



Infertility and obesity role of bariatric procedure

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A new worldwide health problem

The greatest epidemic ever experienced by humans

Resulting from

- ◇ increasing population
- ◇ increasing lifespan
- ◇ Urbanization
- ◇ Plentiful food
- ◇ Physical inactivity

Rate of obesity has doubled over the past decade

- ◇ □ Fertility implications both genders
- ◇ □ Pregnancy Complications
- ◇ □ Metabolic syndrome
- ◇ □ Malignancy
- ◇ □ Economic burden

Adolescent obesity is associated with three-fold increase in nulliparity and four-fold increase in nulligravidity



Complications of Obesity during Pregnancy:

- ◇ Gestational HTN, Pre-Eclampsia, Eclampsia
- ◇ Gestational Diabetes
- ◇ Fetal Macrosomia
- ◇ Risk of medical and surgical complications
- ◇ Higher rate of C-Sections
- ◇ infection and PPH
- ◇ wound related complications
- ◇ Miscarriages
- ◇ Premature deliveries
- ◇ PROM
- ◇ IUGR, Intra-uterine fetal death
- ◇ Placenta Previa and abruption- placenta

$$\text{BMI} = \text{kg}/\text{m}^2$$



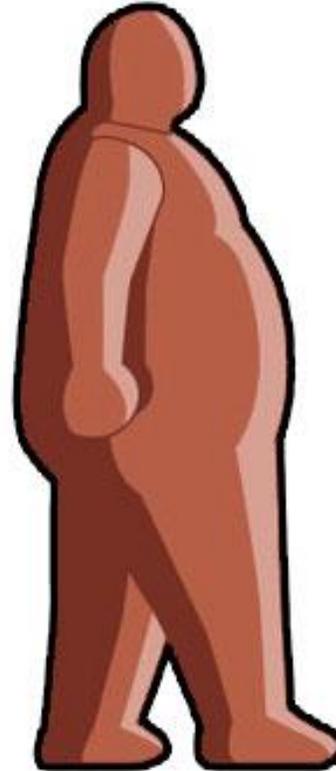
BMI
18.5-24.9
NORMAL
WEIGHT



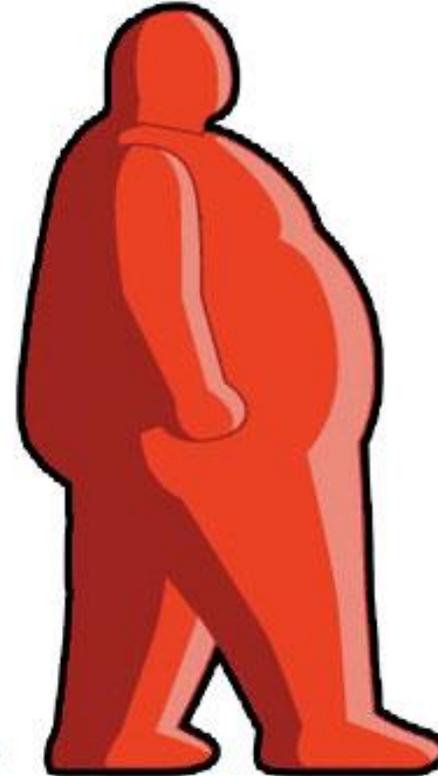
BMI
25.0-29.9
OVER
WEIGHT



BMI
30.0-34.9
OBESITY
CLASS 1



BMI
35.0-39.9
OBESITY
CLASS 2



BMI
40.0-49.9
OBESITY
CLASS 3

Causes

- ◇ Genetic factor
- ◇ Changing Dietary Habits
- ◇ Decreased Physical activity



CENTRAL PLAYER ...

