# 臨床思路 - 問題解決 (1)

# Logics in Clinical Problem Solving

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# 臨床醫學教育

1) Knowledge (知識)*
2) Clinical Skills (技能)
   - Acquisition skill (擷取技能)
     - History/physical exam*
     - Reasoning skill*
     - Decision making skill*
     - Communication skill*
     - Procedures skills
3) Attitudes (態度、行為)
   - 人文素養*、醫學倫理*、醫病關係等*
   - 醫學法律*、醫療經濟、實證醫學、醫療品質、醫學資訊
4) Value

全人醫療 (Holistic Nedicine)

擷取技能
Acquisition skills
問診 (history taking)
身體診查 (PE)*

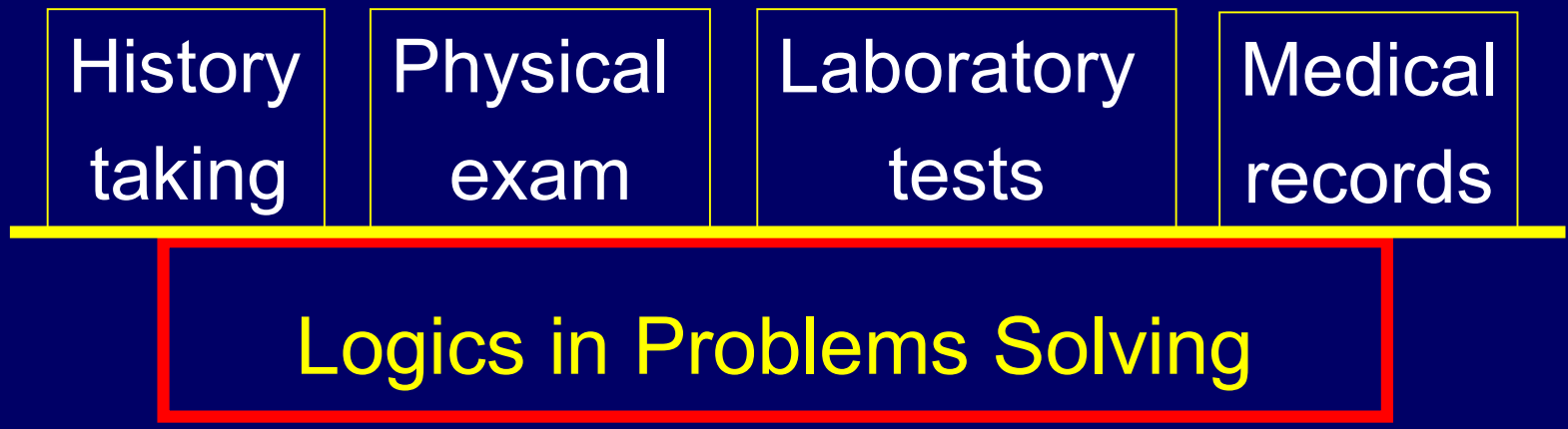

配套*

臨床醫學 (Clinical Medicine)
科學、藝術 (Science/art)

