
بسم الله الرحمن الرحیم

ملاحظات تغذیه ای در بیماران تحت جراحی باریاتریک (۱)

ارائه دهنده:

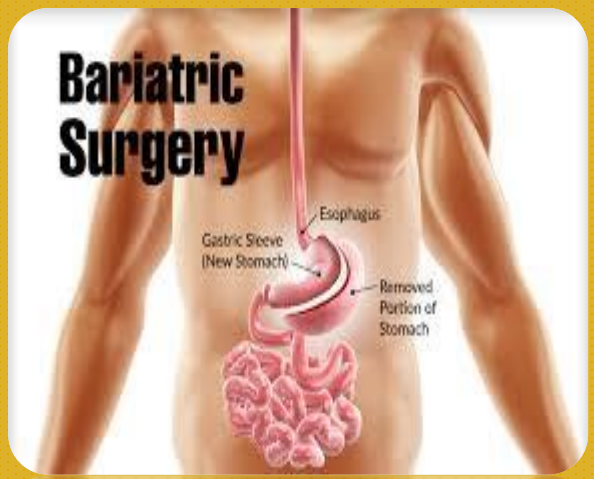
دکتر زینب مختاری

(دکترای تخصصی علوم تغذیه ، استادیار دانشگاه علوم پزشکی اصفهان)

تاریخ برگزاری : شهریور ۱۴۰۱

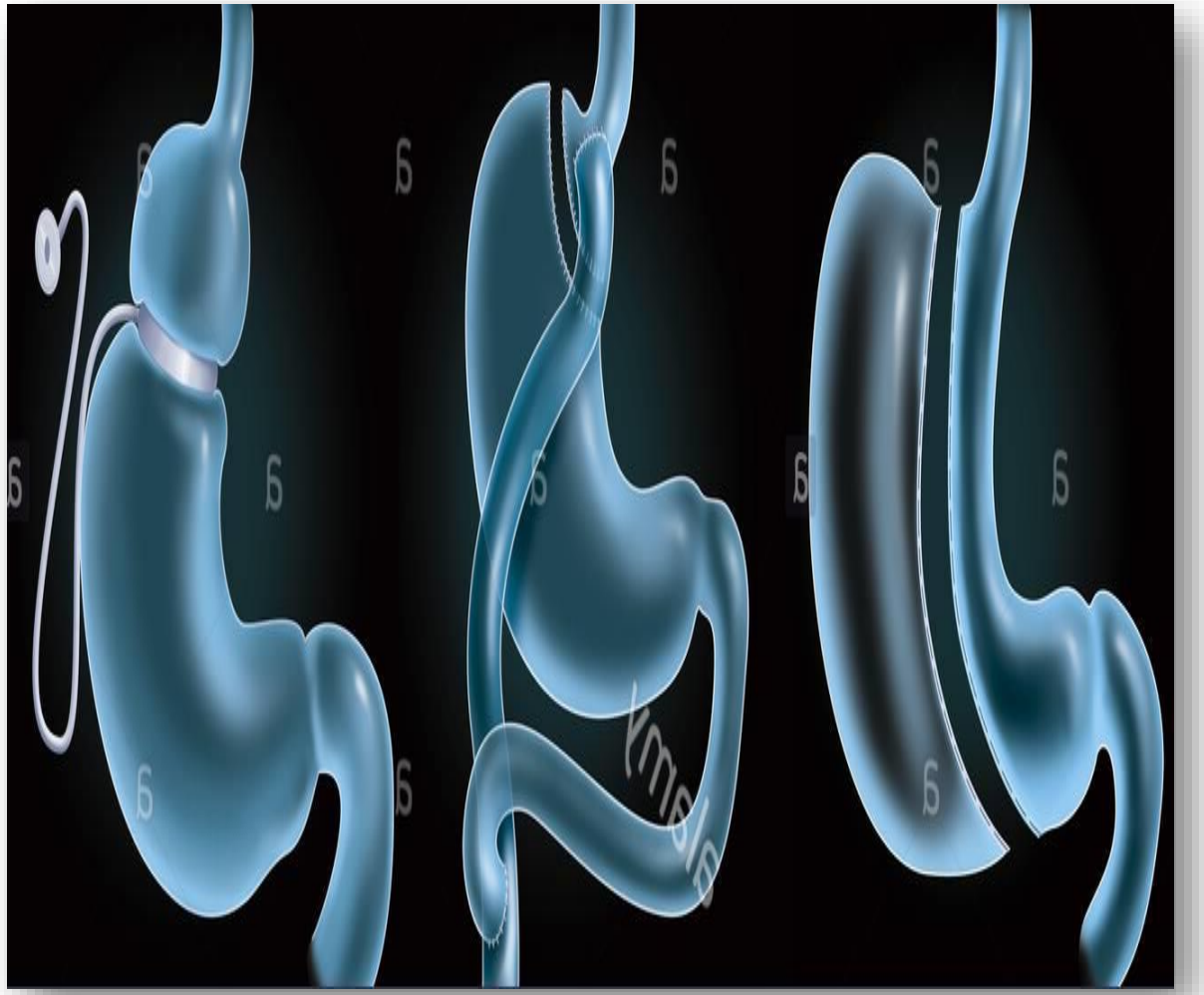
Preoperative Care of the Bariatric Patient

