The Ins and Outs of Enteral and Parenteral Nutrition Therapy

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Objectives:

• To review home nutrition statistics.
• To understand the difference between EN and PN.
• To identify locations for EN and PN tubes and catheters.
• To give examples of the types of tubes and catheters used at home.
Home Enteral Therapy Statistics

- 40,000 people receive parenteral nutrition in their homes in the U.S.
- 152,000 people receive enteral nutrition in their homes in the U.S.

On Top of the World

Rick Davis: Me "taking a drink" in the Grand Canyon through my MIC-KEY and extension tube with a 2 oz syringe. (From www.oley.org)
Enteral vs. Parenteral Nutrition

• **Enteral Nutrition**
  – AKA Tube Feeding
  – Thru the GI tract
  – More physiological
  – Uses the gut
  – More convenient
  – Less risky
  – Less costly

• **Parenteral Nutrition**
  – AKA TPN, Hyperal
  – Thru a central vein, IV
  – Less physiological
  – Gives the gut a rest
  – Less convenient
  – More risk ie: infection
  – More costly
Common Diagnoses for Home Tube Feeding

* Cancer and Neurological Diseases make up ~70% of the enterally fed population
Enteral Tube Location

• **Nasogastric**
  – Through the nose to the stomach

• **Nasointestinal**
  – Through the nose to the small intestine

• **Gastrostomy**
  – Surgically: through the stomach wall
  – Placed with an Endoscope (PEG)

• **Jejunostomy**
  – Surgically: through the abdominal wall to the small intestine
  – Placed with an Endoscope (PEJ)
Feeding Route Selection: Short Term

- Orogastric
- Nasoenteric
  - nasogastric
  - nasoduodenal
  - nasojejunal
Nasogastric / Nasoenteric: Characteristics

- Short-term feeding: < 6 - 8 weeks
- Usually small diameter
- Contraindications to nasogastric tubes
  - significant GER
  - aspiration risk
  - delayed gastric emptying
- Potential complications include:
  - sinusitis
  - nasal erosion
  - tube displacement
  - aspiration (with GER)
Feeding Route Selection: *Long-term*

• Endoscopic or Radiologic
  – PEG
  – PEG-J
  – PEJ

• Surgical
  – Gastrostomy
  – Jejunostomy
Gastrostomy: Characteristics

- Appropriate for long-term feeding
- Requires normal gastric emptying
- Contraindications:
  - significant reflux or aspiration
- May be placed by surgical, endoscopic or radiologic techniques
- Potential complications include:
  - infection
  - leakage
  - fistula
  - buried bumper
  - perforation
Gastrostomy Tube in Place
Jejunostomy: *Characteristics*

- Appropriate for long-term feeding
- Indicated for patients with aspiration or poor gastric emptying
- May be placed by surgical, endoscopic or radiologic technique
- Typically requires feeding pump
- Potential complications include:
  - infection
  - tube occlusion
  - intestinal ischemia
  - bowel obstruction
Low Profile Device: *Characteristics*

- Appropriate for long-term feeding
- Beneficial for:
  - active lifestyle
  - cosmetic purposes
  - agitated patient with risk for pulling out tube
  - possible replacement in the home
- Potential complications include:
  - balloon malfunction
  - improper insertion
  - leakage
DEHP

- Di(2-ethylhexyl) phthalate
- Plasticizer which softens PVC
- Found in feeding bags and tubes
- Associated with liver toxicity in animals
- Lipids leach DEHP from PVC
- Kids > risk than adults
- Some products are DEHP-free
Parenteral Nutrition

I'd like to buy a bowel.

Game shows for people your age.
Diagnoses Associated with Home TPN

- Malabsorptive Disorders
  ie: Short Bowel, Crohn’s, scleroderma
- Motility Disorders
  ie: ischemic bowel, mitochondrial disease
- Bowel Obstruction
  ie: GI and gynecologic oncology
- Pancreatitis
- Intractable vomiting or diarrhea
Parenteral Nutrition Access
Peripheral (PPN) vs Central (TPN)

- **PPN**
  - < 10% carbohydrate
  - peripheral line
    - ie: peripheral, mid-line
  - high volume required
  - low in calories
  - low infection risk

- **TPN**
  - > 10% carbohydrate
  - central line
    - ie: hickman, PICC, broviac
  - can concentrate volume
  - higher in calories
  - higher infection risk
Venous Access Options for HPN

• **Short Term Access**
  – Peripheral lines
  – Midlines

• **Long Term Access**
  – PICCs
  – Tunneled catheters
  – Implanted ports
Long Term Access: Central Catheters

- **Non-Surgical**
  PICC:
  Peripherally Inserted Central Catheter

- **Surgical**
  Tunneled Catheters:
  Hickman, Groshong, Broviac
  Port-A-Caths
Long Term: PICC Lines

- Long line (14-20”) placed above elbow, extending into central circulation
- For mid range therapy (6-12 weeks) or longer??
- X Ray confirmation necessary
- Can be inserted at bedside
- Easy to remove
- Higher risk of occlusion, dislodgement and malposition than Tunneled CVCs
- Can be used for Parenteral Nutrition
PICCs

Per-Q-Cath® and Groshong® PICCs
Long Term: Tunneled Catheters

- Long line surgically tunneled under skin, extends into central circulation
- For long term therapy
- X Ray confirmation necessary
- Catheter tubing extends out from the skin level (approximately 1 foot extension)
- Brand names: Groshong, Hickman (adult), Broviac (pediatric)
- Requires experienced MD to insert
- Can be used for PN
Tunneled

- Hickman™ (BARD)
- Broviac™ (BARD)
- Groshong™ (BARD)
Hickman® Cuffs

VitaCuff Antimicrobial Cuff

SureCuff Tissue Ingrowth Cuff
Device Tips

Hickman

Groshong

NutriThrive
Groshong® Valve

BARD® Groshong®

- Negative pressure opens valve inward, permitting blood aspiration.
- Positive pressure opens valve outward, allowing infusion.
- At neutral pressure, valve remains closed, reducing risk of air embolism, blood reflux and clotting.

Three-way valve reduces risk of air embolism, blood reflux and clotting.

Tip-first placement allows measurement of catheter to size during implantation for more accurate tip placement.

Unique design virtually eliminates use of heparin, minimizes nursing time required for maintenance and improves cost-effectiveness of therapy.

Silicone material offers superior biocompatibility to improve indwelling and catheter time.
Long Term: Implanted Ports

- Short catheter (6”) surgically placed under the skin of the chest or abdomen extending into central circulation
- Indicated for long term, intermittent therapy
- Port access using a special needle: Huber
- Weekly Huber needle change required
- Best used for intermittent therapies (chemotherapy, antibiotics)
- Seldom inserted for PN alone
• M.R.I.™ Low-Profile Implanted Port (BARD Access Systems)
In Summary:

- The number of people at home on enteral nutrition is growing.
- Enteral Nutrition is preferred route of feeding when possible.
- Parenteral Nutrition can be safely given through a variety of catheters.
- Catheters, caps and other IV devices are designed to minimize infection.