurred, and NO AD occurred during the 30-day follow up period.
- All patients tolerated the surgery and were discharged after 3 days.
- There was no conversion or peri-operative mortality.



SFM's passed on average **10-12 days**


19/03/2024
11:00:47AM
*1/100
AVE
S1:FRZ
S2:LM
S3:IRIS
2.8
9.2
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- Preliminary and procedure feasibility data of these new surgical techniques and devices suggest the procedures is both feasible and safe in RYGB surgery.
- We demonstrated the potential to improve surgical outcomes, reduction in surgical steps and associated operation time while standardizing the techniques for the creation a reproducible anastomosis.

Conclusion

Magnetic anastomosis represents a groundbreaking advancement in minimally invasive surgery, offering a safer, more efficient alternative to traditional suturing and stapling techniques.

With reduced complications, faster healing, and promising early outcomes, this technique has the potential to reshape the future of gastrointestinal surgery.

Continued research and refinement will be crucial in standardizing its use, potentially setting a new benchmark for surgical innovation and patient care.

MOHAK TEAM

THANK YOU

We offer various treatment modalities for obesity. The operation is determined by the profile of the patient and guided by findings from analysis of the data from our prospectively maintained database