# Logics in Problems Solving

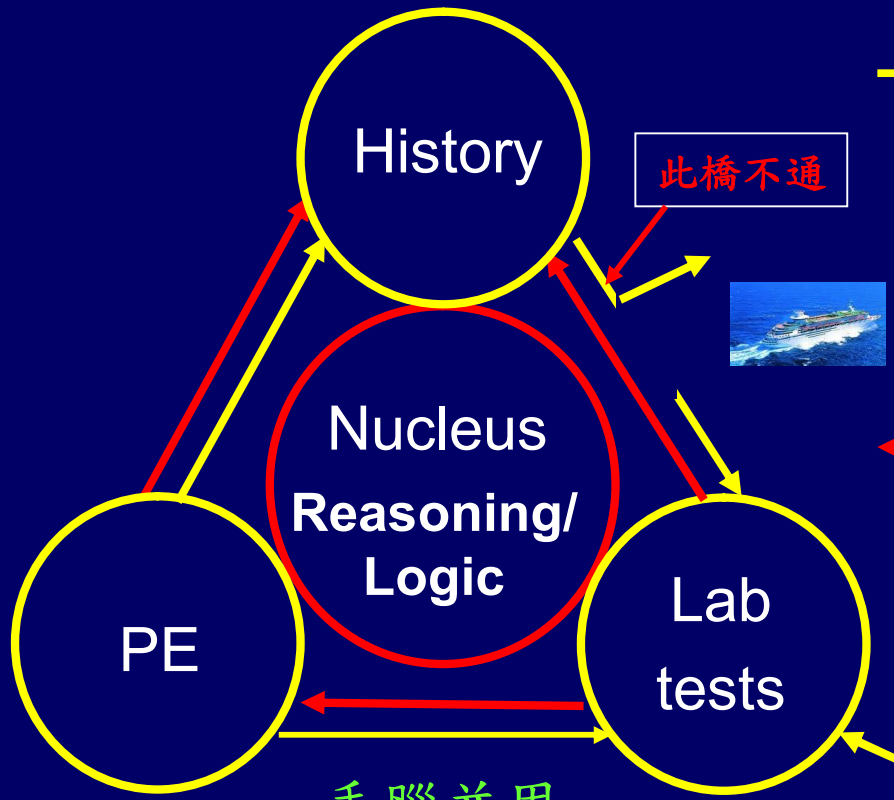
## 問題解決、臨床思路

## A Foundation in Clinical Medicine



# Problems Solving（問題解決）/ Clinical Diagnosis (臨床診斷)

臨床診斷
Problem solving
Means (trio):
1) 病史 (History)
2) 身體診查 (PE)
3) 實驗室檢查 (Lab tests)




此橋不通



對證
Cross exam, verification

補拙(充)
Supplement

Proper (適當)
Timely (適時)
Right setting (適境)

手腦並用
(Brain-hands Coordination)

身體診查
始於第一接觸
(PE begins with 1st encounter)

In the trained, history and PE
Can be conducted simultaneously

避免偏見、自我考驗（練功）、防誤導、防詐

# Problems Solving (問題解決)/ Clinical Diagnosis (臨床診斷)

臨床診斷
Problem solving
Means (trio):
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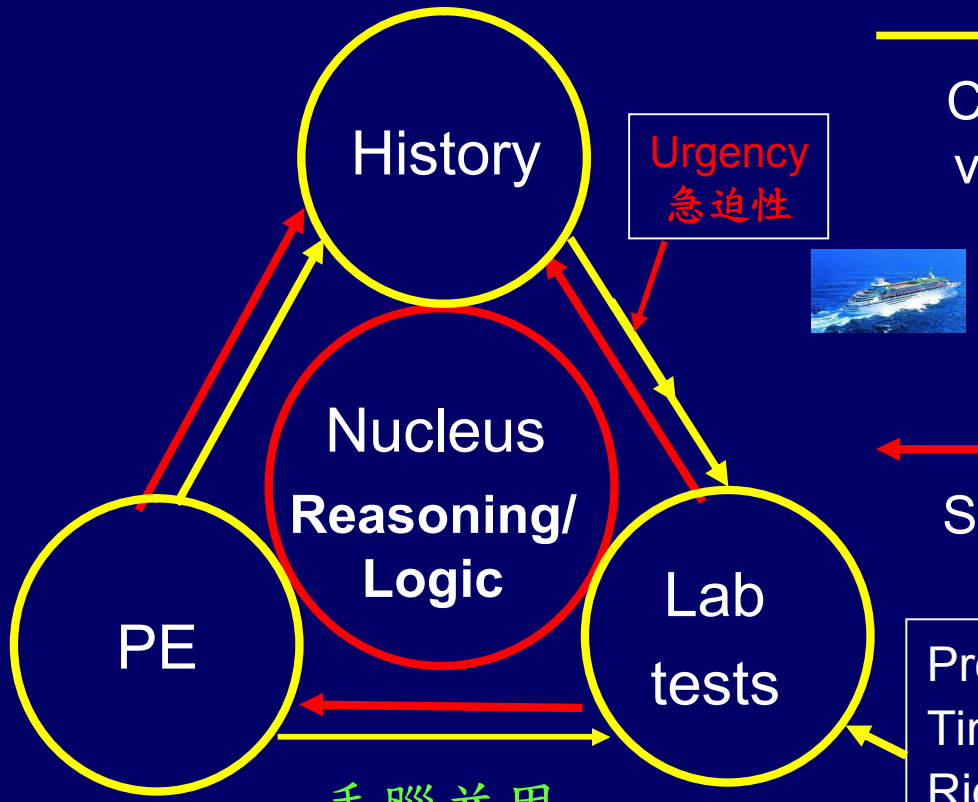


