Perioperative nutrition Management

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Translated the American Pharmacists Association (APhA) Medication Therapy Management Services (MTMs) textbook into Chinese and led the drafting of China's first standard for Medication Therapy Management (MTM) Pharmacy Clinic Services.

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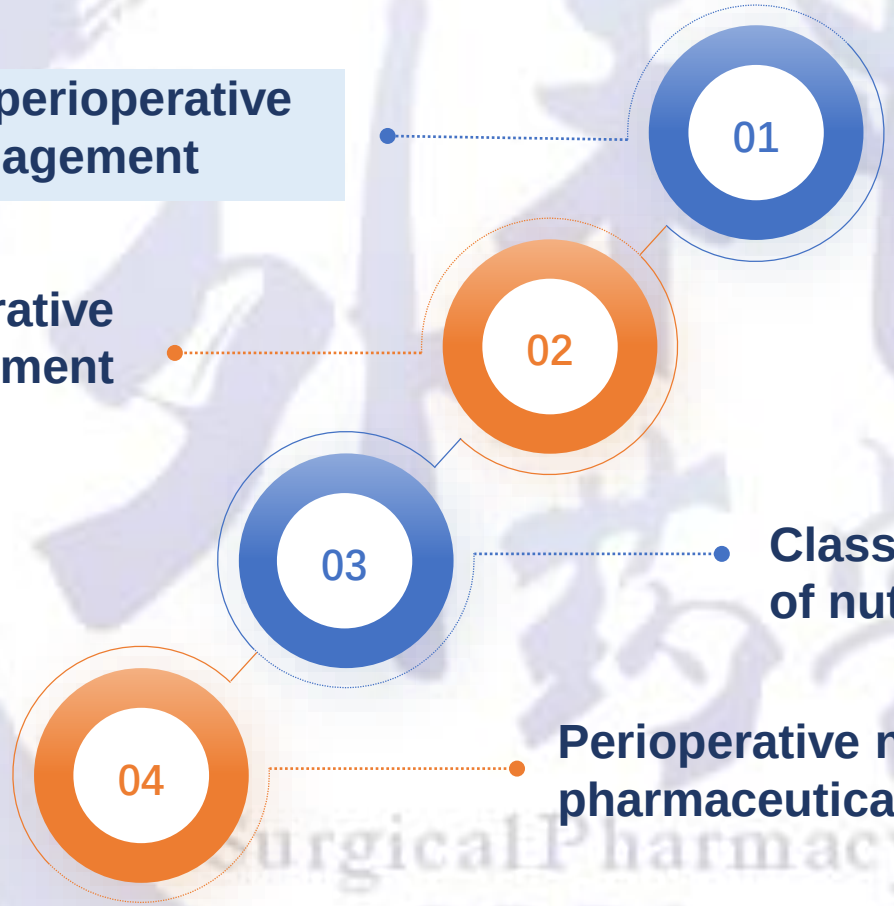

The necessity of perioperative nutrition management

Procedure of perioperative nutrition management

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Perioperative nutritional therapy and pharmaceutical care

Perioperative Malnutrition in Surgical Patients

- Surgical patients are prone to nutritional risks or malnutrition due to disease-related or surgical trauma-induced catabolism, systemic organ dysfunction, and neuroendocrine dysregulation.

- Studies indicate that approximately 40%-50% of surgical patients present with varying degrees of malnutrition.

ESPEN practiacl guideline: Clinical nutrition in surgery（2021）

Adverse clinical outcomes of perioperative malnutrition

- Perioperative malnutrition is associated with higher infection rates, impaired wound healing, increased incidence of pressure ulcers, prolonged ICU stays, and extended hospitalization.

Therefore, optimizing perioperative nutritional management for surgical patients is critically important.

We Must Improve Perioperative Nutrition!

Lobo,D et al.Curr Opin in Anesthes,24;2011

Williams JD,Wischmeyer PW;American Journal of Surgery,2016

Philipson et al American Journal of Managed Care 19:121-128 201

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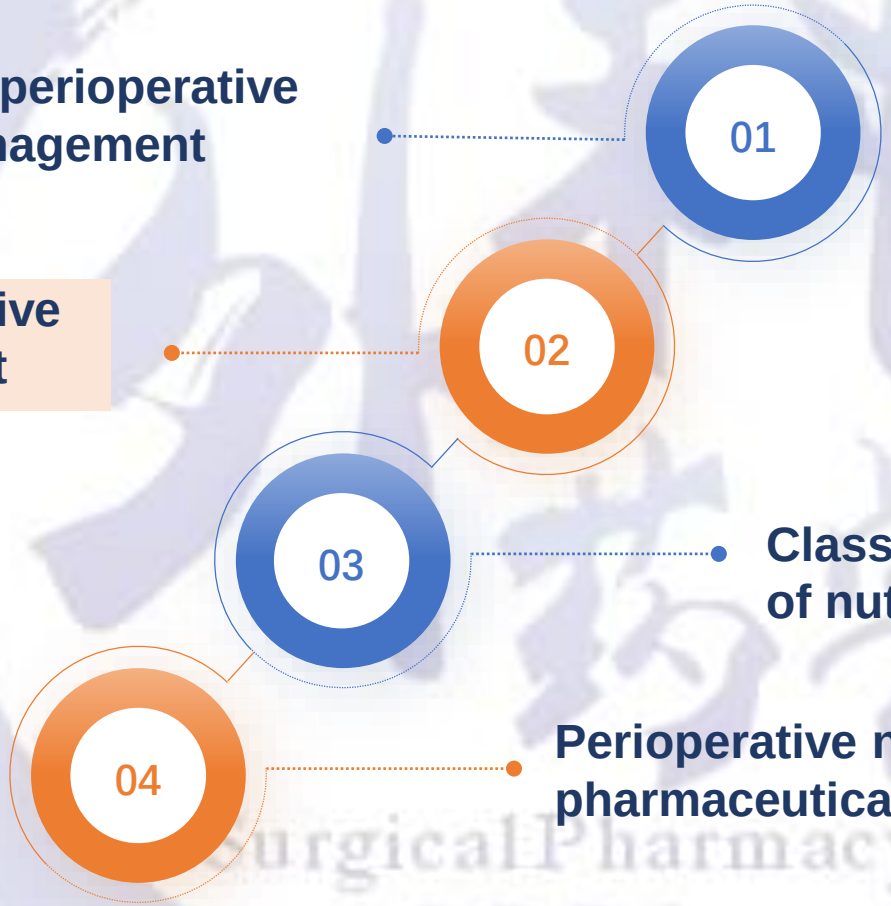

