Bariatric Surgery And Ventral Hernia. One Time Possibility: When and Why

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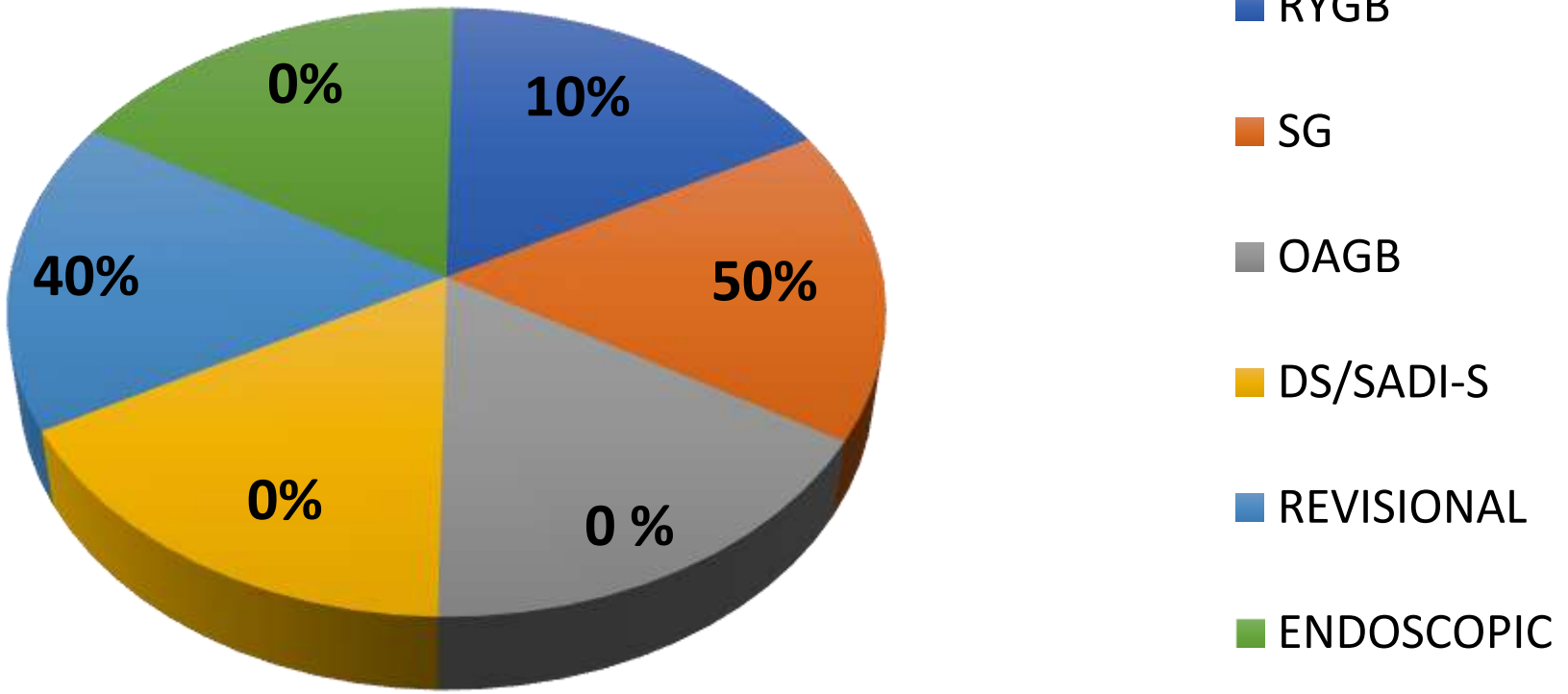
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RYGB
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REVISIONAL
ENDOSCOPIC

Background

- Almost 600 million people with obesity worldwide
- More than 400,000 Bariatric operations worldwide
- VH encountered in 8% (16,000 patients annually) of Bariatric operations
- Physical exam unreliable for smaller hernias

Shettar V. et al. Nutr Clin Pract 2017;32:441-62.
Lau B. et al. Am Surg 2012;78:1118-21.

