

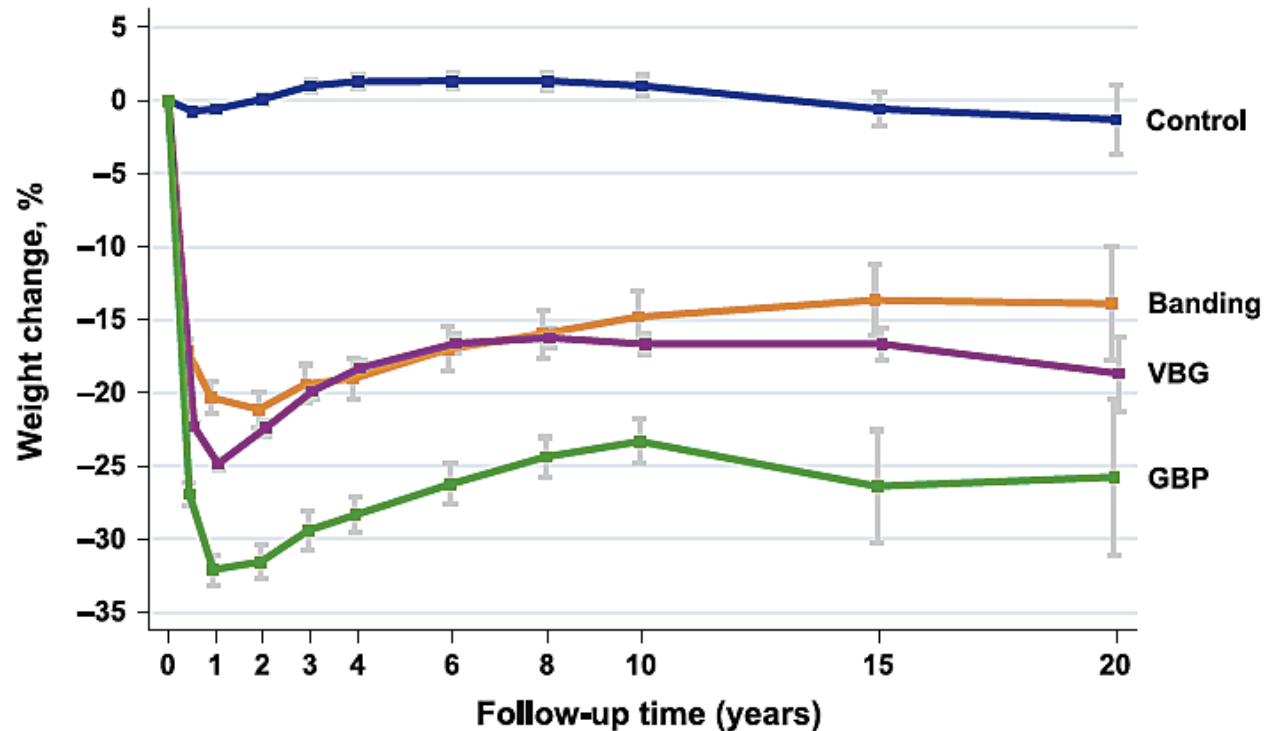
# **Suivi et complications non chirurgicales de la chirurgie bariatrique**

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*Brest, Interclan, 23 Juin 2014*

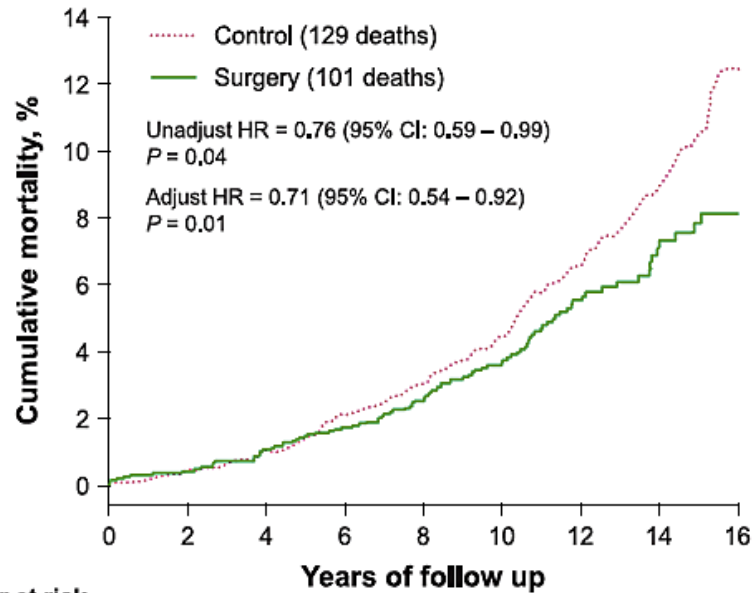
# **Les aspects positifs de la chirurgie bariatrique**

# Swedish Obese Subjects Study (SOS): Poids



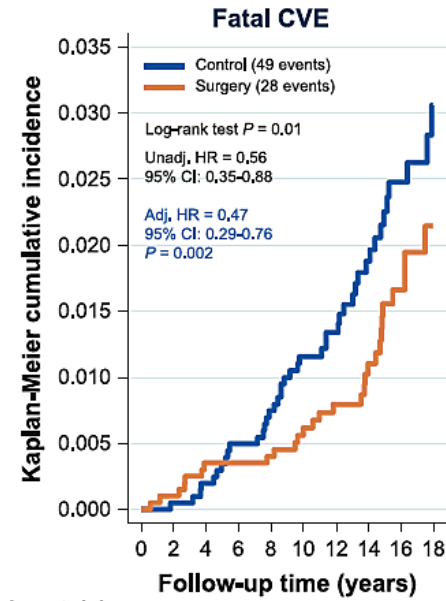
No. examined							
Control	2037	1490	1242	1267	556	176	
Banding	376	333	284	284	150	50	
VBG	1369	1086	987	1007	489	82	
GBP	265	209	184	180	37	13	

# SOS: Mortalité



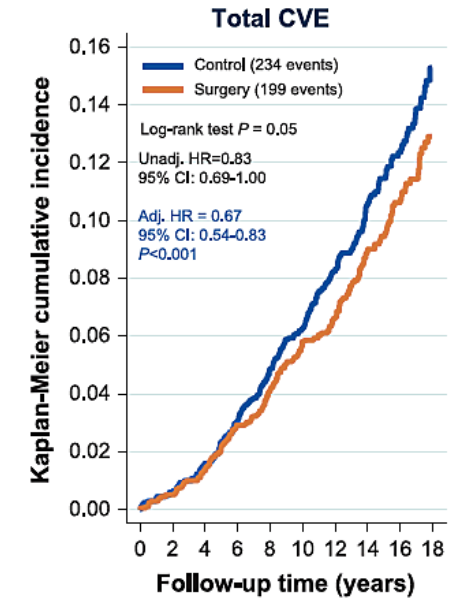
Number at risk

Surgery	2010	2001	1987	1821	1590	1260	760	422	169
Control	2037	2027	2016	1842	1455	1174	749	422	156



Number at risk:

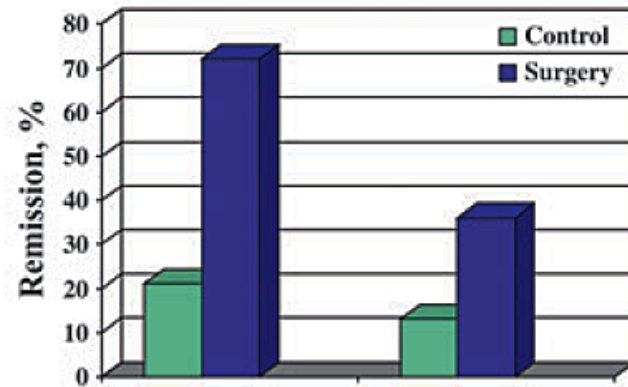
Control	2037	1993	1423	405
Surgery	2010	1970	1557	412