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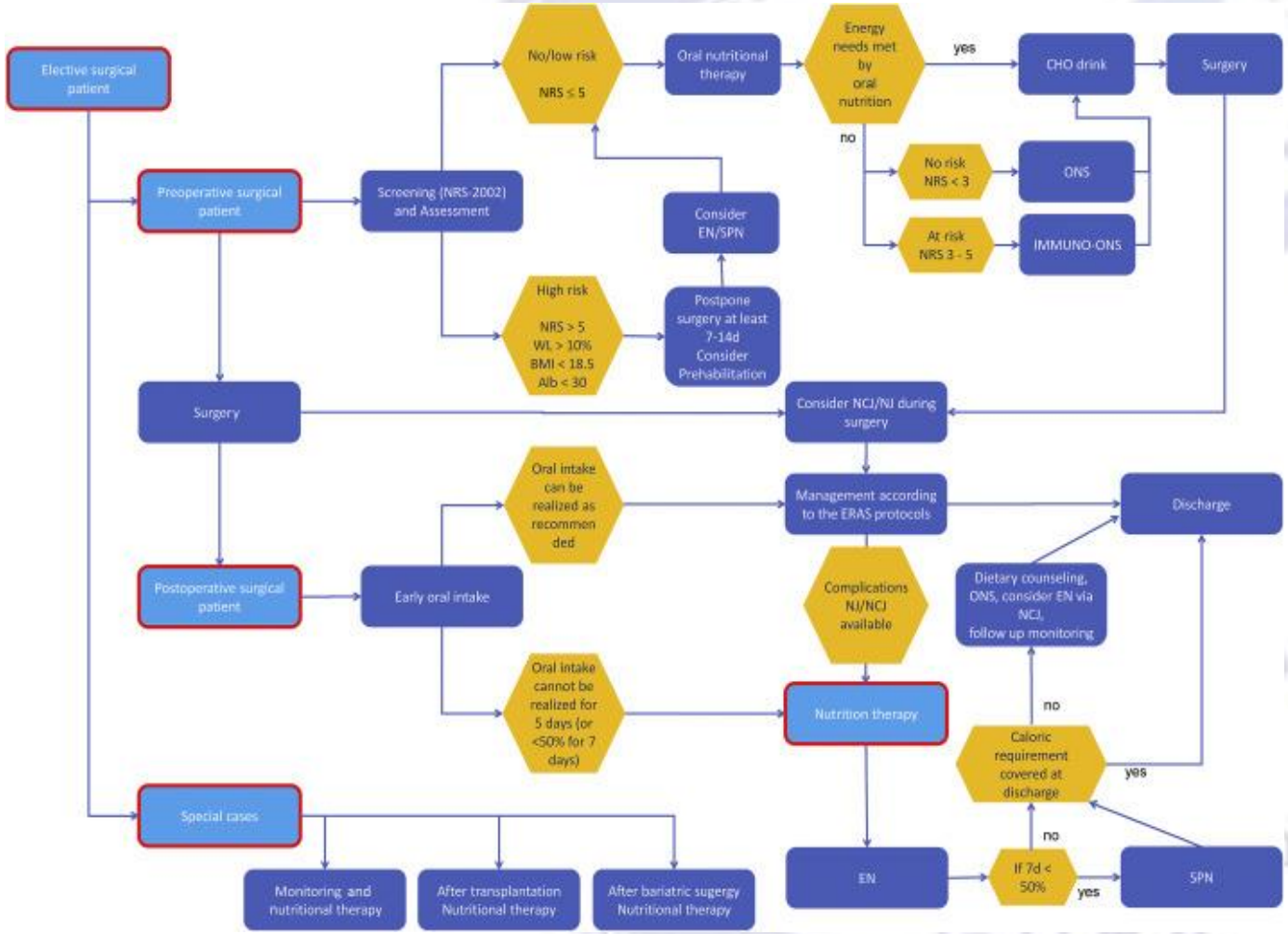
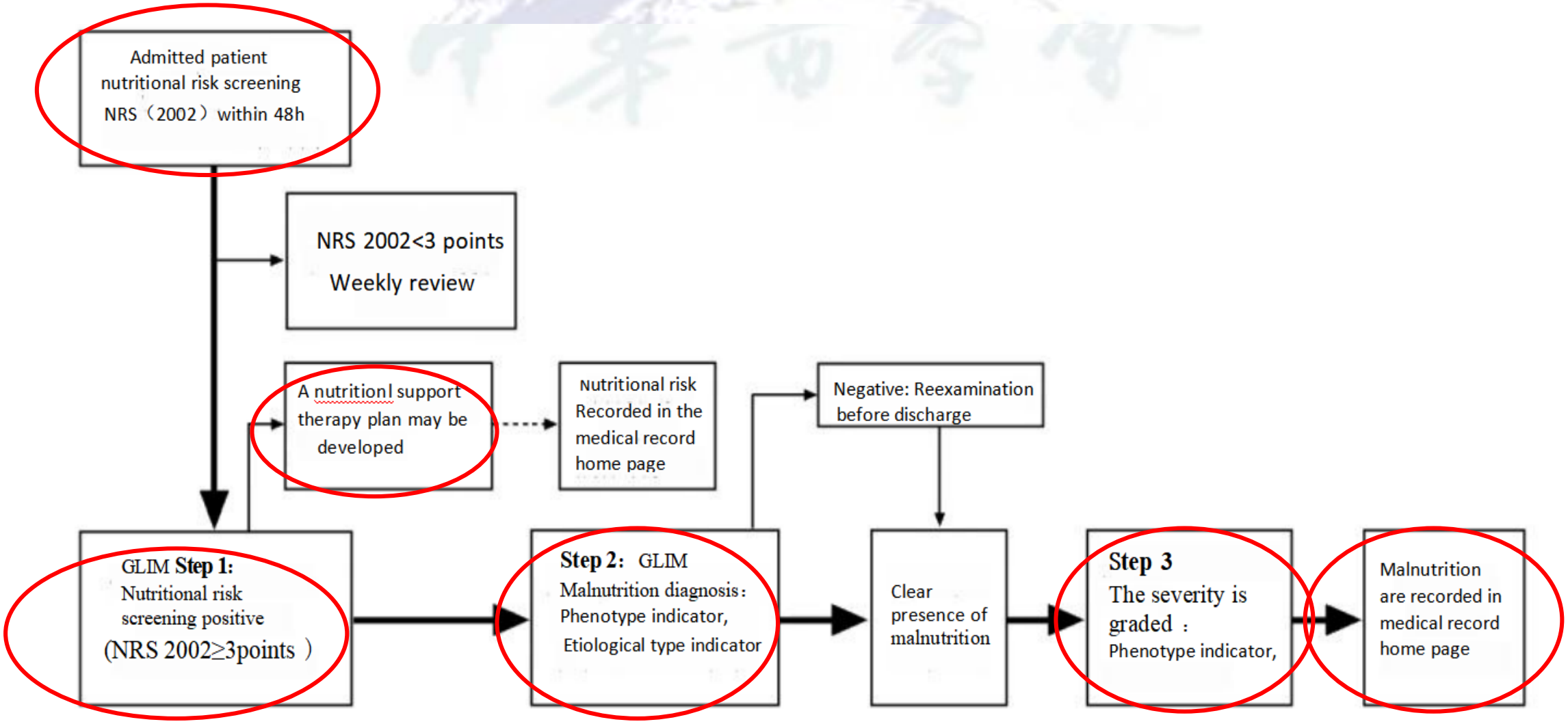


- **Nutritional risk screening, Assessment and Diagnosis**
- **Nutrition Intervention：**
  - **oral nutritional supplements（ONS）**
  - **enteral nutrition（EN）**
  - **complementary parenteral nutrition (SPN)**
- **Nutritional monitoring**

ESPEN practiacl guideline: Clinical nutrition in surgery（2021）

Nutritional screening, assessment and diagnostic procedures



Nutritional Risk Screening（NRS-2002）

Step 1: Initial Screening

1.BMI (kg/m²):

◦<18.5 → Proceed to Step 2

◦≥18.5 → Check weight loss and food intake

2.Weight Loss:

◦5% in past 3 months → Proceed to Step 2

3.Reduced Dietary Intake:

◦Yes (e.g., <50% of needs for >1 week) → Proceed to Step 2

4.Severe Illness (e.g., ICU patient, major surgery, sepsis)

◦**If "Yes" to any, proceed to Step 2.**

◦**If all "No," rescreen weekly.**

Step 2: Final Screening (Scoring)

Category	Score	Criteria
Impaired Nutritional Status	0–3	
0	Normal nutritional status	
1	Mild: Weight loss >5% in 3mo OR poor food intake	
2	Moderate: Weight loss >5% in 2mo OR BMI 18.5–20.5 + impaired general condition	
3	Severe: Weight loss >5% in 1mo (>15% total) OR BMI <18.5 + impaired general condition	
Disease Severity (Stress Metabolism)	0–3	
0	No disease	
1	Mild: Chronic disease (e.g., diabetes, hypertension)	
2	Moderate: Major surgery, stroke, severe pneumonia	
3	Severe: ICU, cancer, burns	
Age Adjustment	+1	Age ≥70 years

- **Score ≥3:**
  Nutritional risk → Requires nutritional intervention.
- **Score <3:**
  Reassess weekly.

GLIM
（Malnutrition diagnosis process）

Nutritional Risk Screening

Evaluation (diagnosis) method

Make an assessment (diagnosis)

Severity rating

nutritional Risk screening

- Use clinically validated nutritional screening tools

Evaluation (diagnostic) indicators

- Phenotypic index
  - Involuntary weight loss
  - Low body mass index（BMI）
  - Decreased muscle mass
- Etiological type index
  - Reduced food intake or absorptionDisease burden/inflammatory status

Meet the criteria for the assessment (diagnosis) of malnutrition

At least 1 phenotype indicator and 1 etiological type indicator are required

Determine the severity of malnutrition

The severity of malnutrition was assessed based on phenotypic indicators

Diagnostic criteria for malnutrition（GLIM)

