Cardiac Care Outcomes Assessment Program (COAP) Enhanced Recovery After Surgery (ERAS) Nutrition Protocol for Cardiac Surgery

Malnourished surgical patients have significantly higher postoperative morbidity, mortality, length of hospital stay, readmission rates, and increased costs associated with their inpatient episodes

We have integrated the Guidelines for Perioperative Care in Cardiac Surgery Enhanced Recovery After Surgery Society Recommendations as well as recommendations by the COAP surgical subcommittee and key stakeholders from cardiac surgical programs across the State.

Regarding nutrition, the Guideline recommendations include:

- Preoperative Correction of Nutritional Deficiency

- For patients who are malnourished, oral nutritional supplementation has the greatest effect if started 7 to 10 days preoperatively and has been associated with a reduction in the prevalence of infectious complications in colorectal patients.

- In patients undergoing cardiac surgery who had a serum albumin level less than 3.0 g/dL, supplementation with 7 to 10 days’ worth of intensive nutrition therapy may improve outcomes.

- Currently, however, no adequately powered trials of nutritional therapy initiated early in patients undergoing CS who are considered high risk are available.

- This may not be feasible in urgent or emergency settings. Further studies are needed to determine when to delay surgery to correct nutritional deficits.

- Based on these data, correction of nutritional deficiency is recommended when feasible (class IIa, level C-LD).

- Encouraging clear liquids until 2 to 4 hours preoperatively is an important component of all ERAS protocols outside of cardiac surgery. However, no large studies have been performed in populations undergoing cardiac surgery. Based on the data available on cardiac surgery, clear liquids may be continued up to 2 to 4 hours before general anesthesia (class IIb, level C-LD).
Preoperative nutritional screening and care:

All elective patients should be screened preoperatively for malnutrition.

Use of a standardized screening tool such as the Perioperative Nutrition Screening (PONS) assessment tool is advised.

Other screening tools and interventions:

**Have you noticed a decrease in your ability to perform daily activities?**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it difficult to shower and/or get dressed?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Is it difficult to walk to your car or your mailbox?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Is it difficult to climb stairs?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0 points</th>
<th>1 point</th>
<th>2 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss unintentional</td>
<td>&lt;3 lbs</td>
<td>5-10 lbs</td>
</tr>
<tr>
<td>Meals/day</td>
<td>3-4 meals</td>
<td>1-2 meals or freq snacks</td>
</tr>
<tr>
<td>Functional status</td>
<td>0 Yes Answers</td>
<td>1-2 Yes Answers</td>
</tr>
</tbody>
</table>

**Scoring:**

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Nutritional Risk</th>
<th>Enhanced Recovery overview</th>
<th>Pre-Surgical Nutrition Tips</th>
<th>Increasing Calories &amp; Protein for Surgery</th>
<th>Refer to Dietitian</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 points</td>
<td>Low</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 points</td>
<td>Moderate</td>
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</tr>
<tr>
<td>3-6 points</td>
<td>High</td>
<td>X</td>
<td>X</td>
<td>X</td>
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Nursing/clinic staff perform an assessment in surgical/preoperative clinics using tools and the results can be uploaded into EMR and trigger a nutrition intervention as appropriate.

Patients at high nutrition risk should be considered for referral to a registered dietitian nutritionist (RDN) for a complete nutrition assessment and intervention.

For diabetic patients, check Hemoglobin A1C and consider referral to diabetes clinic if A1C > 7%.
ENHANCED RECOVERY
Pre-Surgical Nutrition Tips

Fruits
2-4 Servings
1 serving =
1 piece or 1/2 cup most fruits
1 cup berries, melon
6” banana
2 TBSP dried fruit

Vegetables
3-5 Servings
1 serving =
1 cup leafy greens: Spinach, kale, chard, arugula, mixed greens
1/2 cup cooked or 1 cup raw – broccoli, cauliflower, cabbage, carrots, celery, etc

Grains
4-6 Servings
Choose whole grains for more nutrients!
Bread, pasta, tortillas
Brown rice, wild rice, quinoa, faro, oats
Hot cereal, cold cereal