Control	2037	1945	1326	361
Surgery	2010	1921	1468	375

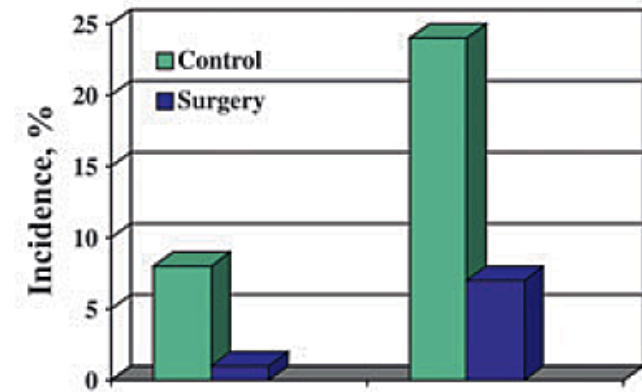
# SOS: Diabète

(a) SOS. Remission from diabetes over 2 and 10 years



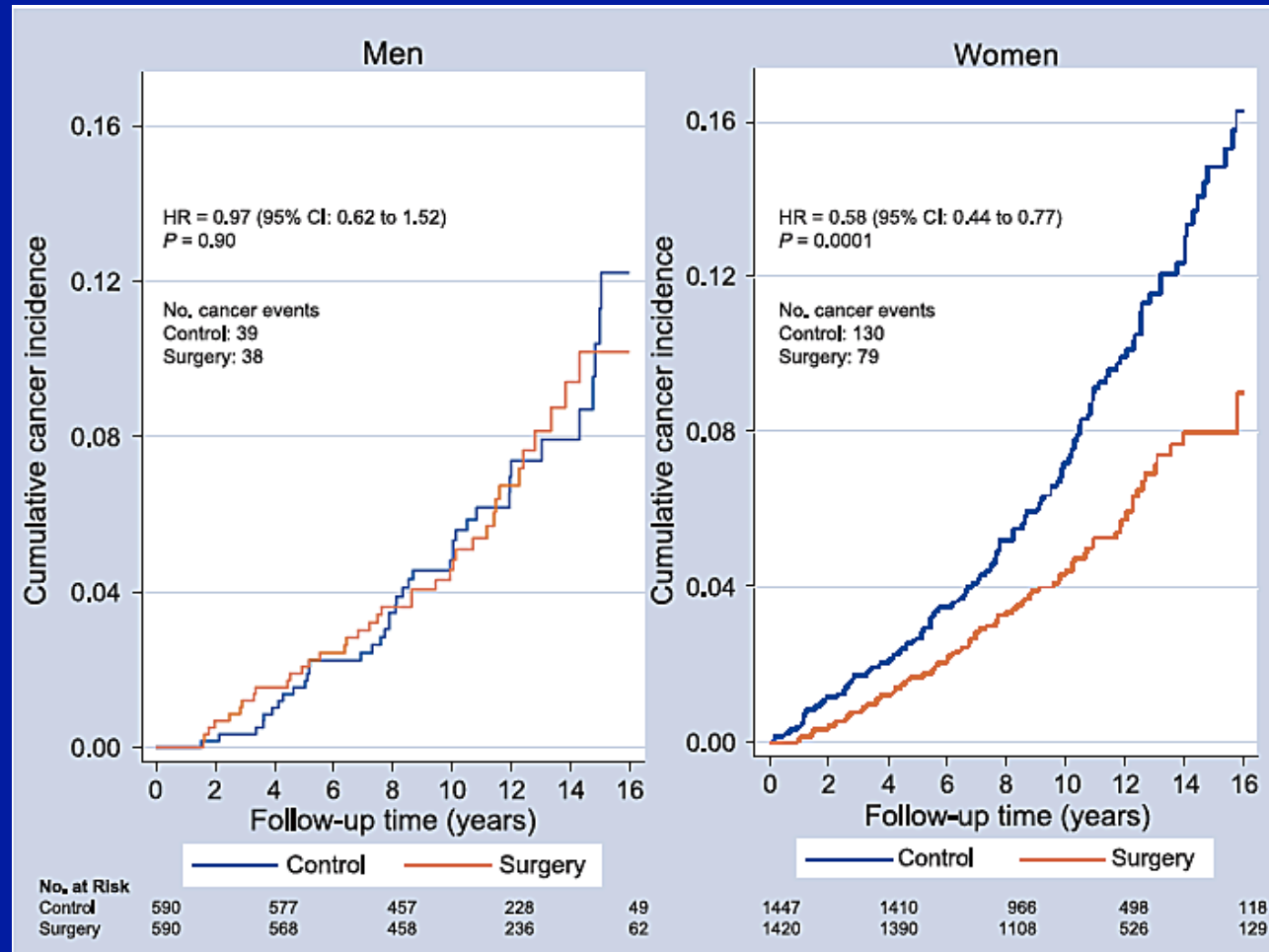
Number of subjects:	2 year	10 year
Control	248	84
Surgery	342	118
Adjusted Odds ratio	8.42	3.45
95% CI	5.68 - 12.5	1.64 - 7.28
P value	<0.001	<0.001

(b) SOS. Incidence of diabetes over 2 and 10 years

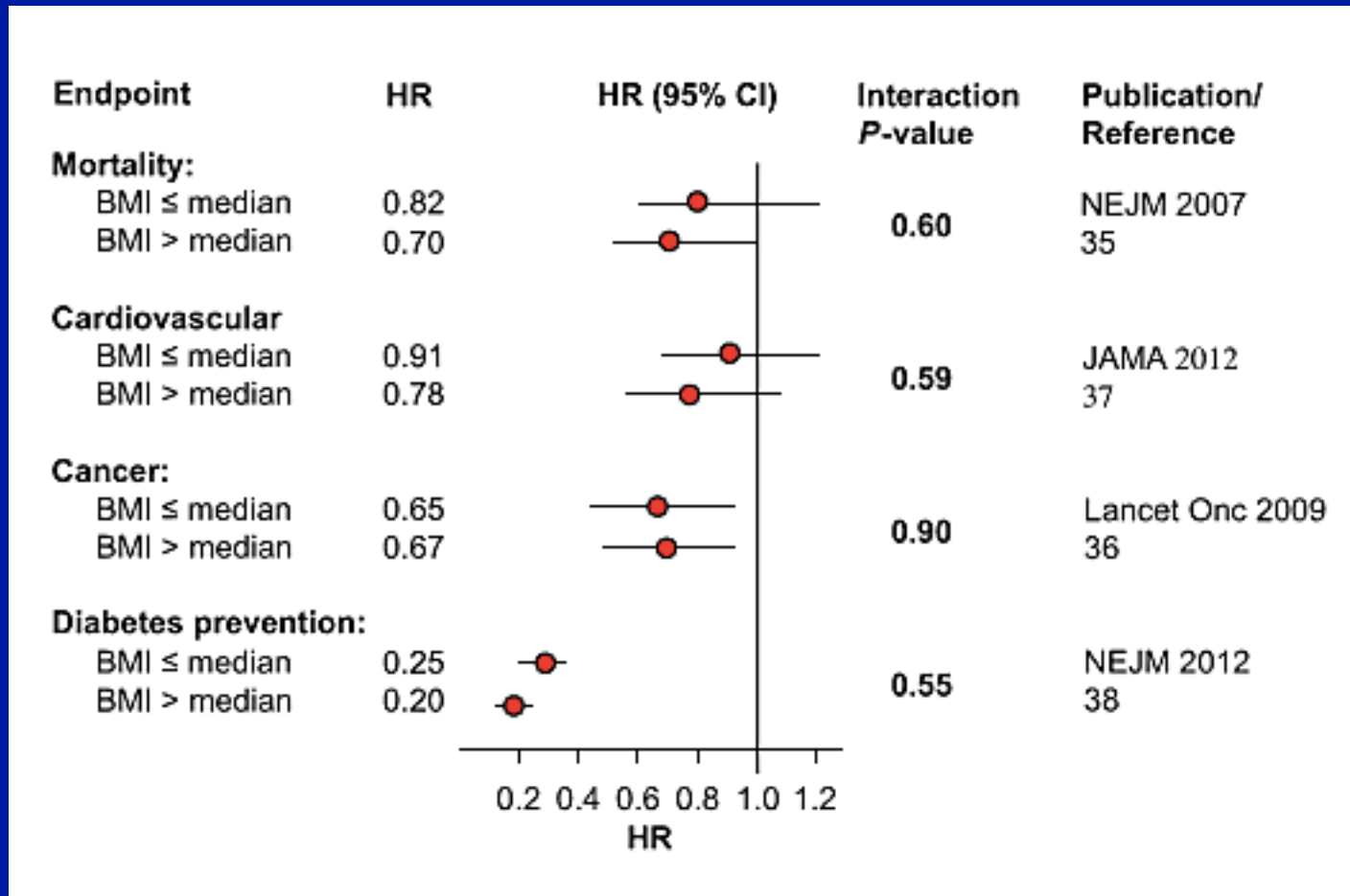


Number of subjects:	2 year	10 year
Control	1402	539
Surgery	1489	517
Adjusted Odds ratio	0.14	0.25
95% CI	0.08 - 0.24	0.17 - 0.38
P value	<0.001	<0.001