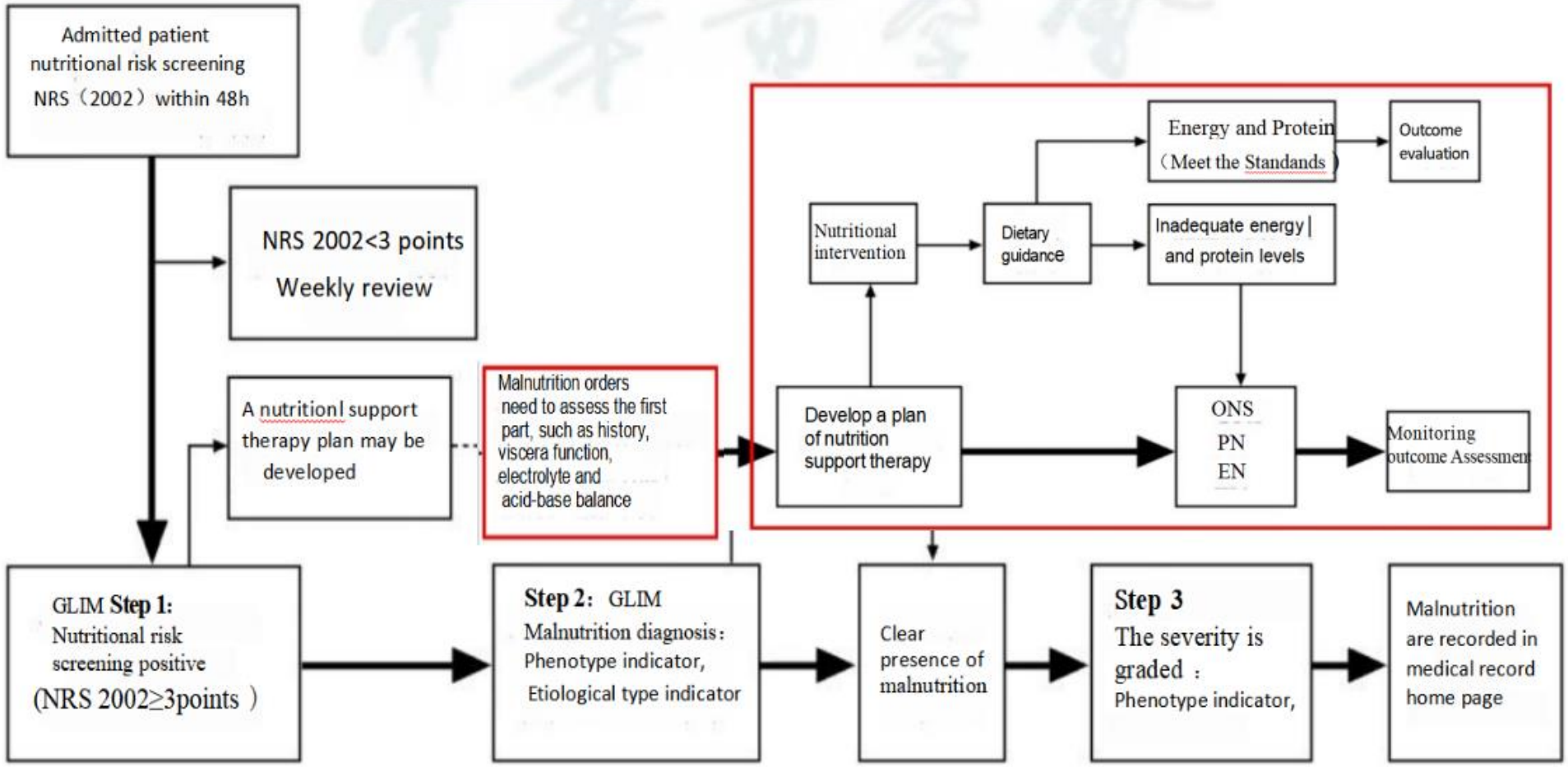
Phenotypic index			Etiological type index	
Involuntary weight loss(%)	Low body mass index（BMI)(kg/m^2)	decrease in muscle mass	Reduced intake or elimination of malabsorption	inflammatory response
Within 6 months>5%， or Over 6 months>10%	BMI<20kg/m^2 (if<70岁) or<22kg/m^2 (if ≥70岁) Asians： BMI<18.5kg/m^2 (if<70岁) or<20kg/m^2 (if≥70岁)	Proven body composition measurement techniques are rated as reduced	Intake of more than 50% less than the normal demand for > 1 week， or Reduce any range >2 weeks， or Any chronic gastrointestinal disease that exists with poor digestion and absorption of food	Acute illness/trauma or chronic diseases（CRP、IGF-1、IL-6、Glasgow prognostic score)

If one phenotypic index and one etiological index are met at the same time, malnutrition can be diagnosed

Malnutrition severity is graded as moderate and severe

Grading	Phenotypic index		
	Weight loss (%)	Low body mass index(kg/m2)	Decreased muscle mass
Moderate malnutrition	Within 6 months >5%-10%，or Over 6 months >10%-20%	<20，if<70Y；<22，if≥70Y	Mild to moderate reduction
severe malnutrition	Within 6 months >10%，or Over 6 months >20%	<18.5，if<70岁；<20，if ≥70岁	Severe reduction

Nutritional screening, assessment and diagnostic procedures



A five-step model of nutritional intervention

- **According to the ESPEN guidelines, when the next step does not meet 50% of the target energy requirements for 7 days, the next step should be chosen.**

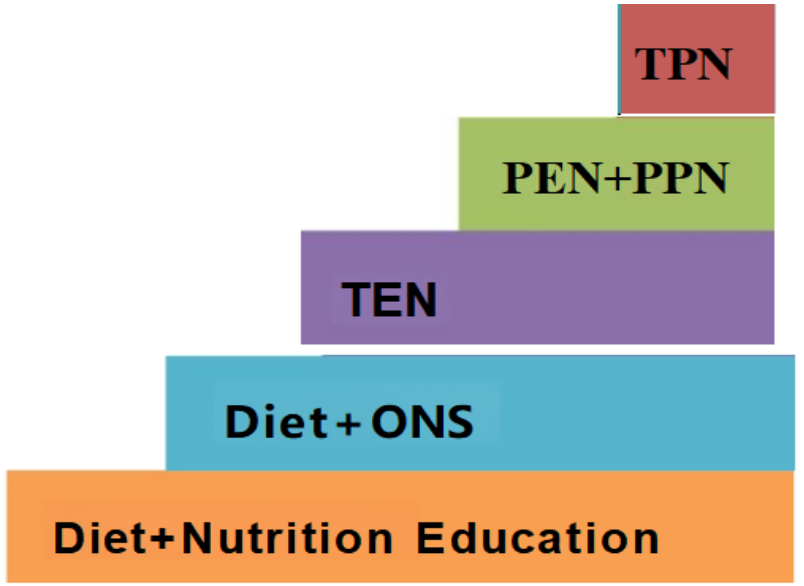


Figure 1-step model of nutritional intervention for malnourished patients

TPN， total parenteral nutrition
TEN， total enteral nutrition
PPN， partial parenteral nutrition
PEN， partial enteral nutrition
ONS， oral nutritional supplements
Nutrition education includes nutrition counseling, dietary guidance and dietary adjustment

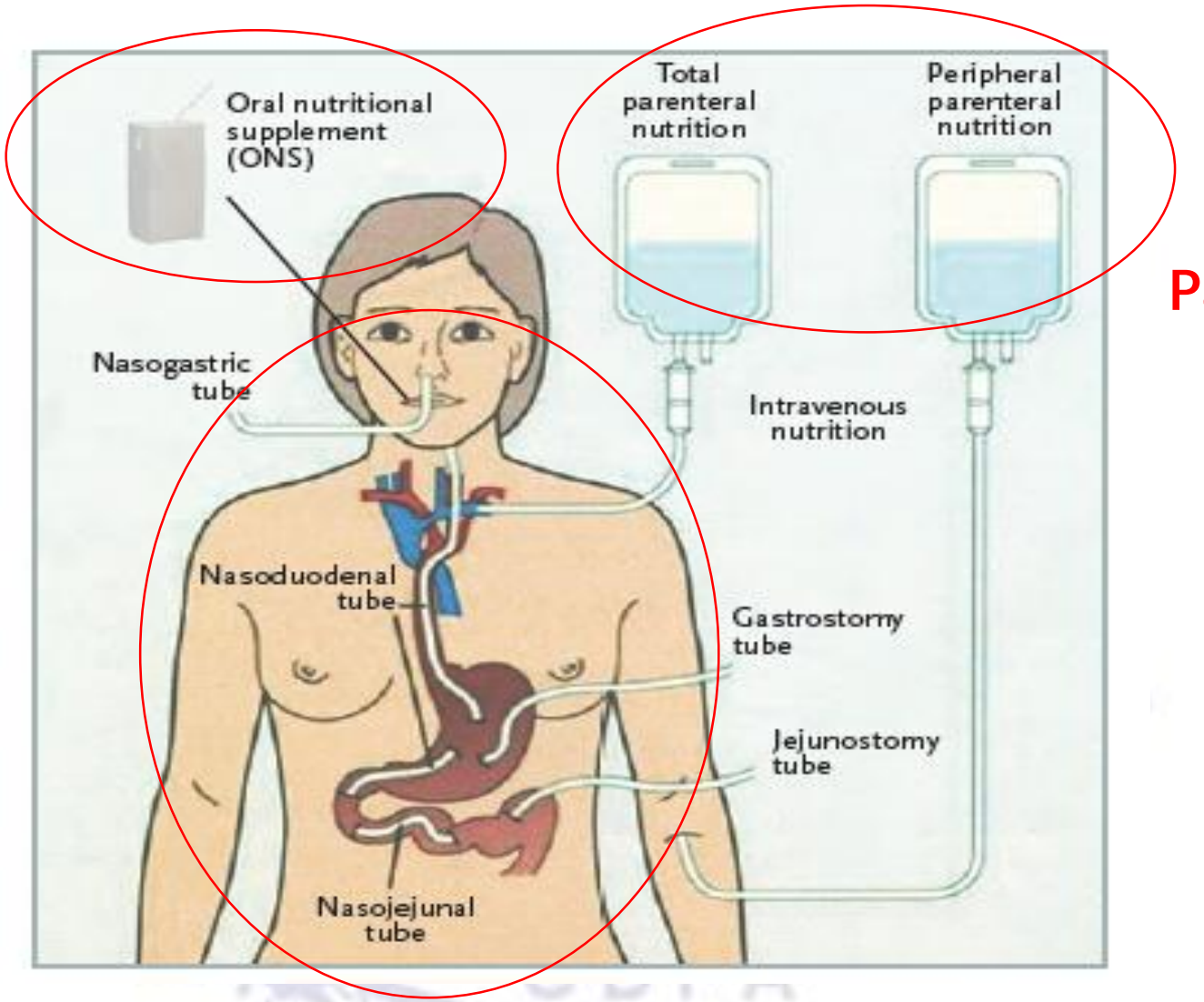
How to Determine the Target Energy and Protein Requirements for Surgical Patients?

