Chapter 11

High Nutrient Diet

High kcal & high protein

When is the high kcal high protein used

- When protein and energy requirements are increased

  due to:

  - Catabolism
  - Protein loss
  - Stress

Summary of conditions that might need high protein high kcal diet

This diet may be indicated in patients with:

- Protein-Energy Malnutrition PEM,
- Failure to thrive: FTT (insufficient weight gain),
- Congenital Anomalies: such as heart defects,
- Burns,
- Cystic fibrosis,
- Nephrotic syndrome,
- Chronic gastrointestinal diseases: such as colon cancer,
- Protein losing enteropathy,
- HIV/AIDS,
- Cancer.

Cystic Fibrosis CF

- Cystic fibrosis (CF) patients:

  ✓ Develop thick, sticky mucus that builds up in the lungs and digestive tract

  - Makes it hard to breathe and can lead to life-threatening lung infections
  - Affects the pancreas:

    - thick secretions there stop the release of digestive enzymes that normally help break down food,
    - making it hard for people to digest and absorb nutrients.

  - The mucus can also block the bile duct in the liver:

    - which eventually causes permanent liver damage in some people with CF.

- ❖ Persons with cystic fibrosis need to eat high calorie and high protein foods throughout the day.

What is Nephrotic Syndrome?

- Nephrotic syndrome is a:
  - ✓ Collection of symptoms that indicate kidney damage.

- Nephrotic syndrome symptoms include the following:

  - Proteinuria: large amounts of protein in urine.
    Protein normal value in urine:
    For a random urine sample, normal values are 0 to 20 mg/dl
    For a 24-hour urine collection, the normal value is < 80 mg/dl in 24 hours.

  - ➢ Hypoalbuminemia: low levels of albumin in the blood:

    Albumin normal level in blood is: (3.5 - 5.0) g / dl (100 ml)

  - ➢ Edema, or swelling, usually in the legs, feet, or ankles, hands or face.

  - ➢ Hyperlipidemia: higher than normal fat and cholesterol levels in the blood.

Signs and Symptoms of Proteinuria

- Swelling, or edema, usually around the face, hands and feet.
- Foamy or Bubbly urine.
- High Blood Pressure.
- Feeling tired.

Protein Losing Enteropathy (PLE)

- Is characterized by an abnormally high loss of serum protein into the gastrointestinal (GI) tract:

  - Resulting in hypoproteinemia.

  - Hypoproteinemia can be complicated by:
    - Edema,
    - Ascites: abdominal swelling,
    - Pleural effusion: water on the lungs,
    - Pericardial effusion: fluid around the heart,
    - Malnutrition.

