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G I A R D I N I  
N A X O S



# NUOVE RACCOMANDAZIONI NUTRIZIONALI:BACKSTAGE IL POSTOPERATORIO: ALERT NUTRIZIONALI

Dott.ssa Barbara Neri  
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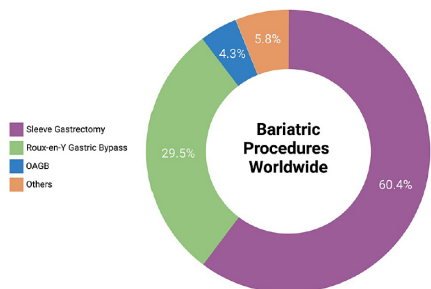
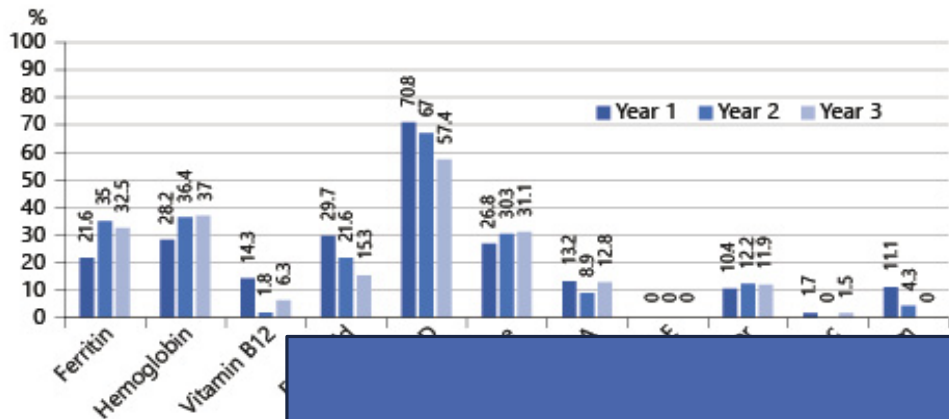
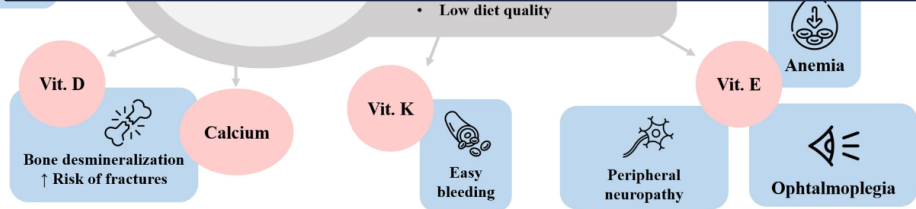
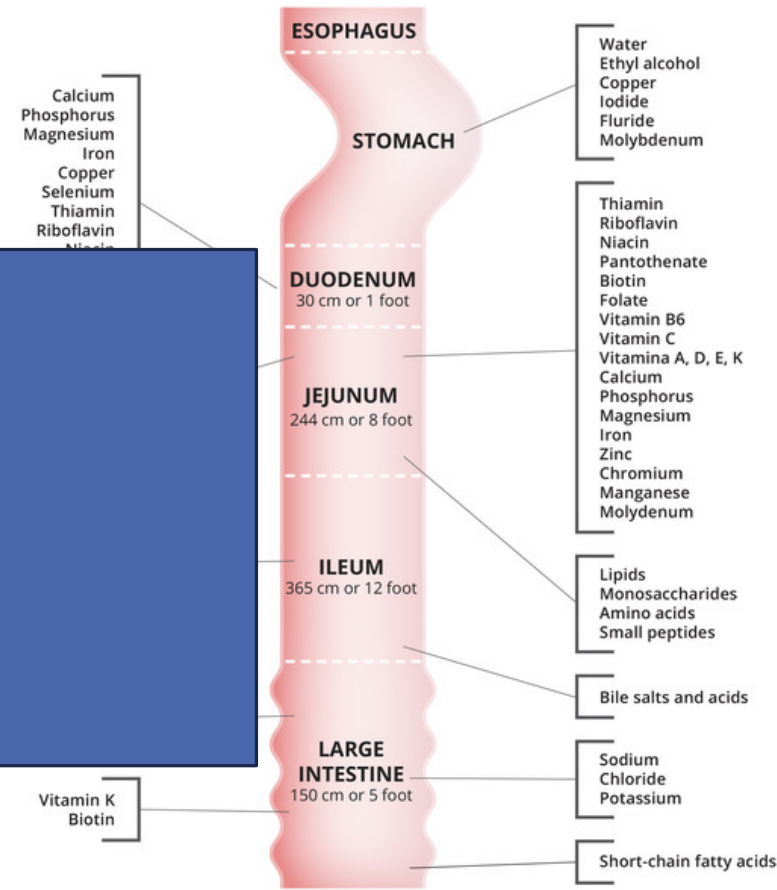


FIGURE 1: Most common bariatric surgeries performed worldwide 2021-2022. Data represents 480,970 procedures performed across 25 countries [23]. OAGB = One-Anastomosis Gastric Bypass. Image credits: Omar A. Kamal, 2024 (created with BioRender.com)

# ALERT



Common nutritional deficiencies after BS and their accompanying alterations



Note: The duodenum, jejunum and ileum make up the small intestine.

