Breastfeeding after Weight Loss Surgery

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A patient who failed to follow nutrition guidelines provided after her gastric bypass several years earlier, suffered from anemia during her pregnancy, and gave birth to an infant weighing a little over five pounds. Growth milestones were not reached and upon assessing the mother's breastmilk at four months postpartum, an analysis of the fat content, or creamatocrit, revealed a low mean fat and calorie content. After the mother supplemented with formula, adequate growth was displayed in the infant at 6 months of age.

Martens WS et al. Failure of a nursing infant to thrive after the mother's gastric bypass for morbid obesity. *Pediatrics*. 1990. 86(5):777-778.

Weight Loss surgery growth

- The number of bariatric surgical procedures performed annually has dramatically increased.
- About 200,000 patients have bariatric surgery each year.
- It is estimated that the majority of these patients are female (about 80%) and half of the bariatric procedures are performed in reproductive aged women with a mean age of 40 years.
- Bariatric surgery also is being used increasingly to treat adolescents with morbid obesity.
- *Source: American Society for Metabolic and Bariatric Surgery*

Meet Paula

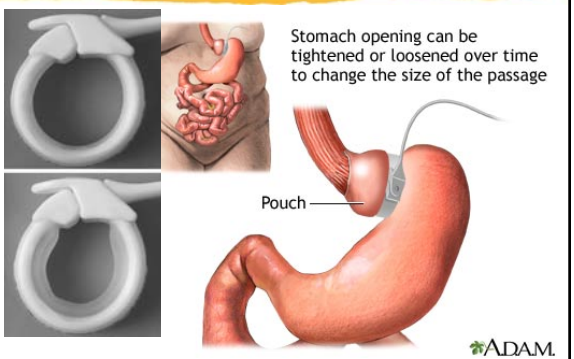
- 29 year old Caucasian female.
- Height: 5'4"Weight:275# highest weight: 311# BMI:47.2
- Followed *Weight Watchers, LA Weight Loss*, physician prescribed diet pills, *&* low carbohydrate diet.
- PMH- HTN, elevated cholesterol, polycystic ovary syndrome/PCOS, glaucoma, DM.
- Meds- Accupril, Prozac, Xanax, Prilosec
- Ideal Weight: 120 pounds ± 10% (108→132 or 60 kg)
- Patient eats 2 to 3 meals a day. Skips breakfast. Often misses lunch due to being busy at sandwich shop which she owns. Understands the need to eat 3 protein rich meals each day.
- Negligible sweets since starting low carbohydrate diet (history of frequent sweets & high carbohydrate foods). Drinks about 120 oz of decaffeinated diet Pepsi and water.

Weight Loss Surgery Procedures

- Gastric Banding/Lap Band
- Roux-en-Y
- Biliopancreatic Diversion with or with out Duodenal Switch BPD/DS
- Sleeve Gastrectomy

Adjustable Gastric Band

- A Saline filled band and placed around first part of stomach to create a small stomach pouch
- The Band may be tightened or loosed by the surgeon by adjustment of saline content using a port placed in the muscle of the body wall in order to increase or decrease satiety.
- Complications include:
  - Vomiting (especially if band is too tight)
  - Possible erosion, gastritis, or slippage of the band
  - Weight lost is not as extensive as malabsorptive procedures
- Band can be completely deflated during pregnancy



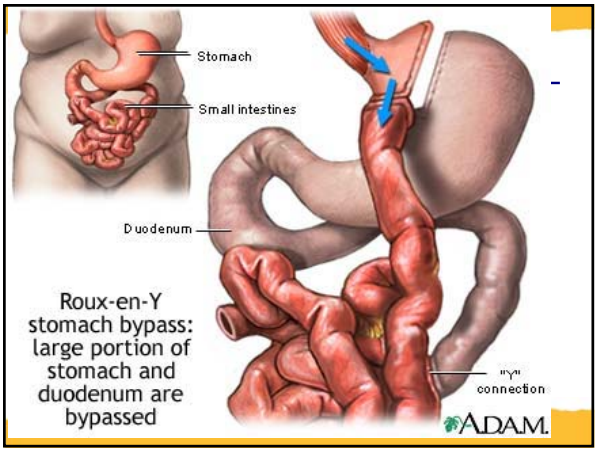
Impact on Nutritional Status

- Banding does not causes malabsorption. Nutrient deficiencies can occur due to decreased food intake or avoidance of certain foods due to intolerances.
- A study by Dixon, et. al in 2005 showed that outcomes for women post-banding had pregnancy outcomes more comparable to the general community rather than morbidly obese individuals.