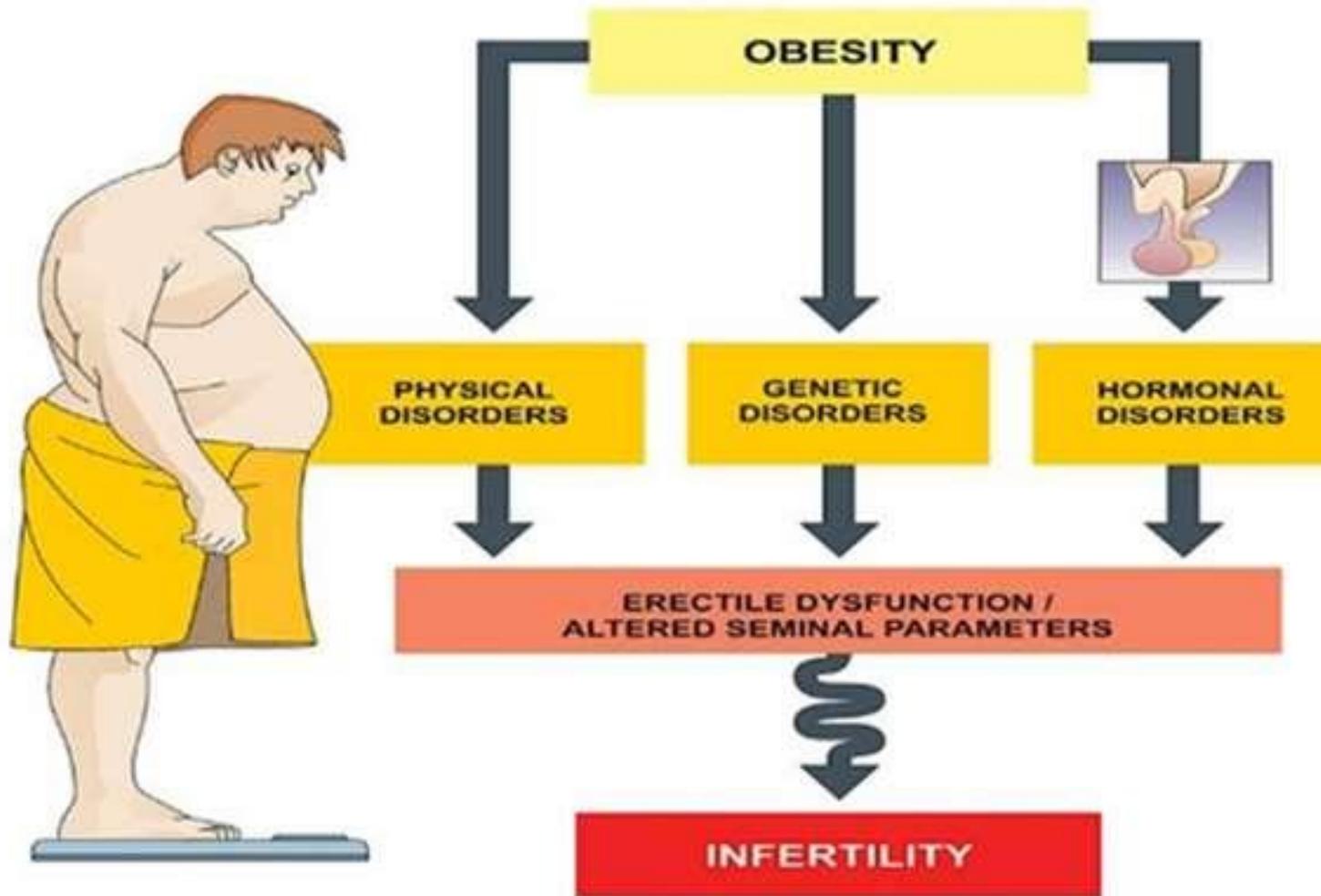
- Insulin resistance
- Hyperandrogenism
- Elevated leptin
- Leptin resistance

CAUSE

- ◇ percentage of **free testosterone** elevated
- ◇ Androgens are irreversibly **aromatized** to estrogens
- ◇ estrogens may affect hypothalamic pituitary (**ovulatory dysfunction, menstrual irregularity and increased risk of breast and endometrial carcinoma**)
- ◇ **LOWERS PLASMA** concentration Of SHBG secondary to elevated insulin
- ◇ SHBG ↓(**Increase in unbound fraction of free E2, testosterone and other sex steroids - Increase in MCR for both E2 and testosterone - Increased conversion of testosterone.**)
- ◇ Decreased secretion and increased clearance of GH (**OBESITY INDUCED CHANGES IN GH AND IGF'S AFFECT OVARIAN STEROIDOGENESIS ANS OVULATION**)
- ◇ **Hyperinsulinemia, insulin resistance** and elevated free circulating androgens cause ovulatory and menstrual disturbances

OBESITY AND INFERTILITY

Mechanisms of Action



OBESITY RELATED HORMONES AND THEIR ROLE IN REPRODUCTION

- ◇ **Leptin** :excessive leptin associated with obesity may impair reproductive function at the level of

Ovary.(secreted in adipose tissue, regulate eating behavior and energy balance)

- ◇ **Adiponectin** : Insulin resistance and obesity are associated with lower plasma adiponectin concentrations and also Adiponectin is found to be lower in PCOS.
- ◇ **Ghrelin** : Ghrelin and leptin have opposing actions, Ghrelin is a signal to conserve energy by increasing appetite
- ◇ **Cytokines**: elevated cytokine levels may contribute to ,infertility (ESR, CRP)

Obese PCOS women have :

- ◇ - More marked hyperinsulinemia
- ◇ - Insulin resistance
- ◇ - Relative hyperglycemia
- ◇ - Lower SHBG levels
- ◇ - Higher levels of total and free testosterone and DHEAS
- ◇ - Decreased GH pulse amplitude
- ◇ - Increased LH pulse frequency
- ◇ - Attenuated LH pulse amplitude

Obesity augments the metabolic disorder

prevalent in PCOS leading to:

- ◇ - Oligomenorrhoea.
- ◇ - Chronic anovulation.
- ◇ - Lower pregnancy rates.
- ◇ - Higher miscarriage rates.
- ◇ - Increased obstetric complications.