Protein Loss

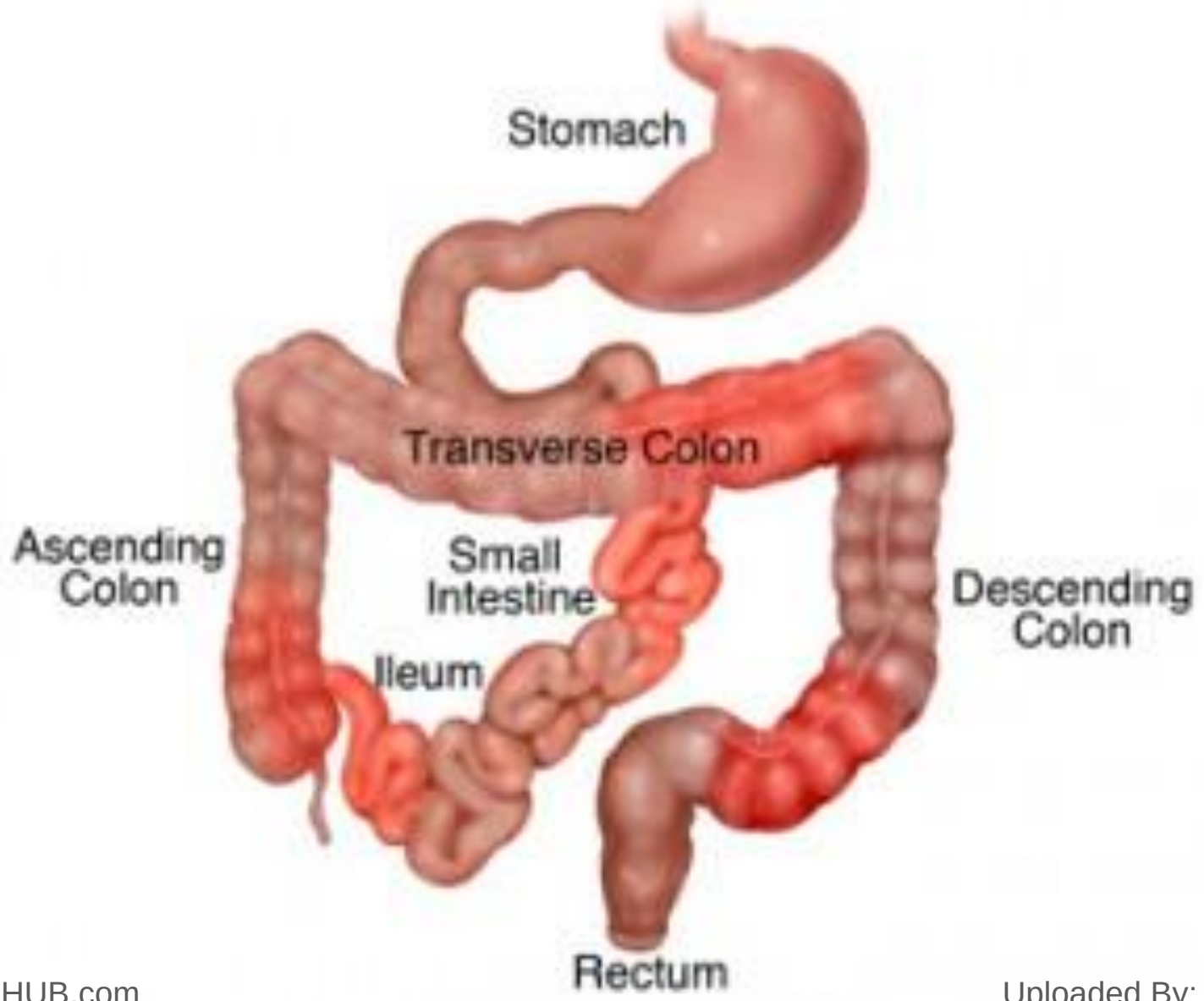
- Any condition that:
  - Causes serious inflammation in the intestines
    - ➢ Can lead to protein loss.

  - Some of the more common causes are:
    - Bacterial or parasitic infection of the intestines,
    - Celiac sprue, also known as celiac disease or gluten-sensitive enteropathy,
    - Crohn's disease: inflammatory bowel disease (*IBD),*
    - Lymphoma: cancer in the lymph nodes,
    - HIV/AIDS: human immunodeficiency virus/Acquired immunodeficiency syndrome.

Crohn's Disease

- A type of inflammatory bowel disease (IBD)
  - Inflammation of the lining of the GI tract.
  - Inflammation can involve different areas of the GI tract in different people.
  - Inflammation can lead to:
    - Abdominal pain
    - Severe diarrhea
    - Fatigue
    - Weight loss
    - Malnutrition.

Crohn's Disease



When to use the high kcal high protein diet

- Rehabilitation from debilitating disease:
  - ➢ to increase patient's strength.
- Following surgery or in preparation for surgery:
  - ➢ to compensate for possible losses
- Healing from pressure sores or bed sores.

When to use the high kcal high protein diet Cont'd.

Weight Loss

- Usually occurs with:
  - Traumatized patients,
  - Patients with bed sores.

- Weight should be monitored closely and energy intake adjusted accordingly.

- A high nutrient diet should provide adequate energy and nutrients without causing significant weight gain unless the patient is underweight.