Preoperative Nutritional assessment



جراحی باریاتریک و پیامدهای آن

جراحی باریاتریک (Bariatric)



- ریشه یونانی ، "bar" به معنای "وزن" و "iatrics"به معنای "درمان" و یا "شفا"
- به عنوان یک گزینه درمانی برای دستیابی به **کاهش وزن قابل توجه** و **ماندگار**

American Society for Metabolic and Bariatric Surgery (ASMB)

SURGICAL PROCEDURE

Roux-en-Y Gastric Bypass

Gastric Banding

Sleeve Gastrectomy

Biliopancreatic Diversion with Duodenal Switch

NON-SURGICAL PROCEDURE

ReShape Balloon

Ellipse Balloon

Spatz Balloon

Obalon Balloon

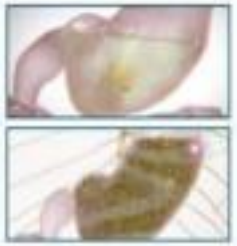
Orbera Balloon

POSE Procedure

Gastroplasty Apollo Device

Aspire Assist

Transpyloric Shuttle



Gelesis 100

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- RYGB
- One-anastomosis gastric bypass

- Biliopancreatic Diversion
- Biliopancreatic Diversion with Duodenal Switch

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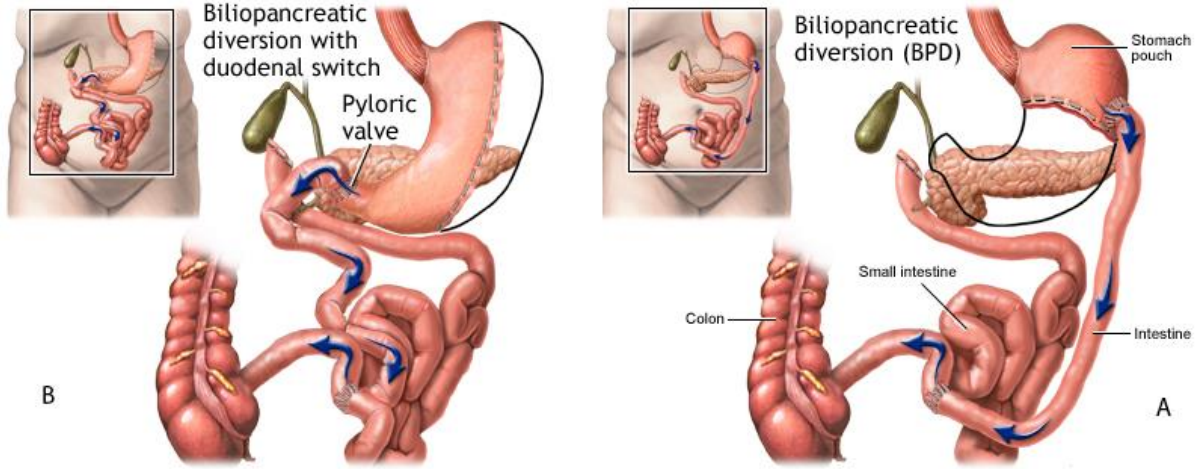
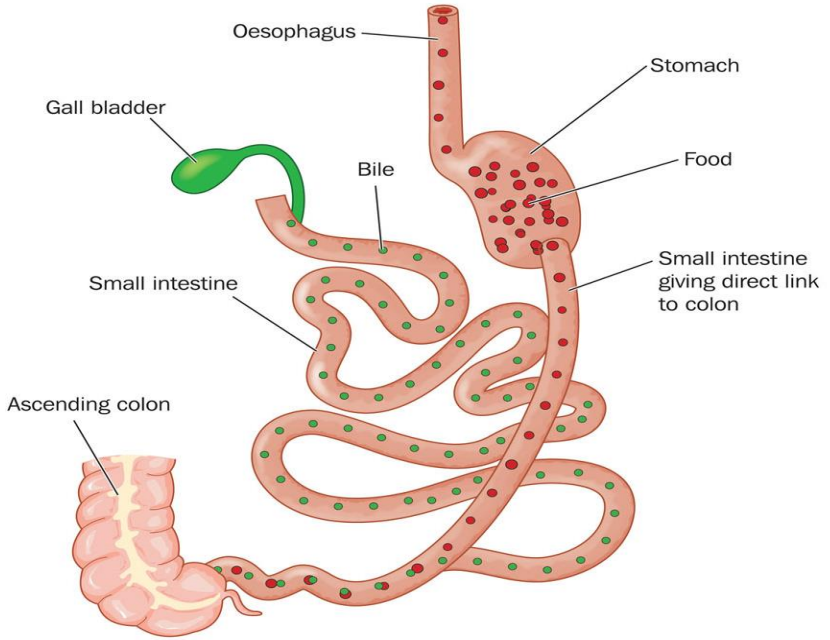
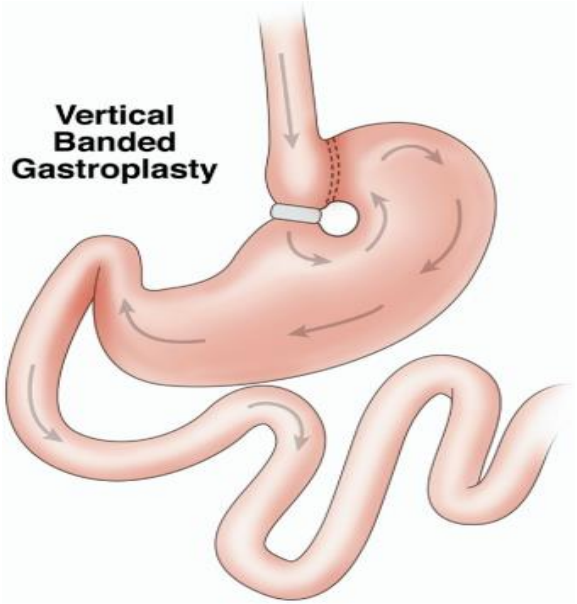
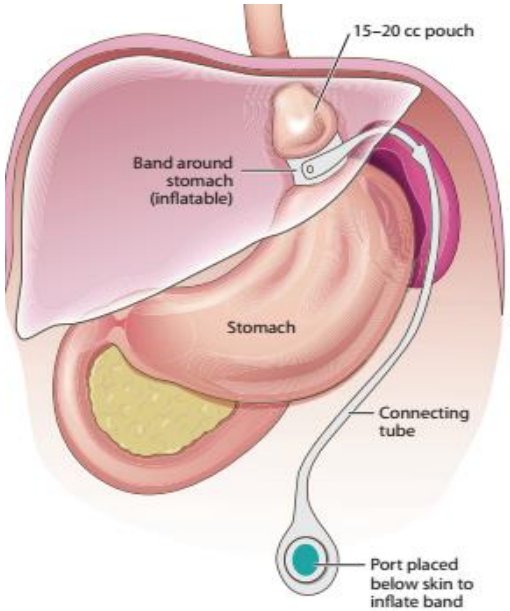
- Laparoscopic adjustable gastric ban
- Sleeve gastrectomy
- Gastric Plication
- Gastric balloon