Risk of VH and BMI
Linear relationship BMI- development VH

- BMI 25-29.9 kg/m^2, odds ratio (OR) 1.63.
- BMI 30-39.9 kg/m^2, odds ratio (OR) 2.62.
- BMI 40-49.9 kg/m^2, odds ratio (OR) 3.91
- BMI 50-59.9 kg/m^2, odds ratio (OR) 4.85.

Lau B, Kim H, Haigh PI, et al. Am Surg 2020;78(10):1118–21.

Background

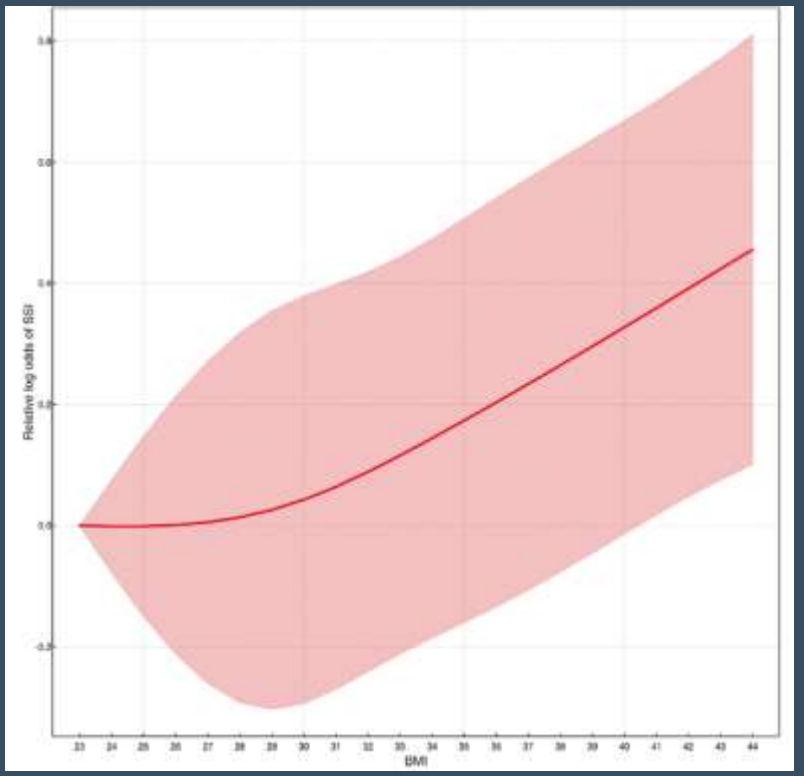
- **Obesity is risk factor for:**
  - Development of ventral hernias
  - Recurrence and complications after repair.

Sugerman HJ, Kellum JM, Reines HD, DeMaria EJ, Newsome HH, Lowry JW (1996) Greater risk of incisional hernia with morbidly obese than steroid-dependent patients and low recurrence with prefascial polypropylene mesh. Am J Surg 171:80–84.

Cleveland RD, Zitsch RP, Laws HL (1989) Incisional closure in morbidly obese patients. Am Surg 55:61–63

Regnard JF, Hay JM, Rea S, Fingerhut A, Flamant Y, Maillard JN (1988) Ventral incisional hernias: incidence, date of recurrence, localization and risk factors. Ital J Surg Sci 18:259–265

Mingoli A, Puggioni A, Sgarzini G, Luciani G, Corzani F, Ciccarone F, Baldassarre E, Modini C (1998) Incidence of incisional hernia following emergency abdominal surgery. Ital J Gastroenterol Hepatol 31:449–453