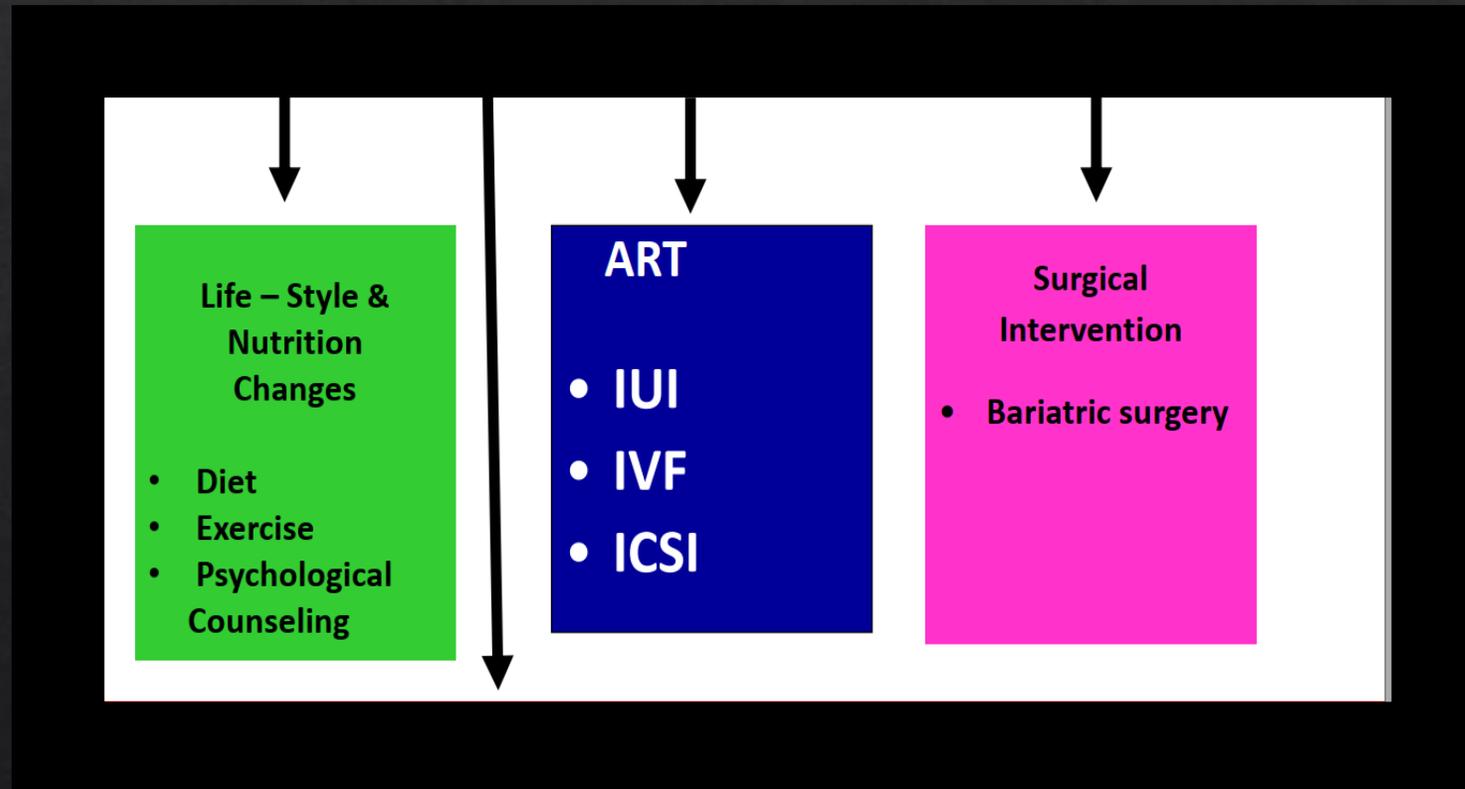
- ◇ IVF pregnancy rates lower in obese women compare to those of normal weight.
- ◇ ↑ Obesity is a significant risk factor for adverse pregnancy outcome:
spontaneous abortion in infertile women who became pregnant after infertility treatment

OBESITY & ASSISTED REPRODUCTION

Obese women : not only have a **lower chance of pregnancy** following **In Vitro Fertilization**, they require **higher doses of gonadotropins** and have an **increased miscarriage rate**



Treatment Modalities For Infertility in Obesity



AIM

The aims of Bariatric surgery in morbidly obese are to:

- ◇ Normalise metabolic & psych-social development
- ◇ Enhance fertility
- ◇ Improve the outcome of pregnancy
- ◇ Improve the weight & metabolic development of offspring.

INDICATION

It is considered for patients with

- ◇ BMI >40 kg/m² (or BMI >35 kg/m² with comorbid conditions)
- ◇ age groups from 18 to 60 years
- ◇ obesity lasting >5 years
- ◇ patients who failed to lose weight or to maintain long-term weight loss despite appropriate nonsurgical medical care
- ◇ patient willingness to participate in a postoperative multidisciplinary treatment program.

Factor	Criteria
Weight (adults)	BMI \geq 40 kg/m ² with no comorbidities BMI \geq 35 kg/m ² with obesity-associated comorbidity
Weight-loss history	Failure of previous nonsurgical attempts at weight reduction, including nonprofessional programs (for example, Weight Watchers, Inc)
Commitment	Expectation that patient will adhere to postoperative care Follow-up visits with physician(s) and team members Recommended medical management, including the use of dietary supplements Instructions regarding any recommended procedures or tests
Exclusion	Reversible endocrine or other disorders that can cause obesity Current drug or alcohol abuse Uncontrolled, severe psychiatric illness Lack of comprehension of risks, benefits, expected outcomes, alternatives, and lifestyle changes required with bariatric surgery

BMI, body mass index.

