LA PREVENZIONE DELLA FISTOLA NELLA CHIRURGIA BARIATRICA

A. Usai

Ospedale Regionale Umberto Parini
Direttore Dr. P. Millo
Chirurgia Generale e d' Urgenza
Aosta

ELSEVIER

Surgery for Obesity and Related Diseases ▮ (2014) 00–00

SURGERY FOR OBESITY AND RELATED DISEASES

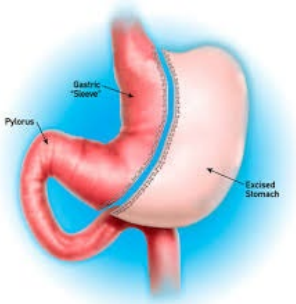
Original article

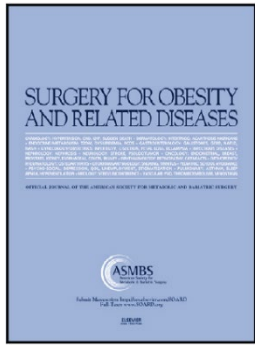
Comparison of laparoscopic sleeve gastrectomy leak rates in four staple-line reinforcement options: a systematic review

Michel Gagner, M.D.[a,*], Jane N. Buchwald, B.A.[b]

[a]*Department of Surgery, Hopital du Sacré Coeur, Montréal, QC, Canada*

[b]*Division of Scientific Research Writing, Medwrite Medical Communications, Maiden Rock, WI, U.S.*





SG: staple-line complications

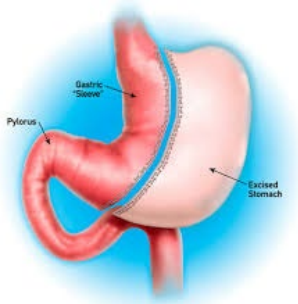
Major surgical complications, such as bleeding, leakage and gastric stenosis, occur in about 5% of cases in large series [2]. The mean incidence of leakage, which usually occurs in the upper portion of the staple line, is 2.1% (1.1-5.3 %) [2]. Leak is the second most common cause of death after SG, with an overall reported mortality rate of 0.4% [3].

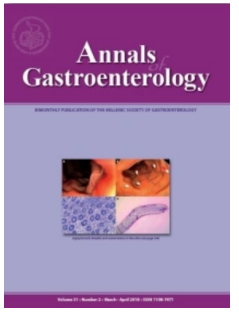
INVITED REVIEW

Annals of Gastroenterology (2018) **31**, 56-64

Complications of staple line and anastomoses following laparoscopic bariatric surgery

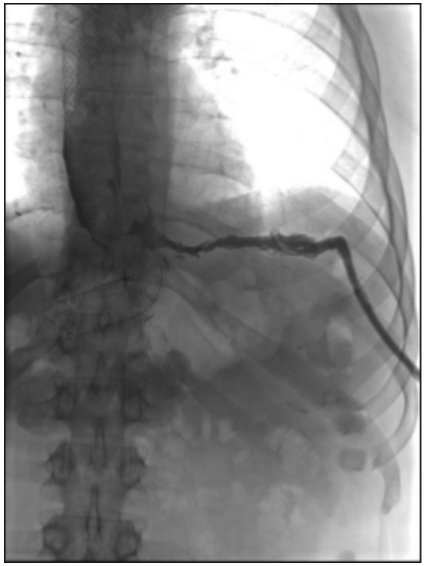
Gianfranco Silecchia, Angelo Iossa
University of Rome "La Sapienza", Rome, Italy





SG: Staple-line leak: pathogenesis and prevention

- Mechanical
- Ischemic



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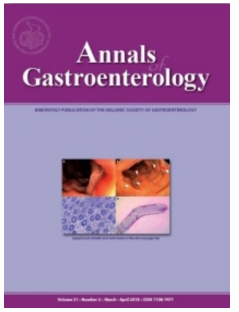

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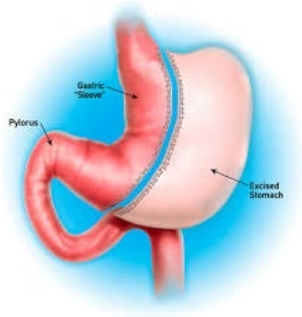