# SOS: Cancers

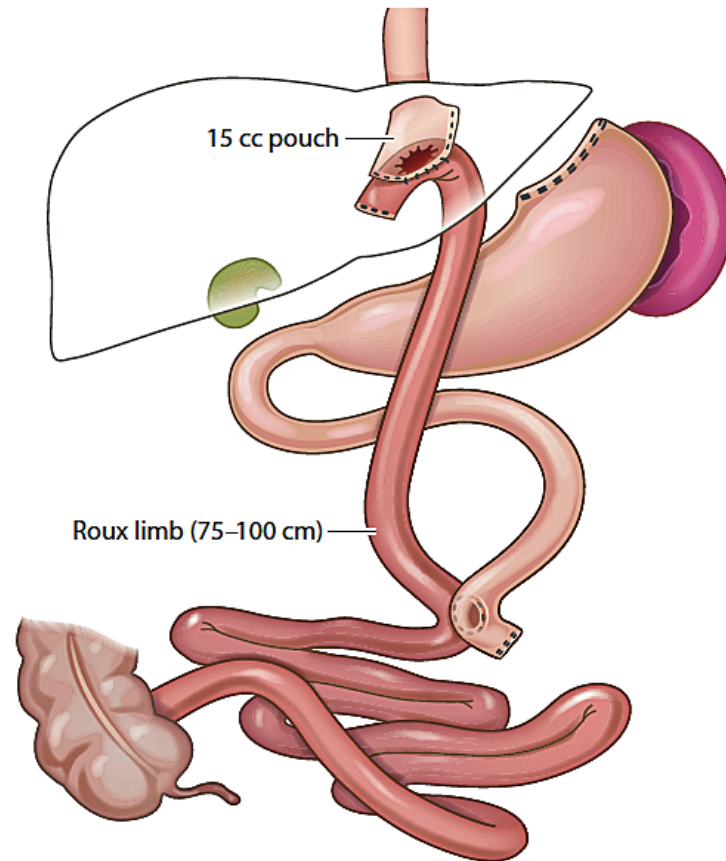


# SOS: Bilan

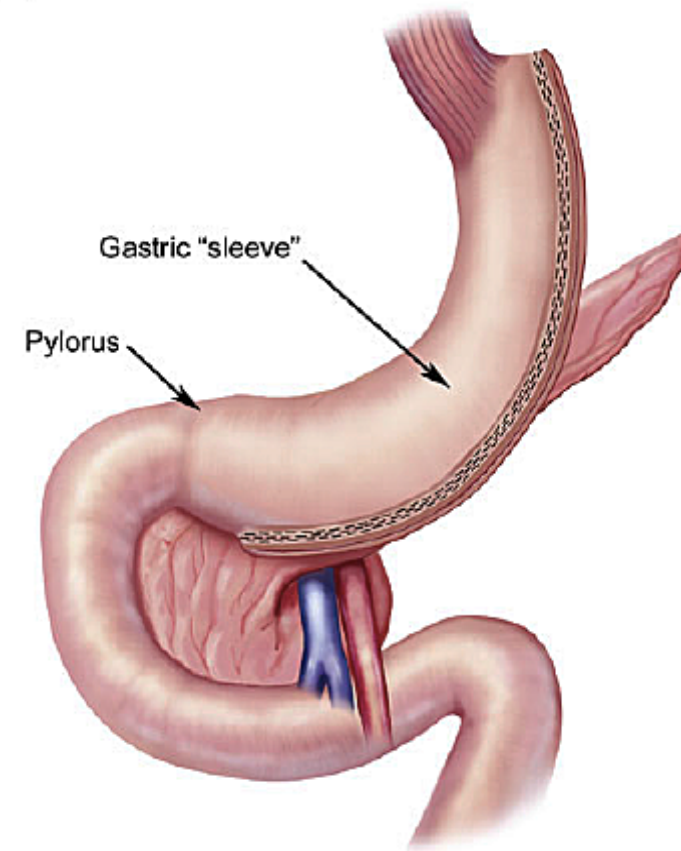


# Type d'interventions « modernes »

**a** Roux-en-Y gastric bypass

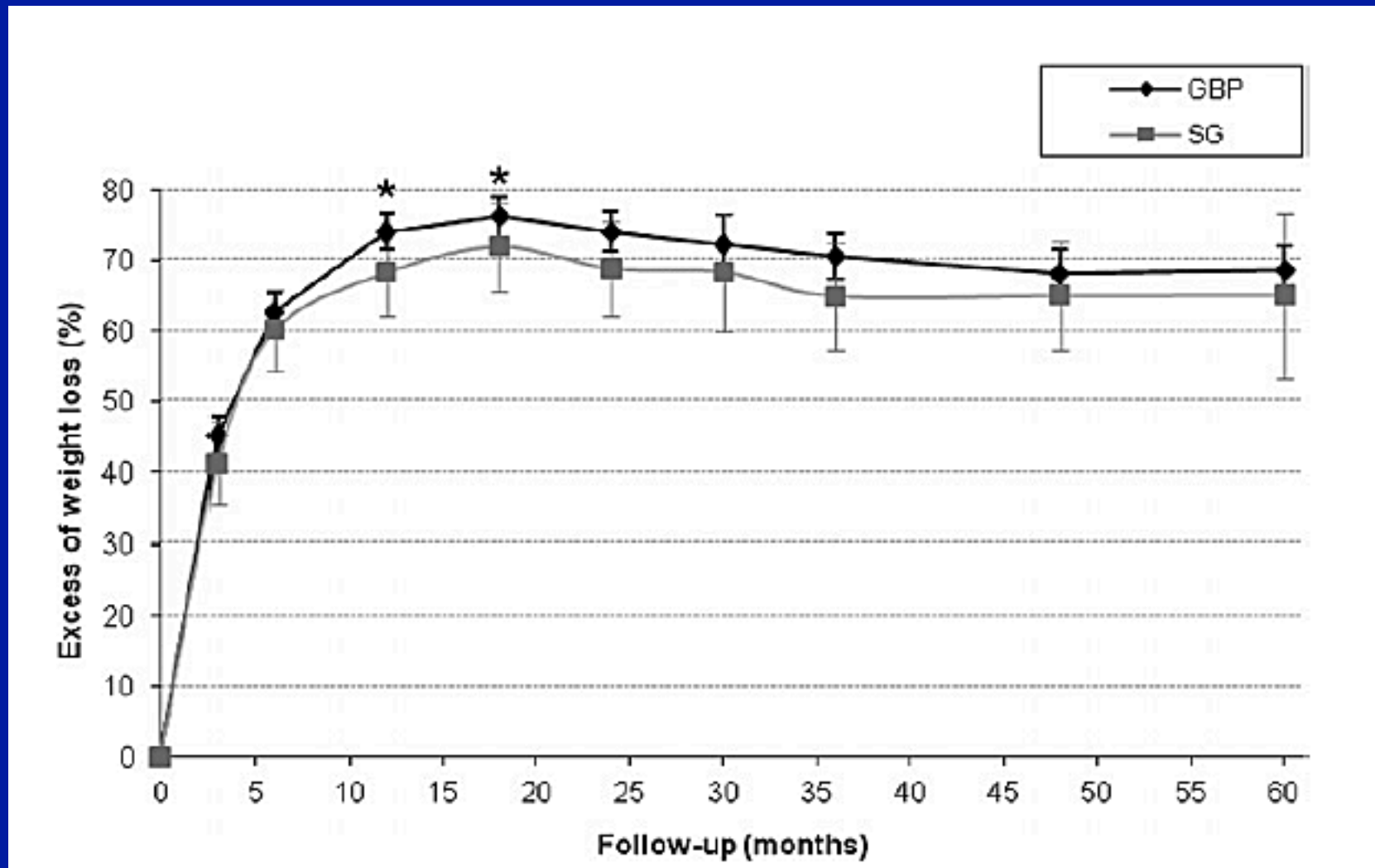


**b** Sleeve Gastrectomy



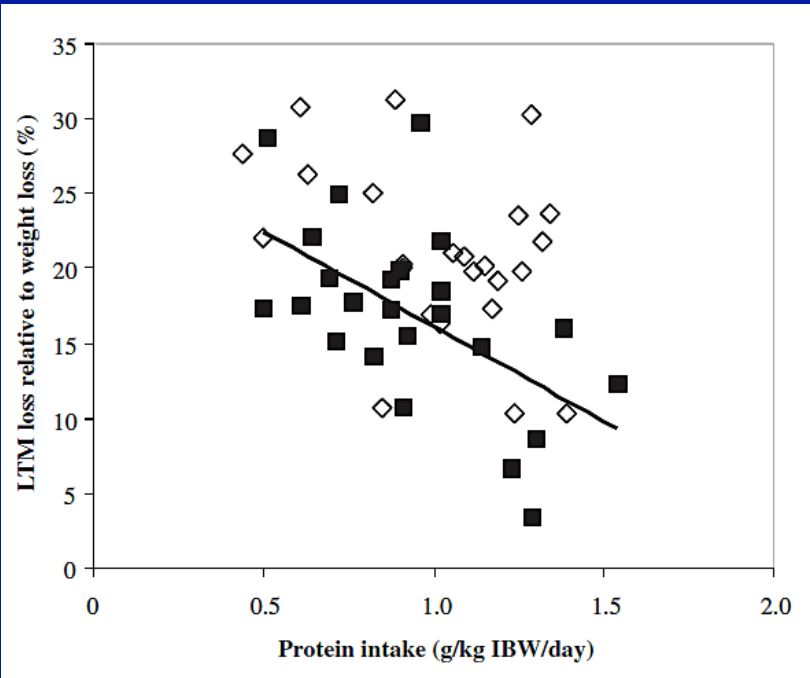


# Perte de l'excès de poids après SG vs. GBP



# **Les aspects négatifs de la chirurgie bariatrique**

# Apport protéique et masse maigre



Multilinear regression analysis of the determinants of lean tissue mass loss relative to weight loss (as a percent), at 4- and 12-months after surgery.