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Original article

**Bariatric surgery affects obesity-related protein requirements**

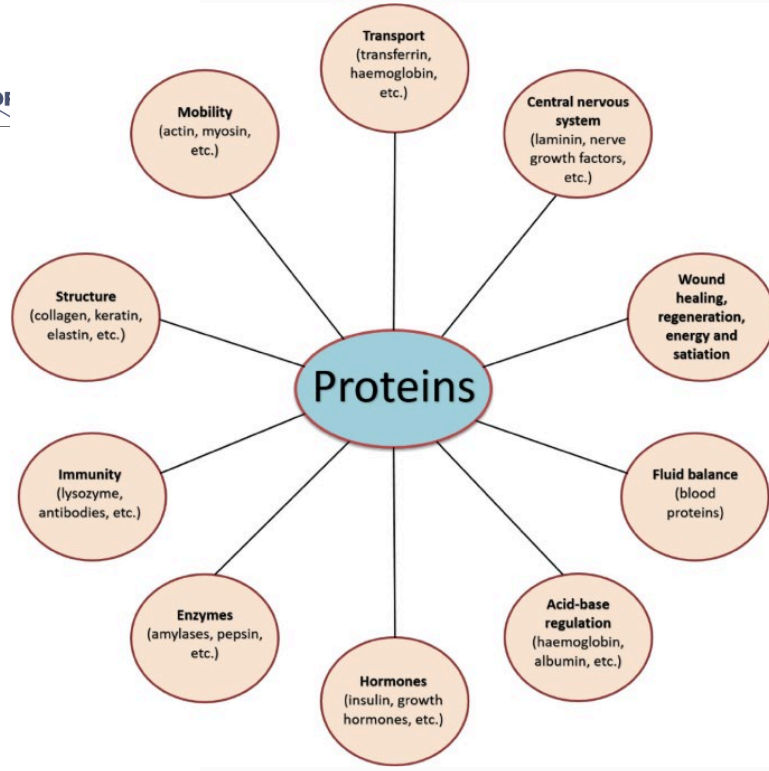
C. Guillet <sup>a,\*</sup>, A. Masgrau <sup>a,1</sup>, A. Mishellany-Dutour <sup>a</sup>, A. Blot <sup>a</sup>, A. Caille <sup>a</sup>, N. Lyon <sup>a</sup>, B. Pereira <sup>b</sup>, K. Slim <sup>c</sup>, M. Robert <sup>d</sup>, E. Disse <sup>e</sup>, N. Feugier <sup>e</sup>, P. Le Ruyet <sup>f</sup>, C. Louvet <sup>g</sup>, M. Miolanne <sup>g</sup>, N. Farigon <sup>g</sup>, M. Laville <sup>e</sup>, Y. Boirie <sup>a, g</sup>

- un cambiamento temporale nel fabbisogno proteico dopo la chirurgia bariatrica, indipendentemente dal tipo di intervento chirurgico.
- L'assunzione spontanea di proteine dopo la chirurgia bariatrica non copre il fabbisogno proteico per la maggior parte dei pazienti

raccomandazioni proteiche dietetiche specifiche devono essere adattate ai pazienti affetti da obesità dopo l'intervento.

Article  
**Nutritional Status, Selected Nutrients Intake, and Metabolic Disorders in Bariatric Surgery Patients**

Iwona Boniecka <sup>1,\*</sup>, Aneta Czerwonogrodzka-Senczyna <sup>1</sup>, Anna Jeznach-Steinhagen <sup>1</sup>, Krzysztof Pańnik <sup>2</sup>, Dorota Szostak-Węgierek <sup>1</sup> and Samir Zeair <sup>3</sup>



**Riduzione Assunzione proteica:**

- minore assunzione di cibo,
- ridotto assorbimento correlato alla diminuita produzione di acido cloridrico e enzimi digestivi
- intolleranza ai prodotti ad alto contenuto proteico (in particolare la carne) che può persistere per molti anni

# SCOMPENSO EPATICO

Può verificarsi dopo la chirurgia bariatrica e in un periodo di tempo molto variabile.