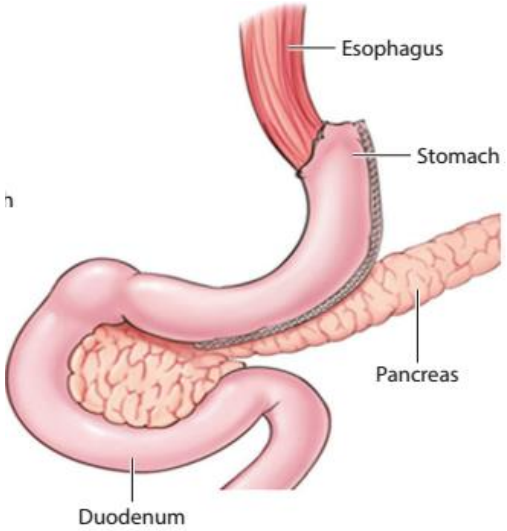


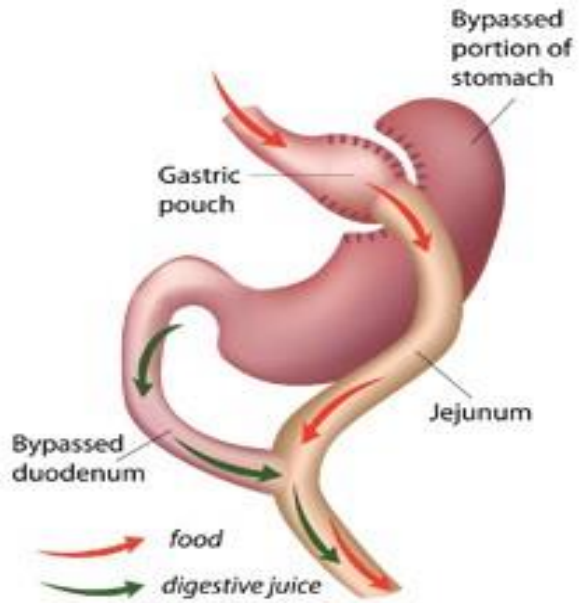


A: Biliopancreatic Diversion, B:Biliopancreatic Diversion with Duodenal Switch

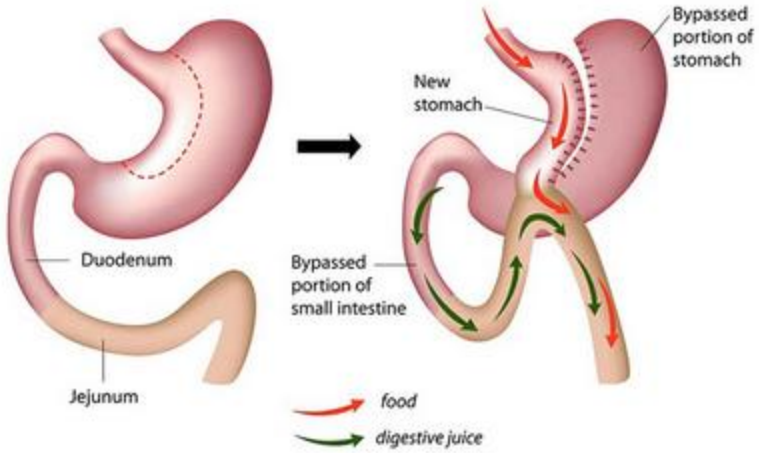








RYGB جراحی بای‌پس معده



One-anastomosis gastric bypass

The three key components

- a small gastric pouch,
- a restrictive gastrojejunal anastomosis
- the creation of a roux limb to promote malabsorption

Fig. 13.4 Shape of the resected stomach with a continuous staple line and an additional resection of the fundus. On the right the stomach is insufflated to see its size and shape. Left: regular stapler line. Right: staple line reinforced with buttressing material