	OR	95% CI	p
<i>4 months after surgery</i>			
<b>Protein intake (g/kg IBW/d)</b>	<b>-0.376</b>	<b>(-20.071), (-2.113)</b>	<b>0.017</b>
Gender (Male = 1, Female = 2)	0.120	(-6.234), (11.163)	0.570
Age (years)	-0.071	(-1.245), (0.154)	0.645
Lean tissue mass at baseline (kg)	0.068	(-0.298), (0.405)	0.798
Type of surgery (GBP = 0, SG = 1)	0.197	(-1.823), (8.011)	0.211
<i>12 months after surgery</i>			
<b>Protein intake (g/kg IBW/d)</b>	<b>-0.468</b>	<b>(-16.764), (-4.753)</b>	<b>0.001</b>
Gender (Male = 1, Female = 2)	0.221	(-2.791), (9.953)	0.263
Age (years)	0.148	(-0.067), (0.217)	0.290
Lean tissue mass at baseline (kg)	0.215	(-0.124), (0.389)	0.303
Type of surgery (GBP = 0, SG = 1)	0.399	(1.538), (8.382)	0.006

L'étude conclut qu'un apport  $\geq 60$  g/j de protéines et  $\geq 1,1$  g/kg/j de protéines est associé à une moindre perte de masse maigre.

# Malabsorption après GBP

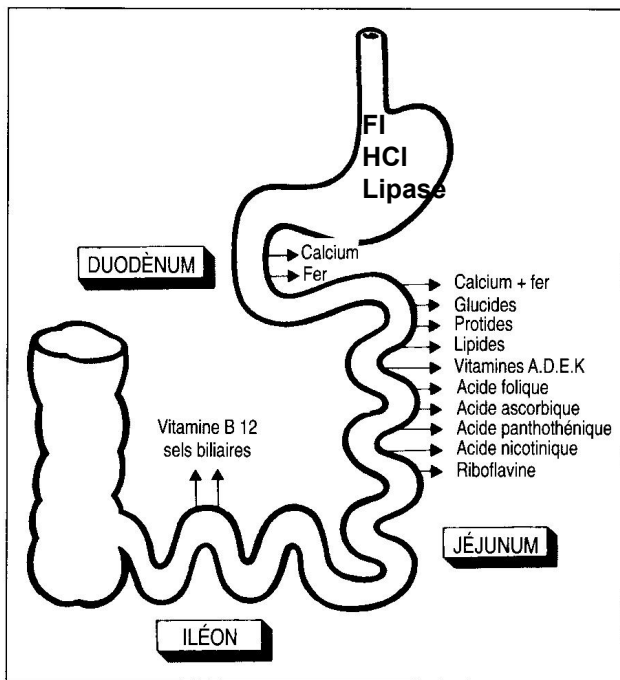


Fig. 33.5. Principaux sites d'absorption au niveau de l'intestin

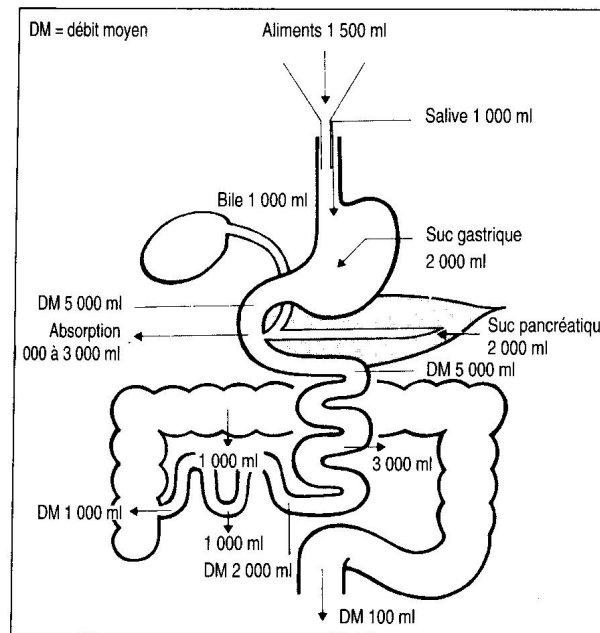
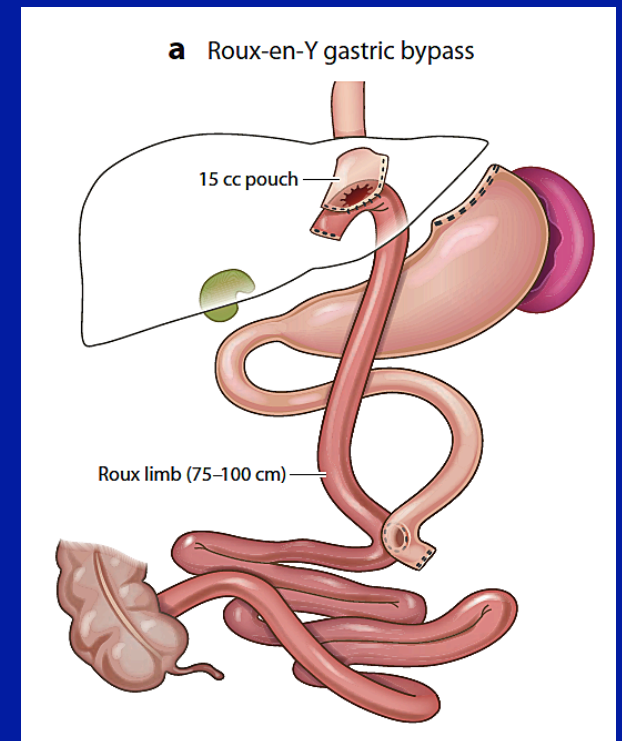
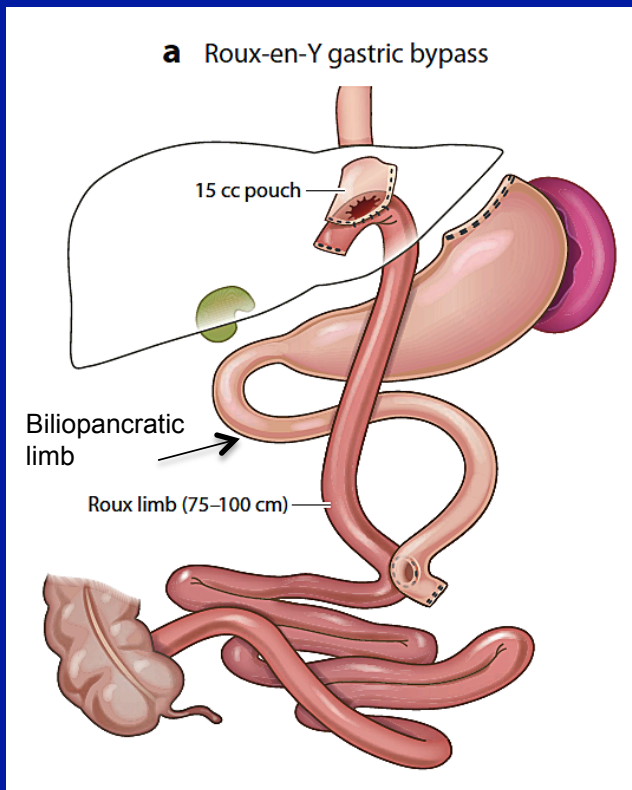


Fig. 33.4. Rôle du tube digestif dans l'absorption et la sécrétion des volumes liquidiens quotidiens (DM : débit moyen par jour).