- For perioperative patients, indirect calorimetry is the preferred method for measuring actual **energy requirements**. If measurement is not feasible, weight-based formulas **(25–30 kcal/kg/d)** or predictive energy equations may be used
- T**he target protein requirement** for perioperative patients is **1.5–2.0 g/kg/d**

Shi H Ping et al. Five-step treatment of malnutrition. E-journal of Tumor Metabolism and Nutrition,2015

Nutritional Support Mode

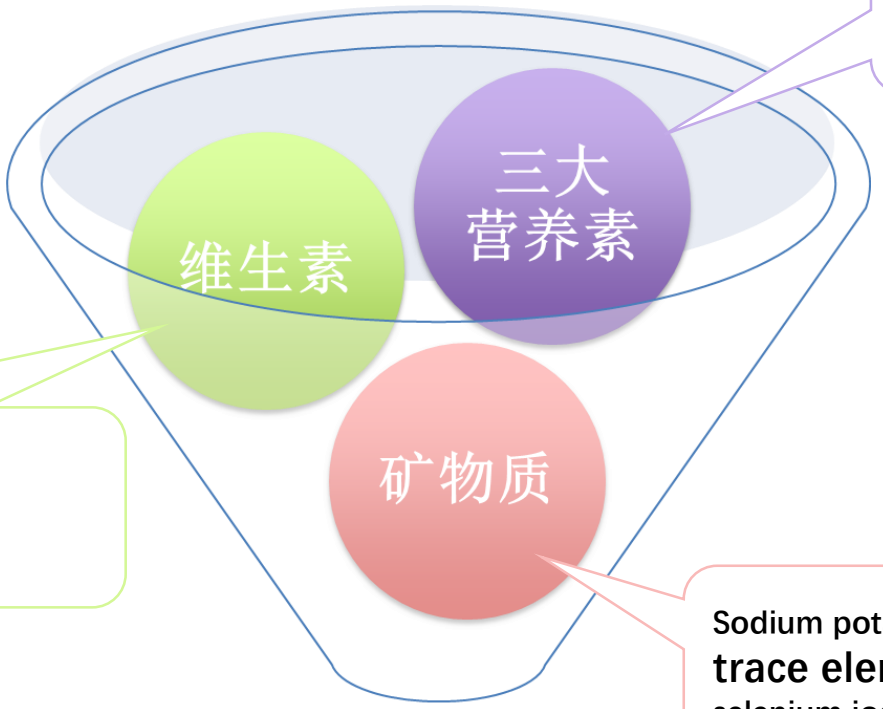
oral nutritional supplement（ONS）



Parenteral nutrition

Enteral nutrition (tube feeding)

The basic composition of nutritional preparations



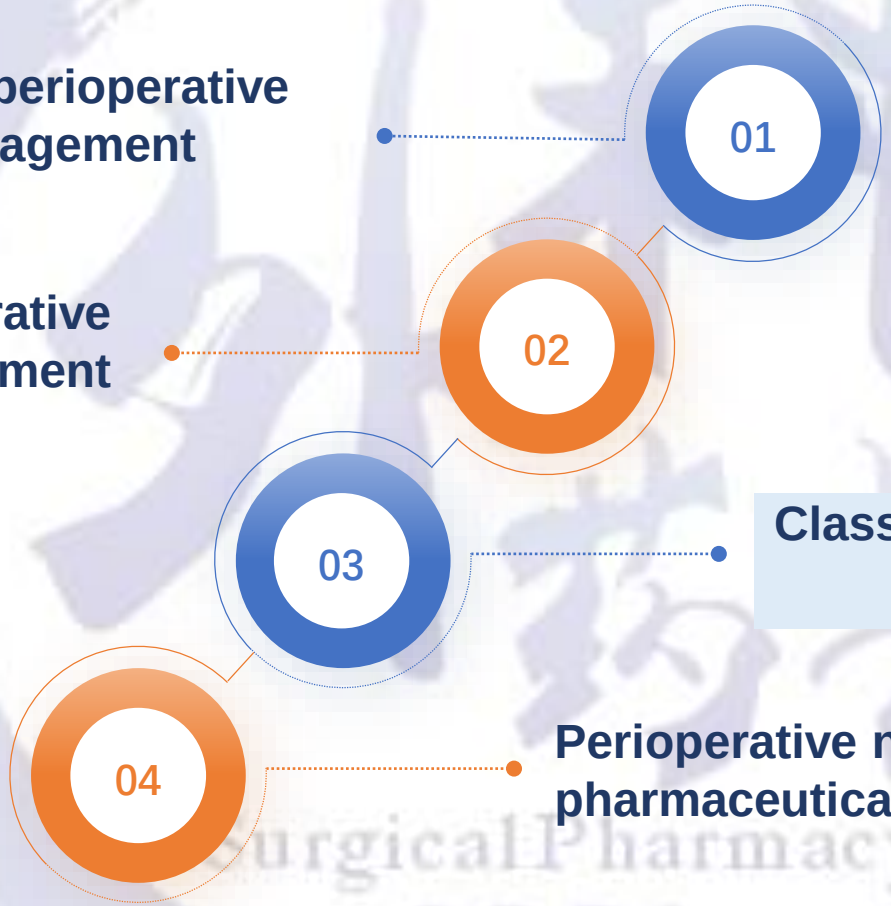
Energy supply: carbohydrate, fat milk
protein synthesis： amino acid

Water solubility：VB、VC
Lipid solubility：VA、VD、VE、VK

Sodium potassium calcium magnesium phosphorus
trace element ： Iron copper zinc manganese selenium iodine

nutrition agent

Content



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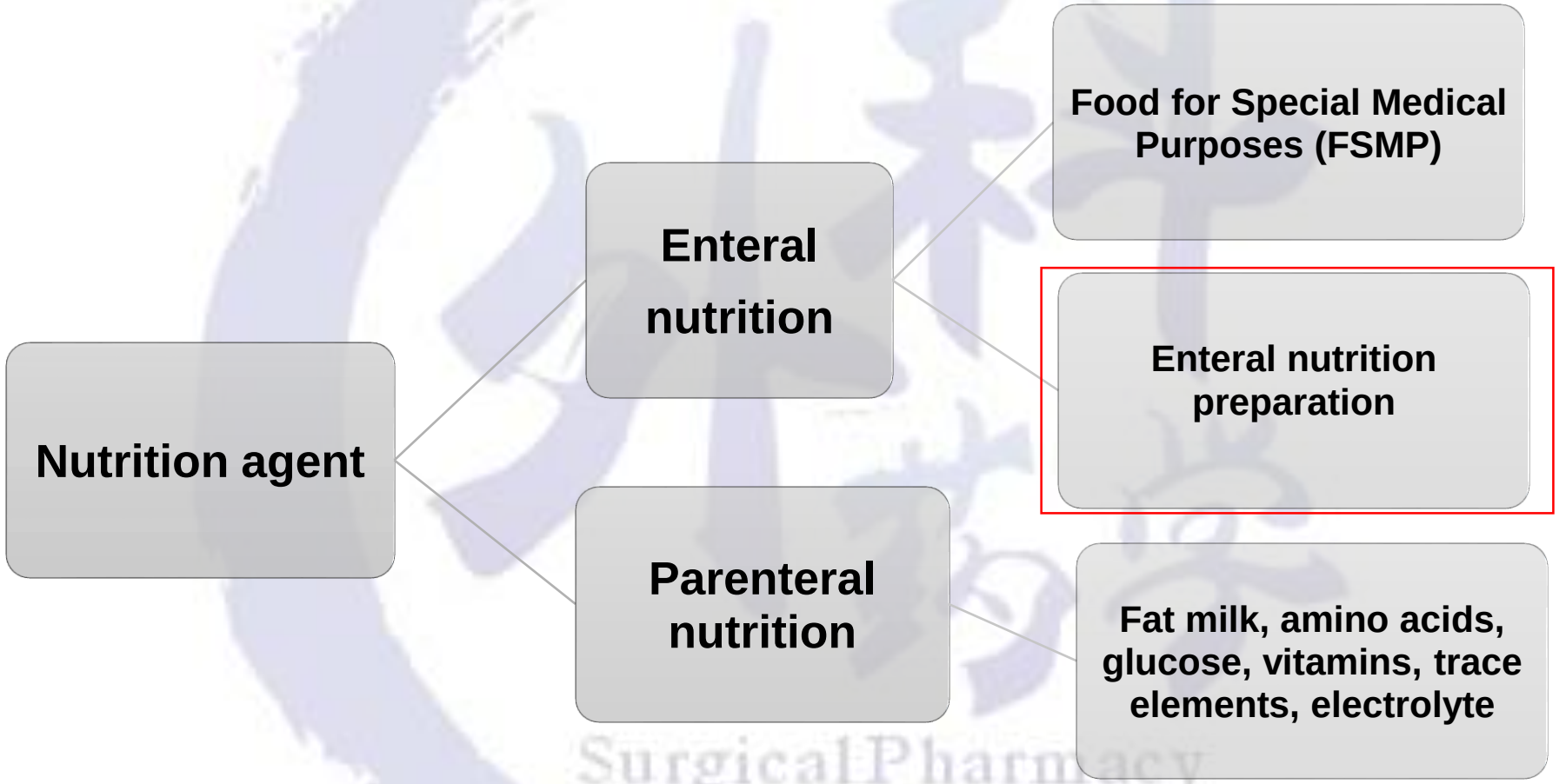
Classification of Nutritional Preparations