NICE GUIDELINES

women seeking fertility advice with a BMI above 29 kg/m² should be informed that:

- ◇ They will take longer time to conceive.
- ◇ ART is less likely to be effective at this BMI.
- ◇ Losing weight in a structured group programme of exercise and dietary advice is likely to increase their chances of conceiving.

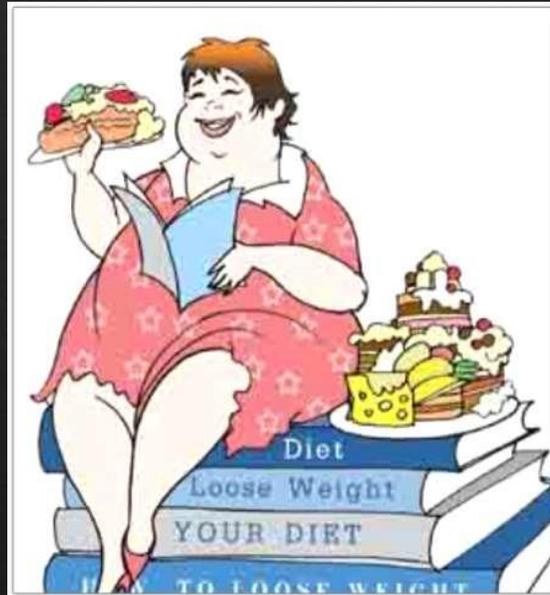
BRITISH FERTILITY SOCIETY GUIDELINES

- Fertility treatment should be deferred in women who are morbidly obese, until they have **lost weight to below a BMI of 35 kg/m²**, although in those with more time (under 37 years with normal ovarian reserve) a weight reduction to **less than 30 kg/m² is preferable.**

AMERICAN COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

- Women who are obese, increased their chances of getting pregnant and reduced their risk of pregnancy complications **by having bariatric surgery and the outcome after delivery for both mother and child were acceptable**, provided that adequate nutrition and vitamin supplementation was maintained.

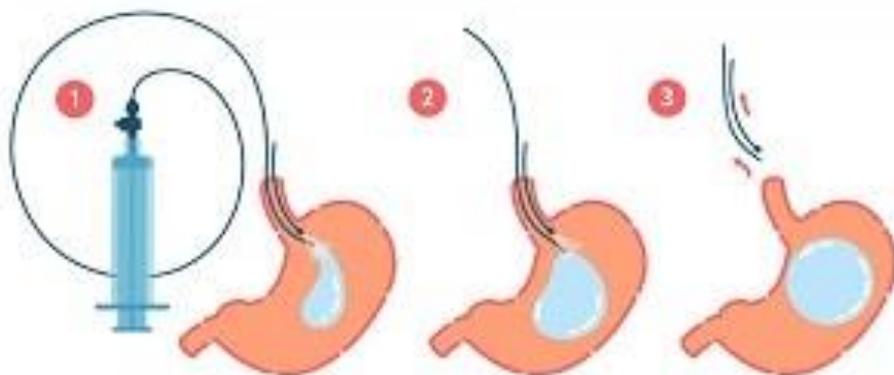
Non surgical



INTRAGASTRIC BALLOON



Intragastric balloon is a non-surgical weight loss procedure that involves placement of the balloon into the stomach to reduce food intake



PROCEDURE

- 1 The catheter with the deflated balloon is inserted into the stomach
- 2 The balloon is inflated with the saline
- 3 The catheter is disconnected from the balloon

