Esophageal Function, Acid and None-acid Reflux after One-Anastomosis Gastric Bypass - A Prospective Midterm Study

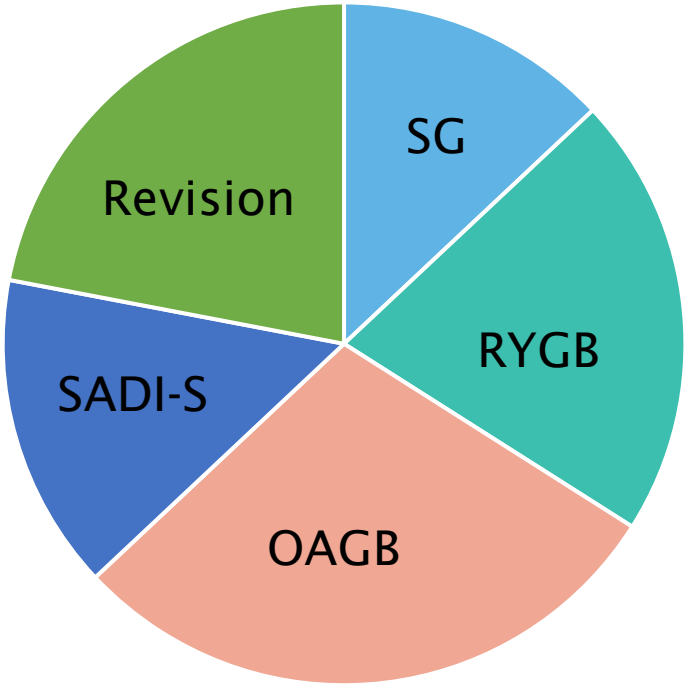
A.p. Prof, Priv. Doz. Daniel Moritz Felsenreich, MD, PHD, FACS, FEBS
Division of Visceral Surgery
Department of General Surgery
Medical University of Vienna

