Still Soaring:
An Olympic Pole Vaulter's 50-year Journey through Nutrition Support

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"Taking care of him is not a job, it's a joy. He's the nicest person you'll ever meet. He never complains about anything. Everybody likes him."
-This patient's full-time nurse and, later, wife in 2006 *Pole Vault Power*

AN AMAZING LIFE

- 69 year-old male
- Olympic pole vault athlete; three-time world record holder
- 1963 trampoline accident while training, at age 19
  - → Spinal cord injury and C3-4 quadriplegia
- Wheelchair-bound, cared for at home by wife and mother
- The injury caused dysphagia, so he received tube feeds via a Percutaneous Endoscopic Gastrostomy (PEG) tube, plus ate some by mouth
- With equipment, he could use a computer, exercise, and travel!

MEDICAL OVERVIEW

- Lived at home in Queen Anne from 1963–2012, in relatively good health, until Feb 2012 PEA arrest →
  - o Reliance on mechanical ventilation via trachea tube
  - o Tube feeds via Percutaneous Endoscopic Gastrostomy (PEG) tube
  - o Lived at rehab + multiple hospital admits due to respiratory difficulty, altered mental status, and PEG site leakage
  - o Ischemic bowels → surgeries: R hemicolectomy with end ileostomy
  - o Prolapsed ileostomy, parastomal hernia
  - o PEG site becomes a gastrocutaneous fistula
  - o Severe pressure ulcers with osteomyelitis
  - o Chronic pleural effusions, requiring chest tube drainage
  - o Recurrent infections: pseudomonas, ESBL, peritonitis
  - o Autonomic dysreflexia and neurogenic bladder
  - o Seizure disorder
  - o Anemia of chronic disease
  - o Dyskinesia, on carbidopa-levodopa

NUTRITION SUPPORT TIMELINE

March - June 2013 at HMC MICU

1). Full TPN
- Performed a metabolic cart
  - o results: 1,235 kcal. Actual needs were ~800 kcal less than estimated and what he'd been receiving at rehab!
- Reduced TPN to match metabolic cart

2). TPN + trickle TF
- Started trickle tube feeds after placing a naso-jejunal FT
- Weaned TPN:
  - o Day 1: Removed lipids . Day 2: Cut dextrose in half and reduced protein

3. Full EN
- Problem: PEG fistula is draining undigested TF – indicates mal- digestion/absorption
  - o → Advanced FT past the fistula, to proximal ileum

4. Recreational oral intake
- Started end-of-life care, stopped TF and dialysis
- Bedside swallow eval: okay to eat with trachea cuff lifted. Family bringing favorite foods

ASSESSMENT

- •Visually emaciated older gentleman
- Quadriplegia generally *reduces* needs; confirmed by indirect calorimetry
- …but he also has *increased* nutrient and energy needs due to sepsis, multiple severe pressure ulcers, recurrent infections, and hemodialysis
- Has been over-fed at rehab by ~800kcal/d
- Has been on TPN for > 1 month
  - Complications include poor glycemic control, fatty liver, more
- Must feed through post-pyloric nasal tube, due to PEG fistula
- Micronutrients vit C, zinc, and MVI are indicated, for wound healing
- Team is requesting to provide minimal protein to reduce uremia and AMS

DIAGNOSIS

- Inadequate oral intake related to SCI and resulting dysphagia, as evidenced by enteral nutrition meeting 100% of nutrient needs
- Many more diagnoses would have been appropriate!

INTERVENTIONS

- Nutrition support, supplementation, communication with team, and more

Goals:
- Wean patient off long-term TPN to avoid complications!
- •Transition to full EN
- Feed successfully, despite PEG fistula
- Feed appropriately for his disease states:
  - Uremia and AMS: lower protein
  - End-stage renal disease: manage 'lytes, high protein
  - Pressure ulcers: increased energy and protein needs
- Achieve energy balance in the complex setting of SCI (lower needs) and sepsis, pressure ulcers, dialysis (increased needs)
- Optimize his nutritional status to prep for potential surgeries

MONITORING AND EVALUATION

- Metabolic carts
- Outputs of his: PEG fistula, ileostomy, and NJT to LIWS
- How are the pressure ulcers healing?
- Labs: renal 'lytes, ammonia and BUN, hydration markers
- Daily rounding with team and visual assessments
- Weight changes not very useful, given massive fluid shifts

OTHER INTERVENTIONS

- Team was concerned that his uremia and altered mental status was due to feeding too much protein
  - ➢ reduced protein to 1.2g/kg, the minimum desired in the ICU and for pressure wounds

- Team was concerned that his edema and ascites were due to undernutrition
  - ➢No. He was actually over-fed at rehab, and received nutrition = metabolic cart at HMC

- Nutrition for pressure ulcers:
  - *30-35 kcal/kg stage I/II; 35-40 kcal/kg stage III/IV*
  - *Protein: 1.2-1.5 g/kg*
  - Some evidence: arginine, glutamine, vit A C E, zinc
  - Hydration and glycemic control are key

- End-stage kidney disease:
  - •He was on and off renal-specific formula (Nepro)

"I would get down a little bit. But then I would think about the other kids who were paralyzed and never had the kind of support I did."
– This patient, in a 1998 *Sports Illustrated* interview

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