

Surgical Nutrition for the Cardiothoracic Patient

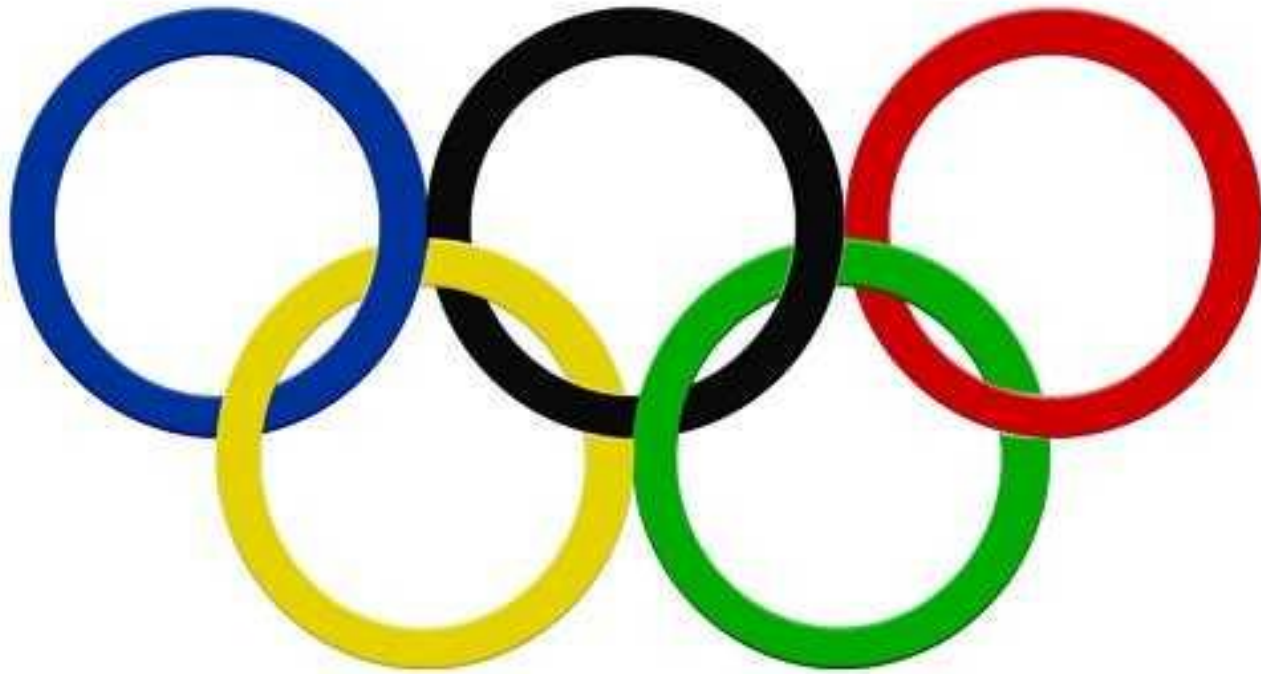
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Financial Disclosures

▶ NONE Declared

PROPER NUTRITION



Surgical Effects on Nutrition Intake & Status

- ▶ Pre-existing CoMorbidity
- ▶ Malnutrition
- ▶ Hypoperfusion
- ▶ Hemodynamic Instability
- ▶ Fluctuating Metabolic/Fluid Demands
- ▶ GI Complications
- ▶ Malabsorption
- ▶ GI & Fluid Losses (15-30 g protein/L)
- ▶ Poor Oral Health
- ▶ Ileus
- ▶ Dysphagia

Surgical Nutrition Goal

- ▶ Prevent **excessive nutrient losses** with delivery of adequate nutrients to meet metabolic demands

Targeted Nutrition



- ▶ Energy Intake
- ▶ Protein Intake
- ▶ Micronutrient Supplementation
- ▶ Immune-Modulators
- ▶ Glucose Control
- ▶ Prebiotics, Probiotics
- ▶ Diet-> Less in More

Targeted Nutrition-> Energy Intake

▶ Energy = Calorie Intake

▶ Surgical Needs

▶ ICU 25-30 kcal/kg/day (70 kg->1750 -2100 kcal)

▶ Recovery 30-35 kcal/kg/day (70 kg->1750-2450 kcal)

▶ Oral Nutrition Supplements (ONS)

▶ Standard x 2 = **700 calories** (40 g protein)

▶ Renal x 2 = **950 calories** (43 g protein)