Executive Director of IFSO-EC
President Elect of IFSO-EC

Disclosures

EAES Research Grant

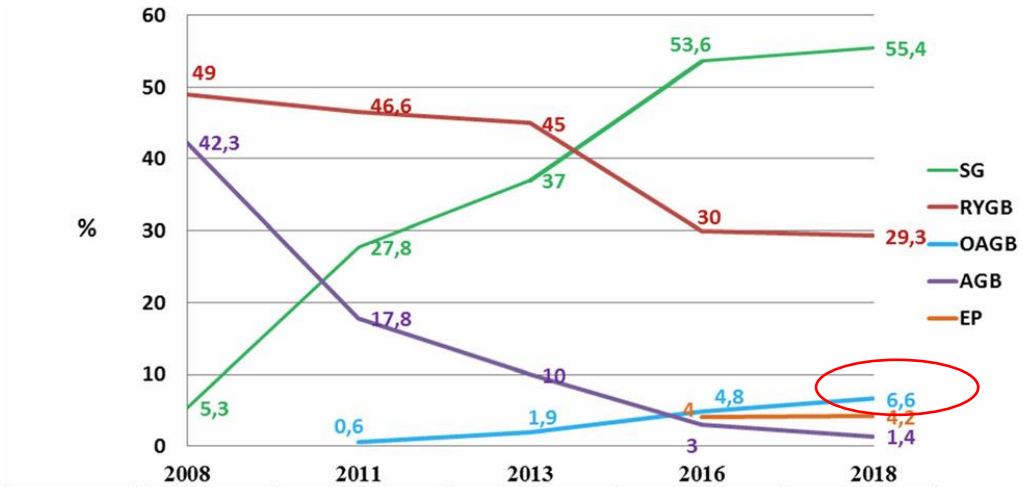
Case mix



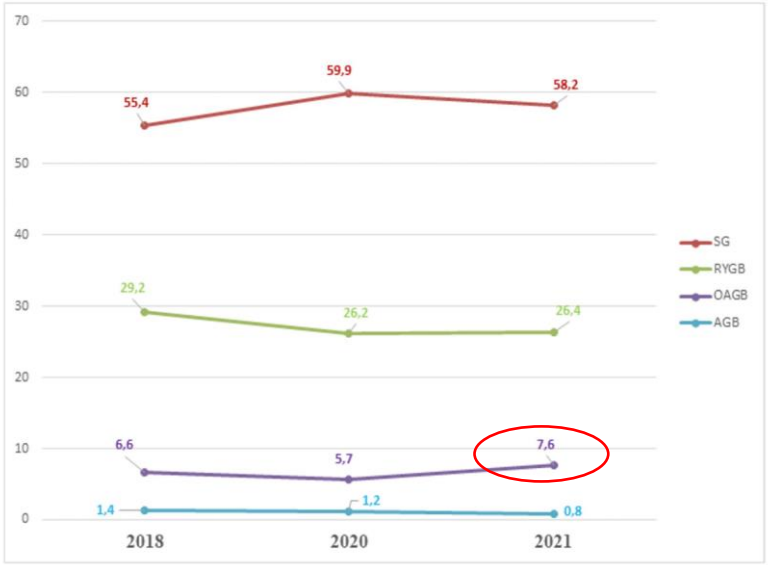
LAGB	0%
SG	13%
RYGB	21%
OAGB	29%
SADI-S	15%
Revision	22%

Background

Bariatric operations worldwide until 2021



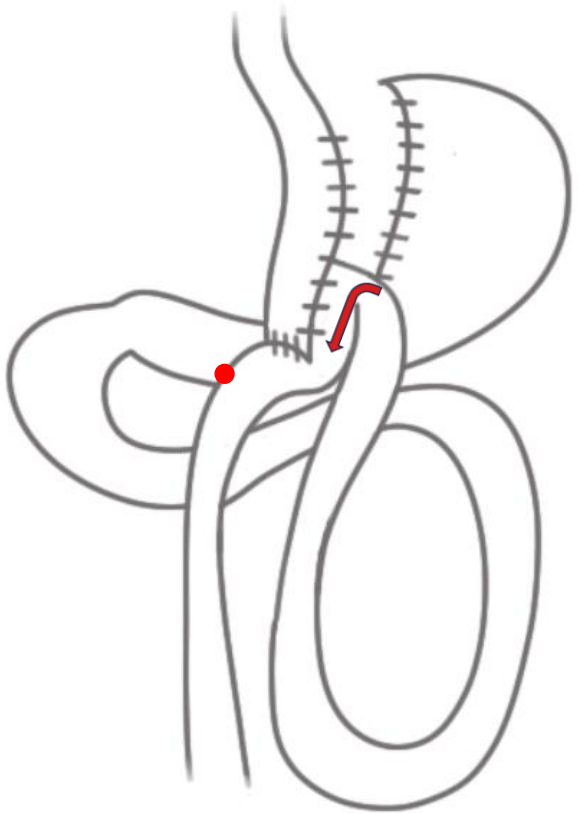
Bariatric procedures (N)	344,221	340,768	468,609	685,874	696,191



Angrisani L. et al. Obes Surg 2024

Technique

- Long, narrow pouch (36fr Bougie)
- Linear anastomosis (30mm)
- 150-175cm biliopancreatic limb
- Anti-reflux sutures
- Anti-kinking suture
- (Hiatoplasty)



Felsenreich D.M. et al., STI 2021

Alkaline reflux after OAGB

One Thousand Consecutive Mini-Gastric Bypass: Short- and Long-term Outcome

Roger Noun · Judith Skaff · Edward Riachi · Ronald Daher · Nayla Abi Antoun · Marwan Nasr

0.4% alkaline reflux (4/1000)

The laparoscopic mini-gastric bypass: the Italian experience: outcomes from 974 consecutive cases in a multicenter review

M. Musella · A. Susa · F. Greco · M. De Luca · E. Manno · C. Di Stefano · M. Milone · R. Bonfanti · G. Segato · A. Antonino · L. Piazza