對證
Cross exam, verification



補拙(充)
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身體診查
始於第一接觸
(PE begins with 1st encounter)

手腦並用
(Brain-hands Coordination)

In the trained, history and PE are conducted simultaneously

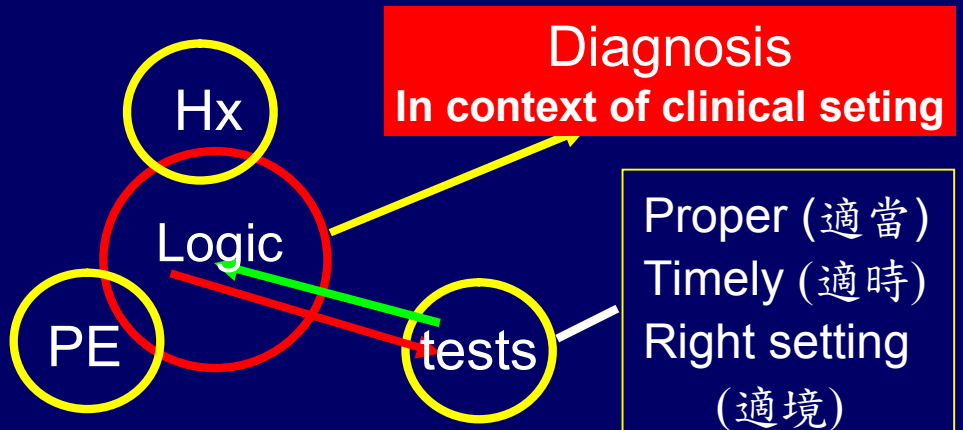
# Logical Interpretation of Acquisition Data

臨床醫學生活化 (Clinical medicine as in daily life)

| Daily Dialogue (對話) | | Clinical setting (臨床情境) |
|---|---|---|
| Speech content (話語內容) | ⟷ | Symptom (症狀) - History |
| Facial expression (表情) | ⟷ | Signs (徵候) - PE |
| Body language (肢體動作) | | |

臨床醫學生活化
(Clinical medicine,
as in daily life)
察言(顏) – 問診
觀色 – 理學檢查

e.g. boy/girl dating




Hx/PE – anytime, anywhere
and priceless!!

# 問題導向臨床醫療
# (Problem-oriented Clinical Medicine)
## - 臨床問題解決 (Clinical problem solving)

1) 了解主角*(Understand the main character (i.e. patient *)

個人背景 (personal background)

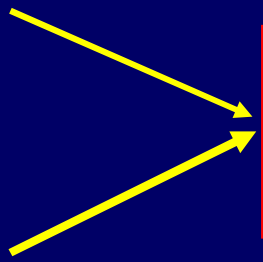
初步 (基本資料)

依需要性進一步了解

醫療背景 (Medical background)

初步 (基本資料)

依需要性進一步了解



Admission Note
Basic data
（基本資料）

2) 解決問題 (Problem solving)

*同一問題對每個人而言所代表的意涵及處置方式不盡相

# Basic Data (基本資料) - 了解個人背景及健康背景

**Basic Data (基本資料) :**

個人背景:

Name (姓名）　　Age/sex (年齡/性別)　　Occupation (職業)

Marital status (婚姻狀況)　　Ethnic origin (族群)　　Place of residence (住處)

健康、醫療背景: Past History (既往病史)

## 為何需要基本資料?

1) 探討病因所需相關資料

~~(姓名):~~　　年齡/性別:　　職業:職業病

~~(婚姻狀況):~~　　族群: 族群相關疾病　　住處: 地區流行病

既往病史: 與主訴之相關關係?