Why use the high kcal high protein diet

- Most treatment strategies aim to:
  - Facilitate "catch-up" growth,
  - ➢ Provide extra calories and protein that exceed the Recommended Dietary Allowance for age (RDAs for age).

- Preventing malnourishment in people who:

  - Are unable or unwilling to eat normal portions of food due to:
    - Cognitive impairment,
    - Lack of appetite.

Why High Energy

- To promote the efficient utilization of protein for anabolism,
- To manage the weight such as treating weight loss.

Characteristics of the Diet

- This diet is based on the general diet.
- This diet provides higher amounts of nutrients than the RDAs.
- The high nutrient diet contains higher amounts of:
  - Calories,
  - Protein,
  - All other micronutrients.
  - Extra fluids with high kcal high protein diet.

Diet Planning

- Increase calorie intake gradually because patients cannot take big increases suddenly:
  - ✓ Increase portion size gradually.
  - ✓ Increase # of meals gradually.
  - ✓ May add extra amounts of fat group foods if appropriate.

- Protein requirement ranges from (0.8 – 1.5) g / kg of body weight:
  - ✓ Depending on the stage of the disease.

- Add vitamin C rich foods at every meal:
  - ✓ for skin integrity and wound healing.

Diet Planning Cont'd.

- Encourage foods that are high in Zinc because:

  - Zn^{++} plays a role in:
    - ✓ Protein synthesis,
    - ✓ Resistance to infection.

- Use Food Sources of Zn^{++} rather than Supplements because:

  - Overdoses might lead to adverse effects such as:
    - ➢ Decreased immune response,
    - ➢ Decreased HDL.

Sources of Zn^{++}

- Rich sources: oysters, red meat, lamb liver, and cheese [meat group foods]; chicken legs are richer than the white meat.
- Zn^{++} is found in grains, legumes and nuts, but:
  - Zn^{++} in refined grains and their products is better absorbed than whole grain products because bran contains most of the phytate.
- Other good sources: Fortified ready to eat cereals.

Diet Planning Cont'd.

- Use high nutrient foods rather than:
  - High sugar foods such as desserts.

- Add non fat dry milk to liquid milk or other dishes such as mashed potatoes or cream soups:
  - ✓ This measure increases both energy and protein.

- Consider individual differences: for example,

  - ✓ for some giving 3 main meals and 3 snacks,
  - ✓ for others only 3 main meals produce better results.

An example of a high kcal high protein diet for one day

Food Group	# of exchange units
Milk & alternatives	3-4
Meat and alternatives	≥ 9
Grains and grain products	≥ 8
Vegetables	≥ 3
Fruits	≥ 2
Fats & Oils	≥ 3

High Calorie High Protein Ideas

- Shakes: cold drinks made of milk, a sweet flavoring such as fruit or chocolate, and typically ice cream, whisked until frothy. Examples:
  - Milk shake,
  - Chocolate Shake,
  - Banana Shake,
  - Banana Apple Shake,
  - Strawberry Shake,
- Eggnog,
- Butter milk,
- Sahlab,
- Pudding,
- Mochaccino: chocolate cubes in a glass cup, then warm milk, then foamed milk, then a shot of espresso.

Adequacy

- Nutritional adequacy may not be possible with diet alone.

- Most probably such patients will need:
  - Nutritional supplements,
  - Vitamin and mineral supplements.

High Calorie, high Protein Supplements

Products ®	Amount	Calories	Protein in grams
Boost Plus	8 ounces	360	14
Boost High Protein	8 ounces	240	15
*Choice DM	8 ounces	220	9
Carnation Instant Breakfast mixed with whole milk	8 ounces	280	15
Ensure	8 ounces	250	9
Ensure Plus	8 ounces	360	13
*Glucerna Shake	8 ounces	220	10
*Boost Diabetic	8 ounces	250	14
Resource 2.0	8 ounces	480	20
Carnation Instant Breakfast – Lactose Free VHC	8 ounces	560	23
UNJURY (protein powder)	1 scoop	90	20

Please note: Most major grocery chains have store brands and comparable supplements that are lower in price than the name brands.