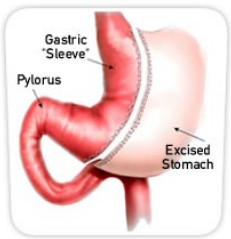
Dixon JB, Dixon ME, O'Brien PE. Pregnancy after Lap-Band surgery: management of the band to achieve healthy weight outcomes. Obes Surg 2001;11:59–65.

Roux-en-Y Gastric Bypass

- Most common procedure in the US
- Combination of restrictive and some macronutrient malabsorption. The stomach is divided into a small pouch
- Micronutrient malabsorption can occur
- Complications include: gallstones, diarrhea, hair loss, anemia, incisional hernia, gastric leak, vomiting.
- Lifelong vitamin/mineral supplementation required



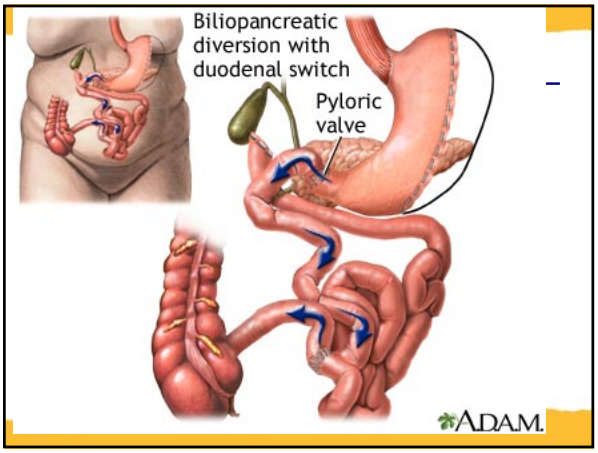
Sleeve Gastrectomy



Surgically "removes" 80% of the stomach

Gastric tubulization is performed starting 3–4 cm from the pylorus by dividing the gastric corpus and leaving a gastric tubular pouch with a capacity of 80 to 100 mL.

Often used for extreme obesity and can be later converted to RYGB and is not reversible.



Biliopancreatic diversion with duodenal switch (BPD/DS)

- Part of the stomach is resected, creating a smaller stomach. The distal part of the small intestine is then connected to the pouch, bypassing the duodenum and jejunum.
- Almost 9 feet of small intestine is bypassed. All the enzymes and bile from the liver and pancreas meet ingested food further down in the ileum, at about 100 cm (3 feet) from the large intestine (colon). This means food is digested and absorbed in only 3 feet of intestine before it enters the large intestine.
- Very small percentage of surgeries in US
- Macronutrient and micronutrient malabsorption
- According to their website, this surgery is performed by the surgeons at the Bariatric Surgery Institute of Wisconsin

Process of Qualification

- Efforts to lose weight with diet and exercise have been unsuccessful.
- Body mass index (BMI) is 40 or higher (extreme obesity).
- BMI is 35 to 39.9 (obesity), plus significant weight-related health problems, such as DM, HTN or sleep apnea.
- Lap Band required BMI is lower than RYGB and may vary among programs.
- A team of health professionals — usually including a doctor, dietitian, psychologist and surgeon evaluate the patient for appropriateness
- Most programs now require training on food and beverage choices post-op.
- In this population deficiencies in Vitamin D, Selenium, and Zinc prior to surgery have been identified.

Ernst B, et al. (2009). Obesity Surgery, Jan, 19(1).

Diet Recommendations

- Reduce food volume
- Chew food very well
- Slow pace of eating
- No liquids with meals/No carbonation
- Encourage fruits and vegetables as diet progresses
- Include high protein foods (at least 60g/day); may need protein supplements

Not so sweet side effects

- Dumping syndrome can occur after consuming refined sugars and high-glycemic carbohydrates.
- Symptoms include abdominal cramping, bloating, nausea, vomiting, and diarrhea. Hyperinsulinemia and hypoglycemia can occur later, resulting in tachycardia, palpitations, anxiety, and diaphoresis.
- Women with dumping syndrome may not tolerate the 50 gram glucose load utilized to screen for gestational diabetes. Alternative screening methods, such as home glucose monitoring, should be considered in patients who have undergone restrictive/malabsorptive surgery.