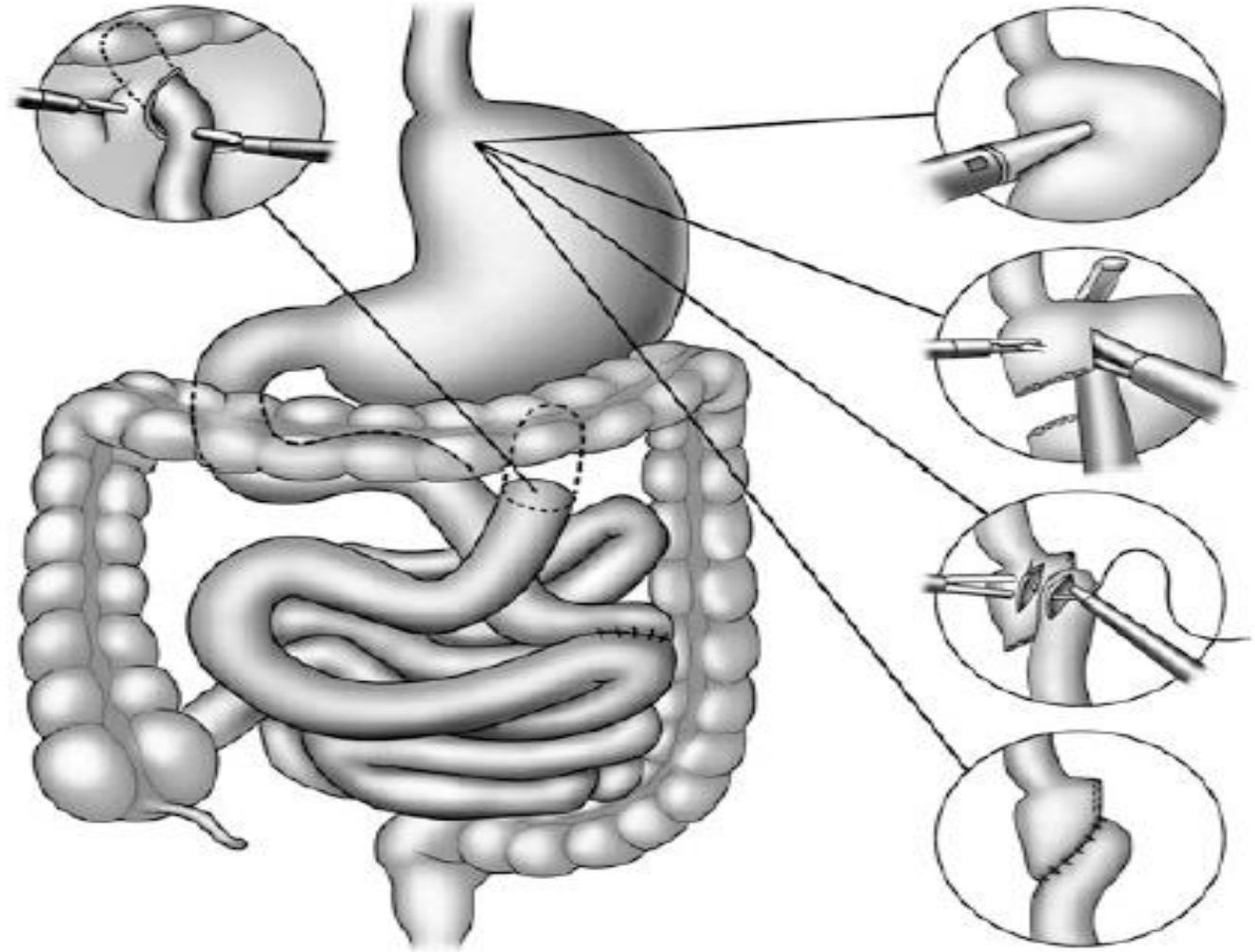


Fig. 12.3 Steps in gastrojejunostomy

Guiding bariatric procedure selection based on risks, benefits, and target weight loss: procedures endorsed by ASMBS and possibly covered by insurance

Procedure	Target weight loss (%TWL)	Favorable aspects	Unfavorable aspects
LAGB [845]	20%–25%	No anatomic alteration Removable Adjustable	High explant rate Erosion Slip/prolapse
SG [845]	25%–30%	Easy to perform No anastomosis Reproducible Few long-term complications Metabolic effects Versatile for challenging patient populations	Leaks difficult to manage Little data beyond 5 yr 20%–30% GERD
RYGB [845]	30%–35%	Strong metabolic effects Standardized techniques <5% major complication rate Effective for GERD Can be used as second stage after SG	Few proven revisional options for weight regain Marginal ulcers Internal hernias possible Long-term micronutrient deficiencies
BPD/DS [845]	35%–45%	Very strong metabolic effects Durable weight loss Effective for patients with very high BMI Can be used as second stage after SG	Malabsorptive 3%–5% protein-calorie malnutrition GERD Potential for internal hernias Duodenal dissection Technically challenging Higher rate of micronutrient deficiencies than RYGB

Physiological Mechanisms of Bariatric Procedures

مکانیسم های فیزیولوژیکی روشهای باریاتریک

- **Malabsorption :** RYGB, BPD, BPD-DS
- **Caloric Restriction**
- **Energy Expenditure ???**
- **Changes in Eating Behavior**
- تغییر میکروبیوتای روده

تغییر در ترجیحات غذایی و انتخاب های غذایی می تواند ناشی از :

- ❖ **کاهش فعالیت مناطق پاداش مغز به ویژه پس از دریافت غذاهای پرکالری باشد.**