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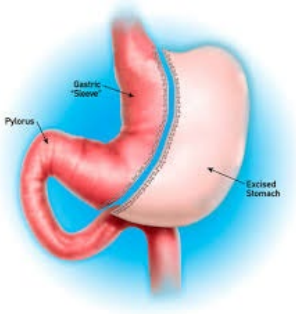
Bleeding	0-20%	Patient-related factors: Liver disease, coagulopathy, hypertension, super-obesity, revisional surgery Surgeon-related factors: Low level of expertise, no staple-line reinforcement	Staple line reinforcement (buttress, glue and Lembert's suture); Appropriate cartridge colors from antrum to fundus; Bleeding check with low intra-abdominal pressure and increased systolic blood pressure (≥140 mmHg)
Stenosis	0.7-4%	Oversewing of the staple line; Overtraction of the greater curvature during stapling; Small hematomas or leaks that heal as scar tissue	Symmetric/lateral traction of the stomach during stapling; Distance of 1.5 cm from the *incisura*

AOH, angle of His

Surgical Strategies That May Decrease Leak After Laparoscopic Sleeve Gastrectomy

A Systematic Review and Meta-Analysis of 9991 Cases

Manish Parikh, MD, Reda Issa, BA,* Aileen McCrillis, MLIS,† John K Saunders, MD,* Aku Ude-Welcome, MD, and Michel Gagner, MD‡*



2013

112 studies (73 retr, 39prosp)
Jan 2002-Aug 2010
9991 LSG
198 leaks (2,2%)

Bougie size
Butressing material
Distance from pylorus

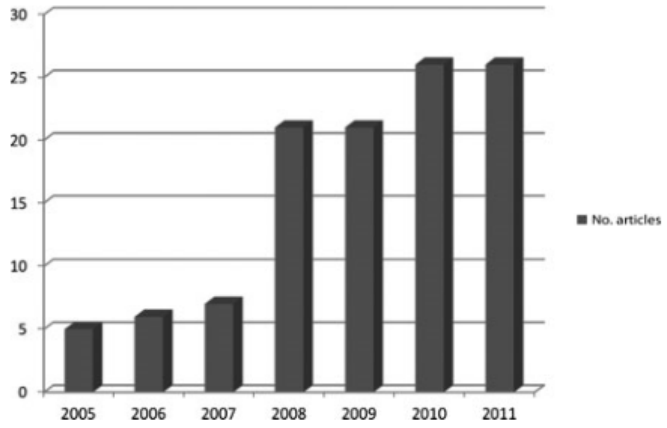


FIGURE 2. Number of publications per year for LSG.

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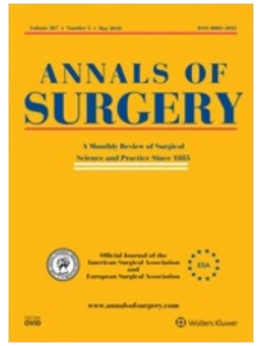
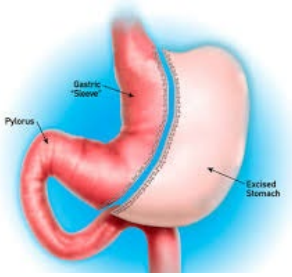
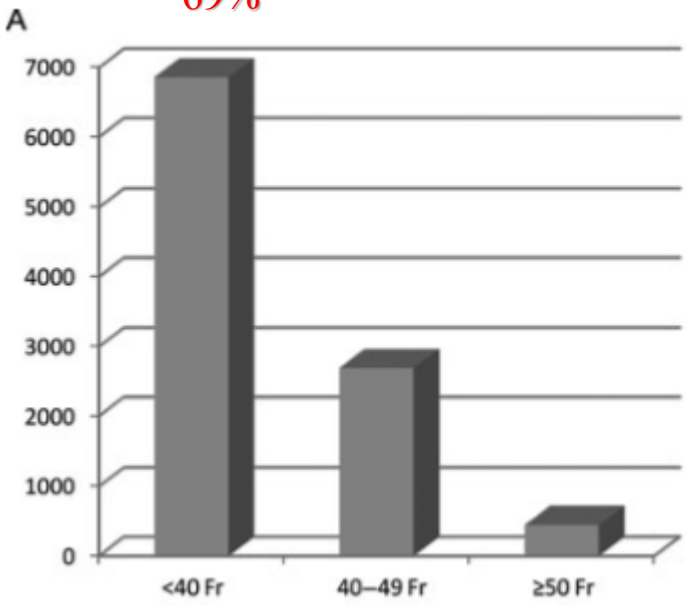
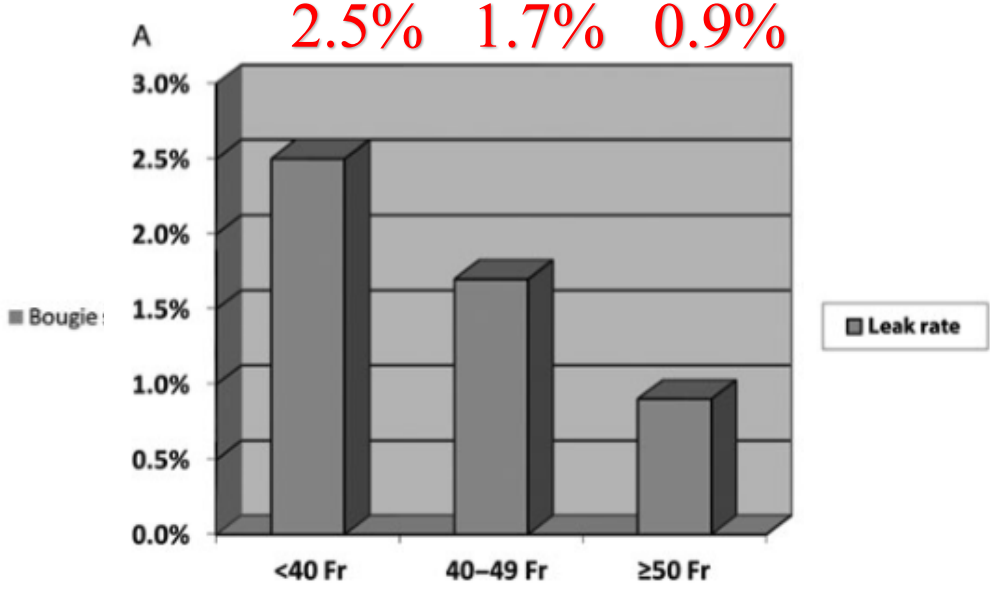