BENEFITS



non-surgical



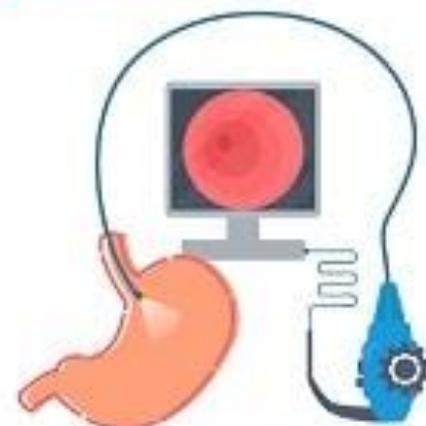
30 min duration



balloon is removed in 6 months

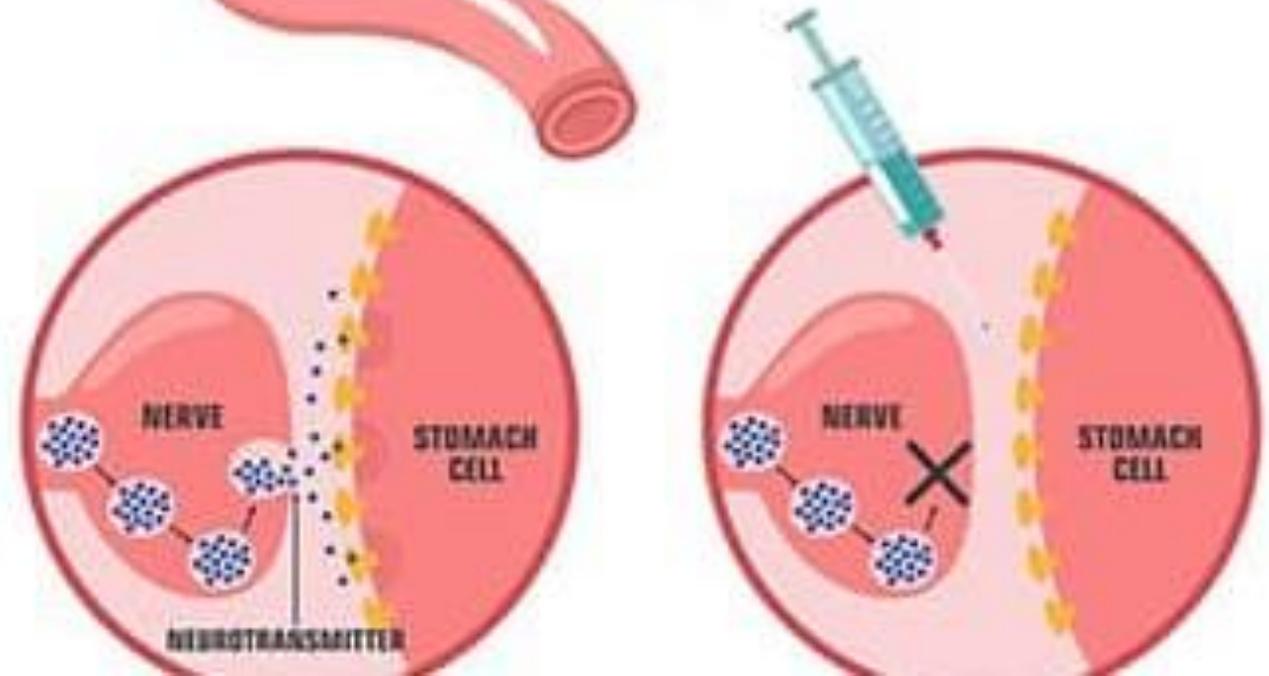
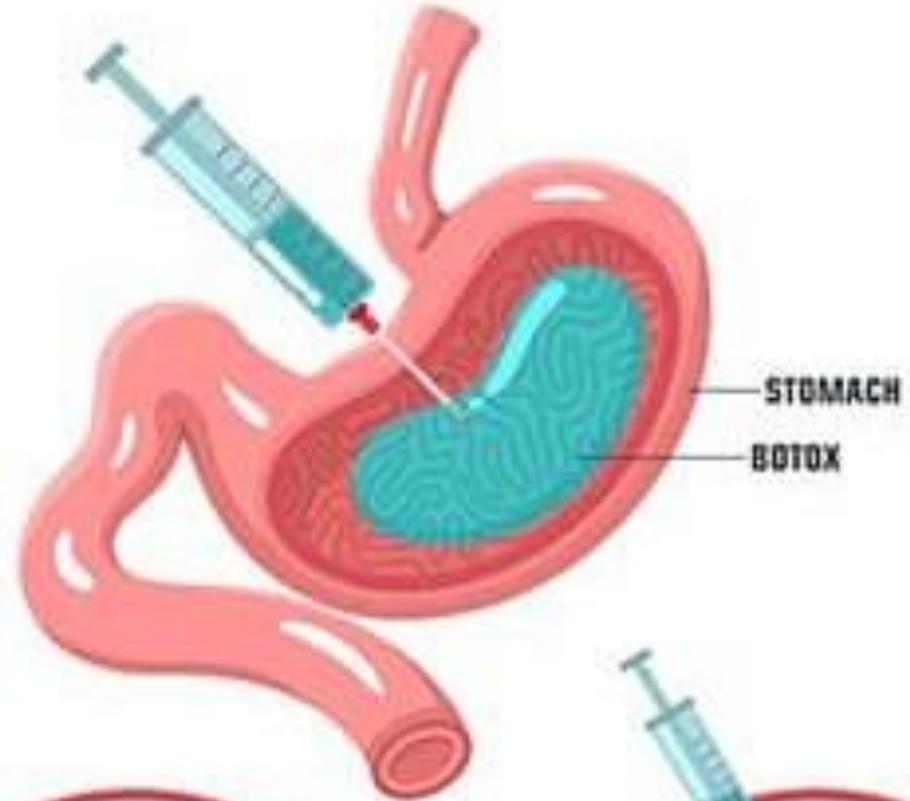