2) 行使全人醫療所需資料 (建立醫病關係--等等)

姓名:　　年齡/性別:　　婚姻狀況:

職業: 寒暄題材、問題處置之區隔、歸建

族群: 交談語言、文化、習俗之不同

住處:寒暄題材、追蹤照顧

# 問題解決 (Problem Solving)

解決問題之先決條件在於提示問題並洞察問題之內涵(剖析問題)，再解決問題

## Steps (步驟)

1. 提示問題 (Problem finding/submission)
2. 剖析問題 (Problem analyses)
3. 解決問題 (Problem Solving)

~~[4. *問題處置 (Problem managements)]~~

*問題解決 (邏輯思考)不包括具體性 處置

## Means (方法)

1. 病史(history taking)
2. 理學檢查 (physical Exam)
3. 實驗室檢查 (laboratory tests)

# 1. 提示問題 (Problem Finding/Submission)
# 方法/過程 (Means/Process)

1) 病史(history taking)
   - 主訴 (chief complaints)
   - 既往病史 (past history)
   - 現況病史 (present illness)
   - 過敏史 (allergy history)
   - 社會史 (social/occupational history)
   - 家族史 (family history)
   - 器官系統複查 (review of systems)
2) 身體診查 (physical exam)
3) 實驗室檢查 (laboratory data)
4) 處置 (managements – side effects/complications)

# 2. Chief Complaints (主訴) – 求助理由、目的

- 儘量以病人的口語與方式將其最憂慮的症狀及 其發生時間簡敘述

  Use patient's own language and way of expression to state the main worrisome symptom and the time duration

- 儘可能避免使用代表診斷或診斷相關的詞句

  Avoid using diagnostic or related words, implying diagnosis

- Examples:

  Chest pain for 3 days

  Breathlessness for 2 weeks

# Opening Statement (開場白) – Composition (結構)

Basic Data (初步了解 個人、醫療背景)

Name: Li, x x  Age*/sex*: 60/M  Occupation*: taxi driver

Marital status: married  Ethnic origin: Ming-Nan

Place of residence: Hu-wei

Past history (醫療背景): hypertension and diabetes mellitus

Chief complaint: Chest pain for 3 days

Present illness (開場白 – opening statement)

## 口頭報告 表述 (opening statements in Chinese)

李先生為一位65歲計程車司機,已婚,閩南籍,住 (雲林縣) 虎尾,患有高血壓、糖尿病,因為胸痛三天(昨天)經由急診處住院

### 英文開場白編輯 (開場白結構)

1) This 60-year old man, a taxi driver, 2) with hypertension and DM was admitted via emergency room 3) because of chest pain for 3 days.

1) Personal background (個人背景) – keywords (關鍵詞)

*必選 (mandatory) - age/sex/occupation; 選擇性 (elective) - 如該當, if any

2) Medical background (醫療背景); and

3) Chief complaint

# Admission Note – Case 1

Basic Data（初步了解 個人、醫療背景）

Record No: 000000 Date of admission: 2005-8-1 Bed No: 301

Name: Li, x x Age/sex*: 60/M Occupation*: taxi driver

Marital status: married Ethnic origin: Min-Nan

Place of residence: Hu-wei

Past history: hypertension and diabetes mellitus

Chief complaint

Chest pain for 3 days

*必選關鍵詞
(Mandatory key words)

Present illness (開場白 – opening statement)

This 60-year-old man, a taxi driver, with ~~(a past history of)~~ hypertension and DM was admitted via emergency room because of chest pain for 3 days.

問題 (problems): 1) Chest pain; 2) hypertension; 3) diabetes

(Chest pain in a 60-year-old man with hypertension and diabetes)

# Admission Note – Case 2

Basic Data (Preliminary personal and medical backgrounds)

Record No: 000000 Date of admission: '5-8-1 Bed No: 301

Name: Li, x x *Age/sex: 60/M *Occupation: farmer

Marital status: married Ethnic origin: Hakka

Place of residence: Kaohsiung**

Past history: hypertension and DM

Chief complaint

Fever for 3 days

Present illness (開場白 – opening statement)

This 60-year-old male farmer, *a* Kaohsiung** resident, with hypertension and DM was admitted via emergency room because of fever for 3 days.