69%



2.5% 1.7% 0.9%



Mean bougie size 38,2±6.4 fr

Overall leak incidence 2.2%

INVITED REVIEW

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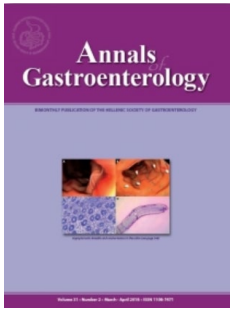

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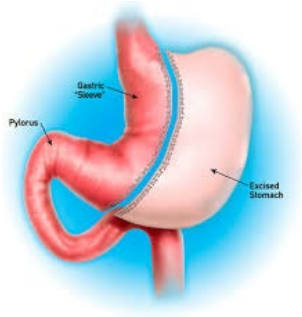

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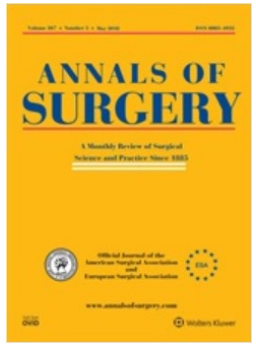

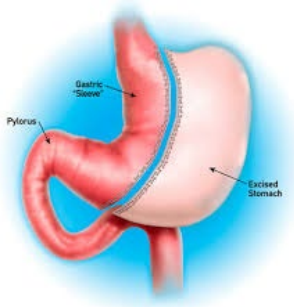

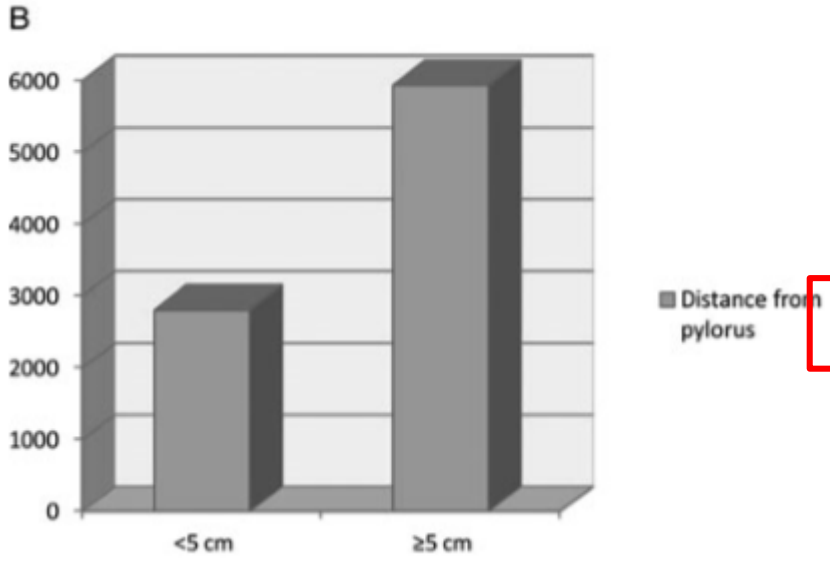

TABLE 1. GEE Model Adjusting for the Effect of Bougie Size, Distance From the Pylorus, and the Use of Buttressing on Leak Rate While Controlling for Age and BMI