Obesity Surgery (2021) 31:3860–3861  
https://doi.org/10.1007/s11695-021-05408-8



LETTER TO THE EDITOR



## Severe Protein Malnutrition After Bariatric Surgery and Liver Failure: a Dangerous Sequence

Antonio Iannelli<sup>1,2,3</sup> · Niccolò Petruccianni<sup>1,2</sup> · Luigi Schiavo<sup>4</sup> · Rodolphe Anty<sup>1,2,3</sup>

Obesity Surgery (2022) 32:1227–1235

https://doi.org/10.1007/s11695-022-05930-3

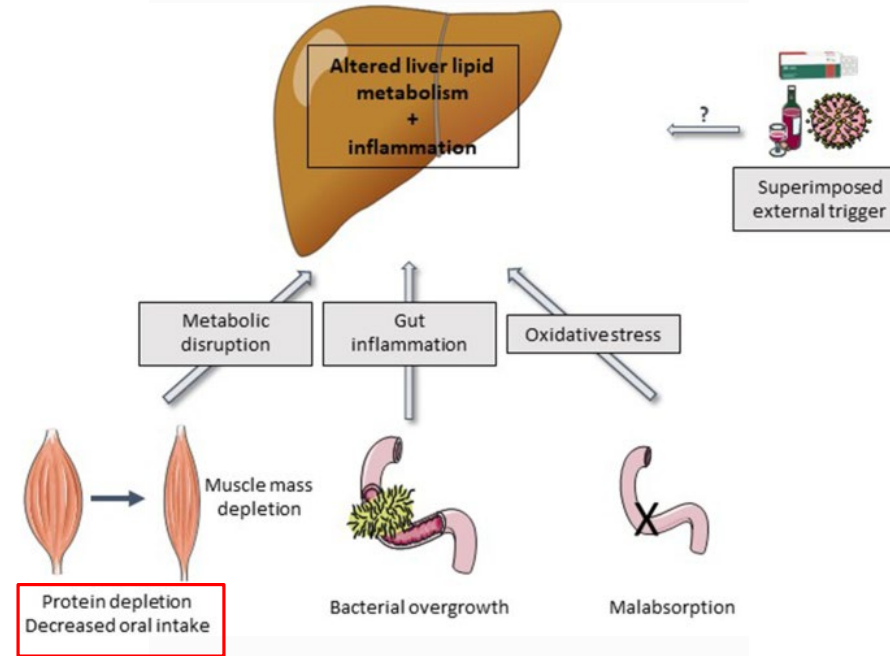


ORIGINAL CONTRIBUTIONS



## Liver Decompensation after Bariatric Surgery in the Absence of Cirrhosis

Perrine Vande Berg<sup>1</sup> · Artida Ulaj<sup>2</sup> · Graziella de Broqueville<sup>1</sup> · Marie de Vos<sup>3</sup> · Bénédicte Delire<sup>1</sup> · Philippe Hainaut<sup>2</sup> · Jean-Paul Thissen<sup>4</sup> · Peter Stärkel<sup>1</sup> · Mina Komuta<sup>5</sup> · Paulina Henry<sup>5</sup> · Nicolas Lanthier<sup>1</sup>



## Liver transplantation for bariatric surgery-related liver failure: a systematic review of a rare condition

Pietro Addeo, M.D.<sup>a,\*</sup>, Manuela Cesaretti, M.D., Ph.D.<sup>b</sup>, Rodolphe Anty, M.D., Ph.D.<sup>c,d</sup>, Antonio Iannelli, M.D., Ph.D.<sup>b,c</sup>

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<sup>b</sup>Digestive Surgery and Liver Transplantation Unit, Archet 2 Hospital, Centre Hospitalier Universitaire de Nice, Université Côte d'Azur, Nice, France  
<sup>c</sup>INSERM U1065, Mediterranean Center for Molecular Medicine, Team 8 Hepatic Complications of Obesity, Nice, France  
<sup>d</sup>Pôle Digestif, Archet 2 Hospital, Centre Hospitalier Universitaire de Nice, Université Côte d'Azur, Nice, France  
Received 16 July 2018; accepted 4 June 2019



SUPPORTO NUTRIZIONALE MIGLIORA LA PROGnosi

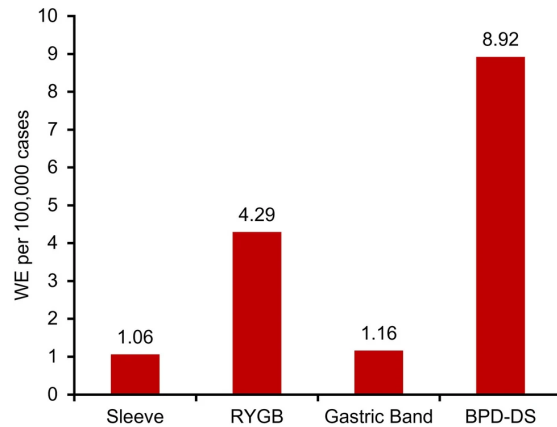
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# Complicanze neurologiche

prevalenza  
fino al 16%.



Steenackers N, Van der Schueren B, Augustijns P, Vanuytsel T, Matthys C. Development and complications of nutritional deficiencies after bariatric surgery. Nutrition Research Reviews. 2023;36(2):512-525.