high rate of weight loss



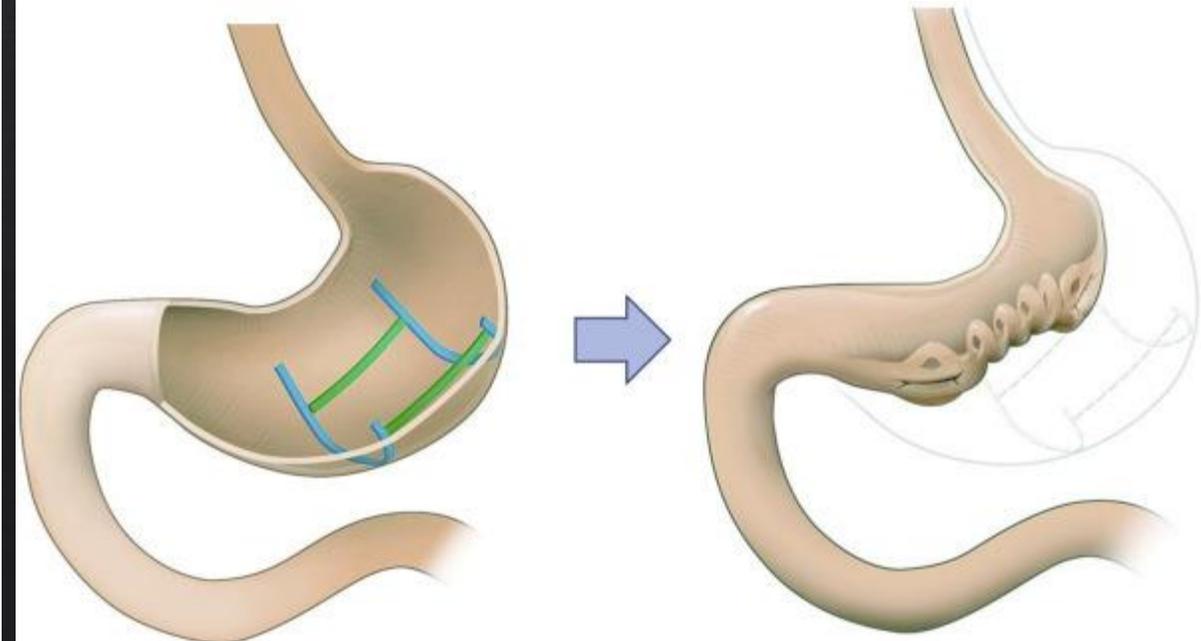
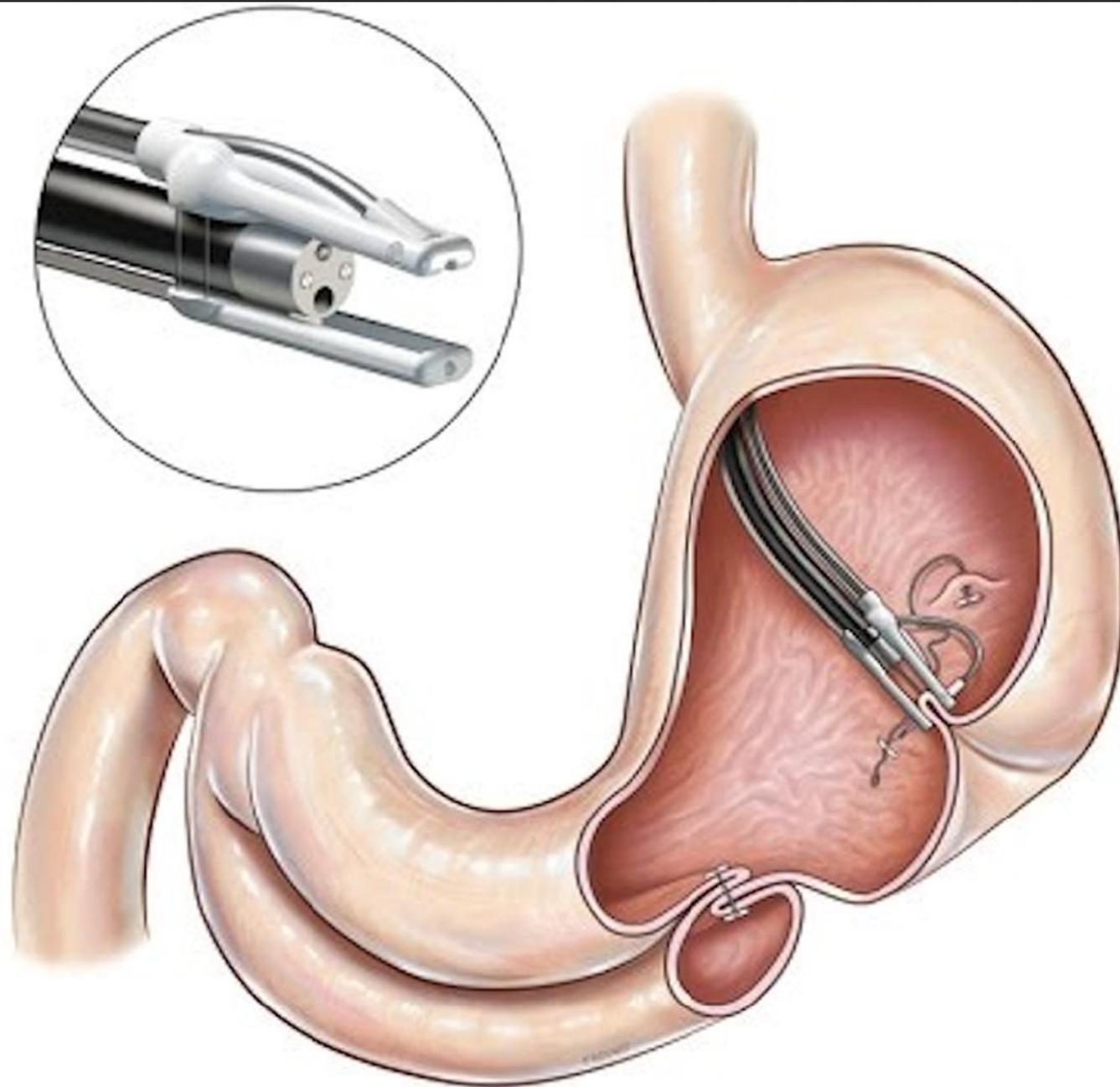
It is performed under endoscopic guidance