	Unadjusted			Adjusted		
	OR	95% CI	*P*	OR	95% CI	*P*
Bougie size						
<40 Fr (reference)	—			—		
40–49 Fr	0.69	[0.41–1.16]	0.161	0.53	[0.37–0.77]	0.0009
≥50 Fr	0.37	[0.18–0.73]	0.0041	0.40	[0.15–1.07]	0.068
Distance to the pylorus						
<5 cm (reference)	—			—		
≥5 cm	1.16	[0.60–2.25]	0.659	1.30	[0.81–2.09]	0.279
Use of buttressing						
Bioabsorbable (reference)	—			—		
No buttressing, no sutures	1.00	[0.37–2.69]	0.997	1.06	[0.49–2.30]	0.873
Nonabsorbable buttressing	1.78	[1.17–2.72]	0.0075	2.01	[0.87–4.68]	0.104
Age						
Mean age <40	—					
Mean age 40–44	0.78	[0.51–1.19]	0.250	0.83	[0.54–1.27]	0.392
Mean age 45+	0.51	[0.27–0.98]	0.044	0.57	[0.31–1.03]	0.061
BMI						
Mean BMI <45	—					
Mean BMI 45–49	1.82	[0.99–3.32]	0.052	1.81	[1.21–2.71]	0.0041
Mean BMI 50+	1.44	[0.73–2.84]	0.296	1.96	[1.16–3.34]	0.012

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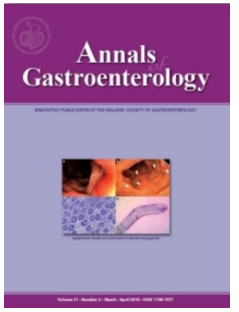

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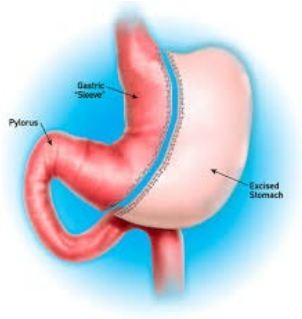

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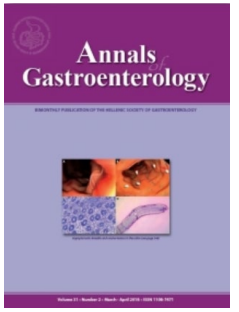

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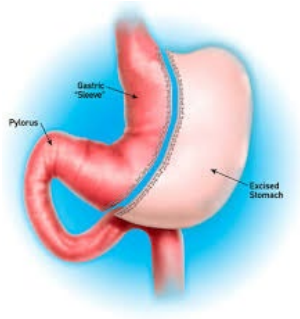

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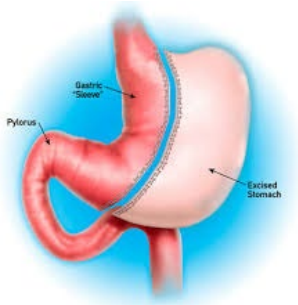
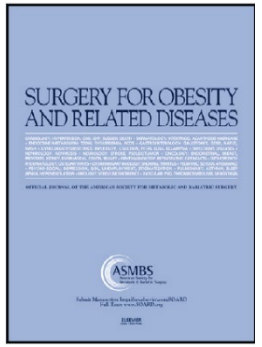




2014

88 papers
8920 pts
191 leaks
2,1 % overall leak rate

Table 4
Leak rates by reinforcement method

Reinforcement method	Leaks	Number of Patients w/o leaks	% Leaks	P-value compared to APM[a]
Absorbable membrane	16	1,446	1.09	—
Oversewing (suture)	86	4,128	2.04	.02
No reinforcement	67	2,512	2.60	.001
Bovine pericardium	22	643	3.30	.0006
Total	191	8,729	2.14	—

APM = (Seamguard) absorbable polymer membrane; PSD = (Peri-Strips Dry) bovine pericardial strips.