- ❖ **سندرم دامپینگ**
- ❖ **؟؟؟؟؟**

Entero-Hormones, Incretins, and Intestinal Adaptation

Table 5.2 Characteristics of entero-hormones after bariatric operations

	Origin	Satiety	Glycemic control	GI motility	RYGB	LSG	LAGB	BPD
GLP-1	L cells	↑	↑	↓	↑	↑	No Δ(delta)	↑
GIP	K cells	No Δ(delta)	↑	No Δ(delta)	↓	Unknown	No Δ(delta)	↓
PYY	L cells	↑	↑ or no Δ(delta)	↓	↑	↑ or no Δ(delta)	No Δ(delta)	↑
Oxyntomodulin	L cells	↑	↑	↓	↑	↑	No Δ(delta)	↑
CCK	I cells	↑	No Δ	↑	?	↑ or no Δ(delta)	Unknown	Unknown
Ghrelin	Oxyntic	↓	No Δ	No Δ	↓	↓↓	No Δ(delta)	No Δ(delta)

اندیکاسیون و کنتراندیکاسیون های جراحی باریاتریک

Table 1.1 Categories of BMI and disease risk relative to normal weight and waist circumference

			Relative disease risk by waist circumference (type 2 diabetes, hypertension, cardiovascular disease)	
			Men ≤102 cm (≤40 in)	Men >102 cm (>40 in)
	BMI kg/m²	Obesity class	Women ≤88 cm (≤35 in)	Women >88 cm (>35 in)
Underweight	<18.5	–	–	–
Normal[a]	18.5–24.9	–	–	–
Overweight	25.0–29.9	–	Increased	High
Obesity	30.0–34.9	I	High	Very high
Obesity	35.0–39.9	II	Very high	Very high
Extreme obesity	≥40	III	Extremely high	Extremely high

Cut off in Asian People:
Men ≥ 94 cm
Women: ≥ 80 cm

In children (2–19 years of age):

Overweight : 95th percentile > BMI-for-age > **85th percentile**

Obesity : BMI-for-age **≥ 95th percentile** on the CDC growth charts.

R4. (NEW).

The BMI criterion for bariatric procedures should be adjusted for ethnicity (e.g., 18.5–22.9 kg/m2 is healthy range, 23–24.9 kg/m2 overweight, and ≥ 25 kg/m2 obesity for Asians) (Grade D).

