Eat on dialysis

~~To Be~~ ~~Or Not To Be~~ Eat

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Objectives

1. Review the problem of malnutrition in dialysis patients.
2. Review the importance of on-dialysis protein supplementation.
3. Discuss the potential risks and benefits of eating on dialysis.

Malnutrition in Dialysis Patients

Obesity

- Major problem in the general population.
- Major risk factor for metabolic syndrome:
  - High cholesterol
  - Coronary artery disease
  - Gout
  - Diabetes

Obesity in the Dialysis Population

- Protects against mortality! (counterintuitive)
- Overweight dialysis patients live longer than normal or low BMI patients.

Malnutrition

- Malnutrition is a major problem among dialysis patients.
- Sick people don't often eat as much as they need.
- Access to nutritious food often limited (cost, accessibility)
- Dialysis and chronic illness lead to a hypercatabolic state.

Poor Nutritional Status

- Poor nutritional status is common among dialysis patients.
  - Associated with increased hospitalizations and mortality.
  - Protein supplementation on dialysis has been shown to improve net protein balance.

Assessment of Nutritional Status

- Body mass index

$$\text{Body Mass Index} = \frac{\text{Weight (in kg)}}{\text{Height}^2 \text{ (in m)}}$$

- Serum Albumin concentration
  - Target: $\geq$ 4 g/dL

Problems

- **Normal albumin**: Does not always mean a patient is well-nourished.
  - Examples: Marasmus, anorexia nervosa
- **Low albumin**: Does not always mean a patient is malnourished.
  - Examples: Inflammation, analbuminemia.

Low Serum Albumin Concentration

- By far the strongest predictor of mortality and poor outcomes in dialysis patients, compared to other risk factors:
  - Hypertension
  - High cholesterol
  - Diabetes
  - Obesity
- Albumin-death association is linear
  - Fung et al (2002): For every 1 g/dL Albumin is below normal, mortality increases by 35%.

Protein Supplementation During Dialysis

Rationale behind Protein Supplementation

- Hemodialysis is a catabolic procedure
- Protein supplementation on dialysis may offset protein losses during treatment.

Intradialytic Parenteral Nutrition (IDPN)

- Use has been debated for years.
- High cost
- Limited provision (< 1000 kcal 3X/week)
- Nausea
- Appetite suppression

Oral Nutritional supplements

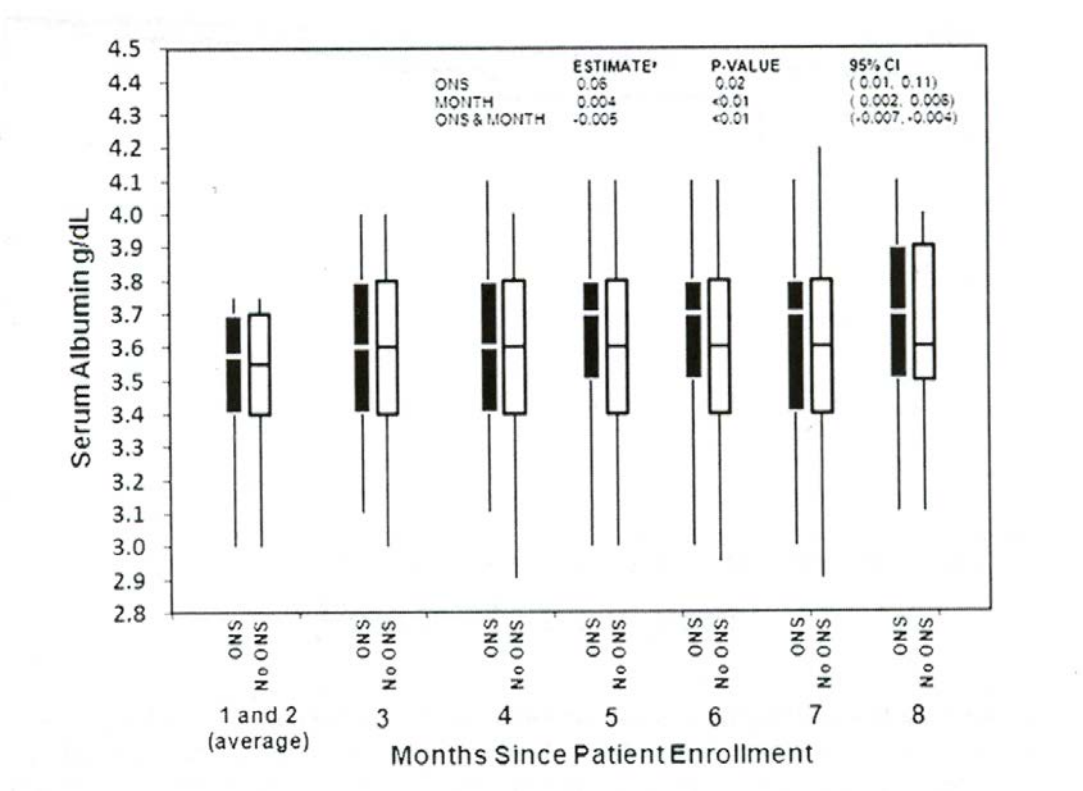
- Safe, inexpensive
- Over the last year, every major dialysis provider in the USA has been providing protein supplements to hypoalbuminemic hemodialysis patients.