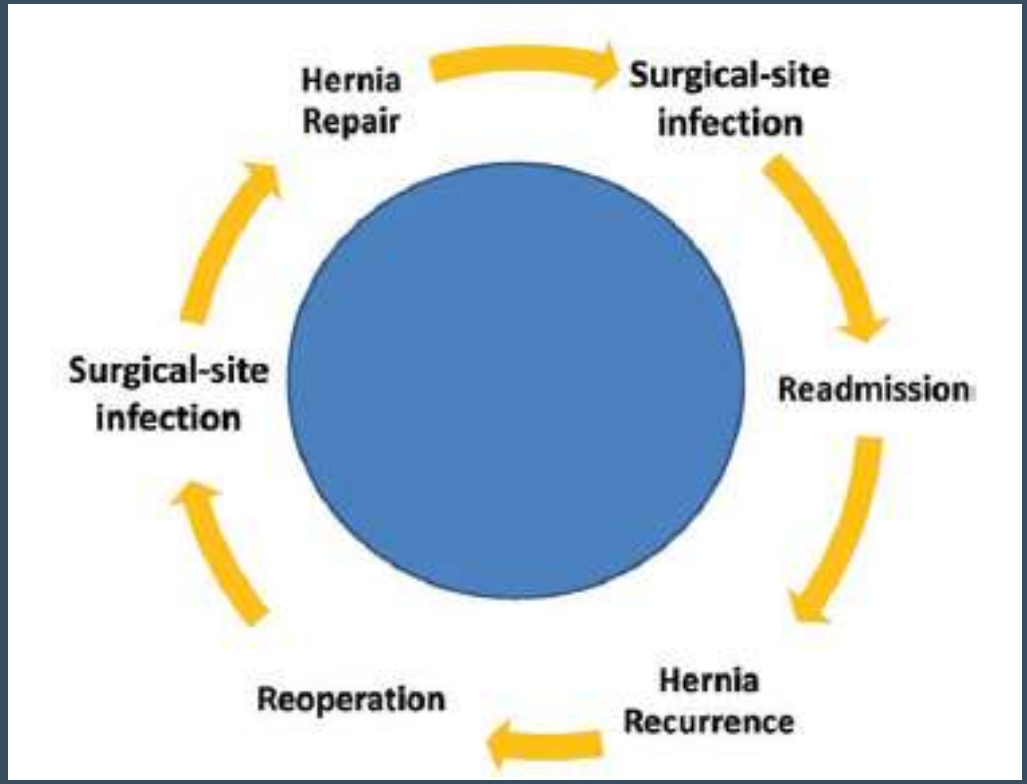
BMI ↑ odds for SSI & SSOPI

Luciano Tastaldi [a,*], David M. Krpata [a], Ajita S. Prabhu [a], Clayton C. Petro [a], Steven Rosenblatt [a], Ivy N. Haskins [a], Molly A. Olson [b], Thomas G. Stewart [b] Michael J. Rosen [a], Jacob A. Greenberg [c]

The American Journal of Surgery 218 (2019) 560–566

The Vicious Hernia Cycle*

Wound infection doubles risk of recurrence*



1% reduction in recurrence = $32 million cost saving§

*Joslyn NA, et al. Plast Reconstr Surg. 2018 Sep;142(3 Suppl):21S-29S
** Holihan JL, et l. Hernia. 2012 Apr;16(2):179e183.
§ Poulose BK, et al. Hernia. 2012 Apr;16(2):179e183.

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VHR with BaS

Available Options
Known Hernias

- Medical weight loss then hernia repair
- Surgical weight loss then hernia repair
- Endoscopic Weight loss procedures then hernia repair
- Concomitant bariatric surgery and hernia repair
  - Primary, Synthetic, Biologic
- Hernia repair

Available Options
Incidental Hernias

- Ignoring hernia (LSG, Omentum)
- Primary suture repair
- Simultaneous mesh repair

Why Concurrent VHR?

- **Risk of SBO and secondary BaS complications**
- Less physiologic and economic impact
- Comparable risk of perioperative complications
- Less economic burden
- Necessary to complete bariatric operation

Why Concurrent VHR?