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Contraindications

- Severe heart failure, unstable coronary artery disease
- End stage lung disease
- Active cancer diagnosis or treatment,
- Cirrhosis with portal hypertension,
- Uncontrolled drug or alcohol dependency
- Severely impaired intellectual capacity
- Crohn’s disease may be a relative contraindication to RYGB and BPD
- Poor results following a variety of bariatric surgical procedures have been reported in patients with lower levels of mental capacity
- Those with contraindications to general anesthesia or uncorrectable coagulopathy

Should be postponed.

- Active peptic ulcer treatment تا زمانی که درمان موفقیت آمیز انجام شود. بارداری یا قصد بارداری در ۱۲ تا ۱۸ ماه آینده
- درلیست پیوند و یا داشتن سابقه پیوند
- بیماران با Active psychosis و یا سابقه بستری در بیمارستان به دلیل سایکوز، سابقه خودکشی و یا تلاش هایی برای خودکشی
- بیماران بایستی دارای توانایی ، اراده و انگیزه برای پیروی از تغییرات سبک زندگی، مکمل های رژیمی و جلسات فالو- آپ بعد از جراحی داشته باشند.

Am I a candidate?
In 10 - 19 years age group

ASMBS pediatric metabolic and bariatric surgery guidelines, 2018

- **BMI ≥140% of the 95th percentile**
- **BMI ≥120% of the 95th percentile with hyperlipidemia, HTN, T2D, insulin resistance, depressed HRQoL, GERD, OSA, NAFLD, orthopedic disease, IIH**

Clinical tools for pediatric providers [homepage on the Internet]. City: PediTools; c2012–18 [updated 2018]. Available from: https://peditools.org/growthpedi/index.php. [Accessed March 15, 2018].

Indications and contraindications for adolescent metabolic and bariatric surgery (MBS)

Indications for adolescent MBS include

- BMI ≥35 kg/m^2 or 120% of the 95th percentile with clinically significant co-morbid conditions such as obstructive sleep apnea (AHI >5), T2D, IIH, NASH, Blount's disease, SCFE, GERD, or hypertension; or BMI ≥40 kg/m^2 or 140% of the 95th percentile (whichever is lower).
- A multidisciplinary team must also consider whether the patient and family have the ability and motivation to adhere to recommended treatments pre- and postoperatively, including consistent use of micronutrient supplements.

Contraindications for adolescent MBS include

- A medically correctable cause of obesity
- An ongoing substance abuse problem (within the preceding yr)
- A medical, psychiatric, psychosocial, or cognitive condition that prevents adherence to postoperative dietary and medication regimens.
- Current or planned pregnancy within 12 to 18 mo of the procedure

BMI = body mass index; AHI = apnea-hypopnia index; T2D = type 2 diabetes; IIH = idiopathic intracranial hypertension; NASH = nonalcoholic steatohepatitis; SCFE = slipped capital femoral epiphysis; GERD = gastroesophageal reflux disease.

Table 7. Pre-procedure Checklist (including Lifestyle Medicine)*

☑	Complete H & P (obesity-related comorbidities, causes of obesity, weight BMI, weight-loss history, commitment, and exclusions related to surgical risk)
☑	Routine labs (including fasting blood glucose and lipid panel, kidney function, liver profile, lipid profile, urine analysis, prothrombin time/INR, blood type, CBC
☑	Nutrient screening with iron studies, B_{12} and folic acid (RBC folate, homocysteine, methylmalonic acid optional), and 25-vitamin D (vitamins A and E optional); consider more extensive testing in patients undergoing malabsorptive procedures based on symptoms and risks
☑	Cardiopulmonary evaluation with sleep apnea screening (ECG, CSR, echocardiography if cardiac disease or pulmonary hypertension suspected; deep-venous thrombosis evaluation, if clinically indicated
☑	GI evaluation (H pylori screening in areas of high prevalence; gallbladder evaluation and upper endoscopy, if clinically indicated)

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☑	Endocrine evaluation (A_{1c} with suspected or diagnosed prediabetes or diabetes; TSH with symptoms or increased risk of thyroid disease; androgens with PCOS suspicion (total/bioavailable testosterone, SHEAS, Δ_4-androstenedione); screening for Cushing's syndrome if clinically suspected (1 mg overnight dexamethasone test, 24-hour urinary free cortisol, 11 PM salivary cortisol)
☑	Lifestyle medicine evaluation: healthy eating index; cardiovascular fitness; strength training; sleep hygiene (duration and quality); mood and happiness; alcohol use; substance abuse; community engagement
☑	Clinical nutrition evaluation by RD
☑	Psychosocial-behavioral evaluation
☑	Assess for individual psychological support/counseling

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- ☑ Document medical necessity for bariatric surgery
- ☑ Informed consent
- ☑ Provide relevant financial information
- ☑ Continue efforts for preoperative weight loss
- ☑ Optimize glycemic control
- ☑ Pregnancy counseling
- ☑ Smoking-cessation counseling
- ☑ Verify cancer screening by primary care physician

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Pre-procedure glycemic control must be optimized using a diabetes comprehensive care plan

