

Three bright green apples are arranged on a white background. One apple is in the foreground, slightly to the right, and is the largest. Two other apples are behind it, one to the left and one to the right, both slightly smaller and partially obscured. The apples have a smooth, glossy texture and a small stem at the top.

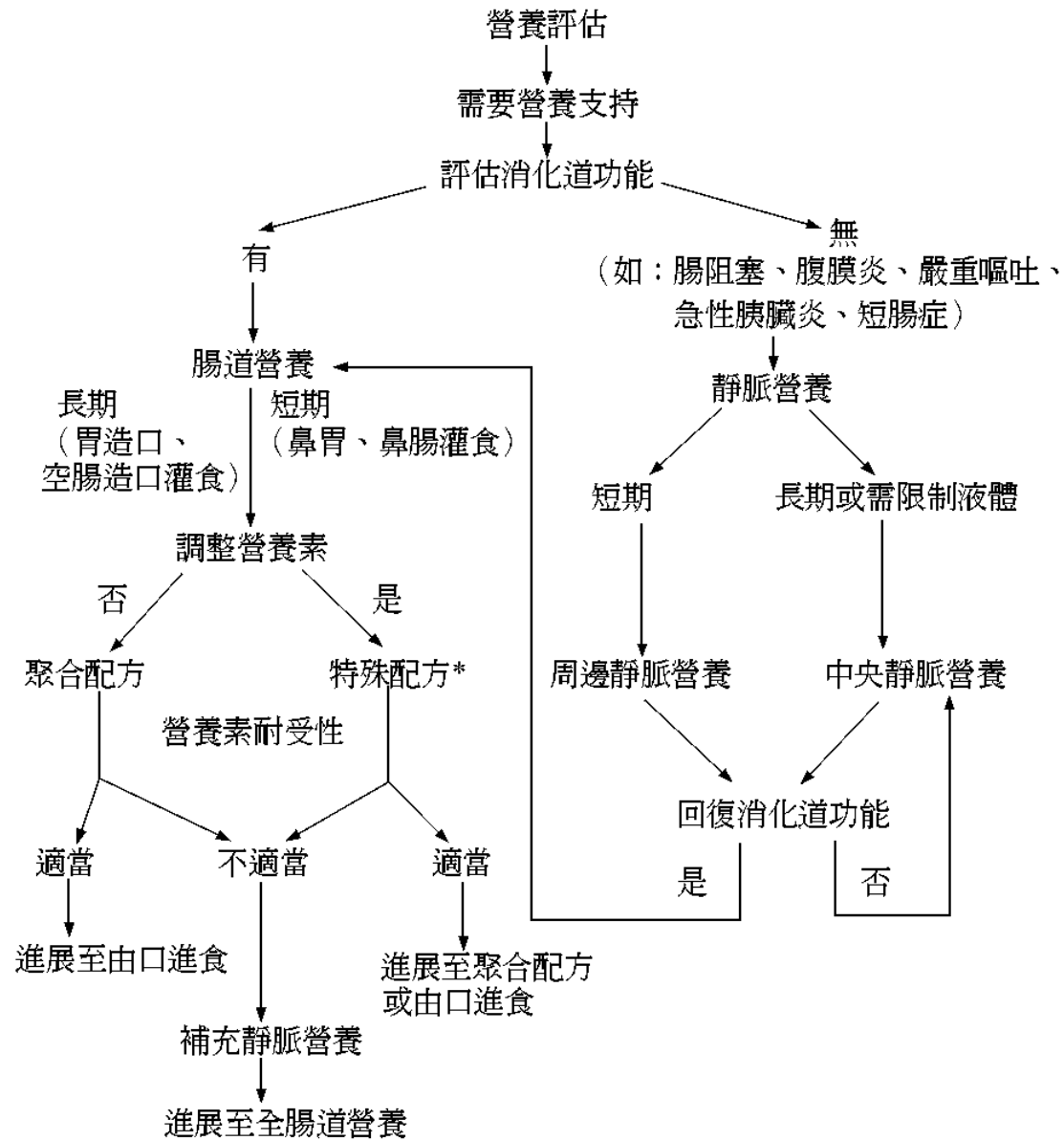
認識病人用營養品

國立陽明大學附設醫院

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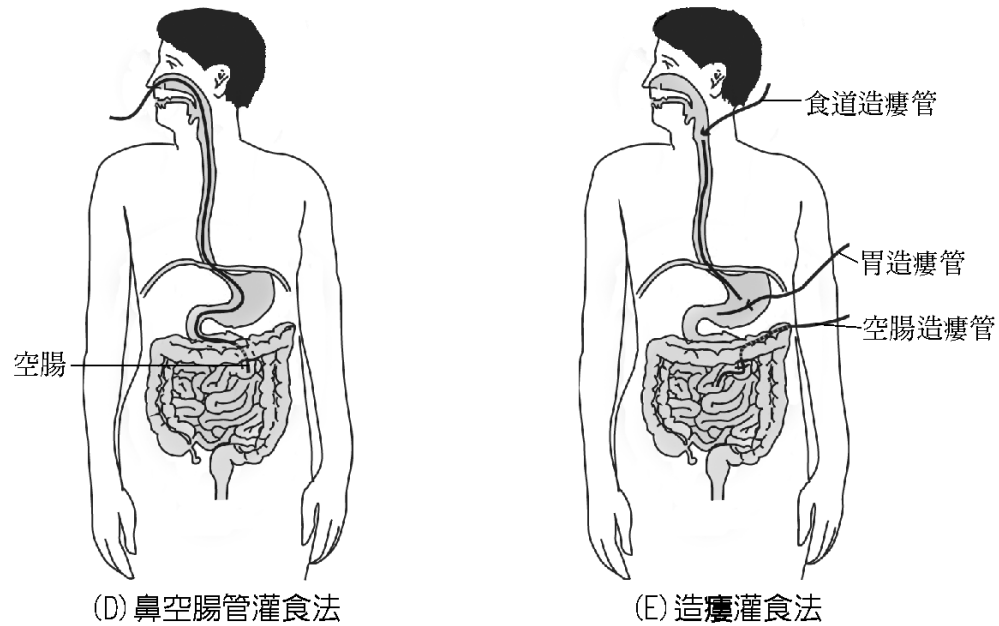
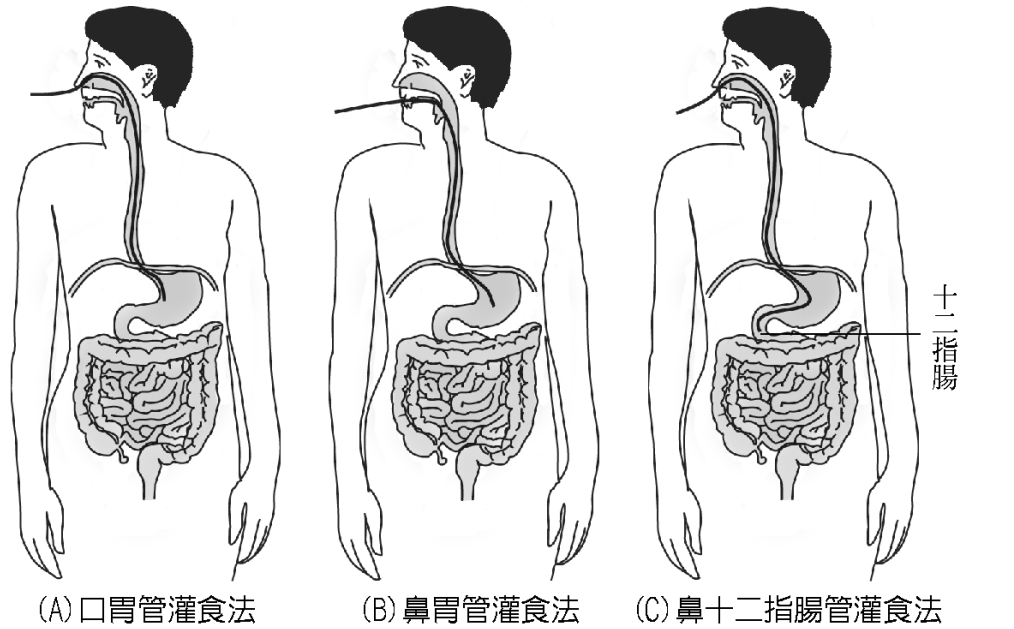
適應症