Common post-operative nutritional problems

- Nausea
- Vomiting
- Dehydration
- Diarrhea
- Dumping Syndrome
- Dizziness
- Bad Breath
- Loss of appetite
- Food feeling "stuck"
- Food intolerances
- Hair Loss
- Lactose Intolerance
- Inadequate Protein
- Food aversions/fears
- Depression: often caused by frustration around inability to eat for comfort/stress
- Vitamin/mineral deficiencies
- Kidney stones

How much weight is lost?

- Typical excess body weight loss varies from 45-80% with surgery.
  - Pories et al reported sustained loss of 49% after 14 years. *Ann Surg. (2011) Mar;253(3):484-7.*
- 47.5% weight loss from adjustable gastric band
- 61.6% weight loss for gastric bypass
- 68.2% weight loss for gastroplasty
- 70% weight loss for biliopancreatic diversion with or without duodenal switch
- Maximum weight loss will take place in the first 12 to 24 months. Thus pregnancy is not recommended for at least the first 18 months after pregnancy.

Position of the American Dietetic Association:Weight Management. Journal of American Dietetic Association 109, (2), 330-346.

Improvements in Health Status

- After weight loss surgery patients may have improvements in
- T2DM
- obesity-related cardiomyopathy
- cardiac function
- Lipid profile
- Respiratory function
- Disordered sleep
- Degenerative joint disease
- Nonalcoholic fatty liver disease (NAFLD)
- Asthma
- Polycystic ovary syndrome (PCOS), infertility, and complications of pregnancy
  - Normalization of hormones after WLS may make pregnancy more likely along with failure of oral contraceptives

A review of perinatal outcomes in 2008 showed that overall outcomes for women s/p WLS had outcomes closer to normal weight women.

Weintraub, A., Levy, A., et. Al. (2008). Effect of bariatric surgery on pregnancy outcome. International Journal of Gynecology, 103, 246-251.

Impact on Pregnancy

- After bariatric surgery, there is a reduced risk for hypertension, pregestational diabetes, gestational diabetes, and preeclampsia, as well as of large-for-gestational-age infants and macrosomia.
- Waiting 12 to 24 months after bariatric surgery before conceiving may be helpful to avoid exposing the fetus to an environment of rapid maternal weight loss and to allow the patient to achieve full weight loss goals.
- Unfortunately weight loss increases fertility due to changes in hormone secretion and ovulation.

ACOG Issues Guidelines on Managing Obesity in Pregnancy. *Obstet Gynecol*. 2009;113:1405-1413.

Nutrients of Concern: Iron

- Decreased intake of sufficient sources of heme iron, a reduction in the acidic environment required to release heme iron, and changes in absorptive surface area, all impact iron stores.
- Bypassing the duodenum and proximal jejunum contribute to iron deficiency because that is the main site of iron absorption.
- Iron deficiencies seen in 15.7% of patients but has been seen as high as 52% in RYGB patients, especially in women who are still menstruating.

Toh, S., Zarshenas, N., & Jorgensen, J. (2009).Prevalence of nutrient deficiencies in bariatric patients. *Nutrition* ,1-7.

Iron

- In a study published this year comparing amount of heme-iron absorption was 23.9% before and 6.2% 12 mo after surgery.
- Nonheme-iron absorption decreased from 11.1% to 4.7% after WLS. No differences were observed by type of surgery.
- Iron intakes from all sources of supplements satisfactorily met recommended guidelines. Serum ferritin and total-body iron decreased more after RYGB than after Sleeve Gastrectomy.
- Prophylactic iron is routinely recommended. The American Association of Clinical Endocrinologists, the Obesity Society, and the American Society for Metabolic & Bariatric Surgery (AACE/TOS/ASMBS) suggest the use of 45 to 60 mg/d. This study showed that this dose was not sufficient for everyone. Labs need to be monitored and further supplementation should be provided if women are consistently low.

Am J Clin Nutr 2012;96:810–7

Iron

- About 80% of the iron present in a term infant is established during the third trimester. Premature infants can miss out on this accretion and can be deficient in total iron.
- Maternal anemia, HTN, or Gestational DM can increase risk of low fetal iron stores in both term and premature infants.
- Amenorrhea from sustained lactation benefits women as decreased blood loss via the menstrual cycle can boost depleted iron stores.
- Analyzation has shown human milk is a poor iron source, but iron from human milk is better absorbed than formula. Lactoferrin, a whey protein connected with infant immune response, has been found in greater concentration in breastmilk from iron-deficient women. It has been hypothesized that this increase may help to protect the infant from iron deficiency.