# Mécanismes malabsorption après GBP



- Forte réduction ou absence des sécrétions gastriques
- Exclusion du duodénum et du jéjunum proximaux
- Asynergie entre le bol alimentaire et les sécrétions bilio-pancréatiques

## Allongement de l'anse bilio-pancréatique

- Raccourcissement de la voie commune
- Retard à la livraison des sécrétions digestives
- Destruction de la lipase pancréatique
- Pullulation microbienne avec malabsorption des graisses

# Malabsorption après GBP

**TABLE 1**

Characteristics of patients before and after Roux-en-Y gastric bypass (RYGB)<sup>1</sup>

Patient no.	Time of surgery			5 mo after RYGB				14 mo after RYGB									
	Age (y)/ sex/ethnicity	DM	Chole	BMI	Wt	BP limb length	DM	BMI	Wt	Wt loss	Wt loss	DM	BMI	Wt	5–14 mo Wt loss	0–14 mo Wt loss	0–14 mo Wt Loss
				kg/m <sup>2</sup>	kg	cm		kg/m <sup>2</sup>	kg	kg	%		kg/m <sup>2</sup>	kg	kg	kg	%
1	56/F/W	Yes <sup>2</sup>	No	55.1	119.1	40	Yes <sup>2</sup>	44.7	96.5	22.6	19.0	Yes <sup>2</sup>	40.3	87.0	9.5	32.1	27.0
2	57/F/B	Yes <sup>2</sup>	No	64.8	176.3	40	No	53.4	145.4	30.9	17.5	No	45.0	122.5	22.9	53.8	30.5
3	59/M/W	Yes <sup>2</sup>	No	58.4	185.0	40	No	42.3	134.0	51.0	27.6	No	30.6	97.0	37.0	88.0	47.6
4	60/F/B	No	Yes	57.8	153.6	40	No	46.8	124.4	29.2	19.0	No	39.4	104.8	19.6	48.8	31.8
5	38/F/B	No	No	68.0	174.1	40	No	50.9	130.3	43.8	25.2	No	41.2	105.5	24.8	68.6	39.4
6	39/F/W	No	Yes	57.6	141.9	50	No	43.9	108.2	33.7	23.7	No	31.5	77.7	30.5	64.2	45.2
7	47/F/W	Yes <sup>2</sup>	Yes	56.6	173.2	50	Yes	40.5	124.0	49.2	28.4	Yes	32.3	98.9	25.1	74.3	42.9
8	57/F/W	Yes <sup>2</sup>	Yes	48.8	129.7	70	No	40.4	107.3	22.4	17.3	No	36.5	96.9	10.4	32.8	25.3
9	45/M/W	Yes <sup>2</sup>	No	49.8	181.7	75	No	35.7	130.2	51.5	28.3	No	34.8	127.0	3.2	54.7	30.1
Mean	—	—	—	57.4	159.4	49	—	44.3	122.3	37.1	22.9	—	36.8	101.9	20.3	57.5	35.5
SEM	—	—	—	2.1	8.1	5	—	1.8	5.1	4.0	1.6	—	1.7	5.2	3.6	6.2	2.8

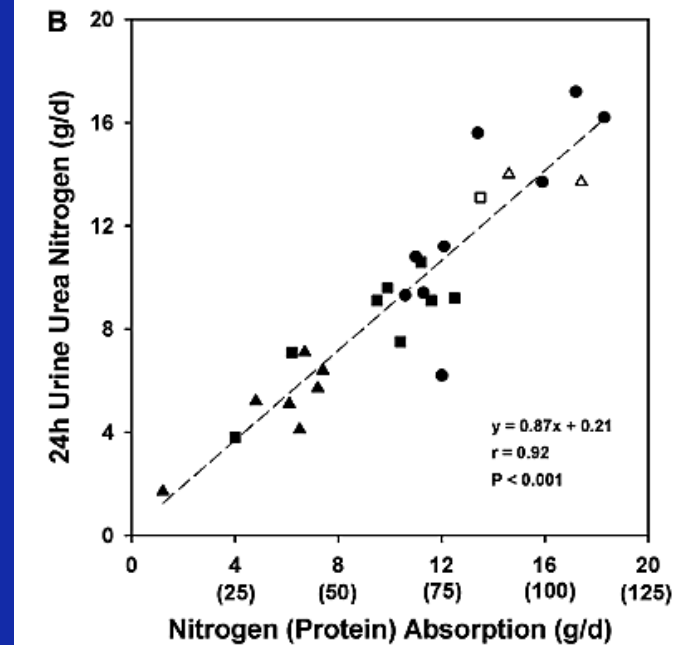
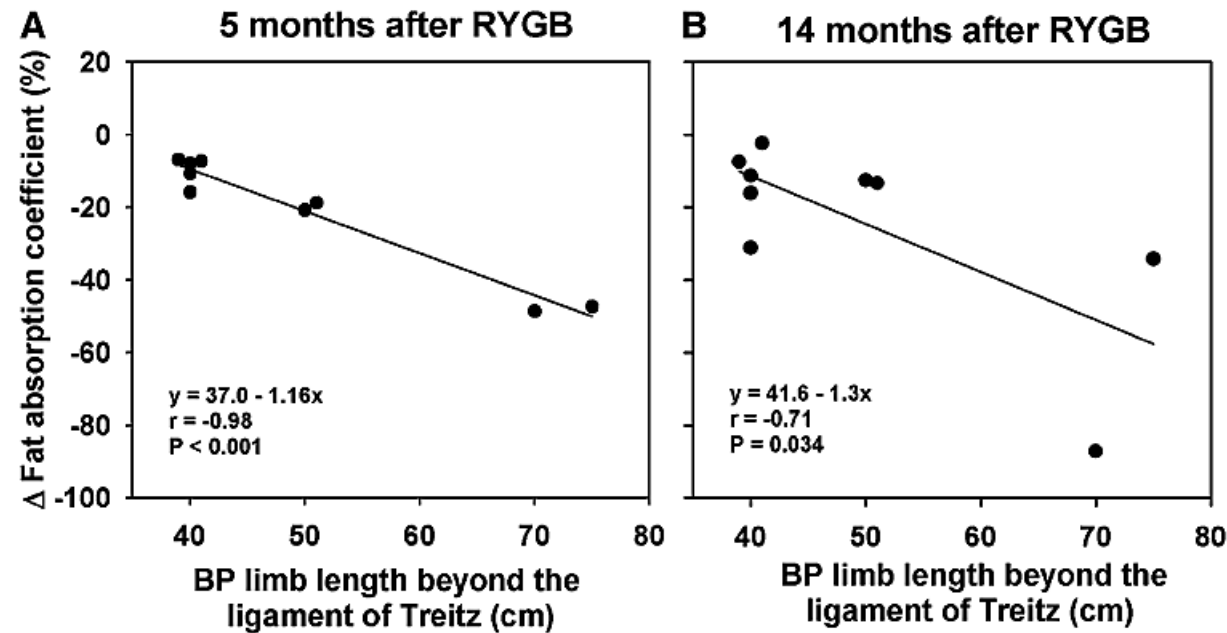
<sup>1</sup> DM, diabetes mellitus; Wt, weight; BP limb length, biliopancreatic limb length beyond the ligament of Treitz; Chole, cholecystectomy; W, white; B, black.

<sup>2</sup> Indicates patients receiving insulin. Four of 6 patients with DM had resolution of hyperglycemia at 5 and 14 mo after bypass.

# Malabsorption après GBP

	Fat Coeff absorb %	Protein Coeff absorb %	CHO Coeff absorb %	Energy Absorb nette Kcal/j	Stool Weight g/j	Stool water %	Number
<b>Before RYGB</b>	92.1 ± 1.3	81.7 ± 1.9	98.3 ± 0.2	3505 ± 217	286 ± 34	77.1 ± 1.3	2.0 ± 0.4
<b>After 5 mo</b>	71.9 ± 5.5	72.8 ± 6.5	97.7 ± 0.5	1318 ± 122	199 ± 38	75.6 ± 1.6	1.5 ± 0.3
<b>After 14 mo</b>	68.1 ± 8.7	78.1 ± 3.6	98.2 ± 0.3	1917 ± 156	232 ± 31	72.8 ± 0.7	1.9 ± 0.3
	<0.001	NS	NS	<0.001	NS	NS	NS

# Malabsorption après GBP





# Conclusion

En moyenne, un syndrome de malabsorption représentait 6% et 11% de la réduction totale de l'absorption d'énergie à 5 et 14 mois respectivement après GBP.

# Dumping syndrome

- Très fréquent (85%)
- Lié aux changements anatomiques
- Peut varier de modéré à sévère
- Vidange rapide des sucres raffinés ou d'autres glucides à indice glycémique élevé ou d'autres aliments concentrés à pouvoir osmotique élevé (produits laitiers; aliments frits)

# Deux types de dumping syndrome

- Précoce

- Délai: 30-60 minutes.
- Durée: jusqu'à 60 minutes.
- Symptômes liés à la charge osmotique:
  - transpiration, bouffées de chaleur, vertiges, tachycardie, palpitations, nausées, diarrhée, crampes, borborygmes.
  - causés par la libération d'hormones intestinales avec des effets vaso-actifs.