0,9% alkaline reflux (8/974)

A 6-Year Experience with 1,054 Mini-Gastric Bypasses—First Study from Indian Subcontinent

K. S. Kular · N. Manchanda · R. Rutledge

2,0% alkaline reflux (18/1054)

One Thousand Single Anastomosis (Omega Loop) Gastric Bypasses to Treat Morbid Obesity in a 7-Year Period: Outcomes Show Few Complications and Good Efficacy

Jean Marc Chevallier · Gustavo A. Arman · Martino Guenzi · Cedric Rau · Mathieu Bruzzi · Nathan Beaupel · Frank Zinzindohoué · Anne Berger

0,7% alkaline reflux (7/1000)

Alkaline reflux after OAGB

Obesity Surgery (2020) 30:4206–4217
https://doi.org/10.1007/s11695-020-04775-y

ORIGINAL CONTRIBUTIONS

One Anastomosis Gastric Bypass with a Biliopancreatic Limb of 150 cm: Weight Loss, Nutritional Outcomes, Endoscopic Results, and Quality of Life at 8-Year Follow-Up

Arnaud Liagre[1] · Tarek Debs[2] · Radwan Kassir[3] · Alain Ledit[4] · Gildas Juglard[1] · Mael Chalret du Rieu[1] · Andrea Lazzati[5] · Francesco Martini[1] · Niccolo Petrucciani[2,6]

Published online: 20 June 2020

Procedure	*N* (%)
Cholecystectomy	11 (9.5%)
Conversion to RYGB	7 (7.6%)
Explorative laparoscopy*	2 (1.7%)
Suture of perforated marginal ulcer	1 (0.8%)
Correction of internal hernia	1 (0.8%)
Abdominal wall surgery	1 (0.8%)

* In 6 cases for intractable reflux, in 1 case for chronic diarrhea

Data are presented as absolute number (percentage)