Baker RD et al. Pediatrics. 2010; 126:1040-1050.

Nutrients of Concern: Zinc

- Zinc absorption also takes place mainly in the duodenum and initial portions of the jejunum. Due to reduction in surface area for absorptive capacity to absorb zinc is significantly reduced.
- A study in 2011 showed reduction in total zinc absorbed before and after surgery at 6,12, and 18 month increments in individuals taking appropriate supplementation.
- Percentage zinc absorption decreased significantly from 32.3% to 3.6% at 6 mo after RYGBP and to 21% at 18 mo after surgery.
- Mild zinc deficiency in adults has been associated with alterations in immune function, dermic lesions, and cognitive function.
- Thus, data suggest justification for routine supplementation, but at a higher dose, probably in the range of 40 to 60 mg/d.

Ruz, M., Carrasco, F., et. Al. Zinc absorption and zinc status are reduced after Roux-en-Y gastric bypass: a randomized study using 2 supplements. Am J Clin Nutr 2011;94:1004–11.

Nutrients of Concern: Vitamin D

- Some research shows that Vitamin D status may be inadequate in morbidly obese women and men prior to weight loss surgery. A small Norwegian study showed that morbidly obese women and men had significantly lower concentrations of vitamin B-6, vitamin C, 25-hydroxyvitamin D, and lipid-standardized vitamin E than did the healthy controls.
- Deficiency seen in about 50% of RYGB patients
  - Maternal: weakness, muscle aches, bone pain.
  - Infant: muscle spasms, caused by insufficient calcium, proceeds full blown rickets; older infants may be slow to sit and crawl, or the spaces between the skull bones (fontanelles) may be slow to close

Toh, S., Zarshenas, N., & Jorgensen, J. (2009).Prevalence of nutrient deficiencies in bariatric patients. Nutrition ,1-7.

Aasheim, E., Hofsø, D., Hjelmesæth, J., Birkeland, K., and Bøhmer, T. Vitamin status in morbidly obese patients: a cross-sectional study. Am J Clin Nutr 2008;87:362–9. Limited by small sample size and Norwegian population sample.

Vitamin D

- The best dose amount of calcium and vitamin D patients need s/p RYGB to maintain stable parathyroid hormone and vitamin D levels has yet to be determined. Typical amounts of 800 to 1000 IU are recommended after surgery.
- 25(OH)D concentrations are the only source of vitamin D early in pregnancy and have been shown to correlate with neonatal concentrations at birth.
- Infants may be influenced more by the Vitamin D status of the mother during pregnancy and by the amount of sun exposure received, than by Vitamin D levels in breastmilk as milk contains low levels of Vitamin D. Additionally, there has been little evidence to suggest that lactation increases Vitamin D needs in the mother.
- The American Academy of Pediatrics recommends that infants less than six months old should be kept out of direct sunlight in order to limit UVA light exposure and suggests that "all breastfed infants receive at least 200 IU of Vitamin D per day beginning in the first two months after delivery."

American Academy of Pediatrics. Breastfeeding and the use of human milk. Work group on breastfeeding. *Pediatrics*. 1997; 100:1035-1039.

Nutrients of Concern: Vitamin B12

- Vitamin **B12** is bound to protein in food and is cleaved from the protein by the action of gastric acid and pepsin in the stomach. It then binds to intrinsic factor before being absorbed in the terminal ileum.
- Testing has shown that secretion of hydrochloric acid may be nearly absent in the surgically created pouch. With decreased acid and pepsin exposure, vitamin B12 can not be cleaved from foods such as meat, milk, and eggs. B12's attachment to glycoproteins and subsequent coupling with intrinsic factor needed for absorption is hindered.
- Deficiencies have been discovered in 30% to 70% of patients one to nine years after RYGB. Hemoglobin or mean corpuscular volume (MCV) levels may not reveal this deficiency.
- 17% in AGB
- 26.2% in Sleeve
- 3% in DDS

Toh, S., Zarshenas, N., & Jorgensen, J. (2009).Prevalence of nutrient deficiencies in bariatric patients. *Nutrition* ,1-7.