# Deux types de dumping syndrome

- Tardif

- Délai: 1-3 heures

- Symptômes d'hypoglycémie réactionnelle:

- Transpiration, tremblements, perte de concentration, faim, lipothymies, malaise, perte de connaissance

- Liés à l'hypersécrétion d'insuline en relation avec l'arrivée brutale de glucose.

# Prise en charge du dumping syndrome

- Précoce
  - Compliance à l'alimentation appropriée
- Tardif
  - Compliance à l'alimentation appropriée
  - Limiter les glucides simples, notamment les sodas
  - L'acarbose ou Somastostatine en cas d'échec
  - Éliminer les causes rares comme insulinome

# Fonction intestinale

- Diarrhée

- Fréquente après switch duodéal
- Moins commune après GBP
- Peu fréquente après Sleeve gastrectomy ou anneau
- Causée par les AG, les aliments non digérés et le sorbitol (présent naturellement dans les fruits)

# Prise en charge de la diarrhée

- **Diététique:**
  - Éviter l'excès de graisses
  - Identifier d'autres aliments déclencheurs
  - Dépister une intolérance au lactose: si avérée, éliminer complètement les produits laitiers
- **Médical:**
  - Imodium ou Arestal si caractère moteur (test au carmin)
  - Probiotiques ( $\pm$ )
  - Cholestyramine

# Fonction intestinale

- Constipation

Fréquente

- Causes:

- Hydratation insuffisante
- Consommation de fibres insuffisante
- Supplémentation de calcium et de fer

- Gestion:

- Hydrater et augmenter la consommation de fibres
- Eviter les facteurs aggravants



# Fonction intestinale après chirurgie bariatrique

Ne pas présumer que tous les problèmes intestinaux sont liés à la chirurgie bariatrique !

Les changements récents chez un patient auparavant stable doivent attirer l'attention.

# Dysphagie post-opératoire

Le plus souvent associée à des procédures de restriction

**Symptômes:** striction thoracique ou serrement dans la gorge

## Fonctionnelle

- Ingestion trop rapide
- Trop grandes quantités
- Mastication insuffisante
- Aliments trop durs
- Pains, riz et pâtes
- Steak trop cuit ou blanc de poulet trop sec

## Mécanique

- Sténose anastomotique

# Prise en charge de la dysphagie

- Améliorer la consistance des repas
- Dilatation endoscopique ....

# **Conséquences nutritionnelles**



nutrition AND bariatric surgery



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**Nutritional** deficiencies following **bariatric surgery**: what ... - Bloomberg - Cité 383 fois

**Bariatric surgery** for severely overweight adolescents: ... - Inge - Cité 457 fois

... risk factors 10 years after **bariatric surgery** - Sjöström - Cité 2623 fois

## **Nutrition for Weight Loss Surgery | Dietitian Advice & Weig...**

[www.nutritionforweightlossurgery.com/](http://www.nutritionforweightlossurgery.com/) ▾ Traduire cette page

**Nutrition** information and support for people considering, planning, or who have had **weight loss surgery**. Buy the full guide online!

## **Dietary Guidelines After Bariatric Surgery | Patient ...**

[www.ucsfhealth.org](http://www.ucsfhealth.org/patient-education) > Patient Education ▾ Traduire cette page

Dietary Guidelines After **Bariatric Surgery**. It is very ... Follow a diet low in **calories** , fats and sweets. ... Daily caloric intake should not exceed 1,000 **calories**.

## **Gastric bypass diet: What to eat after the surgery - Mayo Cli...**

[www.mayoclinic.org/.../bariatric-surgery/.../gastric-by...](http://www.mayoclinic.org/.../bariatric-surgery/.../gastric-by...) ▾ Traduire cette page

The gastric bypass diet is designed for people who are recovering from **gastric bypass surgery** to help them heal and change their eating habits. Your doctor or a ...

# Consommation d'alcool

*Obesity (Silver Spring)*. 2013 Dec;21(12):2444-51. doi: 10.1002/oby.20397. Epub 2013 May 31.

## **Alcohol consumption and alcohol problems after bariatric surgery in the Swedish obese subjects study.**

Svensson PA<sup>1</sup>, Anveden Å, Romeo S, Peltonen M, Ahlin S, Burza MA, Carlsson B, Jacobson P, Lindroos AK, Lönroth H, Maglio C, Näslund I, Sjöholm K, Wedel H, Söderpalm B, Sjöström L, Carlsson LM.

### ⊕ **Author information**

#### **Abstract**

**OBJECTIVE:** Increased sensitivity to alcohol after gastric bypass has been described. The aim of this study was to investigate whether bariatric surgery is associated with alcohol problems.

**DESIGN AND METHODS:** The prospective, controlled Swedish Obese Subjects (SOS) study enrolled 2,010 obese patients who underwent bariatric surgery (68% vertical banded gastroplasty (VBG), 19% banding, and 13% gastric bypass) and 2,037 matched controls. Patients were recruited between 1987 and 2001. Data on alcohol abuse diagnoses, self-reported alcohol consumption, and alcohol problems were obtained from the National Patient Register and questionnaires. Follow-up time was 8-22 years.

**RESULTS:** During follow-up, 93.1% of the surgery patients and 96.0% of the controls reported alcohol consumption classified as low risk by the World Health Organization (WHO). However, compared to controls, the gastric bypass group had increased risk of alcohol abuse diagnoses (adjusted hazard ratio [adjHR] = 4.97), alcohol consumption at least at the WHO medium risk level (adjHR = 2.69), and alcohol problems (adjHR = 5.91). VBG increased the risk of these conditions with adjHRs of 2.23, 1.52, and 2.30, respectively, while banding was not different from controls.

**CONCLUSIONS:** Alcohol consumption, alcohol problems, and alcohol abuse are increased after gastric bypass and VBG.

# Ethanolémie après GBP

Surg Obes Relat Dis. 2013 May-Jun;9(3):470-3. doi: 10.1016/j.soard.2013.02.002. Epub 2013 Feb 9.

**Blood alcohol concentrations rise rapidly and dramatically after Roux-en-Y gastric bypass.**

Steffen KJ<sup>1</sup>, Engel SG, Pollert GA, Li C, Mitchell JE.

J Am Coll Surg. 2011 Feb;212(2):209-14. doi: 10.1016/j.jamcollsurg.2010.09.020. Epub 2010 Dec 22.

**Impaired alcohol metabolism after gastric bypass surgery: a case-crossover trial.**

Woodard GA<sup>1</sup>, Downey J, Hernandez-Boussard T, Morton JM.

J Am Coll Surg. 2012 Oct;215(4):475-9. doi: 10.1016/j.jamcollsurg.2012.06.008. Epub 2012 Jul 6.

**Normal alcohol metabolism after gastric banding and sleeve gastrectomy: a case-cross-over trial.**

Changchien EM<sup>1</sup>, Woodard GA, Hernandez-Boussard T, Morton JM.

# Déficits liés à l'obésité

	Normal %	Overweight %	Obese %
<b>Premenopausal women</b>	<b>n = 1980</b>	<b>n = 1212</b>	<b>n = 1320</b>
<b>Vitamin E</b>	<b>16.93</b>	<b>21.41</b>	<b>25.82</b>
<b>Alpha-carotene</b>	<b>14.01</b>	<b>20.34</b>	<b>33.76</b>
<b>Beta-carotene</b>	<b>12.29</b>	<b>19.04</b>	<b>35.92</b>
<b>Beta-cryptoxanthin</b>	<b>13.98</b>	<b>20.15</b>	<b>34.66</b>
<b>Lutein/zeaxanthin</b>	<b>13.87</b>	<b>19.73</b>	<b>32.78</b>
<b>Lycopene</b>	<b>15.24</b>	<b>22.53</b>	<b>30.74</b>
<b>Total carotenoids</b>	<b>11.13</b>	<b>19.91</b>	<b>39.74</b>
<b>Vitamin C</b>	<b>20.04</b>	<b>22.74</b>	<b>35.02</b>
<b>Selenium</b>	<b>3.16</b>	<b>5.67</b>	<b>6.08</b>
<b>Vitamin A</b>	<b>1.42</b>	<b>1.08</b>	<b>1.67</b>
<b>Vitamin D</b>	<b>8.12</b>	<b>15.24</b>	<b>18.95</b>
<b>Folate</b>	<b>15.83</b>	<b>19.61</b>	<b>31.56</b>
<b>RBC folate</b>	<b>17.71</b>	<b>17.30</b>	<b>17.90</b>
<b>Vitamin B12</b>	<b>17.60</b>	<b>20.82</b>	<b>17.04</b>



# Déficits nutritionnels et obésité morbide

**Table 3. Percentage of patients with abnormal levels**

	<b>Preop</b>
Vitamin A	11%
Vitamin B <sub>12</sub>	13%
Vitamin D-25	40%
Zinc	30%
Iron	16%
Ferritin	9%
Selenium	58%
Folate	6%