Enteral Nutrition Preparations

type	TP	TP	SP	SP	TP-MCT	TP-HE	TPF	TPF	TPF-T	TPF-D
The form of a drug	Powder	Powder	Suspension	Powder	Suspension	Emulsion	Suspension	Emulsion	Emulsion	Emulsion
Energy density (kcal/mL)	1.06	1	1	1	1	1.5	1.5	1.5	1.3	0.9
Protein energy (%)	14.2	16	16	15	20	20	16	15	18	15
Carbohydrate energy(%)	54	48	69	70	50	45	49	50	32	53
Fat energy (%)	31.8	36	15	15	30	35	35	35	50	32
Proportion of medium chain fatty acids(%)	N	N	N	47	60	56.9	7.5	N	N	15.5
Proportion of omega-3 fatty acids (%)	N	N	N	N	N	N	5.1	N	Content not labeled	N
Dietary fiber (g/100kcal)	N	N	N	N	N	N	1	1	2	1.67
Osmotic pressure (mOsm/L)	379	-	-	-	-	300	300	320	350	320

EN Selection

1. **The standard (whole protein) formulation is suitable for most patients who require EN**

2. **Special formulations are considered in the following cases**

★SP: Whole-protein intolerance, initial stage after chronic starvation, severe impairment of gastrointestinal absorption function, Jejunum is given enteral nutrition (in intensive care or in patients with severe acute pancreatitis), certain short bowel syndrome, or intestinal fistula

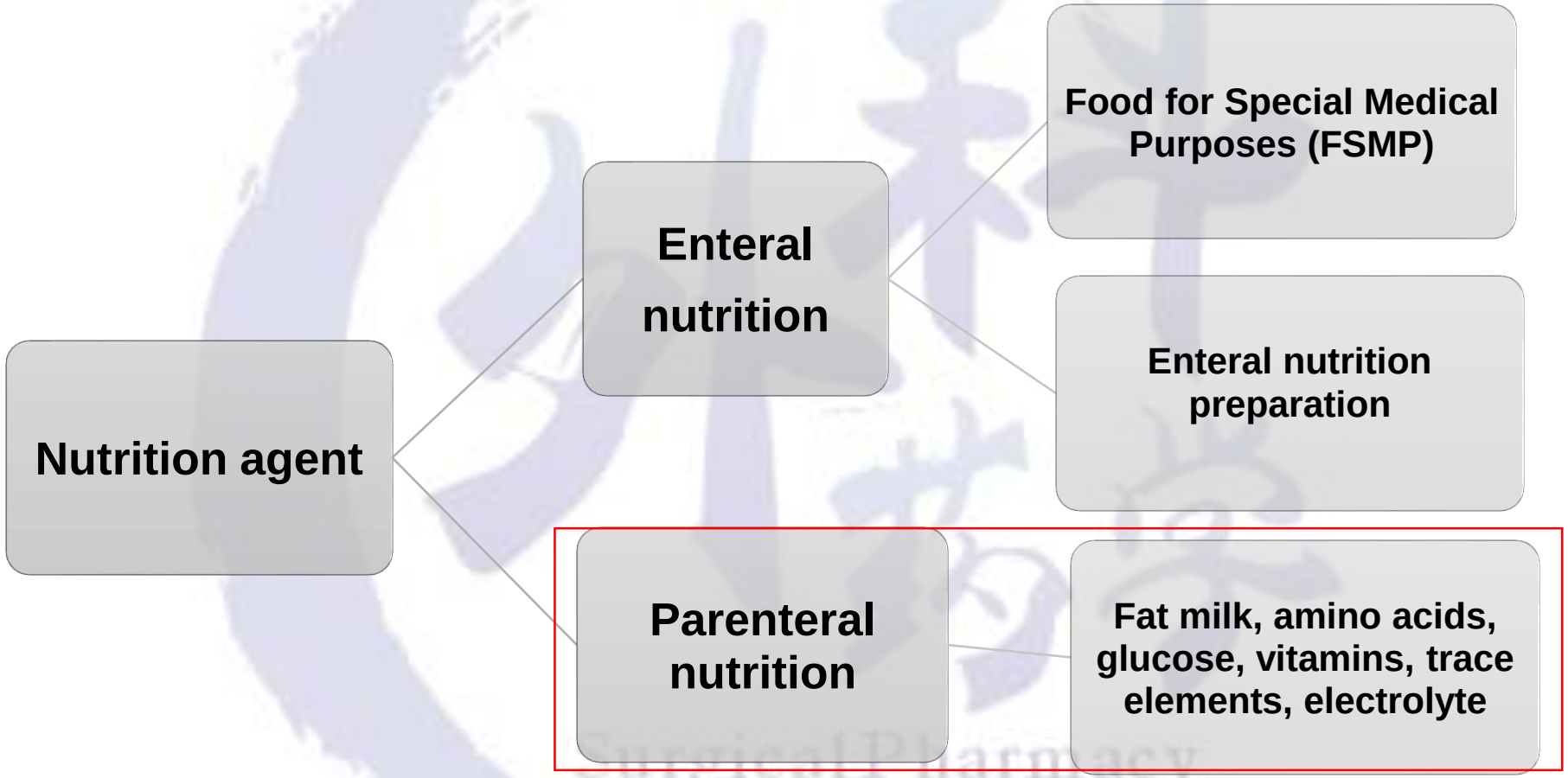
★TP-MCT: Lipid metabolism disorders (bile salt deficiency, pancreatic enzyme deficiency, lymphatic transport abnormalities)

★TP-HE: Need to limit fluid intake such as heart failure, high energy high protein MCT account for a high proportion

★TPF-T: High-fat formulation for cancer patients with immunomodulators

★TPF-D: Diabetic formula

Classification of Nutritional Preparations



Parenteral Nutrition Drugs

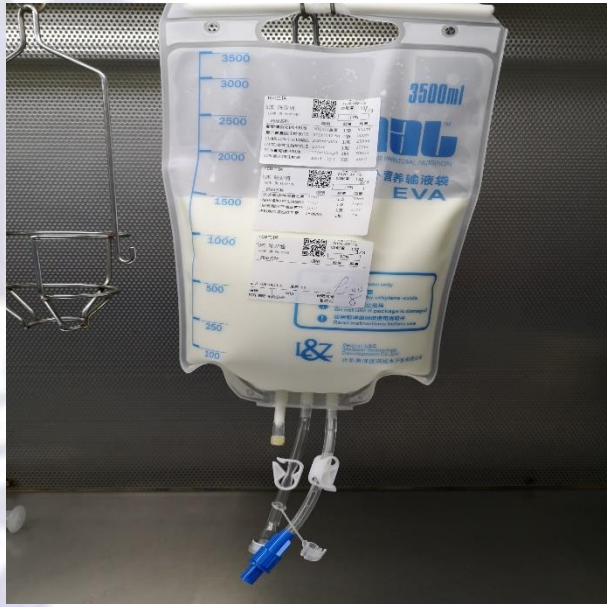
Component	Preparation
Carbohydrate	Glucose(10%、50%)
Lipid emulsion	Long chain of soybean oil fat emulsion, long chain fatty milk, fat emulsion structure and olive oil fat emulsion, fish oil fat emulsion, a variety of oil fat emulsion
Amino acid	Compound amino acids (3 aa, 9, 15, 18 aa aa aa, 20 aa, etc.), Pediatric compound amino acids (18, 19 aa aa), propylene ammonia acyl glutamine
Electrolyte	Sodium chloride, potassium chloride, calcium gluconate, calcium chloride, magnesium sulfate, potassium magnesium aspartate, sodium glycerophosphate, potassium hydrogen phosphate complex
Trace elements	Multiple trace elements
Vitamins	Water-soluble vitamins, fat-soluble vitamins, multivitamins, 12 multivitamins
Water	Sterilized water for injection (or supplemented with 0.9% sodium chloride, 5% glucose, glucose sodium chloride injection, etc.)
Premix	Fatty milk amino acid glucose injection

Parenteral Nutrition Mixture

two-in-one

Premixed industrial multi-cavity bag

three-in-one



Self-fitting bag

Lipid emulsion preparation

Trade name	Fatty acid composition	Fat Sources
20% Intralipid	Long chain triglycerides(LCT) ω-6	soybean oil
20%力能+C6 20%卡路 20%Lipofundin+VE	Medium-long chain triglycerides(MCT/LCT) (1 : 1)	
20%力文	Structural fat milk	soybean oil
20% ClinOleic	LCT ω-9、 ω-6 (4：1)	Olive oil, soybean oil
10% Uwen	LCT ω-3	fish oil
20%合文	LCT ω-6、ω-9、ω-3、MCT (6：5：3：6)	Soybean oil, olive oil, fish oil

Characteristics of Lipid Emulsion Preparation

Drug type	Type the metabolic rate	essential fatty acid	Hepatic burden	suitable for the croud
LCT	slow	yes	higher	Regular need to supplement essential fatty acids
MCT/LCT	fast	portion	low	Liver dysfunction, hypermetabolic state
Structural fat milk	faster	yes	low	Need to supply energy quickly and reduce side effects
fish oil lipid emulsion	medium	No (but anti-inflammatory)	low	Patients with sepsis and postoperative inflammatory reactions

Common Compound Amino acid Preparations

Generic name	Concentration	Specifications	Amino acid content (g)
Compound Amino acid Injection(3AA)	4.26%	250ml	10.65
Compound Amino acid Injection(9AA)	5.59%	250ml	13.98
Compound Amino acid Injection(15AA)	8%	250ml	20
Compound Amino acid Injection(18AA-Ⅰ)	6.74%	100ml	6.74
Compound Amino acid Injection(18AA-Ⅱ)	8.5%	500ml	42.5
Compound Amino acid Injection18AA-Ⅲ)	10.36%	250ml	25.9
Compound Amino acid Injection(20AA)	10%	500ml	50
Alanyl glutamine Injection	20%	50/100ml	10/20
Compound amino acid (15) dipeptide (2) Injection	13.4%	500ml	67