Vitamin B12

- Mothers who are B12 deficient during pregnancy may give birth to infants with subnormal B12 stores. Further depletion may occur as the infant is undersupplied via human milk from a B12 deficient mother.
- In lap band patients there may be poor protein/meat tolerance and thus inadequate B12 consumption.
- Maternal side effects: macrocytosis, glove and stocking neuropathy, sore tongue, paleness, weakness, fatigue and anemia; tingling in hands and feet, loss of reflex, confusion, irritability, depression
- Infant: can occur as early as 2 weeks of age, most infants are healthy until about 1-12 months of age after which they fail to thrive and show developmental regression; lethargy, loss of muscle control, macrocytic anemia

Nutrients of Concern: Folate

- Absorbed primarily by the proximal third of the small intestine, folate uptake must occur in a smaller surface area under modified conditions.
- Folate deficiency has been documented in up to 40% of patients after RYGB and is of great concern in regards to the onset of neural tube defects. Both serum folate levels and red blood cell counts should be evaluated to detect deficiencies and patients supplemented appropriately.
- Folate and Vitamin B12 are required components in the creation of RNA and DNA, in addition to nervous system requirements. These micronutrients are essential for infants due to rapid growth and development.
- Symptoms
  - Anemia
  - GI tract deterioration

Shah, M., Simha, V. & Garg A. (2006). REVIEW: Long-term impact of bariatric surgery on body weight, co-morbidities, and nutritional status. *The Journal of Clinical Endocrinology & Metabolism, 11*(91), 4223-4231.

Nutrients of Concern: Calcium

- With the primary absorption site omitted, passive diffusion of calcium must occur along the remaining small intestine. Blood levels normally remain stable, as calcium is leeched from bone stores.
- Studies have shown a reduction in typical woman's maternal bone content occur during the first 3-6 months of lactation, but this loss is replaced in later lactation and after weaning.
- Breast milk calcium secretion does not appear to depend on the current calcium intake of the mother, nor does phosphorus, magnesium, or sodium. Maternal intake during pregnancy may predetermine the calcium content of breast milk after delivery.
- Deficiency
  - Variable, but estimated in 10% of RYGB patients
  - Result of bypassing duodenum and proximal jejunum
  - Low intake of Ca sources post-op
  - Decline in bone mass has been reported from RYGB patients

Shah, Simha, & Garg. (2006). REVIEW: Long-term impact of bariatric surgery on body weight, co-morbidities, and nutritional status. *The Journal of Clinical Endocrinology & Metabolism, 11*(91), 4223-4231

Nutrients of Concern: Thiamine (B1)

- Thiamine deficiency becomes an issue for patients after surgery especially if there is frequent vomiting. Thiamine, being a water soluble vitamin, needs frequent consumption.
- A review published in 2008 reported over 100 cases of Wernicke's encephalopathy in RYGB patients. Patients who demonstrate confusion, impaired memory, ataxia, or ophthalmoplegia should have serum thiamine level checked.
- Post-op vomiting due to gastric band slippage or because a band is too tight or a stricture post RYGB can lead to a thiamine deficiency.
  - Maternal: lethargy, depression, irregular heartbeat, or burning hands/ feet
  - Infant: vomiting, lethargy, irritability, abdominal distension, diarrhea, respiratory symptoms, developmental delay, or failure to thrive.

Fat Soluble Vitamins

- Decreased fat breakdown
- Loss of absorptive surface
- A: Changes in vision, loss of night vision, dry eyes, dry hair/skin
- Cranial bleeds in babies with mothers with Vitamin K deficiency, current study taking place in Belgium

- 11% -Eckert 2009, Clements 2006
- 52.5% -Ledoux
- 18% correlated with low prealbumin- Zalesin 2011

- Higher in BPD- 69% Vitamin A, 68% Vitamin K, 4% Vitamin E

Long Term Monitoring

- Only 14–59% of postoperative bariatric surgery patients continue to take the prescribed multivitamin supplement long-term; therefore, patients without appropriate preconception care may not have adequate supplement levels at the start of pregnancy.
- All **bariatric** surgery patients would be best served by receiving regular monitoring of serum nutrient levels starting at 3 months after surgery and periodically thereafter.