Azienda USL Valle d'Aosta-Vallée d'Aoste

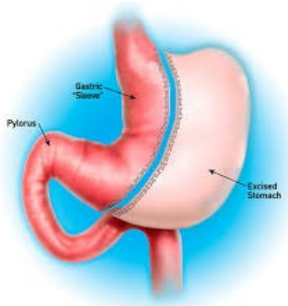
IFSO European Chapter Bariatric and Centre of Excellence Metabolic Surgery European Accreditation Council

OBES SURG (2016) 26:1710–1716
DOI 10.1007/s11695-015-1991-1

ORIGINAL CONTRIBUTIONS

Clinical and Economic Evaluation of Absorbable Staple Line Buttressing in Sleeve Gastrectomy in High-Risk Patients

X. Gayrel[1] · M. Loureiro[1,2,3] · E.M. Skalli[1] · C. Dutot[1] · G. Mercier[1,3] · D. Nocca[1,3]



2016

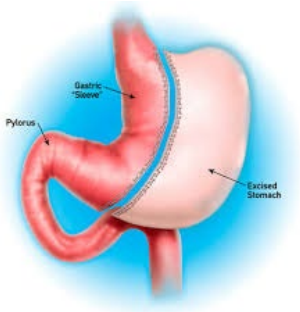
202 pts
116 no butressing
86 butressing
No difference in leaks

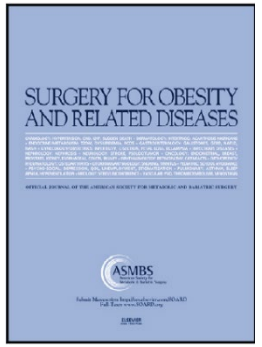
Table 3 Postoperative complications

Characteristics	Buttressing ($n=86$)	Control ($n=116$)	p value
Staple line leak, n (%)	2 (2.3 %)	4 (3.5 %)	1.0
Bleeding, n (%)	0 (0)	10 (8.6 %)	0.005
Reoperation, n (%)	0 (0)	5 (4.3 %)	0.073
Mean ± SD, hospital stay (range)	4.2 ± 0.9(3–8)	5.2 ± 3.8(3–29)	0.005

ASMBS position statement on prevention, detection and treatment of gastrointestinal leak after gastric bypass and sleeve gastrectomy including the role of imaging, surgical exploration and nonoperative management

Julie Kim MD, Dan Azagury MD, Dan Eisenberg MD, Eric DeMaria MD, Guilherme M. Campos MD, on behalf of the American Society for Metabolic and Bariatric Surgery Clinical Issues Committee

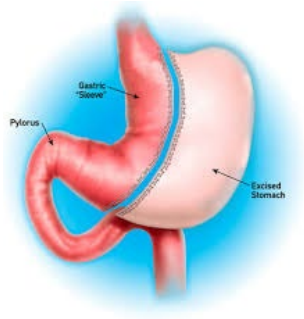




2015

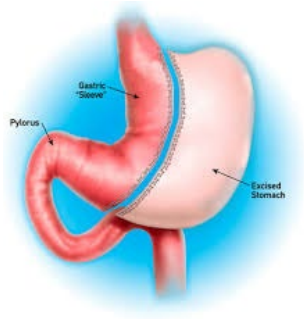
The heterogeneity of the studies, small statistical power, discrepancy of buttressing materials utilized and over-sewing methods in conjunction with varying staple heights and techniques (different bougie sizes) limit any recommendations regarding the use of these materials to prevent GI leak after SG.

Sleeve Gastrectomy Laparoscopica Aosta



2006-2020	237
Sesso m:f	91:146
Età	45.6(18-65)
Peso (kg)	137.9(92-256)
Altezza (cm)	164.5(138-188)
BMI	50.7(35.4-91)
EW (kg)	79.1 (36.5-182) mediana 75.2

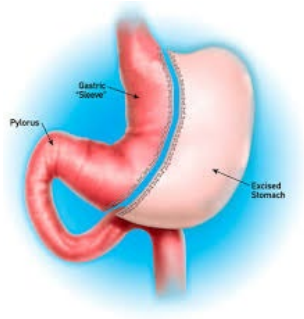
Sleeve Gastrectomy Laparoscopica Aosta



Distaza dal piloro	cm	n.pz
	5	211
	6	3
	7	23

Bougie	mm-Fr	n.pz
	12-36	120
	14-42	15
	16-48	89
	18-54	13

Sleeve Gastrectomy Laparoscopica Aosta



Morbidità <30 gg	20 (10.7%)
fistola	**1(0.5%)**
raccolte	2
polmonite	3
trombosi periferica	2
TEP	2
infez.ferita	4
sanguinamenti	6
pancreatite	1
Degenza (gg)	9.9 (4-233)