However…

- Higher risk of complications
- Higher risk of recurrence

Furthermore…Staged repair

- May lower risk of recurrence
- Less technically challenging procedure
- Lower perioperative morbidity

Concurrent BaS and VHR? Why

Repair of ventral hernias in morbidly obese patients undergoing laparoscopic gastric bypass should not be deferred Surg Endosc (2004) 18: 207–210

G. M. Eid, S. G. Mattar, G. Hamad, D. R. Cottam, J. L. Lord, A. Watson, R. M. Dallal, P. R. Schauer

- 85 patients LRYGB
- Avg BMI 50.9 kg/m^2
- Primary repair 59. Hernia size 7.74 cm^2
- Biologic 12. Hernia size 17.7 cm^2. IPOM with SIS
- Deferred 14 Hernia size 14.5 cm^2. All reduced at LRYGB
- Follow-up avg 26 mo

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G. M. Eid, S. G. Mattar, G. Hamad, D. R. Cottam, J. L. Lord, A. Watson, R. M. Dallal, P. R. Schauer

- Recurrence:
  - Biologic: 0% avg f/u 13 mo.
  - Primary: 22% avg f/u 30 mo.

- Deferred Group: 35.7% Bowel obstruction (all hernias reduced at original procedure)

- Conclusions:
  - All incarcerated hernias should be concomitantly repaired with biologic

Concomitant RYGB & Hernia Repair

Datta T et al. Surg Obes Relat Dis 2008

- Incarcerated Omentum left:
  - Succesfully deferred 100%
- Primary repair:
  - 25% SBO at repair site
- Prosthetic repair:
  - Longer hospital stay
  - No recurrence at 14-months

Concurrent ventral hernia repair in patients undergoing laparoscopic bariatric surgery: a case-matched study using the National Surgical Quality Improvement Program database

Zhamak Khorgami, M.D.[a], Ivy N. Haskins, M.D.[b,c], Ali Aminian, M.D.[a,*], Amin Andalib, M.D., M.S.[d], Michael J. Rosen, M.D.[b], Stacy A. Brethauer, M.D.[a], Philip R. Schauer, M.D.[a]

SURGERY FOR OBESITY AND RELATED DISEASES

Surgery for Obesity and Related Diseases 13 (2017) 997–1003

- 1,976, matched BaS vs. BaS+VHR
- 55.1% LRYGB, 44.9% LSG
- 83.1% reducible hernia.
  - 16.9% incarcerated or strangulated hernia
- 67.4% laparoscopic VHR.
  - 32.6% open VHR (2.8%)with mesh.

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SURGERY FOR OBESITY AND RELATED DISEASES

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VHR had HIGHER

- Composite adverse event (2.7% vs. 4.8%, p<.01)
- Return to OR (3.3% vs. 0.6%, p<.01)
- Readmission (3.2% vs. 5.9%, p<.01)
- Length of hospital stay (2.1 days vs. 2.3 days, p<.01)
- Return to OR (3.3% vs. 0.6%)
  - 21.2% for Redo VHR

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SURGERY FOR OBESITY AND RELATED DISEASES

Surgery for Obesity and Related Diseases 13 (2017) 997–1003

Primary outcomes stratified by bariatric surgical procedure

Outcome	Bariatric surgery only	Concomitant VHR	*P* value	Odds ratio (95% CI)
Roux-en-Y gastric bypass, N = 544				
Composite adverse events, N (%)	16 (2.9%)	36 (6.6%)	.007	2.30 (1.25–4.22)
30-day readmission, N (%)	23 (4.2%)	37 (6.8%)	.047	1.73 (1.01–2.98)
30-day reoperation, N (%)	6 (1.1%)	24 (4.4%)	.002	4.07 (1.65–10.07)
Sleeve gastrectomy, N = 444				
Composite adverse events, N (%)	11 (2.5%)	12 (2.7%)	.750	1.15 (.49–2.69)
30-day readmission, N (%)	9 (2%)	21 (4.7%)	.022	2.57 (1.15–5.78)
30-day reoperation, N (%)	0 (.0%)	9 (2.0%)	.039	8.81 (1.11–69.93)

