

## GC+NUTRITION

### SYMPOSIUM: NUTRITIONAL AND METABOLIC CHANGE AFTER GASTRECTOMY

## Pathophysiology of Nutrition and Metabolic Change after Gastrectomy

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Although the incidence of gastric cancer appears to be slowly decreasing, it still is the most prevalent malignancy in Korea. The nationwide screening program contributed to the early detection and the marked improvement of gastric cancer survival over the last two decades, and therefore, the number of long-term survivors is gradually increasing. This in turn requires more attention to their long-term nutritional consequences which are related to radical gastrectomy for gastric cancer to provide proper nutritional supplementation guidelines and also a better quality of life in these patients.

Patients undergoing gastrectomy experience restriction in food intake as well as metabolic changes in the nutrient absorption in many ways. Nutritional intolerances and malabsorption may lead to nutritional deficiencies and undesirable clinical consequences in gastric cancer patients following radical gastrectomy. These nutritional deficiencies may develop months to years after surgery; anemia and metabolic bone disease are the most common manifestations of the long-term nutritional sequelae in these patients. Here reviews the pathophysiology of the metabolic changes following gastric cancer surgery and suggest appropriate surveillance and nutritional supplementation plan for these patients.

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# Nutritional Benefit after Function Preserving Gastrectomy for Gastric Cancer

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### SYMPOSIUM: NUTRITIONAL AND METABOLIC CHANGE AFTER GASTRECTOMY

## Nutritional Change after Onco-metabolic Surgery for Gastric Cancer

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Since reconstruction following gastrectomy are similar to bariatric surgery, some investigators have attempted to modify reconstruction by elongating length of bypassed limbs in gastric cancer with type 2 diabetes to achieve better metabolic outcomes.

Onco-metabolic surgery (OS) is a modification of RY reconstruction, in length of bypassed limb longer than conventional surgery (CS).

Major nutritional complications of bariatric surgery are micronutrient deficiencies including iron, folate and vitamin B12.

In one prospective pilot study evaluated nutritional safety and feasibility of OS comparing CS, incidences of anemia, iron and vitamin B12 deficiency did not differ. However, median vitamin B12 concentration tended to be lower and reductions greater. Also, in retrospective multicenter report showed a favorable glycemic control without nutritional deficit and anemia after 1 year follow up.

The nutritional safety of OS should be clarified, especially, about vitamin B12 deficiency. The incidence of nutritional deficiency could increase during longer follow-up, so cumulative data collection over a long period is essential.

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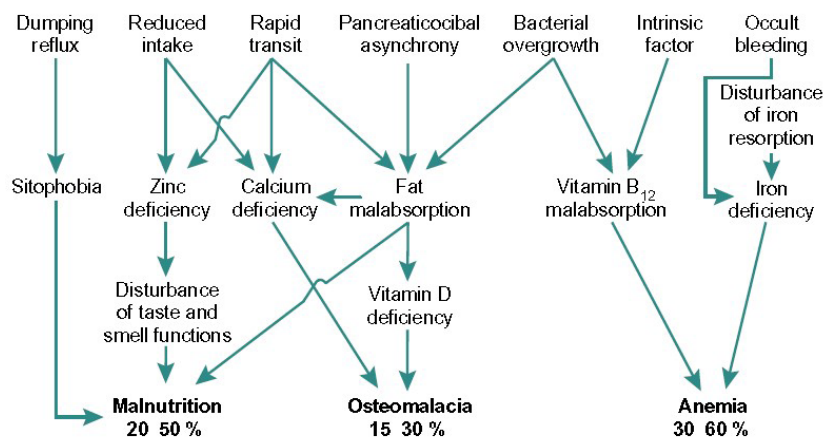
### SYMPOSIUM: NUTRITIONAL AND METABOLIC CHANGE AFTER GASTRECTOMY

## Nutritional support in Gastric Cancer

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### 1. Mechanism of malnutrition after gastrectomy



(Scholmerich J. Best Pract Res Clin Gastroenterol. 2004)

### 2. Peri-operative nutritional support

1) ESPEN guidelines for clinical nutrition in surgery in general (Clinical Nutrition 2017)

- Patient with malnutrition and at nutritional risk.
- If NPO ≥ 5 days anticipated
- low oral intake, < 50% of recommended intake > 7 days expected

2) Validation study of peri-operative ONS support for gastric cancer in SNUH (Kong SH, Lee HJ et al. Surgery. 2018)