Protein
5-7 oz min/day
Fish, beef, chicken, pork, cheese, cottage cheese
Legumes: lentils, beans, soy, peas, peanuts
Protein powders (whey, veggie-based)

Dairy
2-3 Servings
Milk, yogurt, Greek yogurt
Alternatives: Soy, almond, coconut, or oat milk or yogurts

Fats & Oils
Use liberally if you need to gain weight or in moderation if trying to maintain:
olive oil, sesame oil, vegetable oils, coconut oil, peanut oil, etc
butter, margarine, mayonnaise, shortening
sour cream, cream cheese

Healthier fats:
avocado, nuts, olives, nut butters, seeds, and the following oils: fish, flaxseed, nut, olive, and vegetable
ENHANCED RECOVERY
Tips for Increasing Calories and Protein

Eat small meals or snacks throughout the day

Push Protein
Increase protein intake with dairy, meat, eggs, nuts, beans, and soy products

Dairy:
- Sprinkle powdered milk into scrambled eggs, yogurt, bread mix, casseroles, sauce, and gravy
- Add cheese to casseroles, meat, sandwiches, potatoes, salads, vegetables, rice, and pasta
- Try cottage cheese as a dip, in salad or with vegetables or pasta
- Mix yogurt with cereal, granola, or fruit

Meat and Eggs:
- Eat dishes made with eggs: French toast, pancakes, custards, cooked pudding, omelets, quiche, hard-boiled eggs, and cakes
- Add small pieces cooked beef, pork, fish, poultry, or eggs to salads, casseroles, vegetables, soups, omelets, and noodles
- Serve meat with extra gravy or sauce
- Enjoy simple fried foods like chicken or fish

Make Drinks Count
Choose higher-calorie, protein-rich beverages such as: milk, shakes, smoothies, eggnog, nectars, and juice
- Switch to 2% or whole milk
- Try half & half or evaporated milk in place of milk or water in recipes for pudding, hot chocolate, shakes, soups, or casseroles
- Use less water when reconstituting juices
- If you do not tolerate cow’s milk try soy milk, soy yogurt, lactose-free milk or a milk-free supplement, such as Boost or Ensure, on cereal and in recipes
For patient with Heart Failure: Recommend modified diet for volume and sodium.

For Diabetic patients: Recommend modified diet to decrease carbohydrate intake.
Preoperative Carbohydrate Loading:

Carbohydrate drink 2-3 hour prior to surgery (no modification for diabetic patients).

The Guidelines recommend:

• A carbohydrate drink (a 12-ounce clear beverage or a 24-g complex carbohydrate beverage) 2 hours preoperatively to reduce insulin resistance and tissue glycosylation, and improve postoperative glucose control, and enhance return of gut function.
• In a 2003 Cochrane review of patients undergoing cardiac surgery, carbohydrate loading reduced postoperative insulin resistance and hospital length of stay.
• In a large randomized clinical trial in patients undergoing cardiac surgery, preoperative carbohydrate administration was found to be safe and improved cardiac function immediately after cardiopulmonary bypass. However, it did not affect postoperative insulin resistance.
• Given the current minimal supportive data in patients undergoing cardiac surgery, carbohydrate loading is given a weak recommendation at this time (class IIb, level C-LD).

Postoperative Oral and Enteral feeding:

In absence of any concerns for aspiration, advance diet as soon as tolerated.

Consideration of parenteral nutrition if enteral nutrition is not feasible after 48 hours.

Liberalize postoperative diet instead of cardiac diet while in-hospital with a focus on high protein and healthy fat consumption to aid in malnutrition correction and recovery while in the inflammatory phase for up to 2 weeks post-operative.

Nutrition consultation and education for all patients within 24-48 hours for long term dietary recommendations.

The Guidelines include other important, ungraded ERAS elements as below:

• Early postoperative enteral feeding and mobilization after surgery are considered other essential components of ERAS surgical protocols.
• Programs tailor recommendations to achieve these goals working with staff with expertise in nutrition, early cardiac rehabilitation, and physical therapy.
**Recommended team constitution:**

Surgeons

Anesthesiologists

Nurse Practitioners

Physician Assistants

Dietitians

Nurses

Caregivers

Patients