Concomitant VHR

- Increased early morbidity
  - regardless type of bariatric procedure
  - irrespective of the surgical approach to VHR

Are Concomitant Operations During Bariatric Surgery Safe? An Analysis of the MBSAQIP Database

Benjamin Clapp [1], Isaac Lee [2], Evan Liggett [2], Michael Cutshall [2], Bryson Tudor [2], Grishma Pradhan [2], Katherine Aguirre [2], Alan Tyroch [2]

Obes Surg. 2020 Nov;30(11):4474-4481.

- 15,614 patients from MBSAQIP.
- Concomitant hernia repairs (incisional, ventral, and inguinal)

Concomitant LRYGB or SG+hernia Higher rates of:

- Readmission,
- Reintervention
- Reoperation
- Death ($p < 0.001$)

Concurrent Laparoscopic Ventral Hernia Repair with Bariatric Surgery: a Propensity-Matched Analysis

Journal of Gastrointestinal Surgery (2020) 24:58–66

Muhammad Moolla[1] · Jerry Dang[2] · Aryan Modasi[2] · Simon Byrns[2] · Noah Switzer[3] · Daniel W. Birch[2] · Shahzeer Karmali[2]

- 430,225 patients from MBSAQIP.
  - LSG (73%) LRYGB (27%).
- **4,690 (1.1%) concomitant VHR**
- 74% female. Mean BMI 46.1 kg/m^2

Concurrent Laparoscopic Ventral Hernia Repair with Bariatric Surgery: a Propensity-Matched Analysis

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Muhammad Moolla[1] · Jerry Dang[2] · Aryan Modasi[2] · Simon Byrns[2] · Noah Switzer[3] · Daniel W. Birch[2] · Shahzeer Karmali[2]

Table 2 Perioperative factors and 30-day complications in unmatched and matched cohorts

		Propensity-matched patients		
		Bariatric surgery alone $n = 4648$	Bariatric surgery with VHR $n = 4648$	p value
Operative time, min mean ± SD	< 0.001	93.7 ± 50.0	112.6 ± 57.9	< 0.001
Length of stay, days median (IQR)	< 0.001	2 (1)	2 (1)	< 0.001
Reoperation	50 (1.1)		108 (2.3)	< 0.001
Major complications	176 (3.8)		268 (5.8)	< 0.001
Readmission	186 (4.0)		249 (5.4)	0.002

VHR Group

- Longer OR time
- Longer LOS
- Higher complications
  - Deep SSI
  - Sepsis
- 1.5x Readmission
- 2x reoperation
  - Enterolysis more common

VHR group 7.5 time more VHR within 30 days

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Outcomes of concomitant ventral hernia repair performed during bariatric surgery

Surg Endosc (2017) 31:1573–1582

G. Sharma[1] · M. Boules[1] · S. Punchai[1] · A. Strong[1] · D. Froylich[1]
N. H. Zubaidah[1] · C. O'Rourke[1] · S. A. Brethauer[1] · J. Rodriguez[1]
K. El-Hayek[1] · M. Kroh[1]

- Retrospective institutional data
- 159 patients concomitant VHR & BaS.
- 91% laparoscopically.
- RYGB 66 %, LSG 31 %, LAGB 3 %
- VHWG-SSO grade 3 (n = 151). 95 % clean contaminated.
- Primary closure 72 %, mesh repair 28 %
  - 3 biologic, 7 synthetic, 5 bio-absorbable, 2 absorbable.

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K. El-Hayek[1] · M. Kroh[1]

- 30-day complications 10%
- Wound infection 6% (No mesh infections)
- Readmission 3%
- Reoperation 3%
- Hernia recurrence:
  - Early 2 %. Reoperation necessary
  - Late 25 %.