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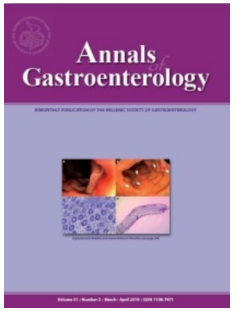

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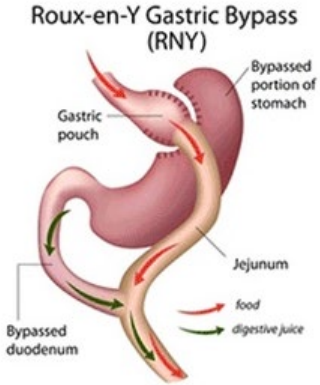
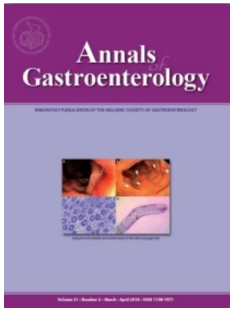


Leaks rates 0.1-5,8%

- G-J anastomois
- Gastric pouch staple line
- J-J anastomosis

INVITED REVIEW

Annals of Gastroenterology (2018) **31**, 56-64



Complications of staple line and anastomoses following laparoscopic bariatric surgery

Gianfranco Silecchia, Angelo Iossa

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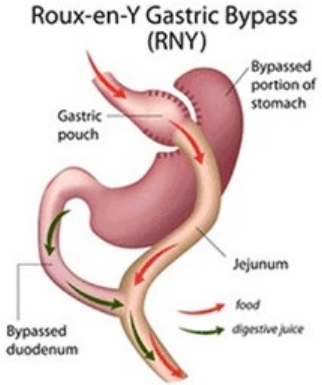


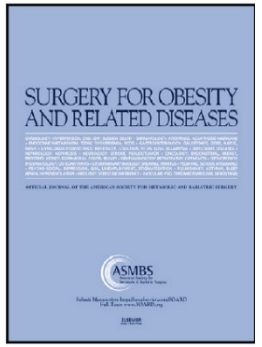
Table 2 Summary of staple-line complications after laparoscopic gastric bypass

Complications	Incidence	Pathogenesis	Prevention
Leak	0.1-5.8%	No differences related to the type of anastomosis (circular, hand-sewn, linear) Controversial effect of reinforcement (protective/worsening)	Fibrin glue on G-J anastomosis; Appropriate cartridge
Bleeding	1.3-3.1%	Patient-related factors: liver disease, coagulopathy, hypertension, super-obesity, revisional surgery Surgeon-related factors: No staple-line reinforcement, mechanical circular anastomosis	Staple-line reinforcement (buttress, glue); Linear or hand-sewn technique
Stenosis	3-28%	Local factors (ischemia, scar formation, and tension of the G-J anastomosis); G-J anastomosis technique; Marginal ulcer	G-J anastomosis >21 mm; linear or hand-sewn technique; Quit smoking and NSAID (marginal ulcer prevention)

G-J, gastro-jejunal; NSAID, non-steroid anti-inflammatory drugs

Technique or technology? Evaluating leaks after gastric bypass

Oliver A. Varban, M.D.[a,*], Ruth B. Cassidy, M.A.[b], Kyle H. Sheetz, M.D.[a], Ann Cain-Nielsen, M.S.[b], Arthur M. Carlin, M.D.[c], Jon L. Schram, M.D.[d], Matthew J. Weiner, M.D.[e], Daniel Bacal, M.D.[f], Amanda Stricklen, M.S., R.N.[b], Jonathan F. Finks, M.D.[a], for the Michigan Bariatric Surgery Collaborative



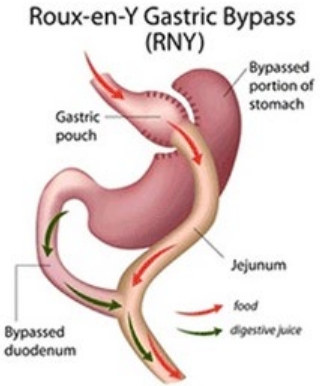
2016

Prospective Analysis Case Control study

16258 pts

Jan 2007-Dec 2011

< 30days leaks



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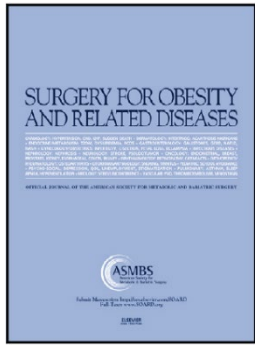
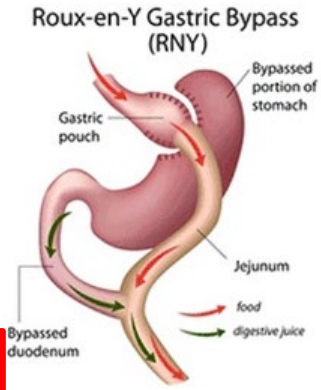