*元素配方、特殊疾病配方、單一營養素配方等

圖 2-1 成人營養支持途徑圖





Wagner

圖 2-2 灌食路徑簡圖



- 目的：
 - 供給吞嚥障礙、不能由口進食或經口攝食量不足但具有腸胃功能之患者的一種營養均衡且易於消化吸收的飲食。
- 定義：
 - 將食物以液體的形式經由餵食管進入體內的一種飲食。



什麼樣的情形需要管灌？

- 口腔或頭頸部的疾病造成不能咀嚼與吞嚥者
- 嚴重外傷、灼傷以致無法經口攝食或經口攝食不足者
- 中風昏迷不醒或意識不清者
- 神經性厭食
- 癌末期患者
- 消化道外科手術患者，需藉導管灌食，以做為進入正常飲食前的過渡飲食



管灌配方有哪些？

- 混合攪拌的管灌飲食
(Blendrd tube feedings)
- 聚合配方飲食(Polymeric Fomulas)
- 特殊配方飲食(Speciality Fomulas)
- 單體配方飲食(Monomeric Fomulas)
- 單素配方(Modular Fomulas)



混合攪拌的管灌食VS商業配方

	優點	缺點
混合	<ul style="list-style-type: none">• 便宜• 變化多• 口味佳(對清醒者)• 天然食物(植化素)	<ul style="list-style-type: none">• 分子面積較不均質化• 衛生條件不易掌控• 組成成分不易固定• 混合物可能過大或濃稠，易塞管
商業	<ul style="list-style-type: none">• 製作方便衛生安全• 濃度較均勻• 完整均衡營養素	<ul style="list-style-type: none">• 成本較高• 價格昂貴



商業配方種類

- 粉末
- 罐裝液狀





Enteral Formula-Nutritionally complete

- Nutritionally Complete
 - When given in the recommended amount, to be used as a sole source of nutrition or as a supplement to the patient's normal intake.
- Nutritionally Incomplete
 - To be used as a supplement only and not as a sole source of nutrition.



● *Clin Nutr 2006;25:180-186*

- **a composition which reflects the reference values for macro and micronutrients for the healthy population**
 - **whole protein, lipid in the form of LCT,**
 - **carbohydrate and fiber**
 - **no gluten and lactose**

- **Clin Nutr 2006;25:180-186**



Standard Formula - Powder



Standard Formula - Liquid



Enteral Formula-Nutritionally complete

- Disease Specific Formula : for a specific disease 、 digestive or metabolic disorder
- High Protein (Nitrogen) : >1.2 g Prot/kg BW
- High Fiber : 20-35 g of fiber
- High FAT (Lipid) Low CHO : $>40\%$ of kcal from fat
- Predigested (Peptides-base) : di-, tri-, oligo-peptide, long chain poly-peptide
- Elemental : free from amino acid, low fat
- Immune-Enhancing (Immune Modulating) : W-3 fatty acid, L-Gln, L-Arg,



- 依據特殊疾病調整其三大營養素比例或調整特殊營養成分
 - 糖尿病
 - 腎臟病(洗腎前、洗腎後)、慢性腎衰竭
 - 肺部疾病
 - 褥瘡、營養不良...
 - 重症之免疫功能不全
 - 肝腦病變



High Protein (Nitrogen) Formula

- Protein : ≥ 1.2 g /kg BW



High Fiber High Protein Formula

- Fiber : 20 – 35 g or >14 g/1000 kcal
- If there is evidence of diarrhea, soluble fiber containing or small peptide formulations may be utilized.(Grade: E)
- Soluble fiber may be beneficial for the fully resuscitated, hemodynamically stable critically ill patient receiving EN who develops diarrhea.
- Insoluble fiber should be avoided in all critically ill patients. Both soluble and insoluble fiber should be avoided in patients at high risk for bowel ischemia or severe dysmotility. (Grade:

C)

- *ASPEN 2009 Critical Guideline*



- EN is the preferred route of nutrition therapy in ICU patients with acute and/or chronic liver disease. Nutrition regimens should avoid restricting protein in patients with liver failure. (Grade: E)
- Standard enteral formulations should be used in ICU patients with acute and chronic liver disease. Branched chain amino acid formulations (BCAA) should be reserved for the rare encephalopathic patient who is refractory to standard treatment with luminal acting antibiotics and lactulose. (Grade: C)