Parameters of commonly used electrolyte preparations

Drug name	specification (ml)	content (g)	Ionic molar weight (mmol)
10% Nacl	10	1	Na17
10% Kcl	10	1	K13.4
calcium chloride	10	0.5	Ca3.4
calcium gluconate	10	1	Ca2
magnesium sulfate	10	2.5	Mg10
Sodium glycerophosphate (Graves)	10	2.16	P10、Na20
potassium aspartate	10	1.712	K10
Potassium magnesium aspartate (Panangin)	10	K103.3mg、Mg33.7mg	K2.6、Mg1.4
potassium magnesium aspartate	2g	K1、Mg1	K5.84、Mg6.93

Microelement

Iron, zinc, copper, iodine, selenium, chromium, manganese, molybdenum, fluorine

Vitamin

Water soluble vitamin： VitB1、VitB2、VitB6、VitC VitB12、Folic acid, niacin, pantothenic acid, biotin

lipid-soluble vitamin： VitA、VitD、VitE、VitK

- The composition is complex, trace but indispensable, and is an important cofactor in the metabolic pathway
- The preparation form is 1 unit, which can generally meet daily needs, and the demand for special cases increases
- It should be noted that preparations for adults and children are different in composition and content
- Note that there are 12 multivitamin preparations that are only approved by the FDA for patients using warfarin

Formulation of parenteral nutrition prescription

ASPEN Recommendations on Appropriate Parenteral Nutrition Dosing for Adult Patients

TABLE 1. MACRONUTRIENTS

Disease/Clinical Condition	Protein/Amino Acids (g/kg/d)	Total Energy (kcal/kg/d)	PN Dextrose (mg/kg/min)	PN Component ILE* (g/kg/d)	Fluid (mL/kg/d)
Stable	0.8-1.5	20-30	4-5	1	30-40
Critically ill, trauma, sepsis	1.2-2.5	20-30	<4	<1	Minimal to provide adequate macronutrients
Different Amino Acid Requirements than Above	**Protein Amino Acids (g/kg/d)**	**Total Energy (kcal/kg/d)**			
Traumatic brain injury	1.5-2.5				
Burns	1.5-2				
Open abdomen	Additional 15-30 g/L exudate				
Acute kidney injury	0.8-2.0				
Continuous renal replacement therapy	Additional 0.2 g/kg/d not to exceed 2.5 g/kg/d)				
Chronic kidney failure with maintenance hemodialysis	1.2				
Hepatic failure	1.2-2 (based on "dry" weight and tolerance)				
Obese	2-2.5 (based on IBW)	22-25 (based on IBW)			

IBW = ideal body weight

**Soybean oil-based emulsion. For indications and dosing of other lipid injectable emulsions (ILE), see manufacturer's product literature.*

Sugar-to-fat ratio:

- Fat can reach 50-60% (hyperglycemia, hypercapnia)
- Over 60% fat, difficult to metabolize

TABLE 2. ELECTROLYTE AND MINERAL

Nutrient	Standard Daily Requirement	Factors That Increase Needs
Calcium*	10-15 mEq	High protein intake
Magnesium	8-20 mEq	GI losses, medications, refeeding
Phosphorus*	20-40 mmol	High dextrose intake, refeeding
Sodium	1-2 mEq/kg*	Diarrhea, vomiting, NG suction, GI losses
Potassium	1-2 mEq/kg*	Diarrhea, vomiting, NG suction, GI losses, medications, refeeding
Acetate	As needed to maintain acid-base balance	Renal insufficiency, metabolic acidosis, GI losses of bicarbonate
Chloride	As needed to maintain acid-base balance	Metabolic alkalosis, volume depletion

TABLE 3. DAILY REQUIREMENTS FOR ADULT PARENTERAL VITAMINS*

Vitamin	Standard Daily Requirement
Thiamin (B_1)	6 mg
Riboflavin (B_2)	3.6 mg
Niacin (B_3)	40 mg
Folic acid	600 mcg
Pantothenic acid	15 mg
Pyridoxine (B_6)	6 mg
Cyanocobalamin (B_{12})	5 mcg
Biotin	60 mcg
Ascorbic acid	200 mg
Vitamin A	990 mcg
Vitamin D	5 mcg
Vitamin E	10 mg
Vitamin K	150 mcg

** Prescribe full daily dose unless patient able to ingest and/or absorb orally/enterally. Full dose of most multivitamin products available in the US provides the above requirements.*

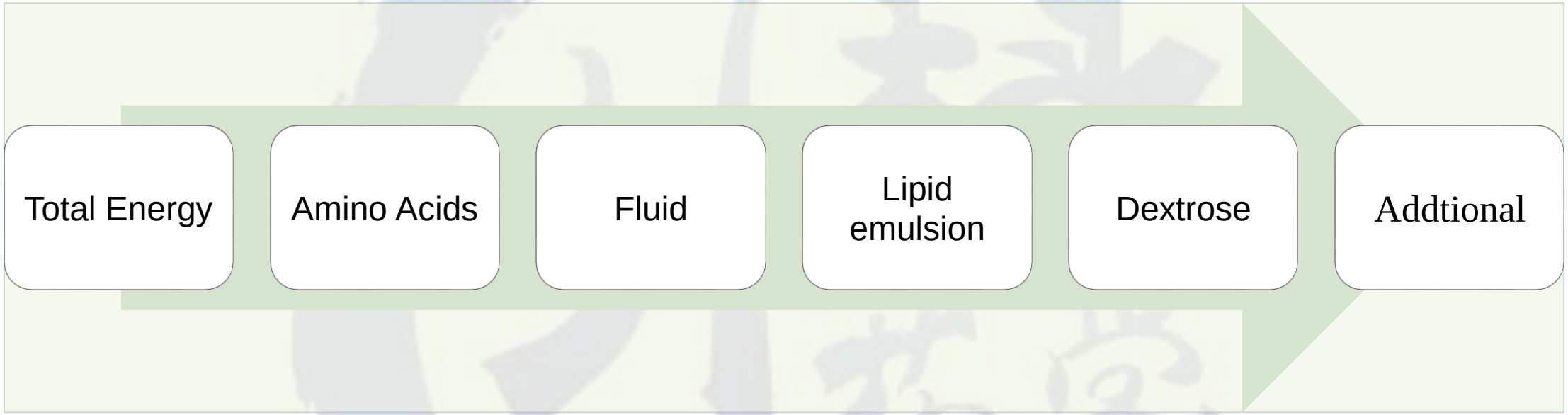
TABLE 4. DAILY REQUIREMENTS FOR ADULT PARENTERAL TRACE ELEMENTS*

Trace Element	Standard Daily Requirement
Chromium	<1 mg
Copper	0.3-0.5 mg
Manganese	55 mcg
Selenium	60-100 mcg
Zinc	3-5 mg

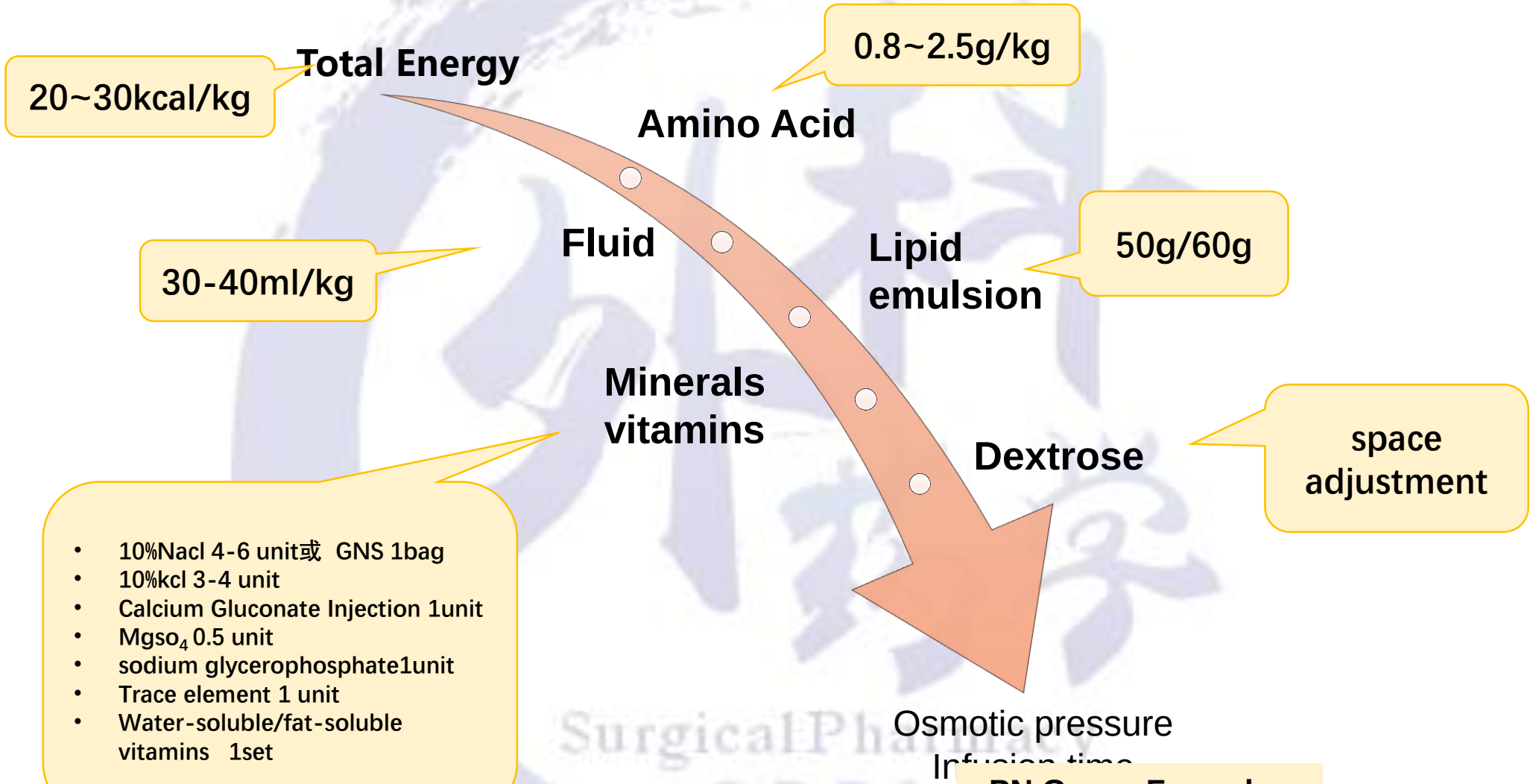
** Prescribe full daily dose unless patient able to ingest or absorb orally/enterally.*