Table 2
Variables used in multivariable regression model ($P < .1$)

	Leak (n = 71)	Matched control (n = 142)	Multivariate model, OR patient estimate (CI)	P
Total operating room time (min): mean ± SD	136.2 ± 79.1	119.8 ± 50.4	Slope estimate <.01 1.01 (1.00, 1.01)	.06
Estimated units of PRBCs for intraoperative/ postoperative transfusion: mean ± SD	1.1 ± 2.1	.1 ± 1.1	Slope estimate = .44 1.55 (1.12, 2.14)	.01
Type of anastomosis & anvil placement				
Circular stapler & transoral	8 (11.3%)	34 (23.9%)	Ref	
Circular stapler & transgastric	37 (52.1%)	63 (44.4%)	.32 (.07, 1.52)	.15
Conversion to open procedure				
No	66 (93.0%)	141 (99.3%)	Ref	
Yes	5 (7.0%)	1 (.7%)	5.72 (.30, 111.16)	.25
Buttressing material used				
No	47 (66.2%)	122 (85.9%)	Ref	
Yes	24 (33.8%)	20 (14.1%)	8.79 (2.49, 31.01)	.00
Fibrin sealant used				
No	62 (87.3%)	99 (69.7%)	Ref	
Yes	9 (12.7%)	43 (30.3%)	.11 (.03, .41)	.00
Vendor type				
Ethicon	39 (54.9%)	97 (68.3%)	Ref	
Covidien	31 (43.7%)	39 (27.5%)	1.15 (.39, 3.34)	.80
Both	1 (1.4%)	6 (4.2%)	2.06 (.15, 29.00)	.59
Model fit statistics	Without covariates	With covariates		
AIC	149.99	121.13		
SC	149.99	151.211		
–2 Log L	149.99	103.13		

AIC = Akaike Information Criterion; PRBCs = packed red blood cells; SC = Schwarz Criterion. The cutoff for inclusion in the multivariable model was



OBES SURG
DOI 10.1007/s11695-015-1703-x

ORIGINAL CONTRIBUTIONS

Clinical Benefit of Gastric Staple Line Reinforcement (SLR) in Gastrointestinal Surgery: a Meta-analysis

Scott A. Shikora[1] · Christine B. Mahoney[2]

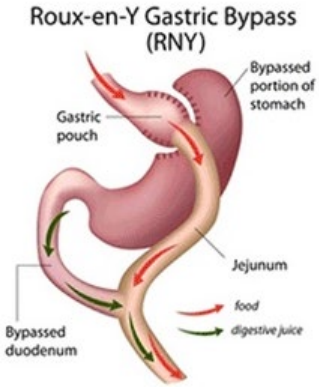


Table 6 Leak rate by reinforcement type for gastric bypass

Buttress material	Number of study arms	Event rate (high to low)	Number of patients
None	81	2.60 %	22,065
Oversuture	45	2.44 %	13,614
Glycolide copolymer	19	1.88 %	1843
Bovine pericardium	25	1.00 %	5160

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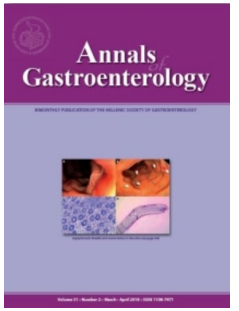

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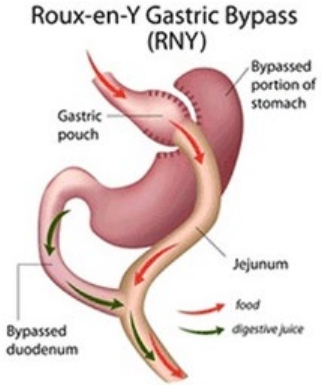