Reasonable targets for preoperative glycemic control:

- Hb A1C of 6.5%–7.0% or less and peri-procedure blood glucose evels of 80–180 mg/dL **(Grade B; BEL 2).**
- A1C of 7%–8%, are recommended in patients with advanced microvascular or macrovascular complications, extensive comorbid conditions, or long-standing diabetes in which the general goal has been difficult to attain despite intensive efforts **(Grade A;BEL 1).**
- In patients with **A1C >8%** or otherwise **uncontrolled diabetes**, clinical judgment determines the **need and timing for a** bariatric procedure **(Grade D)**

Preoperative Care of the Bariatric Patient

BMI Cut offs از معیارهای انتخاب افراد برای جراحی باریاتریک و مورد پذیرش بیمه ها

ولی؟؟؟؟

ریسک فاکتورهای قبل از جراحی؟؟؟؟

Independent risk variables for bariatric surgery

- BMI greater than 50 kg/m2 ?????
- Male gender
- Hypertension
- Age >45 years
- Elevated pulmonary embolism risk

Complications of BS

GERD and LSG

Table 3

Adverse Effects and Complications of Bariatric Surgery

Adverse Effects	Complications
Nausea	Internal hernia
Vomiting	Leakage from staples
Diarrhea	Wound infection from band/port
Nutritional/vitamin deficiencies	Gastric bleeding
Gallstones	Stomal stenosis
	Small-bowel obstruction
	Marginal ulcer

Source: Reference 34.

Predictive of post-discharge VTE:

- congestive heart failure
- paraplegia
- reoperation
- dyspnea at rest
- nongastric band surgery
- age ≥60
- male sex
- BMI ≥50 kg/m2
- hospital stay ≥3 days
- operative time ≥3 h

Preoperative optimization

Smoking and alcohol cessation: Cessation of smoking at least **4–8 weeks before** surgery reduces

Smoking: Increased risk of marginal ulcers, infectious and respiratory complications

Alcohol: infectious and related to wound healing

Preoperative Weight Loss

Preoperative Weight Loss

* میزان کاهش وزن پس از جراحی
* طول زمان عمل جراحی
* عوارض جراحی
* مدت زمان بستری
* خونریزی
* کاهش حجم کبد