- ASPEN 2009 Critical Guideline



High Fat Low CHO Formula

- Fat : $> 40\%$ of kcal from fat
- Specialty high-lipid low-carbohydrate formulations designed to manipulate the respiratory quotient and reduce CO₂ production are not recommended for routine use in ICU patients with acute respiratory failure. (Grade: E)
- Fluid-restricted calorically dense formulations should be considered for patients with acute respiratory failure. (Grade: E)



High Density

- 蛋白質調整
- 濃縮：1.5~2.0 kcal/ml
- 適用：限水、ESRD



Predigested Formula

Peptides-base

- di-, tri-, oligo-peptide long chain poly-peptide
- 水解成小分子的營養素低渣配方(胜肽、胺基酸、葡萄糖聚合物)，易吸收，具足夠的電解質、維生素、礦物質及稀有元素，營養素在近端小腸快速直接被吸收
- If there is evidence of diarrhea, soluble fiber containing or small peptide formulations may be utilized.(Grade: E)
- Patients with severe acute pancreatitis may be fed enterally by the gastric or jejunal route. (Grade: C)

● *ASPEN 2009 Critical Guideline*



- Tolerance to EN in patients with severe acute pancreatitis may be enhanced by the following measures: Minimizing the period of ileus after admission by early initiation of EN. (Grade: D)
- Displacing the level of infusion of EN more distally in the GI tract. (Grade: C)
- Changing the content of the EN delivered from intact protein to small peptides, and long-chain fatty acids to medium-chain triglycerides or a nearly fat-free elemental formulation. (Grade: E)

● *ASPEN 2009 Critical Guideline*



Immune-Enhancing Formula

- Immune modulating
 - L-Gln, L-Arg, high ω 3 FA, Antioxidants
 - 調節發炎、代謝、免疫等
- 適用重症對象：腫瘤、重大手術、多部位創傷、燙傷…等



- Immune-modulating enteral formulations (supplemented with agents such as arginine, glutamine, nucleic acid, ω -3 fatty acids, and antioxidants) should be used for the appropriate patient population (major elective surgery, trauma, burns, head and neck cancer, and critically ill patients on mechanical ventilation), with caution in patients with severe sepsis.
 - (For surgical ICU patients, Grade: A)
 - (For medical ICU patients, Grade: B)
- ICU patients not meeting criteria for immune-modulating formulations should receive standard enteral formulations. (Grade: B)

● *ASPEN 2009 Critical Guideline*



- To receive optimal therapeutic benefit from the immune- modulating formulations, at least 50%-65% of goal energy requirements should be delivered.(Grade: C)

- *ASPEN 2009 Critical Guideline*



- A combination of antioxidant vitamins and trace minerals (specifically including selenium) should be provided to all critically ill patients receiving specialized nutrition therapy. (Grade: B)

- ASPEN 2009 Critical Guideline

- Immune enhancing enteral formulas may be beneficial in malnourished patients undergoing major cancer operations. (Grade: A)

- ASPEN 2009 Anticancer Guideline



Enteral Formula-Nutritionally incomplete

- **Oral Nutritional Supplement (ONS) :**
Supplementary oral intake of dietary food for special medical purpose in addition to the normal food.
- **Modulated (Fortified) products : Enriched with specific nutrients.**



Oral Nutritional Supplement (ONS)

- **Some vitamins and minerals are much higher than DRIs**
- **Recommend :**
 - **Oral supplement**
 - **Replace 2 to 3 meals a day**



Modulated (Fortified) products

- 提供蛋白質、醣類、脂肪等單一營養素的配方自行組合
- 為非均衡營養配方，不宜單獨做為全天之營養素提供使用
- 混合使用時，應注意各類營養素是否達需求





補充醣類



補充蛋白質



補充纖維質



補充油脂



- Soluble fiber : Insoluble fiber = 60:40
- Vitamins & Minerals
 - Trace Minerals : Se Cr Mo required
 - To meet 100% DRIs : 1200~1800kcal