* For people with diabetes

Ensure Plus Can 237ml

is a 1.5kcal/mL nutritionally complete and balanced sip feed designed for the

management of disease related

malnutrition.

Nutrition Facts

Serving size 1 bottle (237 mL)

Amount per serving

Calories 350

	% DV*		% DV*
Total Fat 11g	14%	**Sodium** 210mg	9%
Saturated Fat 1g	5%	**Total Carb.** 50g	18%
Trans Fat 0g		Dietary Fiber <1g	<3%
Polyunsaturated Fat 4g		Total Sugars 20g	
Monounsaturated Fat 5g		Incl. 19g Added Sugars	39%
Cholesterol 10mg	3%	**Protein** 13g	26%

Vitamin D 8mcg	40%	•	Calcium 330mg	25%			
Iron 4.5mg	25%	•	Potassium 470mg	10%			
Vitamin A	25%	•	Vitamin C	50%	•	Vitamin E	50% • Vitamin K 20%
Thiamin	25%	•	Riboflavin	25%	•	Niacin	45% • Vitamin B_6 25%
Folate (60mcg Folic Acid)	25%	•	Vitamin B_{12}	25%	•	Biotin	25%
Pantothenic Acid	25%	•	Phosphorus	15%	•	Iodine	25% • Magnesium 20%
Zinc	30%	•	Selenium	25%	•	Copper	25% • Manganese 25%
Chromium	25%	•	Molybdenum	25%	•	Chloride	10% • Choline 25%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Nutrition Facts

1 serving per container

Serving size	1 bottle (237mL)
Amount Per Serving	
Calories	**360**
	% Daily Value*
Total Fat 14g	**18%**
Saturated Fat 2g	**10%**
Trans Fat 0g	
Cholesterol 10mg	**3%**
Sodium 200mg	**9%**
Total Carbohydrate 45g	**16%**
Dietary Fiber 1g	**4%**
Total Sugars 24g	
Includes 24g Added Sugars	**48%**
Protein 14g	**28%**

Vitamin D 6mcg 30% • Calcium 360mg 30% • Iron 4.5mg 25%
Potassium 470mg 10% • Vitamin A 20% • Vitamin C 50%
Vitamin E 50% • Vitamin K 25% • Thiamin 25% • Riboflavin 40%
Niacin 20% • Vitamin B6 35% • Folate (60mcg Folic Acid) 25%
Vitamin B12 45% • Biotin 25% • Pantothenic Acid 25%
Phosphorus 20% • Iodine 25% • Magnesium 25% • Zinc 30%
Selenium 25% • Copper 35% • Manganese 35% • Chromium 50%
Molybdenum 25% • Chloride 10% • Choline 10%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

360 CALORIES

14g PROTEIN

26 VITAMINS & MINERALS

Dietetic Foods
Nutritional Supplements

- Commercially prepared

- May be used:
  - ✓ Either between meals,
  - ✓ Or added to dishes.

- When used for older adults:
  - ✓ Give such supplements in liquid form,
  - ✓ At least 1 hour before mealtime:
    - ➢ so as not to spoil their appetite at meal time.

Sample menu: 2600 Calories, 125-145 gm of Protein

Breakfast	Lunch or Dinner
1 egg made with bacon, ham, sausage or other meat	3 ounces of meat, fish, or poultry, eggs, cheese
2 waffles, 2 pancakes or 2 slices of toast	1 cup potatoes, rice, noodles, or macaroni + 1 slice bread
	½ cup cooked vegetables
2 teaspoon margarine	2 to 3 teaspoons margarine on bread & vegetables
1 cup high protein milk	1 cup high protein milk
1 serving fruit or juice	1 serving fruit or dessert

Include snacks between meals.

Dietitian's Role

- Analyze carefully the reason for lack of appetite,
- Find out if there is a need for feeding assistance or assistive devices for self feeding,
- Consider the proper positioning of the patient.