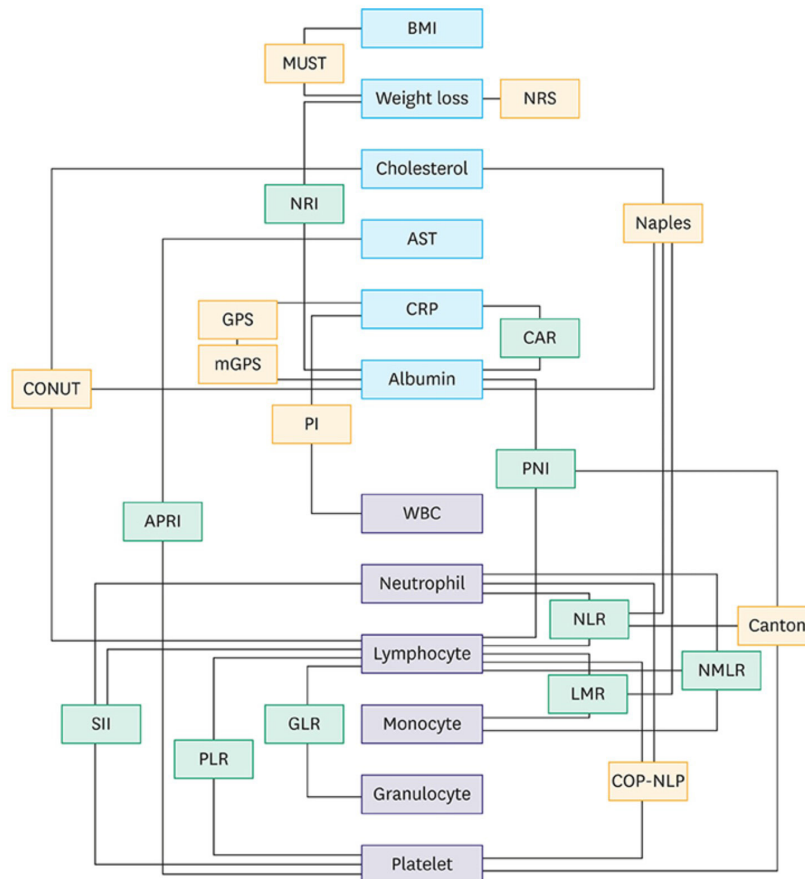
- Peri-operative standard ONS did not reduce the overall incidence of complications after gastrectomy when routinely indicated for all the patients with BMI < 18.5 or for all of the patients with PG-SGA B & C
- Possible benefit of reduced complication only for patients with PG-SGA C

3) KSSMN-01 multicenter study for postoperative ONS supplementation after major GI surgery (Asia Pac J Clin Nutr. 2017)

- The utility of routine postoperative ONS administration after major gastrointestinal surgery was not proven in terms of weight loss at 8 weeks after discharge.
- Tendency and possibility of better wt. maintenance after 8 weeks, esp for patients with PG-SGA B/C and/or high compliance
- Postoperative ONS administration did contribute to the improved recovery of some biochemical parameters, such as the total lymphocyte count and total cholesterol, serum protein, and albumin levels

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### 3. Biomarkers for nutritional/inflammatory/immunologic markers predicting complications and long-term survival after cancer surgery (Guner A, Kim HH, J Gastric Cancer 2019)



#### 4. Anemia

- 1) Iron deficiency anemia
  - Suspicion about other causes of bleeding
  - Oral supplement : 150-300 elementary iron/day for 4-6 months
  - IV supplement :
    - Needed iron (mg) = Bwt (kg) x (target Hb (12) - pt's Hb) x 0.24 + 500 mg
    - Ferric hydroxide sucrose (venofer®) : 100-200mg multiple injection
    - Ferric hydroxide carboxymaltose (Ferrinject®) : 500-1,000mg 1-2 times
- 2) Vit B12 related anemia
  - Total gastrectomy : Vit B12 1mg/2ml IM injection / 2-3 months from 1 yr after surgery (SNUH protocol). Injection/1 month for refractory case
  - Supplementation in other type of operation if serum level is low
  - Oral supplementation : 500-1000mcg/d is optional

#### 5. Osteoporosis

- Prophylactic Ca + Vit D
- Monitoring especially for high-risk patients
  - General risk factors (i.e. postmenopausal women)
  - Additional risk factors after gastrectomy : TG, adjuvant chemotherapy, anemia, back-pain
  - 25-hydroxy vitamin D ± bone mineral density
  - (Ca, P, PTH, bone markers, estrogen in female, testosterone in male)
- Treatment : Ca, Vit D ± oral or IV bisphosphonate