STOMACH BOTOX



- Disturbance of heart rate and breathing.
- Bleeding from the injection; usually resolves itself.
- A small tear or damage to the lining of the upper digestive tract. It may require an operation to repair any damage.
- A reaction to any of the medication
- pain in the throat and abdomen.

The POSE® procedure is a non-surgical technique for stomach reduction.



surgical

Surgical procedures

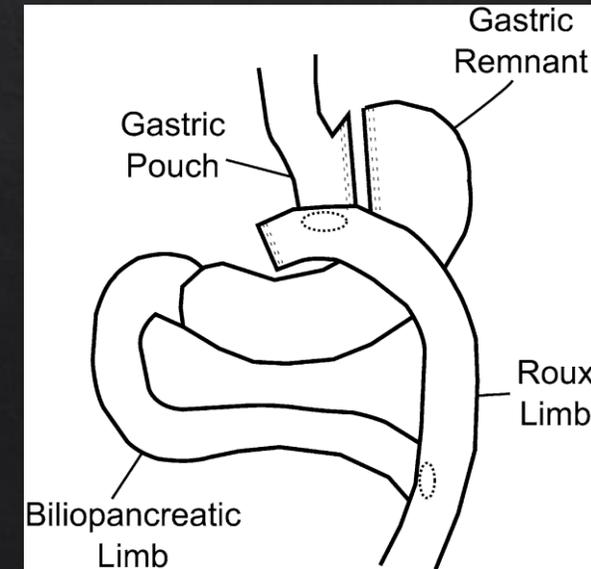
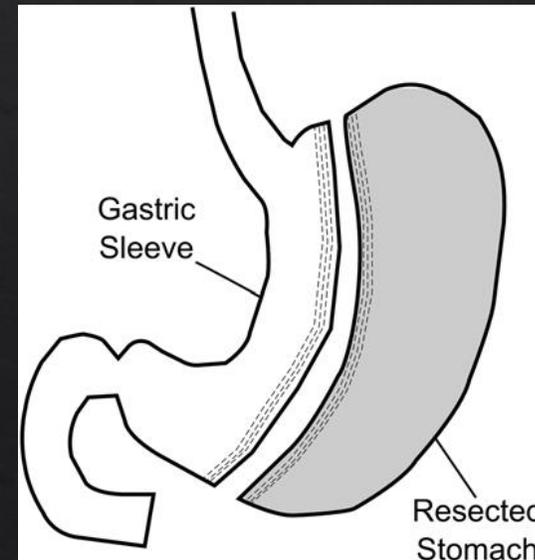
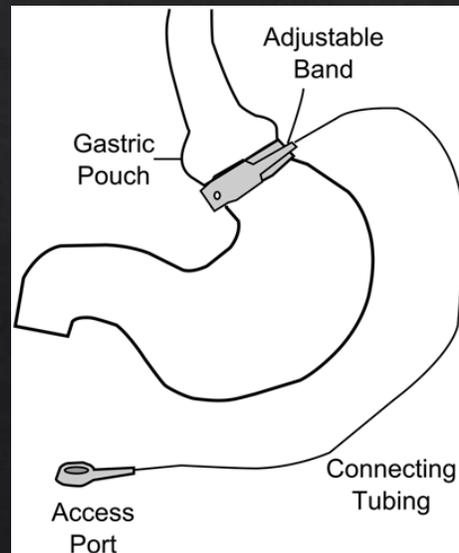
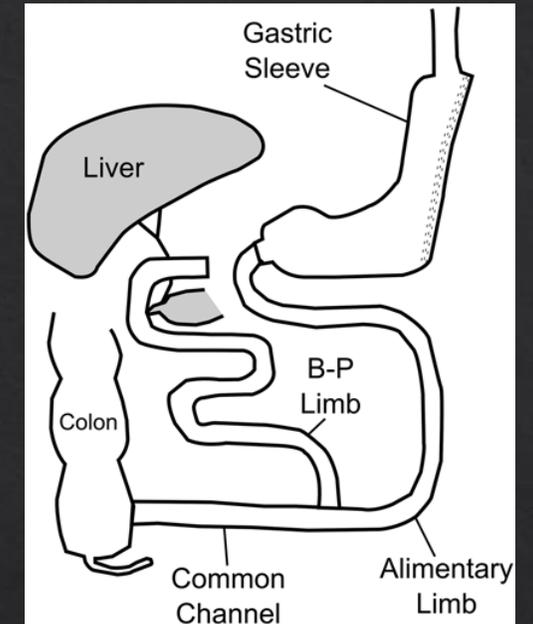
Sleeve gastrectomy (SG)