Cheu et al (CJASN 2013)

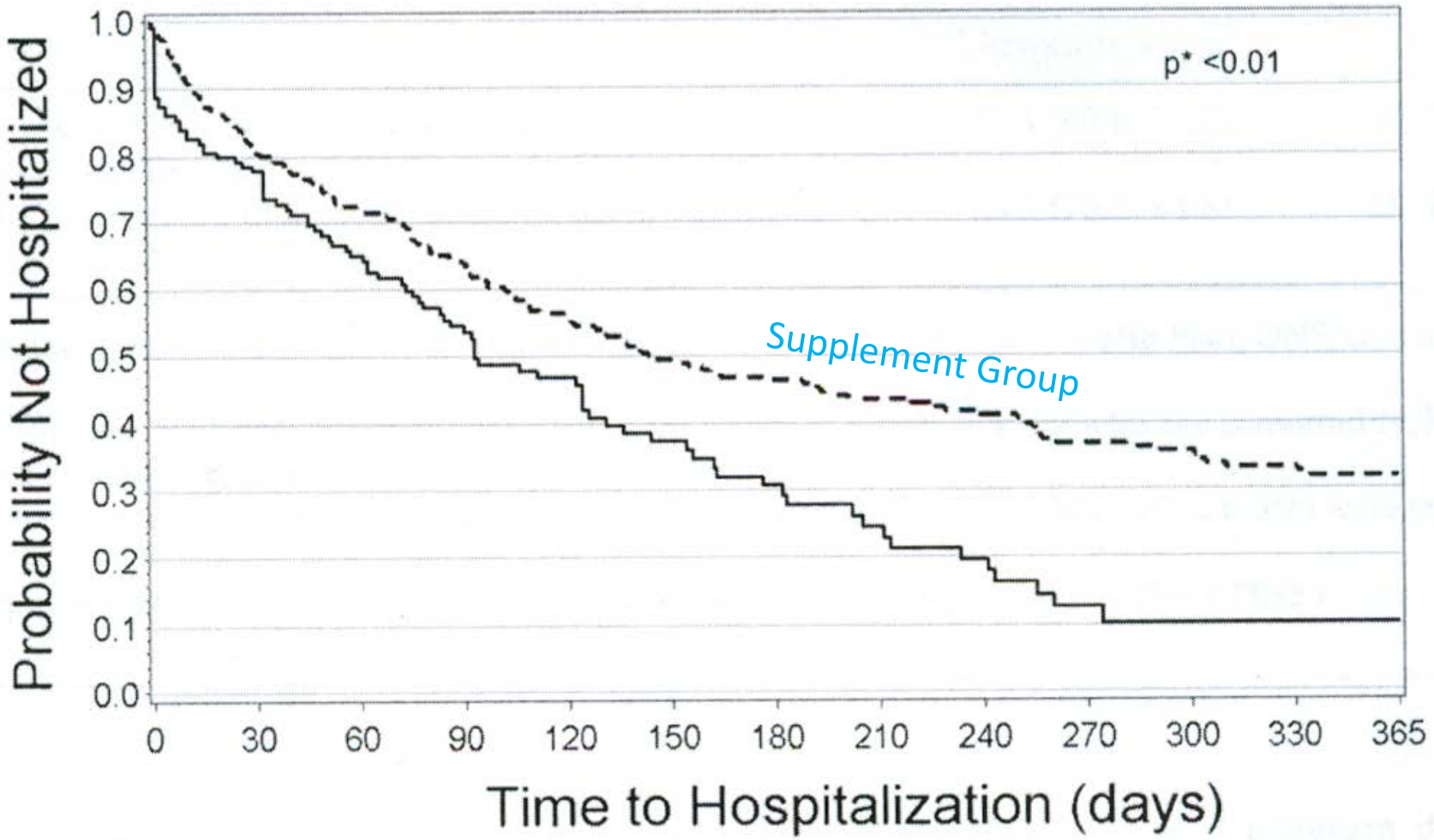
- Retrospective cohort study from 2006 to 2008.
- n=470 hemodialysis patients (Fresenius) at high risk for “protein-energy wasting.”
  - Serum albumin < 3.8 g/dL (2 month average); discontinued if 3 month average > 3.8 g/dL.
  - Identified 276 dialysis patients who received nutritional supplements (n=276) – one can of Ensure per day.
    - n=194 refused ONS or were deemed inappropriate for use.