- *Shankar P. Micronutrient deficiencies after bariatric surgery. Nutrition. 2010; 26(11-12): 1031-7*
- *Dixon JB, Dixon ME, O'Brien PE. Elevated homocysteine levels with weight loss after Lap-Band surgery: higher folate and vitamin B12 levels required to maintain homocysteine level. Int J Obes Relat Metab Disord 2001;25:219–27.*

Nutrients of Concern: Protein

- No consensus has been reached on the extent to which protein energy malnutrition may develop after gastric bypass surgery. In 2003 Bock found that at least 17% of patients had persistent intolerance of protein food sources resulting in an intake less than half of what was recommended.
- In a study of patients having plastic surgery published in 2010, 18% did not meet protein intake, 40% had low iron, and 10% had anemia.
- A protein intake of 65 grams per day is recommended for the first six months of breastfeeding.
- Patients' diets and lab values should be evaluated and patients should be encouraged to focus on high quality protein sources to meet minimal guidelines.

Bock, MA. (2003). Roux-en-Y gastric bypass: the dietitian's and patient's perspective. Nutrition in Clinical Practice. 18,2,141-144.

Naghshineh, N,et. Al. Plast Reconstr Surg 2010 Aug; 126(2): 602-10.

Protein

- 50% Duodenal absorption
- Intake (intolerance to meat, lower volume)
- Decreased pancreatic enzyme secretion
- Decreased contact time
- -Muscle weakness/loss, skin anomalies, nail health, edema
- Higher risk in BDS

What does 65 grams of protein look like?

1 C cereal, 1 C lactaid milk	8
1 large bananas	1
1 Sandwich, with 2oz turkey, 1oz cheese	10+
1 C baby carrots	2
6 oz Greek yogurt	8
½ C almonds	15
4 oz chicken breast	28
1 C brown rice	6
1 C cooked veggies	2

Higher risk in BDS- 90 to 120 grams/day

Fat

Lipid comprises half of breastmilk calories, and is highly variable. The total lipid content of human milk is not affected by daily intake in normal mothers, although it has been correlated with maternal fat stores.

- Breastmilk contains arachidonic acid (ARA) and docosahexaenoic acid (DHA), which have been associated with improved cognition, growth, and vision in children.55 Some experts recommend supplementation of ARA and DHA in the diets of both pregnant and lactating mothers, especially for those patients with limited diets.

Mandel D; Lubetzky R; Dollberg S; Barak S; Mimouni FB Fat and Energy Contents of Expressed Human Breast Milk in Prolonged Lactation. *Pediatrics* 2005; Sep;116(3):e432-e435.

Butte NF; Garza C; Smith EO. Variability of macronutrient concentrations in human milk. *Eur J Clin Nutr*. 1988 Apr;42(4):345-9.

Vitamin/Mineral Supplements

Lap Band	RYGB/Sleeve	BPD/DS
Complete MVI-Chewable	Complete MVI-Chewable	Adult MVI 1 to 2/day - Chewable
Sublingual B12 350-500 mcg	Sublingual B12 350- 500 mcg	Sublingual B12 350-500 mcg
Calcium Carbonate or Citrate- 500 mg TID	Calcium Citrate 500 mg TID	Calcium Citrate 600 mg BID
Vitamin D3 800 to 1000 IU	Vitamin D3 800 to 1000 IU	Vitamin D3 800 to 1000 IU
	Iron 325 mg	Iron 325 mg Ferrous Fumerate- or more
	Zinc 50 mg	ADEK- 1 capsule BID
Must be chewable or liquid		May need B complex with 100 % daily requirements of thiamine, riboflavin, and niacin

Once a woman becomes pregnant 1 PMVI + other supplements is recommended.

Lactation Considerations

- Type of surgery- Restrictive or Malabsorptive?
- Time after surgery until pregnancy occurred.
- History of previous pregnancies
- Weight gain in pregnancy
- Lactation history
- Nutrition Status
- Lab values
- Plastic surgery history
- Use of vitamin and mineral supplements??