Note: These requirements are different than the multi-trace element products currently available in the US.

Formulation of parenteral nutrition prescription



PN Formulation



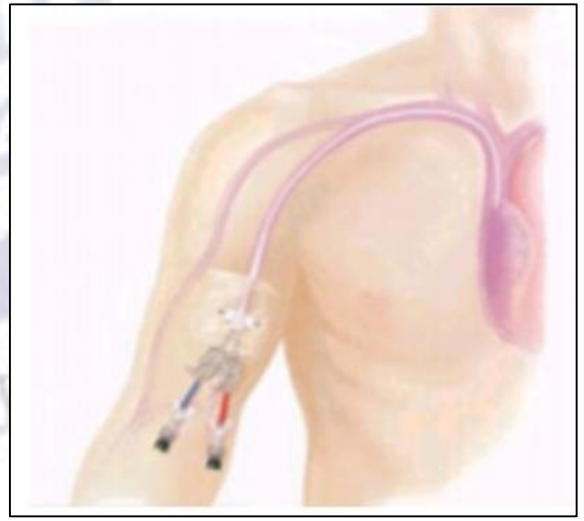
PN infusion route

- **Human plasma permeable concentration：** 285-310 mOsm/kg
- **Peripheral vein：** 600-900 mOsm/L
- **Central vein：** >900 mOsm/L

PVC
osmotic pressure≤900
short-term

CVC
osmotic pressure>900

PICC
osmotic pressure>900
long-term



PN Infusion Time

- The minimum infusion time and maximum infusion rate were calculated according to the maximum oxidation rate of glucose (4-5mg/kg/min)
- Controlled infusion via infusion pump
- In critical cases, continuous infusion is often given 24 hours a day
- Daily infusion of 10-14 hours (adjusted for tolerance) helps to adapt to the patient's physiology and psychology
- When the infusion method is changed, pay attention to step by step

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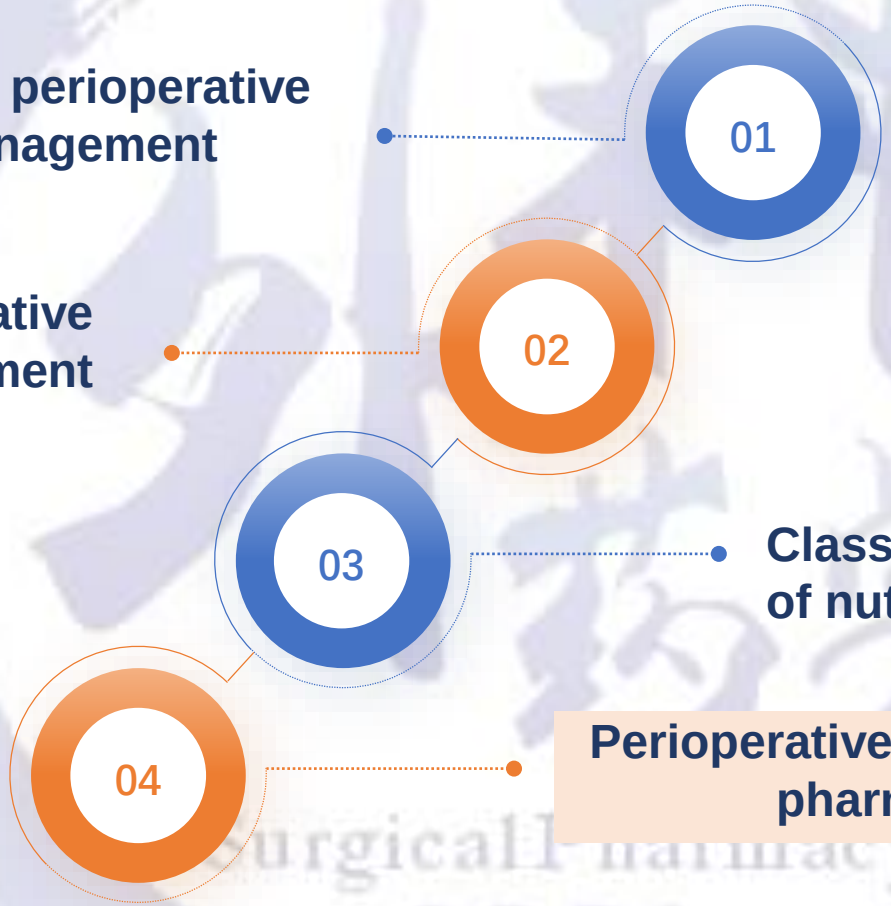

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Perioperative Nutrition Management MDT

外科营养管理MDT

Workflow of nutritional management for surgical pharmacists

每日评估所在病区患者的胃肠道功能及摄入情况

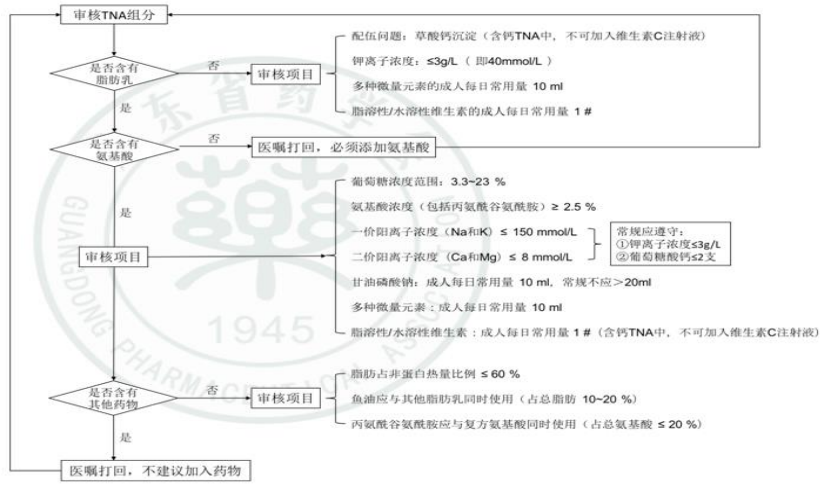
重点患者药学问诊

1. 问诊前详细了解患者的一般情况
2. 药学问诊内容：
- 根据NRS-2002评分表（见附录2）询问患者进食与
- 询问患者药物使用情况，纠正错误用药习惯，指导
- 评估患者用药习惯（自行购买药品、中草药、保健
- 询问患者过敏史（如鸡蛋、鱼、海鲜等）
- 询问患者工作情况、生活习惯、饮食习惯和烟酒嗜好

患者有EN适应证时，提出En支持治疗建议：喂养途径、制剂选择、用量、输注方式和输注速度等

Medical order review

审核TNA医嘱



PN审方流程

重点患者药学问诊

- 询问患者过敏史（如鸡蛋、鱼、海鲜等）
- 询问患者工作情况、生活习惯、饮食习惯和烟酒嗜好

每日药学监护

1. 监护患者胃肠耐受：监护肠内营养摄入、潴留情况；监护胃肠道功能变化（有胃肠道瘘的患者需同时关注瘘口情况）
2. 监护患者生命体征、出入量及其他指标
3. 监护肠内营养相关并发症：监护肠内营养与药物间的相互作用，避免药物引起的机械性并发症（如喂养管堵塞）

Pharmaceutical care

每日药学监护

1. 监护患者胃肠道情况
2. 监护患者生命体征、出入量及其他指标
3. 监护肠外营养相关并发症

每3~4日药学查房

1. 查房前详细了解患者病情变化
2. 药学查房内容：
- 患者主诉、体重变化、耐受情况等
- 检查肠内营养制剂的使用情况，包括喂养途径、输注方式、输注速度等
- 针对依从性较差患者重复用药宣教
- 解答患者的用药问题