RYGB Roux-en-Y gastric bypass

Liagre et al., Obes Surg 2020

Reflux after OAGB

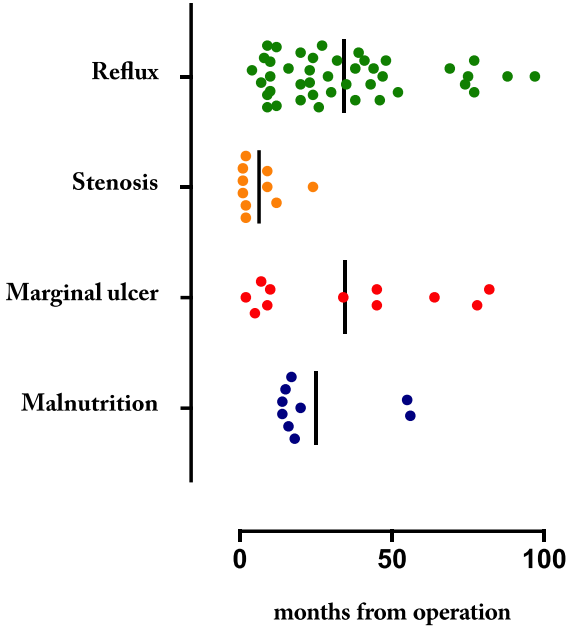
Original article

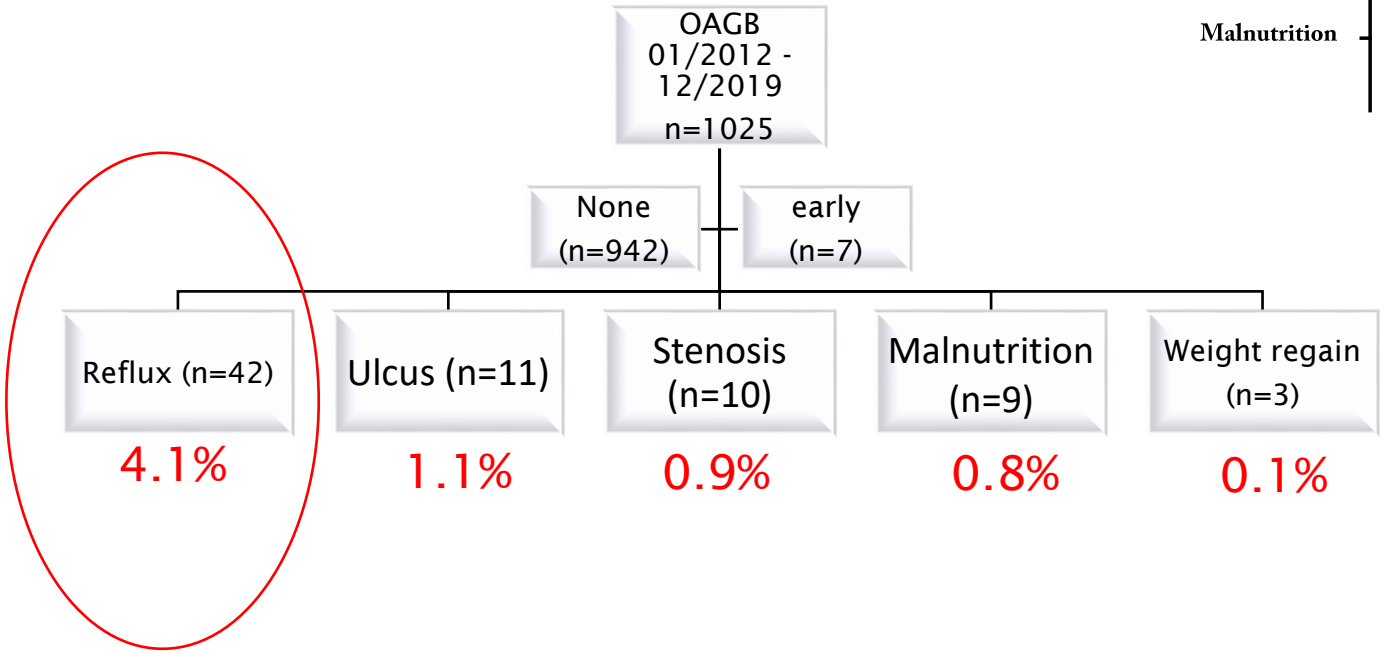
Conversion from one-anastomosis gastric bypass to Roux-en-Y gastric bypass: when and why—a single-center experience of all consecutive OAGB procedures

Julia Jedamzik, M.D.[a], Christoph Bichler, M.D.[a], Daniel M. Felsenreich, M.D.[a], Lisa Gensthaler, M.D.[a], Jakob Eichelter, M.D.[a], Larissa Nixdorf, M.D.[a], Michael Krebs, M.D.[b], Felix B. Langer, M.D.[a], Gerhard Prager, M.D.[a,*]

[a]Division of General Surgery, Department of Surgery, Vienna Medical University, Vienna, Austria
[b]Division of Endocrinology and Metabolism, Department of Internal Medicine III, Vienna Medical University, Vienna, Austria

Received 30 May 2021; accepted 21 October 2021





Functional testing in OAGB

Surgical Endoscopy (2023) 37:3832–3841
https://doi.org/10.1007/s00464-022-09857-9

ORIGINAL ARTICLE

Esophageal function and non-acid reflux evaluated by impedance-24 h-pH-metry, high-resolution manometry, and gastroscopy after one-anastomosis gastric bypass—outcomes of a prospective mid-term study

D. M. Felsenreich[1] · M. L. Zach[1] · N. Vock[1] · J. Jedamzik[1] · J. Eichelter[1] · M. Mairinger[1] · L. Gensthaler[1] · L. Nixdorf[1] · P. Richwien[1] · C. Bichler[1] · I. Kristo[1] · F. B. Langer[1] · G. Prager[1]

Received: 29 September 2022 / Accepted: 27 December 2022 / Published online: 24 January 2023

Functional testing in OAGB

Criteria for inclusion:

Patients with primary One-Anastomosis Gastric Bypass before 2018

Preoperative examinations:

- **Gastroscopy**
- **24h pH-metry**
- **High-resolution manometry**

Felsenreich D.M. et al., in press

Functional testing in OAGB

Specific examinations for this study after a
- minimal follow-up of **1 years**
- mean follow-up **4.1 years**

- **Gastroscopy**
- **24h pH-metry**
- **High-resolution manometry**

Comparison of pre- and postoperative examinations

Additionally:
- History of weight
- Remission of comorbidities
- Quality of life

Felsenreich D.M. et al., in press

Functional testing in OAGB

Included patients:

Table 1 Baseline characteristics and history of weight

	All patients **(n=50)**
Sex (female) (n=36)	72.0%
Age at OAGB (years)	43.9 ±9.0
Previous bariatric procedures	0%
OAGB:	
Length biliopancreatic limb (cm)	150 – 250
Hiatoplasty (n=5)	10.0%
Anti-reflux sutures (n=21)	100%

Symptomatic reflux: 0%

Felsenreich D.M. et al., in press

Functional testing in OAGB

Included patients:

Table 1 Baseline characteristics and history of weight

	All patients **(n=50)**
Sex (female) (n=36)	72.0%
Age at OAGB (years)	43.9 ±9.0
Previous bariatric procedures	0%
OAGB:	
Length biliopancreatic limb (cm)	150 – 250
Hiatoplasty (n=5)	10.0%
Anti-reflux sutures (n=21)	100%

Symptomatic reflux: 0%

Felsenreich D.M. et al., in press

Functional testing in OAGB

History of weight:

Table 1 Baseline characteristics and history of weight

	All patients (n=50)
Weight at OAGB:	
• Weight (kg)	125.5 ±21.0
• BMI (kg/m^2)	44.6 ±5.4
Nadir weight:	
• Weight (kg)	74.2 ±9.4
• BMI (kg/m^2)	26.9 ±2.6
• Change BMI	17.7 ±3.1
• TWL (%)	40.8 ±8.2
• EWL (%)	92.4 ±15.2
Follow-up:	
Minimal follow-up (years)	1.0
Mean Follow-up (years)	4.1 ±2.9
Weight at follow-up:	
• Weight (kg)	79.0 ±13.1
• BMI (kg/m^2)	28.7 ±5.7
• Change BMI	15.9 ±4.6
• TWL (%)	37.1 ±8.1
• EWL (%)	83.7 ±17.1

Felsenreich D.M. et al., in press

Functional testing in OAGB

History of weight:

Table 1 Baseline characteristics and history of weight

	All patients **(n=50)**
Weight at OAGB:	
• Weight (kg)	125.5 ±21.0
• BMI (kg/m^2)	44.6 ±5.4
Nadir weight:	
• Weight (kg)	74.2 ±9.4
• BMI (kg/m^2)	26.9 ±2.6
• Change BMI	17.7 ±3.1
• TWL (%)	40.8 ±8.2
• EWL (%)	92.4 ±15.2
Follow-up:	
Minimal follow-up (years)	1.0
Mean Follow-up (years)	4.1 ±2.9
Weight at follow-up:	
• Weight (kg)	79.0 ±13.1
• BMI (kg/m^2)	28.7 ±5.7
• Change BMI	15.9 ±4.6
• TWL (%)	37.1 ±8.1
• EWL (%)	83.7 ±17.1

Felsenreich D.M. et al., in press

Functional testing in OAGB

History of weight:

Table 1 Baseline characteristics and history of weight

	All patients (n=50)
Weight at OAGB:	
• Weight (kg)	125.5 ±21.0
• BMI (kg/m^2)	44.6 ±5.4
Nadir weight:	
• Weight (kg)	74.2 ±9.4
• BMI (kg/m^2)	26.9 ±2.6
• Change BMI	17.7 ±3.1
• TWL (%)	40.8 ±8.2
• EWL (%)	92.4 ±15.2
Follow-up:	
Minimal follow-up (years)	1.0
Mean Follow-up (years)	4.1 ±2.9
Weight at follow-up:	
• Weight (kg)	79.0 ±13.1
• BMI (kg/m^2)	28.7 ±5.7
• Change BMI	15.9 ±4.6
• TWL (%)	37.1 ±8.1
• EWL (%)	83.7 ±17.1