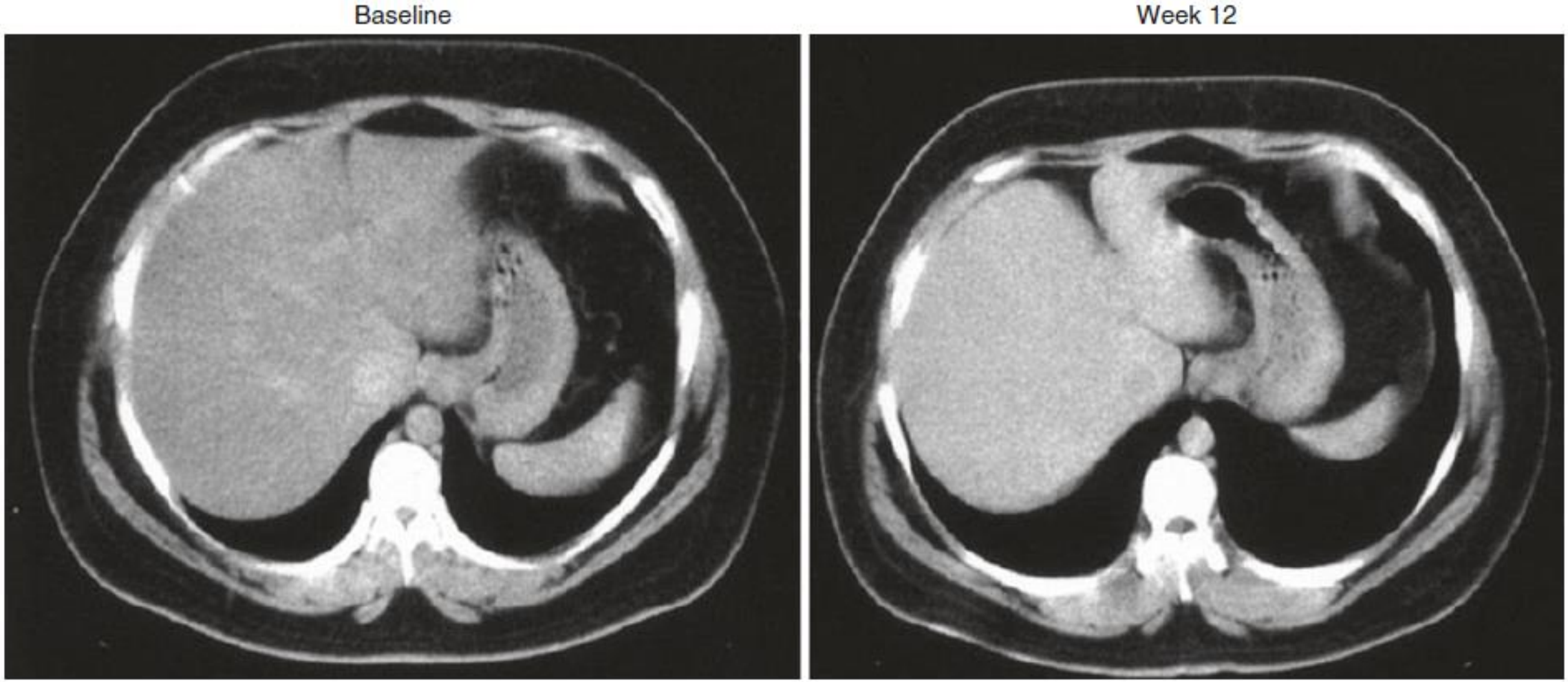

Fig. 10.1 Single cross-sectional images of the liver performed by computed tomography at baseline and week 12 of a very-low-energy diet. The images, taken from within a series of contiguous 8-mm slices used to calculate total liver volume, illustrate the extent of the change in liver volume with weight loss in a 35-year-old man with an initial liver volume of 3.7 L and final liver volume of 2.4 L. A 35% reduction in liver size and a weight loss of 18 kg were observed

Preoperative Weight Loss & Liver Reduction

- کبد با حجم بزرگتر پس از رژیم کاهش وزن کاهش بیشتر حجم کبد
- **نکته:** بیشترین کاهش حجم کبد در ۲ هفته اول کاهش وزن
- به ویژه در افراد با BMI بیشتر از ۵۰ کیلوگرم بر متر مربع
- حدود دو هفته قبل از جراحی

✓ یک رژیم کم کالری 800-1200 kcal/d

یا یک رژیم very low calorie diet (VLCD): 800 kcal/d

+ مشاوره تغذیه و رفتاردرمانی و آموزش

هدف: ۱۰ درصد کاهش وزن

پایش هفتگی بیمار

- **درصد کاهش اضافه وزن (Excess weight loss :EWL%) :**

(وزن ایده آل-وزن قبل از عمل) /(وزن فعلی – وزن قبل از عمل) X ۱۰۰

- **درصد کاهش اضافه BMI (Excess BMI loss :EBL%) :**

(BMI ایده آل-BMI قبل از عمل) /(BMI فعلی – BMI قبل از عمل) X ۱۰۰

- **برگشت وزن (Weight regain) :**

میزان برگشت وزن معنی دار نیز به برگشت ۲۵ درصد از میزان وزن کاهش یافته بیمار پس از جراحی تعریف خواهد شد.

Alcohol use disorder

Gastric bypass surgery is associated with:

1. Accelerated alcohol absorption (shorter time to reach maximum concentration)
2. Higher maximum alcohol concentration
3. Longer time to eliminate alcohol in both men and women
4. Increased risk for development of AUD

Nutritional assessment

History

- Personal and family/social history
- Weight history
- Weight control and intervention history
- Weight goals and expectations
- Knowledge, beliefs and attitudes toward food and lifestyle change
- Dietary patterns, food & nutrient intake (evaluated by questionnaire such as recall, record and FFQ)
- nutritional and vitamin supplement use

Nutritional assessment

Physical examination

- ✓ Anthropometric evaluation (measurement of weight, height, waist & hip circumference, body composition)
- ✓ Nutritional physical examination items (anemia, skin, edema, etc)

Biochemical evaluation(diagnostic testing)

For example, routine laboratory evaluation typically includes :

CBC, metabolic and lipid profile, coagulation profile, thyroid and Liver function tests, Albumin & pre albumin, Vitamin B12, 25-hydroxyvitamin D, PTH, iron study(iron, total iron-binding capacity, ferritin), and others fat-soluble vitamin levels (if considering a malabsorptive procedure).

Common preoperative deficiencies

Protein deficiencies: preoperatively are usually related to diet and may raise the risk of complications with surgery. Deficiency may worsen after surgery due to dietary restriction and/or malabsorption

Vitamin D deficiency: may commonly be found preoperatively. Since increased bone turnover may be a concern after bariatric surgery, vitamin D levels should be corrected if low prior to surgery.

Calcium deficiency: can be associated with malabsorptive procedures, and may exacerbate osteopenia.

Micronutrient deficiencies :vitamin D (55–80 %) and iron (25–50 %), with a smaller number of B12 and thiamine deficiencies also found .

Most common pre operative deficiencies AND supplemntation

B12, folic acid, thiamin, vitamin D and iron

Daily multivitamin mineral supplementation is recommended during the pre operative diet

Pre-op Recommendations

- Multivitamin and mineral supplement, containing thiamine 12–50 mg.
- Calcium with vitamin D.
- Choose a dietary approach that is consistent among providers and patients.

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THANK YOU
FOR YOUR KIND ATTENTION