1. 查房前详细了解患者病情变化
2. 药学查房内容：
- 患者主诉、体重变化、耐受情况等
- 检查TNA的具体使用情况，如输注途径、输注速度、TNA外观等
- 针对依从性较差患者重复用药宣教
- 解答患者的用药问题

出院日宣教

1. 家庭（或转诊机构）营养建议
2. 药物服用建议

Discharge education and follow-up

1. 家庭（或转诊机构）营养建议
2. 药物服用建议

Perioperative nutritional pharmaceutical care

EN Pharmaceutical care	PN Pharmaceutical care
• Gastrointestinal tolerance • Metabolic • Infusion-related (tube feeding)	• Metabolic • Infectious, mechanical • Infusion-related (Osmotic pressure, infusion time)
Clinical observation, laboratory examination indicators	
Nutrition education	

Nutrition Related Pharmaceutical Care Indicators

- **Clinical observation**
  - Chief complaint, symptoms and signs
  - Vital signs, volume, weight
- **laboratory inspection**
  - Mainly blood, urine routine and blood biochemical indexes

specimen	program	Unstable condition	stable disease
Blood	routine	2/week	1/week
	Blood Sugar	1-2/d	1-2/week
	Na、K、CL	1-2/d	1-2/week
	Calcium, magnesium, phosphorus	2-3/week	1/week
	renal function	1-2/week	1/week
	albumin	1/week	1/week
	prealbumin	1/week	1/week
	cholesterol	1/week	1/week
	triglyceride	1/week	1/week
	liver function	1/week	1/week
	C-reactive protein	in necessity	in necessity
Urine	routine	in necessity	in necessity
Drain	Electrolyte and nitrogen content	in necessity	in necessity

PN Pharmaceutical care

- **PN infectious complications**

- the puncture site infection

- catheter-related bloodstream infections

- enterogenous infection

- **Mechanical complications of PN**

- Thrombosis related to puncture and catheterization

- **PN metabolic complications**

PN metabolic complications

- **Metabolic Disorders**（Blood sugar, lipids, nitrogen, electrolytes, vitamins, trace elements)
- **Refeeding Syndrome**
- **PN-related Liver Disease**
- **Gallbladder Stasis and Gallbladder Dilatation** (gallstones and cholecystitis)
- **Intestinal infection**
- **Skeletal Metabolic Abnormalities**

Short-term complications：
symptomatic supportive treatment

Long-term complications：
adjust the PN program，
start EN as early as possible

Pharmaceutical care Record

住院患者药学服务路径

住院号_____ 姓名_____ 性别_____ 年龄_____ 科室_____ 床号_____

入院日期_____ 出院日期_____ 编号_____ 药师_____

时间	药学服务内容		次数	药学监护计划	营养监护计划
入院日	入院评估	□药学 □营养 □生活习惯		□一级监护 □二级监护 □三级监护	□一级监护 □二级监护 □三级监护
	药物重整				
	入院宣教				

时间	药学服务内容	日期	次数
在院期间	住院期间治疗方案		
	住院期间检验检查		
	药学监护		
	营养监护		
	干预		
	住院期间宣教		
出院日	出院宣教		

入院药学/营养评估

住院号_____ 姓名_____ 性别_____ 年龄_____ 科室_____ 床号_____

入院日期_____ 出院日期_____ 编号_____ 药师_____

病情概况

营养摄入　饮食：　ONS：

慢病史

吸烟史　饮酒史

用药史

用药依从性　□主观评定　□Morisky 评分　□差、□中等、□好

1	您是否有时忘记服药？	□是 □否
2	在过去的 2 周内，是否有一天或几天您忘记服药？	□是 □否
3	治疗期间，当您觉得症状加重或出现其他症状时，您是否未告知医生而自行减少药量或停止服药？	□是 □否
4	当您外出旅行或长时间离家时，您是否有时忘记随身携带药物？	□是 □否
5	昨天您服药了吗？	□是 □否
6	当您觉得自己的症状已经得到控制时，您是否停止过服药？	□是 □否
7	您是否觉得要坚持治疗计划有困难？	□是 □否
8	您觉得要记住按时按量服药很困难吗？	□从不 □偶尔 □有时 □经常 □所有时间

过敏史或 ADR 史

营养评估

筛查：□NRS2002 □MNA-SF

NRS2002	1 分	2 分	3 分
疾病评分	□慢性疾病(□肝硬化 □COPD，尤其有急性并发症 □髋部骨折 □糖尿病 □长期血液透析 □一般恶性肿瘤 □挂靠：	□腹部大手术 □脑卒中 □重症肺炎 □血液恶性肿瘤 □挂靠：	□颅脑损伤 □骨髓移植 □APACHEII＞10 分的 ICU 患者 □挂靠：
营养评分	□3 个月内体重下降 5%	□2 个月内体重下降 5%	□1 个月内体重下降 5% □3 个月内体重下降 15% □BMI<18.5 及一般情况差
	□1 周内进食减少 25-50%	□1 周内进食减少 50-75%	□1 周内进食减少>75%
年龄评分	□≥70 岁	总分：	□无营养风险(0) □有营养风险(3)

年龄>60 岁：□否 □是

MNA-SF	0 分	1 分	2 分	3 分
食量减少	□严重减少	□中度减少	□没有改变	——
体重下降	□>3kg	□不知道	□>1-3kg	□没有
活动能力	□卧床或坐轮椅	□不能外出	□可以外出	——
心理创伤/急病	□有	——	□没有	——
精神心理	□严重痴呆抑郁	□轻度痴呆	□没有	——
BMI	□<19	□19-21	□21-23	□≥23
小腿围	□<31	——	——	□≥31
总分		□正常(12)	□有营养不良风险(8)	□营养不良(0)

诊断：□无营养不良　□有营养不良　□严重营养不良

□表现型指标	□非自主性的体重丢失	□过去 6 月体重下降>5%　□过去 6 月体重下降>10% □过去 6 月以上体重下降>10%　□过去 6 月以上体重下降>20%
	□BMI<18.5 且一般情况差	□肌肉量降低
□病因型指标	□食物摄入减少或营养素吸收利用障碍	□摄入量≤能量需要量的 50%超过 1 周 □摄入量<能量需要量超过 2 周 □任何导致患者吸收不足或吸收障碍的慢性胃肠道症状，如： □吞咽困难 □恶心、呕吐 □腹泻 □便秘 □腹痛 □其他： □有关疾病，如： □短肠综合症 □胰腺功能不全 □减肥手术后 □食管狭窄 □胃轻瘫 □肠梗阻 □腹泻或脂肪痢 □排出量较大的肠道造口 □其他：
	□炎症	□急性疾病/损伤有关： □严重感染 □烧伤 □创伤 □闭合性脑损伤 □慢性或反复发作的疾病，如： □恶性肿瘤，具体部位：_____ 分期：早、中、晚、终末期 此癌症是否是疾病相关性营养不良的病因：□是 □否 □COPD □心衰 □CKD □RA □慢性肝病： □炎症指标升高（轻度、短暂的不纳入），具体值：

药学监护

监护日期：	按计划监护：□是 □否
药学查房：	主诉： 查体：生命体征 T ℃，P bpm，R bpm，Bp mmHg， 身高： cm，体重： kg，出入量：
检查结果：	
病情分析：	
监护计划：	
用药监护：	1. 用药方案合理性（□适应证 □用法用量 □给药途径 □相互作用 □配伍禁忌 □老年人多重用药 □其他）： 2. 用药方案的实施： 3. 疗效评估： 4. ADR 监护： 5. 用药依从性评估（主观）：较前 □更好 □差不多 □更差
药学干预：	
医生反馈：	
用药/营养宣教：	
计划下次监护日期：	

营养监护

1. 营养风险筛查：□NRS2002 评分_____分，□MNA-SF 评分_____分，
•评分内容：_____。
2. 营养计划（身高____cm，体重____kg，BMI____kg/m²）
(1) 吞咽障碍：□是，□否
(2) 胃肠道梗阻：□是（□完全性，□不完全性），□否
(3) 疾病特点：□血流动力学不稳定，□重症感染，□心功能不全，□肾功能不全，□肝功能不全，□呼吸衰竭，□恶性肿瘤，□_____。
(4) 营养目标：总热量_____kcal/kg/d，蛋白量_____g/kg/d。
(5) 目前营养摄入情况：
□饮食：

□ONS：

□TF：

□PN：

•目前的每日营养支持总热量_____kcal/kg，蛋白质_____g/kg。
(6) 其他静脉用营养药物：□无，□有：_____。
(7) 静脉输注人血白蛋白：□无，□有：_____。
(8) 口服营养药品/保健品：□无，□有：_____。
(9) 肠外肠内营养相关并发症：□无，□有：_____。
(10) 其他需要说明的情况：□无，□有：_____。
(11) 建议调整目前营养方案：□否，□是：_____。

(12) _____再次营养评定，调整营养计划。

Summay

- A series of metabolic changes occur in the perioperative period, and nutrition is the key measure for rapid rehabilitation.
- Perioperative nutrition management requires a multidisciplinary collaboration, reference standard practice guidelines for diagnosis and treatment process.
- Pharmaceutical care is an important part of perioperative nutrition management, suggest clinical pharmacists in conventional pharmaceutical care process adding nutrition monitoring content, can choose according to existing condition monitoring.
- Perioperative pharmaceutical care and nutrition care must develop a standard workflow, recorded and follow-up.

Thank you