關鍵詞 key words

1) 必選性* (mandatory)

2) 選擇性關鍵詞** (elective)

Kaohsiung - dengue fever endemic area

問題 (problems): 1) Fever; 2) hypertension; 3) diabetes

(Fever in a 60-year-old man with hypertension and diabetes)

# Admission Note – Case 3

Basic Data

Record No: 00000001 Date of admission: 2009-8-1 Bed No: 301

Name: Li, x x *Age/sex: 56/M

Occupation: farmer*

Marital status: married Ethnic origin: aborigine**

Place of residence: Tong-shi

Past history: peptic ulcer

**Elective key word

Chief complaints

Weakness and black stool for 2 days

Present illness

This 56-year-old aborigine** farmer with a past history of peptic ulcer was admitted via ER because of weakness and black stool for 2 days.

(提示問題): 1. Black stool; 2. Peptic ulcer

(GI bleeding in a 56-year-old male with peptic ulcer)

Admission Notes

# 8. Review of Systems (器官系統複查 - 症狀)

**Because symptoms are non-specific and may be related to multiple systems, each symptom is assigned to the system in which it is more or most commonly associated as follows.**

1. General：weakness, fatigue, anorexia, fever, insomnia
2. Integument (skin, hair and nails)：changes in color (pigmentation, *jaundice, cyanosis), pruritus, rash, hair loss
3. HEENT：
   a. Head - headache, dizziness, vertigo
   b. Eyes - visual acuity, color vision, corrective lenses, photophobia, diplopia, pain
   c. Ears - pain, discharge, hearing loss, tinnitus
   d. Nose - epistaxis, discharge, stuffiness, sense of smell
   e. Throat - status of teeth, gums, dentures, taste, soreness, hoarseness, lump
4. Respiratory： dyspnea, wheezing, cough, sputum, hemoptysis, chest distress/pain
5. CV：dyspnea, edema, dizziness, syncope, palpitation. chest distress/pain: intermittent claudication, cold limbs, cyanosis

*jaundice, quantitative problem: others, non-quantitative;

Admission Notes

# 8. Review of Systems (器官系統複查 - 症狀)

6. GI: dysphagia, nausea, vomiting, abdominal distress pain, change in bowel habit (diarrhea, constipation, character of stool), hematemesis, melena, bloody stool
7. GU: urinary frequency, hesitancy, urgency, dribbling, incontinence, dysuria, hematuria, nocturia, polyuria, impotence

   **Female** - menarche, menstrual history (including the date of last period), vaginal bleeding or discharge; pregnancy
8. Metabolic and endocrine: growth and development, weight change*, heat/cold intolerance, nervousness, sweating, polydipsia
9. Hematotologic: anemia*, easy brusity or bleeding, lymphadenopathy, transfusions
10. Musculoskeletal: joint pain, stiffness, limitation of motion, muscular weakenss, wasting
11. Neuropsychiatry: dizziness, syncope, seizure, speech disturbance, loss of sensation, paresthesia, ataxia, weakness or paralysis, tremor, anxiety, depression, irritablility

* weight change, anemia (quantitative problem; The rest, non-quantitative)

# 8. Review of Systems (系統環顧評估-症狀)
# Simplified (for the qualified)

1. General: weakness and fever as above;
2. Integument: void (negative)
3. HEENT: void (negative)
4. Respiratory: as above;
5. CV: ~~(dyspnea, edema, chest distress/pain, palpitation)~~

   as above; no dizziness, syncope, intermittent claudication, or cold limbs;
6. GI: void (negative)

| | |
|---|---|
| No, No! - | Headache (+), Nausea (-), dysphag\gia (-), vomiting (-), abdominal pain (-) |
| Right way - | Elaborate headache; No dysphagia, nausea, vomiting , **or** abdominal pain |

# Review of Systems (器官系統複查 - 症狀)
# Objectives (目的)

1. To supplement overlooked symptoms, relevant to problems in "Present Illness" (亡羊補牢)

   Transcribe relevant positive and negative symptoms in "Present Illness"