Incidence of WE by bariatric procedure

Carenza di **folati B9** può portare a neuropatia periferica o sindrome delle gambe senza riposo.  
Carenza di **vitamina B12** può manifestarsi neurologicamente presentandosi come mielopatia, neuropatia, parestesia, atassia e demenza

## VITAMINA B1

Carenza nel 27% circa  
Assunzione < o > utilizzo

Beri –Beri  
SWK

la diagnosi può essere ritardata o sfuggire a personale sanitario non competente nel campo.

REVERSIBILI

Obesity Surgery (2022) 32:3104–3112  
<https://doi.org/10.1007/s11695-022-06178-7>



REVIEW



B1 Vitamin Deficiency After Bariatric Surgery, Prevalence, and Symptoms: a Systematic Review and Meta-analysis

Mansour Bahardoust<sup>1,2</sup> · Foolad Eghbali<sup>1,3,4</sup> · Shahab Shahabi Shahmiri<sup>1</sup> · Abolhasan alJanpour<sup>5</sup> · Fahime yarighol<sup>1</sup> · Rohollah Valizadeh<sup>1,6</sup> · Ahmad Madankan<sup>1</sup> · Amir Bahador Pouraskari<sup>1</sup> · Behnaz Ashtarinezhad<sup>1</sup> · Hossein Farokhi<sup>7</sup> · Hamid sarafraz<sup>1</sup> · Elham Khanafshar<sup>8</sup>

Vitamina  
idrosolubile

# IPEPARIATROIIDISMO SECONDARIO

Surgical Endoscopy (2023) 37:8019–8028  
<https://doi.org/10.1007/s00464-023-10218-3>

2023 SAGES ORAL

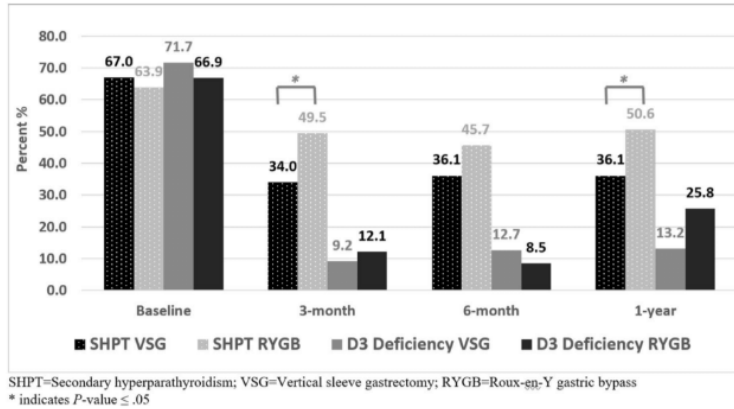


## Prevalence and risk factors for secondary hyperparathyroidism (SHPT) in patients undergoing bariatric surgery

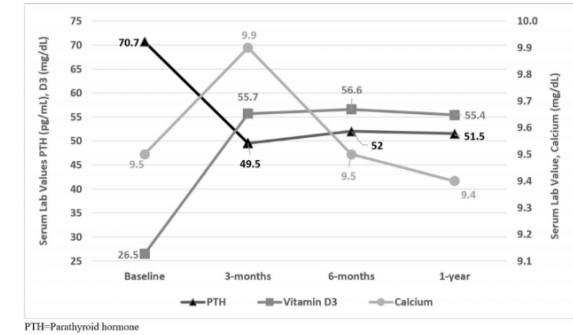
Laura E. Fischer<sup>1,4</sup> · Fernando Moreno-Garcia<sup>1</sup> · Rachel Tran<sup>1</sup> · Allison Harmon<sup>1</sup> · Cooper Little<sup>1</sup> · Grayson Domingue<sup>2</sup> · Kenneth Stewart<sup>3</sup> · Fernando Mier Giraud<sup>3,4</sup> · Rishi Thakral<sup>2</sup>

Received: 21 April 2023 / Accepted: 11 June 2023 / Published online: 18 July 2023  
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**Fig. 4** Prevalence of SHPT and vitamin D3 deficiency by surgery type. Graph showing prevalence of secondary hyperparathyroidism and vitamin D3 deficiency at multiple time points before and after bariatric surgery, stratified by surgical anatomy (Roux-en-Y gastric bypass versus vertical sleeve gastrectomy)



**Fig. 2** Change in mean PTH, calcium, and vitamin D3 over time. Graph showing change in mean serum laboratory values for parathyroid hormone, calcium, and vitamin D3 at multiple time points before and after bariatric surgery



## Long-term Changes in Bone Density and Bone Metabolism After Gastric Bypass Surgery

**METHODS**

Retrospective cohort in Brazil  
 Adults who underwent RYGB at least 2 years before

Outpatients from clinical visits with at least one DXA scan and complete follow-up exams

**N = 127 post-RYGB**

RYGB performed between March/2016 - Nov/2018  
 Median follow-up 5 years

**RESULTS**

51 ± 10.6 years  
 91.3% female  
 52.8% postmenopausal  
 87.4% self-declared White