**Table 4. Percentage of patients with deficiencies**

	<b>Preop</b>
Vitamin A	7%
Vitamin B <sub>12</sub>	5%
Vitamin D-25	40%
Zinc	28%
Iron	14%
Ferritin	6%
Selenium	58%
Folate	2%

# Conclusion

Les déficits en vitamines et oligo-éléments sont plus fréquents chez les obèses et en particulier chez les obèses morbides avant chirurgie bariatrique

Ils surviennent malgré des apports alimentaires excessifs ou élevés, traduisant des choix alimentaires particuliers et/ou une biodisponibilité altérée. La possibilité de séquestration des éléments liposolubles dans le TA n'est pas exclue

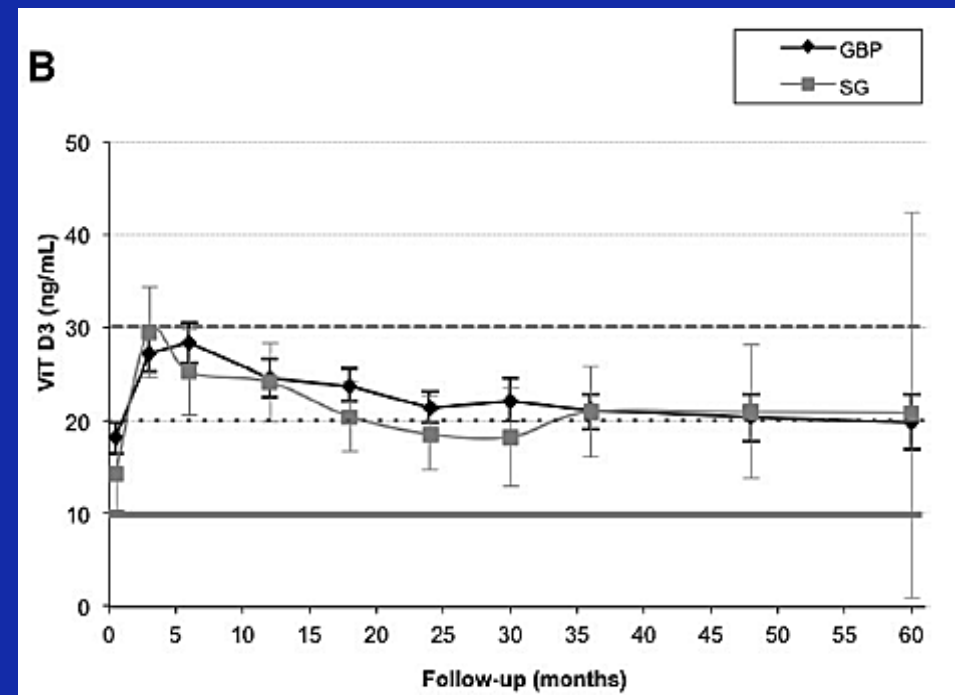
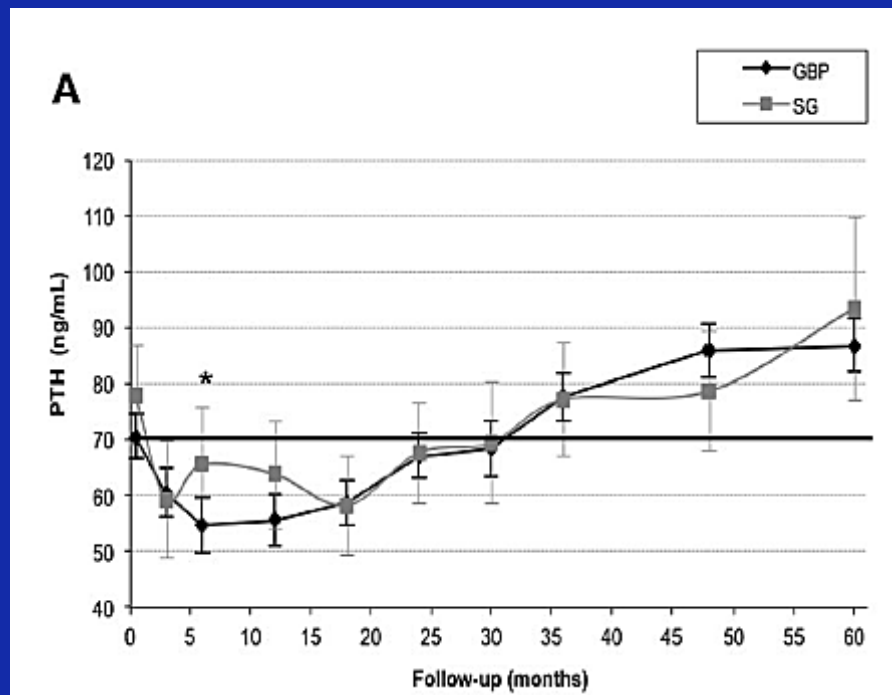
# Prévalence des déficits en micronutriments SG vs. GBP

**Table 4.** Percentage of patients with preoperative and postoperative deficiencies

	Reference range	Time <sup>a</sup>											
		Baseline		6 mo		12 mo		24 mo		48 mo		60 mo	
		SG <sup>b</sup>	GBP <sup>c</sup>	SG	GBP	SG	GBP	SG	GBP	SG	GBP	SG	GBP
Total protein	63-80 g/L	5.4	1.3	0	0	3.4	1.9	0	0	4.5	2.8	0	0
Albumin	34-48 g/L	5.4*	0.5	4.3	2.2	0	0	0	0	4.8	0	0	1
Prealbumin	0.200-0.400 g/L	11.8	6	8.7	31.3	14.3	15.8	3.1	5.7	0	3.8	0	3.9
Hemoglobin	137 men/122 women g/L	10*	22	12.1	20.8	11.5	19.9	11.5	17.7	15.8	17.2	14.3	25.5
Ferritin	15-200 ng/mL	8.3	18.6	0	19	6.5	19.8	20.6	30.1	23.8	29.5	0	28.7
Transferrin	2.5-3.8 g/L	2.8	2	0	9	7.1	5.8	9.4	6.8	0	0.9	0	0
Iron	50-170 µg/dL	30.8	26.5	4.3	18.2	10.3	15.9	9.4	10.6	9.5	12.5	12.5	15.5
Intraerythrocyte folic acid	250-1,050 ng/mL	0	1.8	13.6*	0.9	20.7	2.6	6.1	7.5	0	4.9	12.5	7.9
Zinc	59-110 µg/dL	8.1	11.5	31.8	25.2	39.3	27.5	25	25.8	47.6	26.7	12.5	25.7
Calcium	8.5-10.5 mg/dL	2.9	9.6	0	3.1	3.6	3.5	3.1	5.5	4.8	1.9	12.5	2.9
Magnesium	1.8-2.6 mg/dL	37.8	29.4	12.5	19.4	10.3	14.1	6.3	7.6	4.8	5.7	12.5	5.8
Thiamin	35-91 ng/mL	0	5.5	4.8	8.4	9.1	6.1	25.0*	1.8	0	5.3	0	5.9
Vitamin B-6	15-96 nmol/L	75*	11.3	26.3*	6	11.1	2.8	0	3.9	16.7	8.3	0	4.2
Vitamin B-12	250-1,050 pg/mL	2.7	1.8	3.7	2.9	3.2	6.2	5.9	5.5	0	5.8	12.5	5
<b>Vitamin D</b>													
Sufficiency	>30 ng/mL	6.7*	9.1	22.7	40.2	22.2	26.7	13.3	12.9	33.3	18.7	0	14.3
Insufficiency	>10 to <30 ng/mL	3.3*	30.3	54.5	38.1	40.7	40.8	20	35.6	22.2	30.7	100	38.8
Deficiency	<10 ng/mL	90*	60.6	22.7	21.6	37	32.5	66.7	51.5	44.4	50.7	0	46.9
<b>Parathyroid hormone</b>	10-65 pg/mL	62.5*	44.1	40.9*	11.7	37	16.7	40.6	40.4	57.1	53.8	87.5	56.9

# Prévalence du déficit en vit D

## SG vs. GBP



# Prévalence des déficits en micronutriments SG vs. GBP

1. Surg Obes Relat Dis. 2014 Mar-Apr;10(2):262-8. doi: 10.1016/j.soard.2013.07.014. Epub 2013 Aug 12.

Cross-sectional long-term micronutrient deficiencies after sleeve gastrectomy versus Roux-en-Y gastric bypass: a pilot study.

Alexandrou A(1), Armeni E(2), Kouskouni E(3), Tsoka E(2), Diamantis T(1), Lambrinoudaki I(4).