Nutrition Evaluation of the Lactating Mother

- **A**nthropometric: Ht, Wt, current BMI, Weight before pregnancy, wt loss history
- **B**iochemical: CBC, CMP, Iron Studies, Thiamin, B12, Folate, Vitamin D (25, OH), Zinc. (Vitamin A with malabsorptive).
- **C**linical: Hair, skin, nail, memory changes, tingling, numbness, or fatigue
- **D**ietary Intake
  - Type of Supplementation & Compliance during pregnancy
  - Balanced diet including good protein sources
  - Watch for disordered eating – PICA, aversion, binge type behaviors

Include your Registered Dietitian to complete this portion of assessment

In Pregnancy/Lactation

- Most authorities recommend that pregnancy should be delayed at least 12-18 months after surgery.
- Women who may become pregnant should be advised to consume a prenatal vitamin containing 1 mg folate, 500 1000 micrograms of crystalline vitamin B12, plus calcium citrate in amounts of 1200 to 1500 mg and vitamin D.
- Patients who have had gastric bypass surgery should consume 40 to 65 mg iron in the ferrous form daily.
- Some guidelines suggest that during pregnancy, the prenatal vitamin should be given in addition to a daily multivitamin, not instead of. The consumption of two prenatal vitamins may not be advisable as some combinations may exceed Vitamin A and iron guidelines.

Kominiarek MA, Kilpatrick, SJ. Bariatric surgery and the ob/gyn patient. Contemporary OB/GYN. 2005; 50(3):76-88.

Goals of Nutrition during Breastfeeding

- Adequate calorie intake for milk production
- Well balanced meals and snacks
- Appropriate vitamin and mineral supplementation to prevent or correct deficiencies
- Continue to follow bariatric surgery dietary guidelines
- Education about nutrition and lactation including appropriate weight loss goals

Nutritional Needs

- Protein recommendations
  For most individuals at least 70 grams/day (1.1 grams/kg IBW)
- Calorie recommendations
  - About 1800 to 2200 (about 300 to 500 calories above recommended intake for weight maintenance s/p surgery)
  - Nutritional intake should be adequate to promote and sustain milk production
  - Serum Lab values for protein including albumin and prealbumin are effected by many factors and may not be a good indicator of nutrition status.

Insufficient Milk Syndrome

- Causes:
  - Maternal
    - Energy Restriction
    - Fertility problems
    - Breast surgery
    - Delayed lactogenesis
    - Retained placenta
    - Unrelieved engorgement
    - Began menstruating
    - OTC medications
    - Birth Control
- Causes:
  - Infant
    - Infrequent feeding
    - Ineffective suck
    - Overuse of a pacifier
    - Prematurity
    - Neuromotor problems (Down's Syndrome)
    - Oral anatomic problems (cleft, etc.)

Insufficient Milk Syndrome cont.

- Treatment
  - Maternal/infant history
  - Maternal breast exam
  - Infant physical examination
  - Observe breastfeeding
  - Evaluate milk supply and maternal intake
  - Intervene

Increasing Maternal Caloric Intake after Gastric Bypass

- 5-6 small meals with protein source
- 3 servings milk/dairy per day
- Avoid liquids with meals
- Nutrient dense – not "rabbit food"
- May require protein supplementation
- Intake should be enough to maintain weight without significant loss after pregnancy. Weight loss of up to 1 pound per week has been shown to not effect milk production.

McCrory, MA. Does dieting during lactation put infant growth at risk? Nutr Rev 2001; 59:18-21.

Techniques for Lactation Success

- Increase skin to skin contact
- Frequent breastfeeds especially in the first 24 hours to help delayed lactogenesis
  - Nipple massage may help with latch on elongated/engorged breasts of obese women
  - Tissue sagging may require support under the breast through rolled towels/pillows or laid back/biological nurturing position

Lamb, M. (2011). Weight-Loss Surgery and Breastfeeding. Clinical Lactation, Vol. 2-3, 17-21.

Follow-up

- Infants should be monitored for normal weight gain, developmental milestones, etc. by PCP.
- Mother's should f/u with Lactation Consultant to ensure adequate milk is being produced, infant is able to extricate milk from the breast, and is growing appropriately
- Mother's diet should be evaluated by RD experienced in post bariatric nutritional intake & lactation

What clinicians can do…

- Within your facilities help to develop clinical pathways for patient care with obstetrics, bariatric surgery and lactation programs
- Provide guidance to women of reproductive age prior to weight loss surgery
- Continue to respect individual differences and choice
- Support and participate in clinical research

Resources

- www.lli.org
  - Handout available for topic
  - Jevitt, C, Hernandez, I., and Groer, M. (2007). Lactation Complication by Overweight and Obesity: Supporting the Mother and Newborn. Journal of Midwifery & Women's Health, 52(6), 606-613.