**Low BMD prevalence**

After 2.5 years: 37.8% Low bone mass, 6.7% Osteoporosis  
 After 5 years: 44.4% Low bone mass, 11.1% Osteoporosis (p<.001)

**41.5% Hypovitaminosis D in the 2<sup>nd</sup> year**

**83.7% SHPT in the 6<sup>th</sup> year**

**CONCLUSIONS**

After 5 years, most post-RYGB patients presented calcium-vitamin D-PTH axis disruption

Older patients and menopausal women presented higher rates of low BMD in all DXA sites

Older age was a risk marker for low BMD in femoral neck (OR 1.185; 95% CI 1.118-1.256) and in total proximal femur (OR 1.158; 95% CI 1.066-1.258), after adjusting for follow-up and %EWL

Sperb LF, Leotti VB, Silveiro SP, de Azevedo MJ, Viano LV.

**OBESITY SURGERY**  
 The Journal of Metabolic Surgery and Allied Care

Determinato  
 malfunzionamento dell'asse  
 calcio-vitamina D-PTH

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Recommendations of metaanalyses

French recommendations on the prevention and treatment of osteoporosis secondary to bariatric surgery



Julien Paccou<sup>a,\*</sup>, Laurent Genser<sup>b</sup>, Éric Lespessailles<sup>c</sup>, Éric Bertin<sup>d</sup>, Rose-Marie Javier<sup>e</sup>, Martine Duclos<sup>f</sup>, Anne-Sophie Joly<sup>g</sup>, Yves Boirie<sup>h</sup>, François Pattou<sup>i</sup>, Jacques Delarue<sup>j</sup>, Bernard Cortet<sup>a</sup>

# Valutazione regolare

## Assessment of fracture risk in patients with an indication for or who have already undergone bariatric surgery

### General measures: For whom?



All patients

Normalise the intake of calcium (1000 mg/day after SG, and 1500 mg/day after RYGB) and protein (at least 60 g/day); attain a 25(OH) vitamin D concentration of at least 30 ng/mL; prevent the risk of falls and introduce a program of weight-bearing physical activity

### Who to assess?

- ✓ Regardless of age, in the case of RYGB and biliopancreatic diversion
- ✓ Regardless of age, for patients at high risk of fracture\*
- ✓ Menopausal women and men ≥ 50 years: for other bariatric surgery procedures and excluding patients at high risk of fracture\*

### How to assess?

- ✓ **Measurement of BMD by DXA**
- ✓ **Vertebral imaging (if necessary)**
- ✓ **Osteoporosis risk factors**

\*Patients at high risk of fracture are:

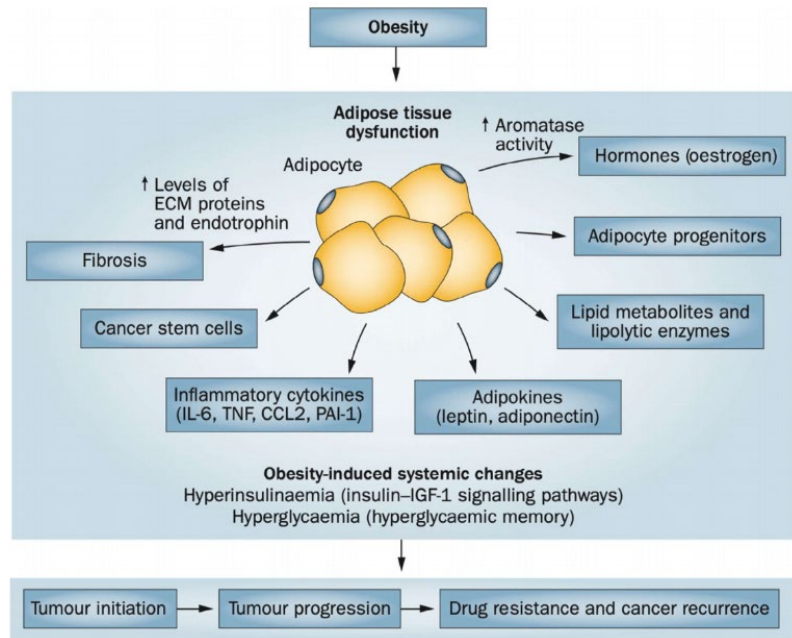
- Those with a history of fragility fracture after the age of 40;
- Those presenting comorbidities that are frequently associated with osteoporosis, i.e. certain endocrinopathies, neurological disorders with neurosensory impairment, hepatic cirrhosis, chronic obstructive pulmonary disease > stage 1, and chronic inflammatory diseases);
- Those taking medications that are frequently associated with osteoporosis (corticosteroids, LH-RH antagonists, antiretroviral drugs, aromatase inhibitors, prolonged chemotherapy).