Table 2 Summary of staple-line complications after laparoscopic gastric bypass

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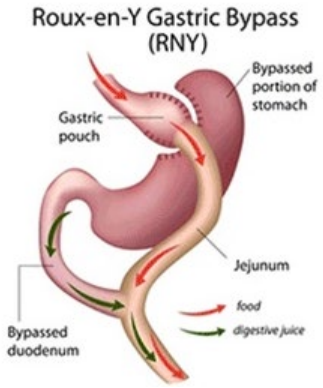
RYGBP Laparoscopico Aosta



2000- 2020

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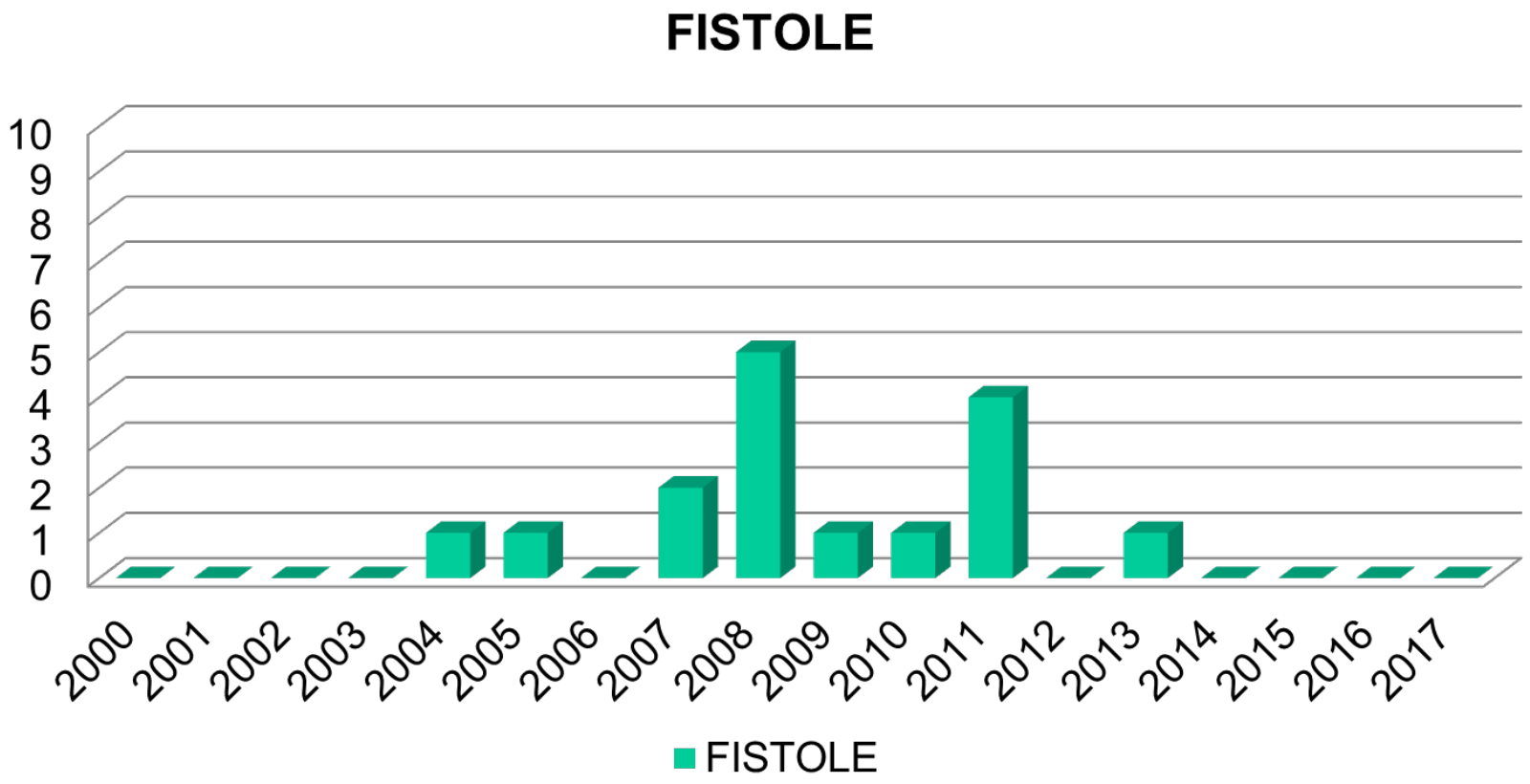
- M:F 102: 367
- ETA MEDIA 41.5 AA (20-65)
- BMI MEDIO 46.4 Kg/cm2
- EW 66.6 kg

- FISTOLA 3.4 % (16/465)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