Results: Albumin

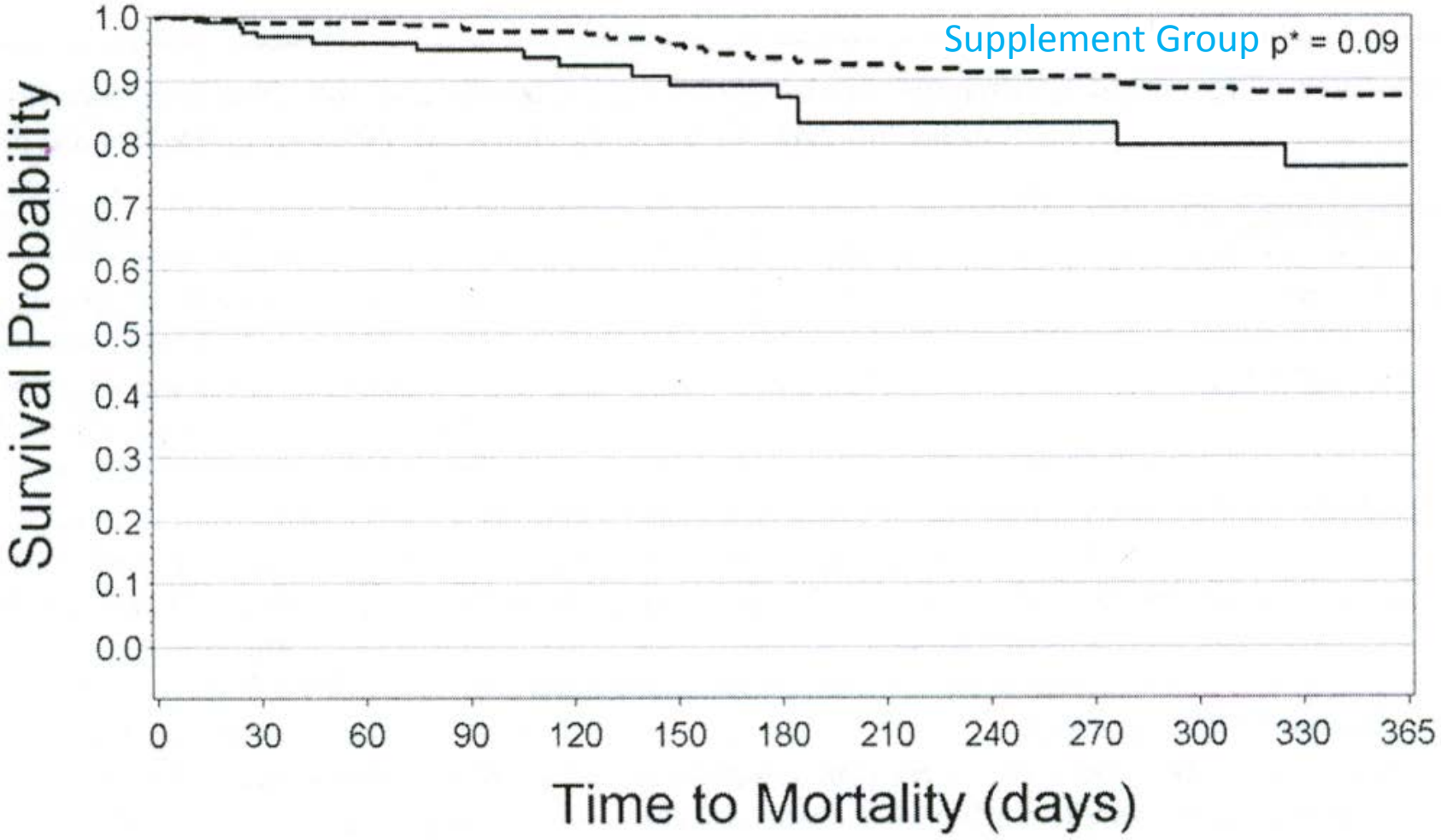
- Minimal increase in serum Albumin with protein supplements.