Concomitant VHR and BaS

Satisfactory results

Concomitant Ventral Hernia Repair and Bariatric Surgery: a Systematic Review

Obesity Surgery (2018) 28:2949–2955

Andrea Lazzati[1,2] • Georges Bou Nassif[1] • Luca Paolino[1]

- Systematic review 11 retrospective studies concurrent VHR-BaS
- 449 patients. RYGB (60%), LSG (36%), AGB (4%) Laparoscopic (93%)
- Mean defect size was 18 cm^2
- Simple suture (n = 191).
- Synthetic mesh (n = 186).
- Biological mesh (n = 72).

Concomitant Ventral Hernia Repair and Bariatric Surgery: a Systematic Review

Obesity Surgery (2018) 28:2949–2955

Andrea Lazzati[1,2] · Georges Bou Nassif[1] · Luca Paolino[1]

- Recurrence:
  - 25.7% suture group.
  - 14.3% biomesh group.
  - 1.1% synthetic mesh group ($p < 0.05$).
- Mesh infection rate was not different
- Overall safe
- Low quality studies (median MINORS score 0.28 ± 0.14)

Ventral Hernia Repair and Obesity: Results from a Nationwide Register Study in France According to the Timeframes of Hernia Repair and Bariatric Surgery

Obesity Surgery (2021) 31:5251–5259

David Moszkowicz[1,2] · Madalina Jacota[3] · Lionelle Nkam[3] · Davide Giovinazzo[2] · Lamiae Grimaldi[3] · Andrea Lazzati[4]

- Retrospective cohort
- 6,260 (53.6%) VHR after BaS
- 3,388 (29.0%) concomitant BaS and VHR
- 2.039 (17.4%) VHR-first

	VHR-first $n=2039$	Concomitant $n=3388$	BS-first $n=6260$	p value
VHR technique				
Mesh	1283 (62.9)	470 (13.9)	3504 (56)	<0.001
Suture	756 (37.1)	2918 (86.1)	2756 (44.0)	

Ventral Hernia Repair and Obesity: Results from a Nationwide Register Study in France According to the Timeframes of Hernia Repair and Bariatric Surgery

Obesity Surgery (2021) 31:5251–5259

David Moszkowicz[1,2] · Madalina Jacota[3] · Lionelle Nkam[3] · Davide Giovinazzo[2] · Lamiae Grimaldi[3] · Andrea Lazzati[4]

Major Complications

- VHR-first 11.1%
- Concomitant 7.8%
- BS-first groups 16.9% (P < 0.001)

Mesh Infection

- VHR-first group 0.6%
- Concomitant group 0.6%
- BS-first group 1.1% (P < 0.001)