### Who to treat?

Menopausal women and men ≥ 50 years:

- ✓ **If previous history of severe fractures**
- ✓ **If non-severe fracture and T-score ≤ -1**
- ✓ **If T-score ≤ -2 (in the absence of fractures)**

# Chirurgia Bariatrica e rischio di cancro



Gender-specific summary of cancer risk for each 5 kg per m<sup>2</sup> increase in BMI for major cancers with strong evidence of relationship with obesity.

Type of Cancer	Number of Cohorts	Relative Risk (95% Confidence Interval)	
		Women	Men
Endometrial cancer [4]	19	1.59 (1.50-1.68)	NA
Gallbladder cancer [4]	4	1.59 (1.02-2.47)	1.09 (0.99-1.21)
Esophageal adenocarcinoma [4]	5	1.51 (1.31-1.74)	1.52 (1.33-1.74)
Kidney cancer [4]	12	1.34 (1.25-1.43)	1.24 (1.15-1.34)
Postmenopausal breast cancer [4]	34	1.12 (1.08-1.16)	NA
Hpatocellular cancer [19]	9	1.12 (1.03-1.22)	1.19 (1.09-1.29)
Pancreatic adenocarcinoma [23]	23	1.10 (1.04-1.16)	1.13 (1.04-1.22)
Colon cancer [4]	29	1.09 (1.05-1.13)	1.24 (1.20-1.28)
Ovarian cancer [77]	34	1.06 (1.00-1.12)	NA
Stomach cancer [4]	8	1.04 (0.90-1.20)	0.97 (0.88-1.06)
Rectal cancer [4]	29	1.02 (1.00-1.05)	1.09 (1.06-1.12)
Later stage prostate cancer [73]	23	NA	1.08 (1.04-1.12)

NA = not available.

Wilson R, Aminian A, Tahrani AA. Metabolic surgery: A clinical update. Diabetes Obes Metab. 2021 Feb;23 Suppl 1:63-83

Pati S, Irfan W, Jameel A, Ahmed S, Shahid RK. Obesity and Cancer: A Current Overview of Epidemiology, Pathogenesis, Outcomes, and Management. Cancers (Basel). 2023 Jan 12;15(2):485



Association of Bariatric Surgery with Risk of Incident Obesity-Associated Malignancies: A Multi-Center Population-Based Study

METHODS	RESULTS	CONCLUSIONS
<ul style="list-style-type: none"> <li>Initially identified 60,285 patients in bariatric surgery group and 1,570,440 patients in nonsurgical group</li> <li>After propensity score matching, 55,789 patients were included in each patient group</li> </ul>	<ul style="list-style-type: none"> <li>Cumulative incidence of de novo obesity-associated cancers at 10 years was 4.0% in the bariatric surgery group and 8.9% in the nonsurgical control group.</li> <li>The bariatric surgery group had lower incidence proportions for de novo breast cancer, colon cancer, liver cancer, ovarian cancer, and endometrial cancer when compared to the nonsurgical control group.</li> </ul>	<ul style="list-style-type: none"> <li>Bariatric surgery is associated with a significantly lower cumulative incidence of de novo obesity-associated cancer compared to a nonsurgical matched control group.</li> <li>Incidence proportions of de novo breast, colon, liver, ovarian, and endometrial cancer were significantly lower in adult patients with obesity in the bariatric surgery group compared to the nonsurgical group.</li> </ul>



Chittajallu, Vibhu MD; Mansoor, Emad MD; Perez, Jaime PhD; Abu Omar, Yazan MD; Firkins, Stephen A. MD; Yoo, Heesoo MD; Baggott, Brian MD; Simons-Linares, Roberto MD



**COLORECTAL CANCER RISK IS IMPACTED BY SEX AND TYPE OF SURGERY AFTER BARIATRIC SURGERY**

**Source:** The MarketScan U.S. nationwide database

**Cohort:** 88,630 with RYGB or VSG (BRS) & 327,734 propensity-matched controls (Cntrl)

**Follow-up years:** 2012 - 2020

**Outcome:** CRC risk

**Effect of surgery type and sex on CRC risk vs. controls**

Reduced CRC risk, only statistically significant post-RYGB (p=0.02)

Higher CRC risk, close to statistically significant (p=0.06)

**Sex effect post-surgery**

Higher risk of CRC in males vs females, mainly rectosigmoid cancer (hazard ratio = 2.69, p<0.001)  
Improvement in diabetes is not conclusively associated with a lower CRC risk

**Conclusion:** Our data suggest an increased risk of CRC in males compared to females after bariatric surgery. Compared to controls, there was decrease in the CRC risk in females after RYGB but not conclusively post-VSG

