

- Risk with coxibs is approximately 50–60% less than with nonselective NSAIDs but still present.
- Concurrent treatment with a PPI or misoprostol may further decrease risk.
- All NSAIDs may carry an increased risk of CV events, especially if used with aspirin (one NSAID may antagonize benefit of another) and with chronic use.
- Significantly increased risk with COX-2s led to withdrawal from market of most coxibs; increased CV risk was later determined to be a class effect.
- Periop use is generally safe in pts with low CV risk, but contraindicated in cardiac surgery pts.
- For most pts, increased risk is small; a risk/benefit analysis should be undertaken before continuing long-term use.
- Can exacerbate and/or induce CHF in susceptible pts.
- Risk is nearly equivalent to that of NSAID-induced gastropathy.
- Can lead to increases in BP, especially in pts with pre-existing Htn.
- Use in pregnancy considered safe for short courses of therapy (<72 hr) and up to 32 wk of gestation.
- Chronic use and use of aspirin generally contraindicated
- Some concern for increased risk of miscarriage early in first trimester and premature closure of ductus arteriosus after 32 wk.

Nutritional Support

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Risk

- Up to 40% of pts may be undernourished on admission to hospital, and two-thirds of all pts lose weight during hospital stay. 60% of elderly pts are malnourished at discharge. More than 376,000 people depend on TPN per year in USA.

Perioperative Risks of Malnutrition

- Decreased respiratory, cardiac, and skeletal muscle mass and strength.
- Up to 50% of heart failure pts are malnourished.
- Decreased visceral protein mass, altered GI mucosal barrier.
- Altered humoral, cell-mediated immunity.
- Altered neutrophil function.
- Increased pulm, thromboembolic complications.
- Pts with protein-calorie malnutrition have increased risk for postop cardiac, noncardiac complications.
- Increased risk for nosocomial infections and decreased wound healing.
- Increased risk for multiple organ failure.
- Increased length of hospital stay.

Worry About

- Hypoglycemia or hyperglycemia, depending on additives to TPN.
- Decreased ability to secrete insulin in malnourished pts.
- Kidney dysfunction and failure prevalent in cases of severe malnutrition.
- Increased free fraction of certain protein-bound drugs with low albumin levels.
- Vitamin B₁₂ and/or folate deficiency, leading to anemia.
- Higher rates of infection with TPN.
- Excess carbohydrate administration via TPN may lead to increased CO₂ production and increased difficulty in weaning from ventilatory support and hepatic steatosis.
- Excess fat administration via TPN may lead to hyperlipidemia, decreased immune function, and reduced reticuloendothelial function.

Overview

- $NRI = 1.519 \times \text{serum albumin (g/L)} + [0.417 \times (\text{current weight/usual weight}) \times 100]$. (Malnutrition

defined as NRI <100; severe malnutrition defined as NRI <83.5.)

- Preop nutritional support for 5–7 d may result in decrease in infectious complications in severely malnourished pts.
- TPN composition:
 - Fluid: 30 mL/kg/d, additional losses
 - Calories: 25–30 kcal/kg/d
 - Glucose: 3.0–5.0 g/kg/d
 - Fat: 1.0–1.5 g/kg/d
 - Protein: 1.5–2.0 g/kg/d
- Additives:
 - Multivitamins in the form of balanced formula should be provided daily.
 - IV formula requires addition of vitamin K, 2 mg/d.
 - Trace elements should be given daily to pts with GFR >20 mL/d; magnesium: 15–20 mg/d; zinc: 15–40 mg/d. (Requirement for replacement is based on serum level.)
- Special formulas: Modified amino acid formula is more efficient in restoring positive nitrogen balance, decreasing ureagenesis, and increasing support of protein synthesis.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
MS	>10% loss of body weight over 6 mo	Renal Hx of renal, hepatic dysfunction Short gut	Muscle wasting Decreased triceps and skinfold thickness, decreased mid-arm circumference	Alb <2.5 g/dL Total lymphocyte count <1500 cells/mm ³

Key References: Fernández López MT, Fidalgo Baamil O, López Doldán C, et al.: Prevalence of malnutrition in not critically ill older inpatients, *Nutr Hosp* 31(6):2676–2684, 2015; Fessler TA: Trace elements in parenteral nutrition: a practical guide for dosage and monitoring for adult patients, *Nutr Clin Pract* 28(6):722–729, 2013.

Perioperative Implications

Monitoring

- Daily monitoring of wt, electrolytes, magnesium
- Weekly monitoring of zinc, liver function tests, PT/PTT
- Nutritional variable: Prealbumin and transferrin are better indicators of nutritional status due to their shorter half-life compared to albumin. Failure to improve or maintain adequate levels usually represents inadequate nutritional support, intercurrent systemic inflammatory response, or advanced organ failure.

Induction/Maintenance

- TPN is usually continued intraop.
- Monitor glucose.
- Malnutrition may predispose a pt to having a higher risk for pseudocholinesterase deficiency; use succinylcholine with caution.

Adjuvants

- For morbidly obese pts, use ideal weight for calculation of TPN requirement.
- For severely underweight pts, use half the difference between pt's ideal weight and actual weight.

Anticipated Problems/Concerns

- Caloric and glucose overload can result in hyperglycemia and hepatic dysfunction.
- Moderate and severe hypoglycemia occur frequently in critically ill pts assigned to intensive glucose control, and are both strongly associated with an increased risk of death.
- Fat overload can result in WBC dysfunction, infectious complication, and increased CO₂ production.