Felsenreich D.M. et al., in press

Functional testing in OAGB

Manometry:

	All Patients		
	Basis OAGB (n=50)	Follow-up (n=50)	p-value
Manometry			
LESP (mmHg) (10-35mmHg)	27.7 ±12.3	29.6 ±15.1	0.439
Time liquid bolus (s) (<12s)	6.2 ±1.9	4.6 ±2.1	**0.001**
IRP (mmHg) (<15mmHg)	12.7 ±6.2	12.0 ±6.7	0.501
DCI (mmHg-cm-s) (450 - 8000 mmHg-cm-s)	2270.0 ±1539.8	1612.7 ±1067.2	**0.017**
Impedance-24h-pH-metry			
Acid exposure time (% of 24h) (normal <4.2%)	4.4 ±4.2	1.6 ±1.4	**0.001**
Total number of refluxes (normal <40)	46.6 ±19.5	56.6 ±34.8	0.060
Number non-acid refluxes	18.7 ±12.6	46.3 ±31.0	**0.001**
Number acid refluxes	27.9 ±17.7	10.3 ±9.5	**0.001**
DeMeester score (normal 14.72)	17.8 ±16.7	10.3±9.6	**0.046**

Felsenreich D.M. et al., in press

Functional testing in OAGB

Manometry:

	All Patients		
	Basis OAGB (n=50)	Follow-up (n=50)	p-value
Manometry			
LESP (mmHg) (10-35mmHg)	27.7 ±12.3	29.6 ±15.1	0.439
Time liquid bolus (s) (<12s)	6.2 ±1.9	4.6 ±2.1	**0.001**
IRP (mmHg) (<15mmHg)	12.7 ±6.2	12.0 ±6.7	0.501
DCI (mmHg-cm-s) (450 - 8000 mmHg-cm-s)	2270.0 ±1539.8	1612.7 ±1067.2	**0.017**
Impedance-24h-pH-metry			
Acid exposure time (% of 24h) (normal <4.2%)	4.4 ±4.2	1.6 ±1.4	**0.001**
Total number of refluxes (normal <40)	46.6 ±19.5	56.6 ±34.8	0.060
Number non-acid refluxes	18.7 ±12.6	46.3 ±31.0	**0.001**
Number acid refluxes	27.9 ±17.7	10.3 ±9.5	**0.001**
DeMeester score (normal 14.72)	17.8 ±16.7	10.3±9.6	**0.046**

Felsenreich D.M. et al., in press

Functional testing in OAGB

Manometry:

	All Patients		
	Basis OAGB (n=50)	Follow-up (n=50)	p-value
Manometry			
LESP (mmHg) (10-35mmHg)	27.7 ±12.3	29.6 ±15.1	0.439
Time liquid bolus (s) (<12s)	6.2 ±1.9	4.6 ±2.1	**0.001**
IRP (mmHg) (<15mmHg)	12.7 ±6.2	12.0 ±6.7	0.501
DCI (mmHg-cm-s) (450 - 8000 mmHg-cm-s)	2270.0 ±1539.8	1612.7 ±1067.2	**0.017**
Impedance-24h-pH-metry			
Acid exposure time (% of 24h) (normal <4.2%)	4.4 ±4.2	1.6 ±1.4	**0.001**
Total number of refluxes (normal <40)	46.6 ±19.5	56.6 ±34.8	0.060
Number non-acid refluxes	18.7 ±12.6	46.3 ±31.0	**0.001**
Number acid refluxes	27.9 ±17.7	10.3 ±9.5	**0.001**
DeMeester score (normal 14.72)	17.8 ±16.7	10.3±9.6	**0.046**