**RESULTS:** Both types of surgery were associated with significant nutritional deficiencies. Vitamin B12 deficiency was significantly higher in patients with RYGB compared with SG (42.1% versus 5%,  $P = .003$ ). The type of surgery was associated neither with anemia nor with iron or folate deficiency (SG versus RYGB: anemia, 54.2% versus 64.3%,  $P = .418$ ; folate deficiency, 20% versus 18.4%,  $P = .884$ ; iron deficiency, 30% versus 36.4%,  $P = .635$ ).

# Symptômes liés aux déficits

Prot	Ca	Fer	Zinc	Vit A	Vit E	Vit K	Vit B1	Vit B12
perte de cheveux, fatigue, OMI	douleur osseuse	fatigue	ongles cassants	vision nocturne diminuée	mauvaise cicatrisation	ecchymoses	paresthésies	fatigue

# La supplémentation standard en vitamines et OE est-elle suffisante après GBP ?

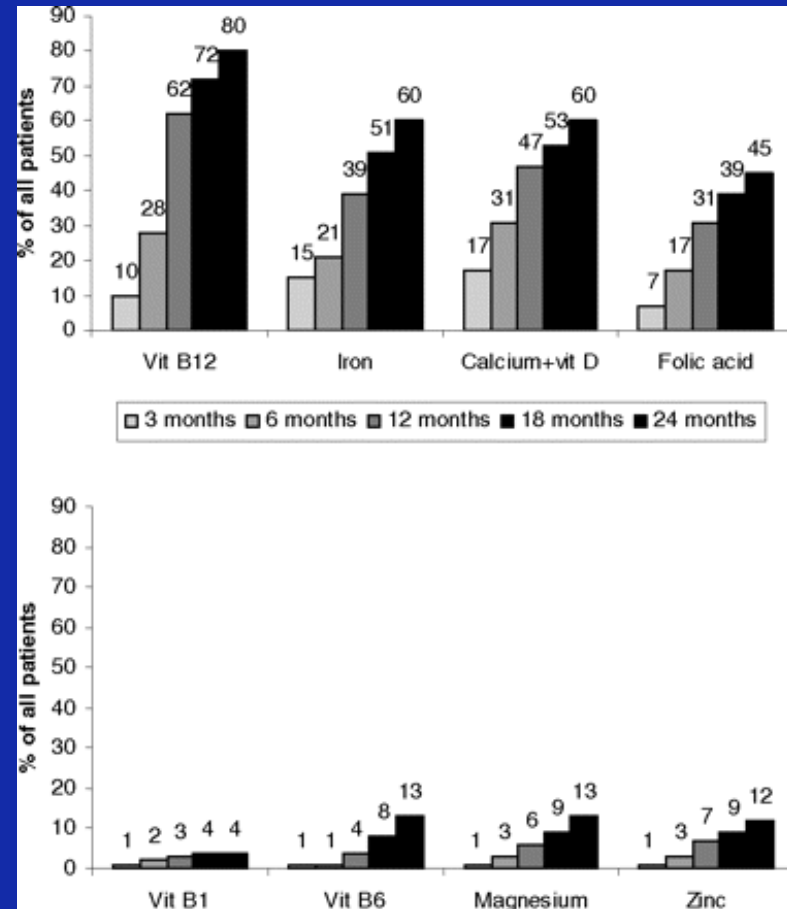
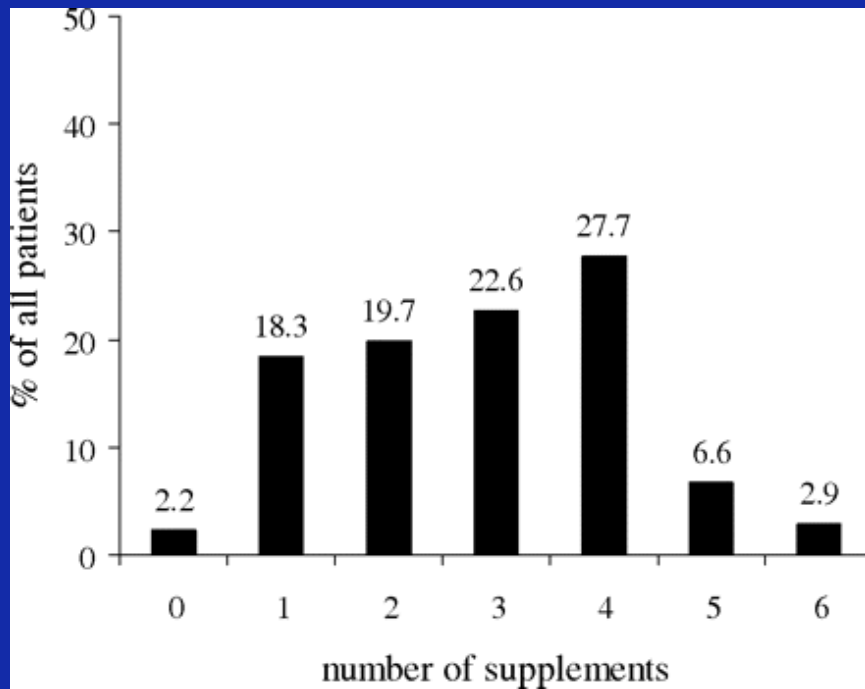
**Table 3. Percentage of patients with abnormal levels**

	Preop	3 mon	6 mon	12 mon
Vitamin A	11%	26%	28%	17%
Vitamin B <sub>12</sub>	13%	7%	3%	3%
Vitamin D-25	40%	12%	18%	21%
Zinc	30%	28%	23%	36%
Iron	16%	18%	10%	6%
Ferritin	9%	16%	23%	3%
Selenium	58%	43%	19%	3%
Folate	6%	29%	15%	11%

**Table 4. Percentage of patients with deficiencies**

	Preop	3 mon	6 mon	12 mon
Vitamin A	7%	26%	28%	17%
Vitamin B <sub>12</sub>	5%	2%	0%	0%
Vitamin D-25	40%	21%	13%	19%
Zinc	28%	23%	23%	36%
Iron	14%	15%	10%	6%
Ferritin	6%	13%	20%	16%
Selenium	58%	43%	19%	3%
Folate	2%	5%	3%	8%

# La supplémentation standard en vitamines et OE est-elle suffisante ?





# Conclusion

Chez les patients avec GBP, clairement la supplémentation polyvitaminique et en OE "standard" n'est pas suffisante, en particulier pour la B12, la vitamine E, le fer.

Reste le problème de l'hyperparathyroïdie secondaire au déficit en 25 OH D3 alors que la 1,25 OH D3 est normale.



# Proposition de supplémentation

**TABLE 3.** Diagnosis and treatment of nutritional deficiencies

Deficiency	Symptoms and signs	Confirmation	Treatment first phase	Treatment second phase
Protein malnutrition	Weakness, decreased muscle mass, brittle hair, generalized edema	Serum albumin and prealbumin levels, serum creatinine	Protein supplements	Enteral or parenteral nutrition; reversal of surgical procedure
Calcium/vitamin D	Hypocalcemia, tetany, tingling, cramping, metabolic bone disease	Total and ionized calcium levels, intact PTH, 25-D, urinary N-telopeptide, bone densitometry	Calcium citrate, 1,200–2,000 mg, oral vitamin D, 50,000 IU/d	Calcitriol oral vitamin D 1,000 IU/d
Vitamin B12	Pernicious anemia, tingling in fingers and toes, depression, dementia	Blood cell count, vitamin B12 levels	Oral crystalline B12, 350 µg/d	1,000 –2,000 µg/2–3 months im
Folic acid	Macrocytic anemia, palpitations, fatigue, neural tube defects	Cell blood count, folic acid levels, homocysteine	Oral folate, 400 mg/d (included in multivitamin)	Oral folate, 1,000 µg/d
Iron	Decreased work ability, palpitations, fatigue, koilonychia, pica, brittle hair, anemia	Blood cell count, serum iron, iron binding capacity, ferritin	Ferrous sulfate 300 mg 2–3 times/d, taken with vitamin C	Parenteral iron administration
Vitamin A	Xerophthalmia, loss of nocturnal vision, decreased immunity	Vitamin A levels	Oral vitamin A, 5,000–10,000 IU/d	Oral vitamin A, 50,000 IU/d

# Exercise

- IMPERATIF
- La perte de poids ne se fera pas sans elle
- 30 minutes par jour, ou bien 3 X 1 h/semaine
- Assez intense pour entraîner des sueurs

# Quelles recommandations ?

Indications doivent être portées selon les recommandations HAS

RCP obligatoire

Partenariat multi-disciplinaire spécialisé

Suivi à vie; ne pas oublier le suivi psychologique

Attention aux apports protéiques notamment dans les premiers mois

Dosages vitamines et micronutriments tous les 6 mois

Supplémentation systématique ajustée selon résultats biologiques

Attention à l'alcool !