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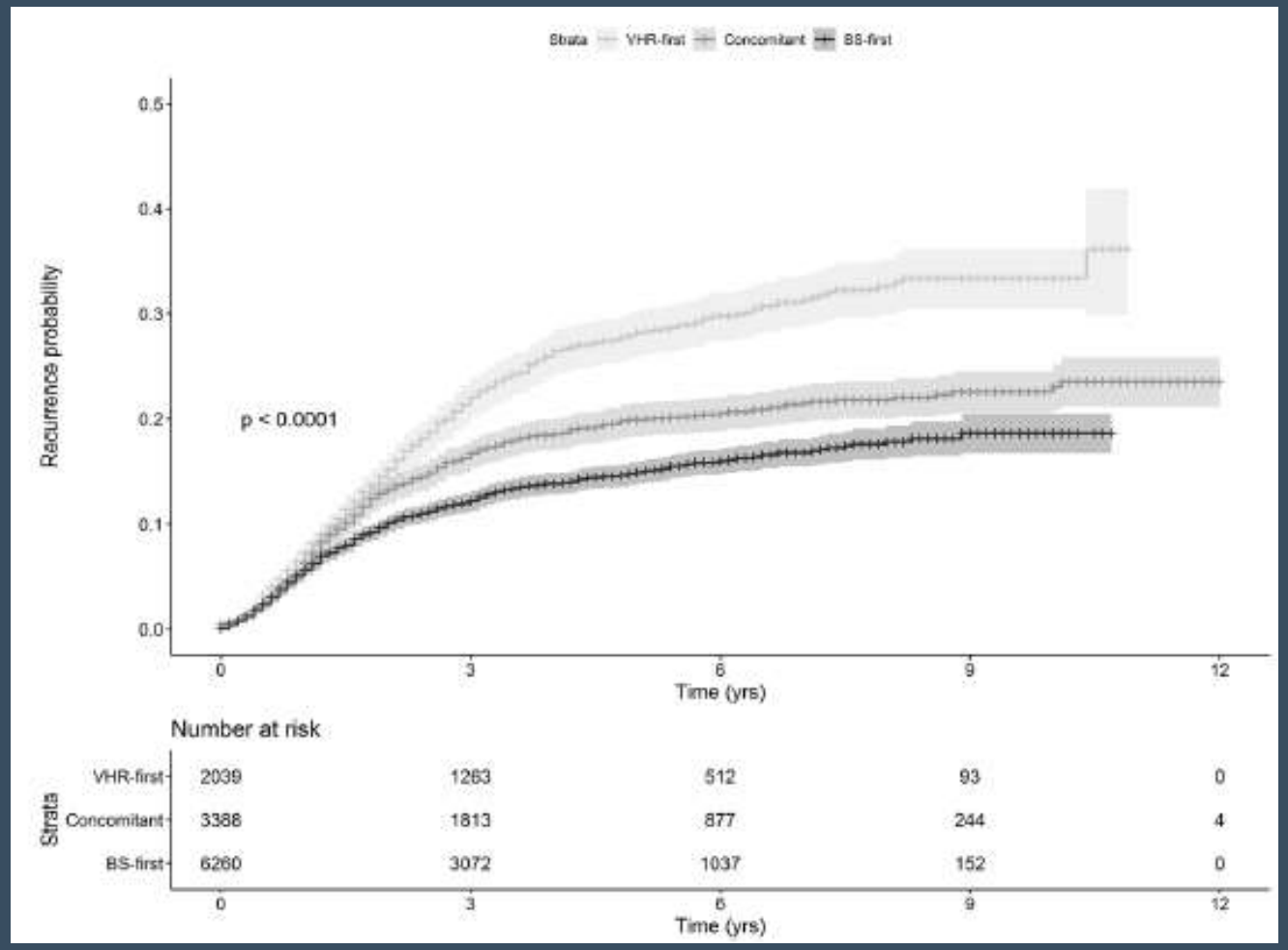

Recurrence

- VHR-first group (36.2%)
- BS-first group (24.5%)
- Concomitant VHR-BS group (18.6%) P < 0.001.
- Suture repair higher risk
- VHR-first group (HR 1.51)
- BS-first group (HR 1.43)P < 0.001)
- Not in the concomitant group

Concomitant VHR and Bariatric Surgery
Is Mesh Safe?

- Primary repair or biologic mesh because of associated contamination*
- Prosthetic mesh in contaminated cases
  - No greater incidence of SSI or mesh-related complications**
- 11 LRYGB synthetic mesh repair no mesh infections§

* Eid GM, et al. Surg Endosc 2004;18:207–10.
** Kelly ME, et al. Am Surg 2002 68:524–528.
§ Schuster Ret al. Obes Surg 2006; 16:1205–1208.

Morbid obesity with ventral hernia: is concomitant bariatric surgery with laparoscopic ventral hernia mesh repair the best approach? An experience of over 150 cases

Palanivelu Praveen Raj, M.S., D.N.B.[a,*], Siddhartha Bhattacharya, M.S., F.N.B.[a], S. Saravana Kumar, D.N.B.[a], R. Parthasarathi, M.S.[b], Bharath Cumar, M.S.[b], C. Palanivelu, M.S., M.Ch.[c]

SURGERY FOR OBESITY AND RELATED DISEASES

Surgery for Obesity and Related Diseases 15 (2019) 1098–1103

- Single center retrospective
- 156 concomitant BaS+IPOM
- 120 LSG (BMI 43.64±6.8), 36 LRYGB (BMI42.49±8.57).
- 39 recurrent hernia.
- No postoperative mesh infections
- 1 (1.5%) recurrence.