Felsenreich D.M. et al., in press

Functional testing in OAGB

Manometry:

	All Patients		
	Basis OAGB (n=50)	Follow-up (n=50)	p-value
Manometry			
LESP (mmHg) (10-35mmHg)	27.7 ±12.3	29.6 ±15.1	0.439
Time liquid bolus (s) (<12s)	6.2 ±1.9	4.6 ±2.1	**0.001**
IRP (mmHg) (<15mmHg)	12.7 ±6.2	12.0 ±6.7	0.501
DCI (mmHg-cm-s) (450 - 8000 mmHg-cm-s)	2270.0 ±1539.8	1612.7 ±1067.2	**0.017**
Impedance-24h-pH-metry			
Acid exposure time (% of 24h) (normal <4.2%)	4.4 ±4.2	1.6 ±1.4	**0.001**
Total number of refluxes (normal <40)	46.6 ±19.5	56.6 ±34.8	0.060
Number non-acid refluxes	18.7 ±12.6	46.3 ±31.0	**0.001**
Number acid refluxes	27.9 ±17.7	10.3 ±9.5	**0.001**
DeMeester score (normal 14.72)	17.8 ±16.7	10.3±9.6	**0.046**

Felsenreich D.M. et al., in press

Endoscopy in OAGB

Gastroscopy:

Table 3 Gastroscopy before OAGB and at follow-up

	Alle patients
Basis (OAGB)	(n=50)
Macroscopic	
Gastritis	10 (20.0%)
Esophagitis	7 (14.0%)
Hiatal hernia	14 (28.0%)*
Mean hiatal hernia size	1.62 cm (R 1-3)
Microscopic	
Helicobacter pylori	6 (12.0%)**
Gastritis	12 (24.0%)
Esophagitis	6 (12.0%)
Barrett´s esophagus	0 (0%)

Follow-up	(n=50)
Macroscopic	
Pouchitis	12 (24.9%)
Anastomositis	14 (28.0%)
Anastomotic ulcer	8 (16.0%)
Esophagitis	6 (12.0%)
Hiatal hernia	0 (0.0%)***
Bile in the pouch	24 (48.0%)
Microscopic	
Helicobacter pylori	1 (2%)
Pouchitis	9 (18%)
Anastomositis	19 (38.0%)
Esophagitis	17 (34.0%)
Barrett`s esophagus	3 (6.0%)

Felsenreich D.M. et al., in press

Endoscopy in OAGB

Gastroscopy:

Table 3 Gastroscopy before OAGB and at follow-up

	Alle patients
Basis (OAGB)	(n=50)
Macroscopic	
Gastritis	10 (20.0%)
Esophagitis	7 (14.0%)
Hiatal hernia	14 (28.0%)*
Mean hiatal hernia size	1.62 cm (R 1-3)
Microscopic	
Helicobacter pylori	6 (12.0%)**
Gastritis	12 (24.0%)
Esophagitis	6 (12.0%)
Barrett´s esophagus	0 (0%)

Follow-up	(n=50)
Macroscopic	
Pouchitis	12 (24.9%)
Anastomositis	14 (28.0%)
Anastomotic ulcer	8 (16.0%)
Esophagitis	6 (12.0%)
Hiatal hernia	0 (0.0%)***
Bile in the pouch	24 (48.0%)
Microscopic	
Helicobacter pylori	1 (2%)
Pouchitis	9 (18%)
Anastomositis	19 (38.0%)
Esophagitis	17 (34.0%)
Barrett`s esophagus	3 (6.0%)

Felsenreich D.M. et al., in press

Comorbidities in OAGB

Table 2 Associated medical problems and GERD before OAGB and at follow-up

	All patients
Basis (OAGB)	(n=50)
T2D	9 (18.0%)
Arterial hypertension	25 (50.0%)
OSA	4 (8.0%)
Hyperlipidemia	9 (18.0%)
GERD	0 (0%)
Follow-up	(n=50)
T2D	2 (4.0%)
Arterial hypertension	11 (22.0%)
OSA	1 (2%)
Hyperlipidemia	1 (2%)
GERD	6 (12.0%)