Roux-en-Y gastric bypass (RYGB)

Adjustable gastric banding (AGB)

Mini-gastric bypass/one anastomosis gastric bypass (MGB/OAGB)

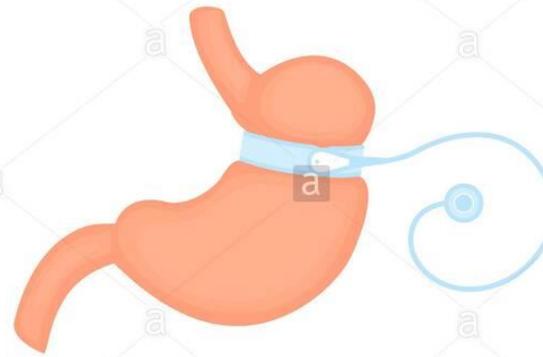
Biliopancreatic diversion/duodenal switch (BPD-DS)



BARIATRIC SURGERY PROCEDURES



**VERTICAL SLEEVE
GASTRECTOMY**



**ADJUSTABLE
GASTRIC BAND**



**ROUX-EN-Y
GASTRIC BYPASS**



**MINI-GASTRIC
BYPASS**

Bariatric surgery improves the markers Of PCO which influence fertility, such as

- ◇ Anovulation,
- ◇ Hirsutism,
- ◇ Hormonal changes,
- ◇ Insulin resistance,
- ◇ Sexual activity .

However, bariatric surgery should not be considered a treatment for infertility .

- ◇ Pregnancy is better to be **delayed for 1-2** years after bariatric surgery.
- ◇ During pregnancy adequate nutrition and vitamin supplementation should be maintained,
- ◇ Caution should be exercised when determining eligibility for in vitro fertilisation in women who have undergone bariatric surgery.

Preparing for a pregnancy after bariatric surgery

Table 1 Routine nutrient supplementation after bariatric surgery

<i>Non-pregnant population*</i>	<i>During pregnancy</i>
Multivitamin 1–2 daily	One prenatal vitamin daily
Calcium citrate (1200–2000 mg/day) with vitamin D (400–800 U/day)	Calcium citrate (1200 mg/day) with vitamin D (400–800 U/day)
Folic acid 400 µg/day in multivitamin	Folic acid 400 µg/day in prenatal vitamin, replace with additional doses if deficiency confirmed
Elemental iron with vitamin C (40–65 mg/day)	Elemental iron (40–65 mg/day) plus prenatal vitamin, replace with additional doses if deficiency confirmed
Vitamin B12 ≥350 µg/day orally or 1000 µg/month intramuscularly or 3000 µg every 6 months intramuscularly or 500 µg/week intranasally	Vitamin B12 ≥350 µg/day orally, replace with additional doses if deficiency confirmed

- ◇ The most common nutritional deficiencies are of protein, iron, vitamin B12, folate, vitamin D. and calcium.
- ◇ Evaluate for micronutrient deficiencies at the beginning of pregnancy .
- ◇ If there is a proven deficit, then treat & monitor.
- ◇ In the absence of a deficiency, monitor the blood count, iron, ferritin, calcium, and vitamin D levels every trimester .
- ◇ It is not known if women require higher dose of folic acid (greater than 0.4mg/d)
- ◇ The daily recommendation for protein intake of 60g is the same regardless of bariatric surgery status .
- ◇ Caloric and protein restriction during pregnancy may impair fetal growth so, there is no recommendation for caloric restriction during pregnancy.

Complication

Complications

Hemorrhage

Leakage

Vomiting

Deep venous thrombosis

Gastric stenosis

Gastric volvulus

Wound infection

Conversion to open

Intraoperative mortality

Pulmonary embolism mortality

contraception

- ◇ Increased risk of oral contraception failure with mal-absorption .
- ◇ Non-oral rout should be considered .

peri op order

- ◇ Forensic consent
- ◇ Cardiac , endocrine consult
- ◇ Endoscopy (h pylori treatment)
- ◇ Anti emboli (sock , pomp , anticoagulant)
- ◇ Anti gastric acid
- ◇ Prophylactic antibiotic
- ◇ No need for Bowell prep
- ◇ Control of BP during surgery and repeat anti biotic and anticoagulant in long surgery
- ◇ Control of urine out put
- ◇ Mobile ASAP

Conclusion

- ◆ • Obesity in women has impacts on **fertility and fertility treatment**.
- ◆ • Increase in BMI **reduces the chance of conception** in ovulatory women and affects the outcome of ovulation induction treatment.
- ◆ • Obese women undergoing **IVF require higher doses of gonadotrophins**, respond poorly to ovarian stimulation and have fewer oocytes harvested.
- ◆ • Obesity is associated with **lower fertilization rates, poor quality embryos** and higher miscarriage rates.
- ◆ Weight loss in these women improves their reproductive outcomes; however, in order for this to be effective it has to be gradual and sustained

THANKS