Parameters	LSG (n = 120)	LRYGB (n = 36)
Hernia location		
Umbilical/paraumbilical	60	23
Infraumbilical	39	9
Supraumbilical	9	0
Swiss cheese defect	12	4
Defect size (longest diameter in cm)	3.58 ± 3.36	3.96 ± 3.12
Operative time (min)	118.34 ± 29.88	154.69 ± 35.54
Size of mesh (cm^2)		
15 x 15	31	4
20 x 15	86	32
30 x 20	3	0

LSG = laparoscopic sleeve gastrectomy; LRYGB = laparoscopic Roux-en-Y gastric bypass

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Biologic vs Synthetic Mesh for Single-stage Repair of Contaminated Ventral Hernias

A Randomized Clinical Trial

Michael J. Rosen, MD,[1] David M. Krpata, MD,[1] Clayton C. Petro, MD,[1] Alfredo Carbonell, DO,[2] Jeremy Warren, MD,[2] Benjamin K. Poulose, MD, MPH,[3] Adele Costanzo, RN,[1] Chao Tu, MS,[4] Jeffrey Blatnik, MD,[5] and Ajita S. Prabhu, MD[1]

JAMA Surg. 2022 Apr; 157(4): 293–301.

- Multicenter, single-blinded randomized clinical trial
- 126 synthetic vs. 127 biologic retromuscular mesh
- Follow-up 2 years
- Recurrence: biologic mesh 20.5%, synthetic mesh 5.6%
- No difference SSOPI
- Difference in price: biologic, $21,539 vs. synthetic, $105; P < .001

Absolute risk reduction recurrence of 14.9%

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Is the Use of Prosthetic Mesh Recommended in Severely Obese Patients Undergoing Concomitant Abdominal Wall Hernia Repair and Sleeve Gastrectomy?

J Am Coll Surg 2014;218:358–362

Yaniv Cozacov, MD, Samuel Szomstein, MD, FACS, Fernando M Safdie, MD, Emanuele Lo Menzo, MD, PhD, FACS, Raul Rosenthal, MD, FACS

- Prospective collection of peritoneal fluid aspirate
- 154 samples (102 LSG, 52 LRYGB)
- LSG samples all negative
- LRYGB culture positive in 15% ($p < 0.05$).

Concomitant VHR and Bariatric Surgery

Best Evidence Topic

- Not sufficient evidence to define the best surgical strategy for VHR in patients undergoing BS
- Individualized approach is reasonable.

* Sait MS, Som R, Borg CM, et al. Ann Med Surg. 2016;11:21–5

American Society for Metabolic and Bariatric Surgery and American Hernia Society consensus guideline on bariatric surgery and hernia surgery

Surgery for Obesity and Related Diseases 14 (2018) 1221–1232

Emanuele Lo Menzo, M.D.[a], Marcelo Hinojosa, M.D.[b], Alfredo Carbonell, M.D.[c], David Krpata, M.D.[d], Jonathan Carter, M.D.[e], Ann M. Rogers, M.D.[f,*]

SURGERY FOR OBESITY AND RELATED DISEASES

- **47 studies**:
  - only 1 was level 1b evidence
  - the remainder level III-IV.
- **Heterogeneity**

Lo Menzo E, Hinojosa M, Carbonell A, et al. Surg Obes Relat Dis 2018;14(9):1221–32.

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Conclusions

- No consensus on the optimal management of VH during BaS
- Concomitant Bariatric surgery and VHR
  - When: Necessary to complete the BaS
  - Why: to avoid post procedure SBO
- Synthetic mesh seems safe (Laparoscopic, retromuscular)