Felsenreich D.M. et al., in press

Comorbidities in OAGB

Table 2 Associated medical problems and GERD before OAGB and at follow-up

	All patients
Basis (OAGB)	(n=50)
T2D	9 (18.0%)
Arterial hypertension	25 (50.0%)
OSA	4 (8.0%)
Hyperlipidemia	9 (18.0%)
GERD	0 (0%)
Follow-up	(n=50)
T2D	2 (4.0%)
Arterial hypertension	11 (22.0%)
OSA	1 (2%)
Hyperlipidemia	1 (2%)
GERD	6 (12.0%)

Felsenreich D.M. et al., in press

Comorbidities in OAGB

Table 2 Associated medical problems and GERD before OAGB and at follow-up

	All patients
Basis (OAGB)	(n=50)
T2D	9 (18.0%)
Arterial hypertension	25 (50.0%)
OSA	4 (8.0%)
Hyperlipidemia	9 (18.0%)
GERD	0 (0%)
Follow-up	(n=50)
T2D	2 (4.0%)
Arterial hypertension	11 (22.0%)
OSA	1 (2%)
Hyperlipidemia	1 (2%)
GERD	6 (12.0%)

Felsenreich D.M. et al., in press

Comorbidities in OAGB

Table 2 Associated medical problems and GERD before OAGB and at follow-up

	All patients
Basis (OAGB)	(n=50)
T2D	9 (18.0%)
Arterial hypertension	25 (50.0%)
OSA	4 (8.0%)
Hyperlipidemia	9 (18.0%)
GERD	0 (0%)
Follow-up	(n=50)
T2D	2 (4.0%)
Arterial hypertension	11 (22.0%)
OSA	1 (2%)
Hyperlipidemia	1 (2%)
GERD	6 (12.0%)

Felsenreich D.M. et al., in press

Comorbidities in OAGB

Table 2 Associated medical problems and GERD before OAGB and at follow-up

	All patients
Basis (OAGB)	(n=50)
T2D	9 (18.0%)
Arterial hypertension	25 (50.0%)
OSA	4 (8.0%)
Hyperlipidemia	9 (18.0%)
GERD	0 (0%)
Follow-up	(n=50)
T2D	2 (4.0%)
Arterial hypertension	11 (22.0%)
OSA	1 (2%)
Hyperlipidemia	1 (2%)
GERD	6 (12.0%)

Felsenreich D.M. et al., in press

Management of (biliary) reflux after OAGB

- **Symptomatic therapy:** double-dose PPI (1 month 2x40mg Esomeprazol) / Ursodeoxycholic acid
  + no smoking, no alcohol,
  + dietological re-evaluation (reflux-promoting eating habits)

- **Diagnosis:**
  - Gastroscopy + biopsies (signs of reflux), bile?
  - 3D-CT volumetry (ITM?)
  - Manometry + 24h pH-metry (LESP?, acid, non-acid reflux?)

- **Re-operation:**
  - Conversion to RYGB (adding a jejuno-jejunostomy)
  - Hiatoplasty, if needed
  - Always look for obstruction in the common limb!
    - Kinking, adhesions, Petersen-space hernia

Conclusion:

- **Very good outcome** regarding weight loss and remission of obesity related complications **4 years after OAGB.**

- Decreased acid reflux but increased non-acid reflux in the 24h pH-metry.

- **Suspicious findings** in the gastroscopy 4 years after OAGB even in asymptomatic patients (**esophagitis, pouchitis, anastomotic ulcers**, etc.).

Thank you for your attention!

Gerhard Prager

Felix Langer

Daniel Moritz Felsenreich

Larissa Nixdorf

Magdalena Eilenberg

Julia Jedamzik

Christoph Bichler

Paula Richwien

Natalie Vock


IFSO
European Chapter
13th Congress of the International Federation for the Surgery of Obesity (IFSO) European Chapter
15-17 May 2025 | Venice, Italy