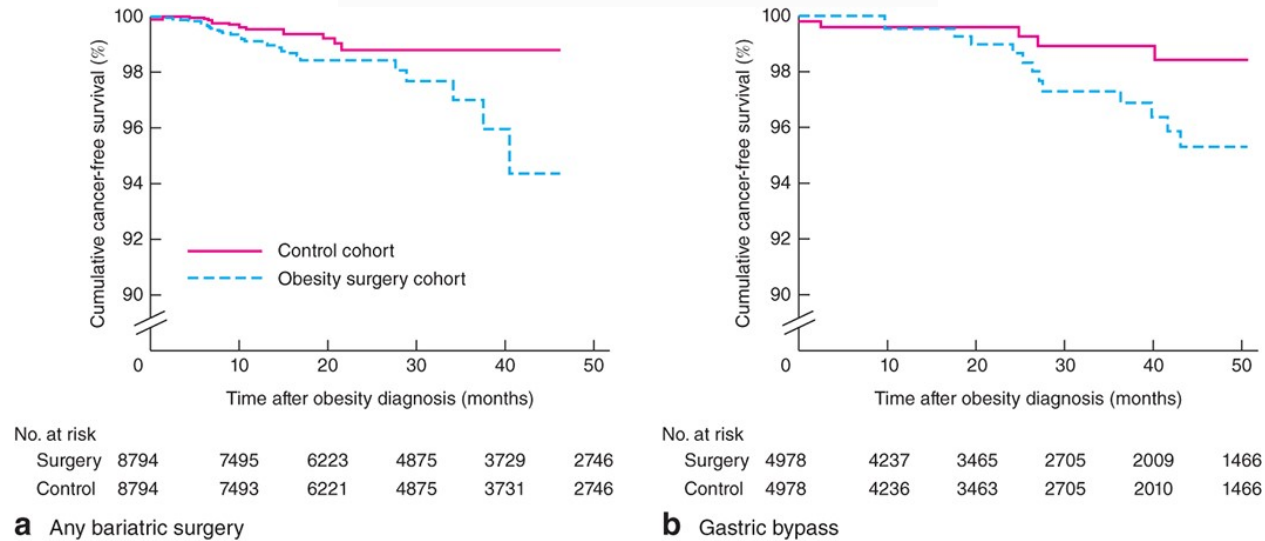
Hisham Hussain; Samuel Akinyeye; Maria Mihaylova; Eric McLaughlin; Chienwei Chiang; Steven K. Clinton; and David Lieberman

Aumento del rischio di CRC, soprattutto nei maschi rispetto alle femmine dopo chirurgia bariatrica

Rischio fortemente ridotto ma non scomparso

SCREENING  
Prevenzione/controllo

**Fig. 2** Kaplan–Meier curves of freedom from colorectal cancer following a any bariatric surgery and b gastric bypass ...