Results: Hospitalization



Results: Survival



Should We Encouraged our Patients to Eat on Dialysis?

Eating on Dialysis

- If malnutrition is a major risk factor for death, and protein supplementation may improve survival and decrease hospitalizations, should we encourage our patients to eat on dialysis?

- Historically in this country, most dialysis clinics do not allow, or at least discourage, patients from eating on dialysis.
  - Is this good or bad advice?

Advantages of Eating on Dialysis

- Offsets energy loss during dialysis
- Might mitigate muscle wasting.
- Patient satisfaction.

What are the downsides to eating during dialysis?

- Hemodynamic instability associated with eating.
- Reduction in dialysis efficiency
- Nausea and vomiting
- Choking risk
- Patients forget to bring their binders to dialysis.
- Infection control

Hypotension

- Blood pressure may be lowered during and after eating because of splanchnic circulation expansion.
  - Eating -> increased intestinal blood flow -> less blood in the peripheral blood vessels.
- In theory, hypotensive episode may lead to shortening treatment or less efficient fluid removal.
- In practice, hypotension from eating tends to be only modest.

Shibagaki study (1998)

- N=20 HD pts given a meal 45 minutes into dialysis.
- SBP and DBP dropped after the meal (152/85 -> 143/79)

Muller-Deile Study (2014)

- Conducted a study to look at the influence of eating on blood pressure.
- N=40 dialysis patients fed a standard meal during dialysis.
- Found no reduction in SBP, DBP after meal ingestion.

Reduced Adequacy

- Reduction in solute removal because of sequestration of blood in the digestive tract, minimizing the blood available to be dialyzed and reducing the concentration gradient between the blood and dialysate.
- 2 studies have shown decreased clearance:
  - Miguelsanz et al (2001), n=14, Spain
  - Kara and Acikel (2010), n=25, Turkey
- Study limitations: Protein intake generates urea, which would raise the BUN concentration (and therefore reduce URR); this could partly explain the above findings.

Nausea and Vomiting

- Common problem in dialysis patients
- Occur in approximately 10% of all treatments.
- Could be worsened by eating.
  - Analogous to eating during or right after exercise.

Choking

- Risk of aspiration and other respiratory complications.
- Greater risk in patients with neurologic disorders and swallowing problems.
- Increased likelihood in patients who are not sitting upright.

Infection Control

- Food crumbs may lead to infestation
- Risk of fecal-oral contamination including hepatitis A is possible
- Risk of food poisoning.

International Patterns

- Most dialysis clinics outside of the US allow and even encourage patients to eat on dialysis.
- Meals are routinely offered to patients in most European and South East Asian countries.
- In the past, meals on dialysis were also routine in the United States.

FrEDI Study

- Fosrenol for Enhancing Dietary Protein Intake in Hypoalbuminemic Dialysis Patients Study.
- N=110 hypoalbuminemic dialysis patients (< 4.0)
- Intervention group (n=51): Meals on dialysis for 8 weeks as prepared meal boxes (50g protein, 850 cal, low phosphorus) + Fosrenol (500-1500mg)
- Control group (n=55): Low calorie meals (< 50) containing almost no protein (e.g. salads) during dialysis
- Study duration: 8 weeks

FrEDI Study Results

- Rise in albumin $\geq$ 0.2 g/dL while maintaining phos 3.5-5.5:
  - Intervention group: 25%
  - Control group: 9.8% (p=0.036)
- No adverse events
- High patient satisfaction with high-protein meals.

Summary

- Malnutrition is common among dialysis patients and is a risk factor for poor clinical outcomes.
- Protein supplementation during dialysis has been shown to reduce mortality and hospitalization.
- Eating on dialysis is probably safe and in theory could offset calories lost during treatment.