Targeted Nutrition->Protein Intake

▶ Surgical Needs

- ▶ ICU 1.5-2 g/kg/day (70 kg-> 105-140 g)
- ▶ Recovery 1.2-1.4 g/kg/day (70 kg-> 84-98 g)

▶ Oral Nutrition Supplement (ONS)/Modulars

- ▶ Protein Powder 3 pkts **18 g protein** (50 kcal)
- ▶ 4 pkts **24 g protein** (100 kcal)

Targeted Nutrition->Micronutrient Supplementation

- ▶ Deficiencies often present
- ▶ Due to inadequate intake/administration amounts, altered requirements & increased losses
- ▶ Decreased serum levels may not indicate actual deficiencies but redistribution as an adaptive response
- ▶ Duration of supplementation - 14 days, 30 days

ZINC

- ▶ Trace Element
- ▶ Healing of wounds
- ▶ Carbohydrate metabolism, production and activity of insulin
- ▶ Function of the immune system

Vitamin C

- ▶ Water soluble
- ▶ Antioxidant
- ▶ Wound healing, collagen formation
- ▶ Metabolism of long-chain triglyceride
- ▶ Not synthesized by humans
- ▶ Caution with use with renal compromise

SELENIUM

- ▶ Trace element
- ▶ Functions as an antioxidant
- ▶ Depleted in systemic inflammatory response syndrome
- ▶ Repletion in long term parenteral nutrition

Vitamin D

- ▶ Fat soluble
- ▶ 70% of US population are Vit D deficient
- ▶ Bone metabolism
- ▶ Immune function
- ▶ Muscle strength

Thiamine (Vitamin B1)

- ▶ Water soluble
- ▶ Carbohydrate metabolism
- ▶ At risk: ETOH, dialysis, malabsorption, malnutrition, long-term diuretics

Targeted Nutrition-> Immune Modulators

- ▶ Glutamine
- ▶ Arginine

- ▶ Eicosapentaenoic Acid (EPA)
- ▶ Docosahexanoic Acid (DHA)

GLUTAMINE

- ▶ Considered conditionally essential amino acid
- ▶ Depleted with physical stress
- ▶ Preferred source of fuel for immune modulating metabolic processes
- ▶ Not be used routinely in MICU

ARGININE

- ▶ Declines with traumatic injury & with major surgery
- ▶ Some studies suggest improvement with immune function and wound healing
- ▶ Not be used routinely in MICU

Omega 3 Fatty Acids

- ▶ Anti-inflammatory & antithrombotic, lower serum triglyceride
 - ▶ Eicosapentaenoic Acid (EPA)
 - ▶ Docosahexanoic Acid (DHA)
- ▶ Semi-Elemental TF formula: 2.4 g/L EPA + DHA

Targeted Nutrition->Glucose Control

▶ Poorly Controlled

- ▶ Increase Morbidity
- ▶ Increase Mortality
- ▶ Increase Length of Stay

▶ Controlled

- ▶ Reduced sepsis
- ▶ Stimulate Protein Synthesis
- ▶ Reduce Whole Body Muscle Wasting in critical illness

Targeted Nutrition → Probiotics

- ▶ Living microorganisms
- ▶ Aid in improving GI barrier function, modification of gut flora & immunomodulation
- ▶ Prevention of antibiotic associated diarrhea, c diff infections, multiorgan dysfunction syndrome & ventilator-associated pneumonia
- ▶ Dietary supplement. No FDA regulations
- ▶ Safety with administration

Targeted Nutrition → Prebiotics

- ▶ Defined as non-digestible but fermentable foods that selectively stimulate the growth and activity of bacteria in the colon
- ▶ Includes Fiber additive- fructooligosaccharide (FOS), inulin
- ▶ Diarrhea → 10-20 g in divided doses over 24 hrs

Targeted Nutrition-> Oral Intake - Less is More

- ▶ Less Restriction→ Consider Regular diet
- ▶ Less Sodium→ 4 g Sodium
- ▶ Less Simple Sugars→ No Concentrated Sweets
- ▶ Start with Entrée First
- ▶ Less Juices but More Fresh fruits
- ▶ Avoid Fried Foods

CONCLUSION

- ▶ Screen and assess pre & post operatively for nutrition risk
- ▶ Early nutrition intervention aids with preventing mucosal injury, maintain ideal balance of gut microbiota, reducing infectious complications and possibly improving splenic perfusion
- ▶ Attention to metabolic management with changes in kcal & protein requirements and glycemic control
- ▶ Benefits of oral nutrition & modular supplements, use of antioxidants, pre and probiotics.

Questions?

MEMORIAL
HERMANN