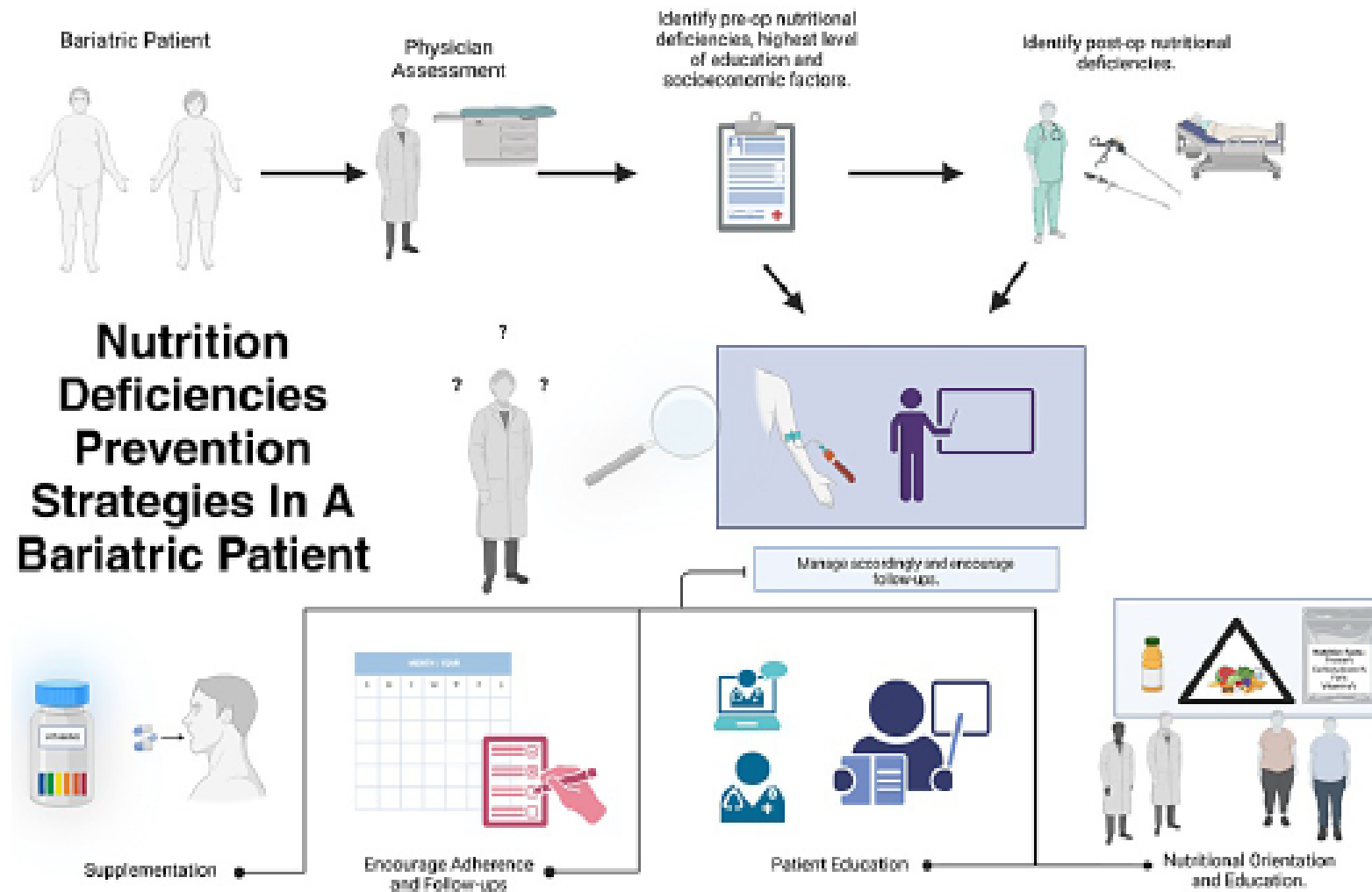


*Br J Surg*, Volume 105, Issue 12, November 2018, Pages 1650–1657, <https://doi.org/10.1002/bjs.10914>

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# CONCLUSIONI



Kamal F A, Fernet L Y, Rodriguez M, et al. (February 27, 2024) Nutritional Deficiencies Before and After Bariatric Surgery in Low- and High-Income Countries: Prevention and Treatment. Cureus 16(2)



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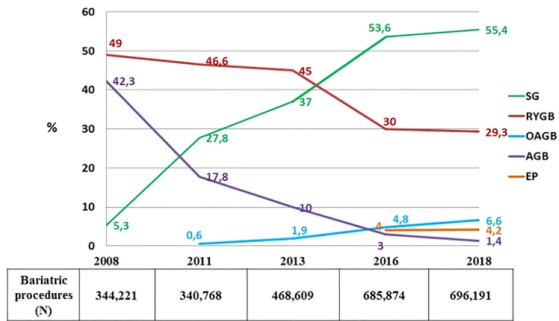
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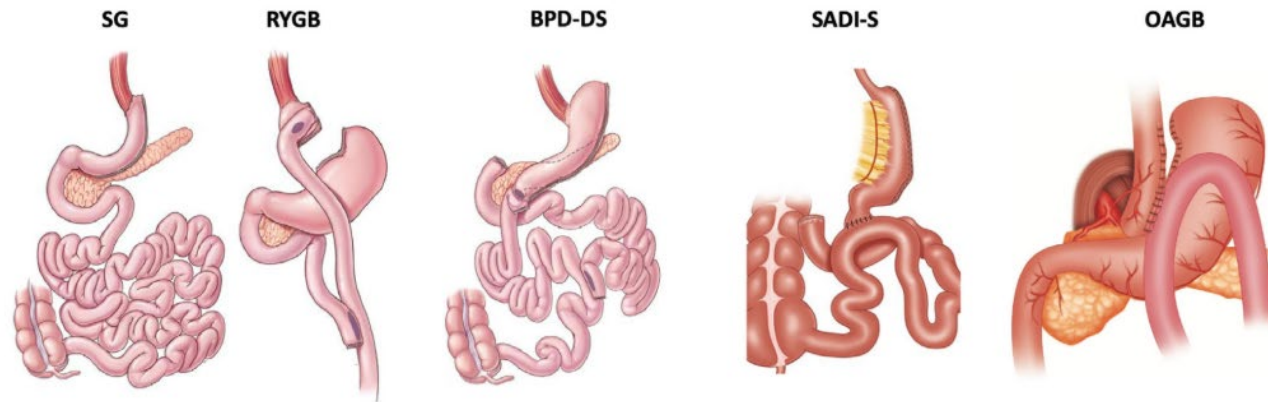
**Grazie**







**FIGURE 3** Number of metabolic surgeries performed from 2008 to 2018, and endoscopic procedures from 2016 to 2018. Adapted from Angrisani et al. ("Bariatric Surgery Survey 2018")<sup>155</sup>



**FIGURE 4** Anatomy of metabolic procedures more commonly performed globally.<sup>17,24,48</sup> BPD-DS, biliopancreatic diversion with duodenal switch; OAGB, one anastomosis gastric bypass; RYGB, Roux-en-Y gastric bypass; SADI-S, single anastomosis duodenoileostomy with sleeve gastrectomy; SG, sleeve gastrectomy