2. To Identify new problems, unrelated to problems in "Present Illness" (發現新大陸)

   If positive, elaborate

No! No! - Headache (+), Nausea (-), dysphag\gia (-), vomiting (-), abdominal pain (-)

Right way - Elaborate headache; No dysphagia, nausea, vomiting **or** abdominal pain

# 1. Classification of Clinical Problems

## 臨床問題分類 – 4 classes (4類型)

### A. 症狀(symptoms)

非定量問題 (Non-quantitative problem)

不適感/痛 (pain/distress)、呼吸困難(dyspnea)、
頭暈(dizziness)、昏厥(syncope)、發燒(fever)

定量問題 (Quantitative problem)

體重減輕 (weight loss)

### B. 徵候/現象(signs/findings)

非定量問題 (non-quantitative problem)

水腫(edema)、意識障礙 (consciousness disturbance)

### C. 定量檢驗結果評估 (Quantitative assessment)

貧血 (anemia)、黃疸 (jaundice) 、低血鉀症 (hypokalemia)

低血糖症 (hypoglycemia)

### D. 症候群/疾病(syndrome/disease)

congestive heart failure, hypertension; diabetes;

shock; CKD, stroke (ischemic or hemorrhagic)

# 問題提示分類、剖析、解決

| 1. 提示 Submission | 類型 Type | 2. 剖析* Analyses* | 3. 解決策略 Strategy |
|---|---|---|---|
| A. 症狀 Symptoms | 定量 Quantitative | LQQOPERA法 | 依質量不減定律或經濟 (Mass preservation law) (會計)學法則剖析解決 (Accounting rules) |
| B. 徵候 Signs<br>C. 定量性檢驗異常 Abnoramal Quantitative Lab tests | 非定量 Non-Quantitative | LQQOPERA法 | Strategies (策略):<br>1) Systems<br>2) Anatomic<br>3) Pathophysiologic<br>4) Pathologic |
| D. 症候群/疾病(syndrome/disease | | 依指引綱領 (Guidelines) 剖析、解決 | |

*知己知彼 百戰不殆《孫子兵法 - 謀攻篇》

胡適作考證『在不疑處有疑』

影像記憶

# 策略 (Strategy)
## Similarity between Warfare and Clinical Problem Solving


### 戰爭 (Warfare)

知彼(情資蒐集)
(Intelligence Gathering)

戰術策略 (Strategies)

- 地面戰 (ground)
- 海戰 (sea)
- 空戰 (air)
- 飛彈戰 (bomb, missile)
- 生物戰 (biological)
- 化學戰 (chemical)
- 心理戰 (psychological)
- 資訊戰 (e-information)

孫子( Sun-Tse) - a great military strategist in Confucius era
孫子兵法 - "Knowing self and opponent wins every battle"

### 臨床問題解決
### (Clinical Problem Solving)

問題剖析
(Problem Analysis)
LQQOPERA

非定量問題
(Non-quantitative problem)

解決策略 (Strategies)

1) Systems
2) Anatomic
3) Pathophysiologic
4) Pathologic

# 問題提示分類、剖析、解決

| 1. 提示 Submission | 類型 Type | 2. 剖析* Analyses* | 3. 解決策略 Strategy |
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| B. 徵候 Signs<br>C. 定量性檢驗異常 Abnoramal Quantitative Lab tests | 非定量 Non-Quantitative | LQQOPERA法 | Strategies (策略):<br>1) Systems<br>2) Anatomic<br>3) Pathophysiologic<br>4) Pathologic |
| D. 症候群/疾病(syndrome/disease | | 依指引綱領 (Guidelines) 剖析、解決 | |

*知己知彼 百戰不殆《孫子兵法 - 謀攻篇》

胡適作考證『在不疑處有疑』

# 2.問題之剖析 (Problem Analysis)

## Hong (洪氏) LQQOPERA (Acronym) 法 - History Taking

此剖析法原則上應包括 LQQOPERA 8要項，較特殊者可依情略去其中一些項目，如在呼吸困難省略位置 (L)

**L**ocation (位置)
**Q**uality (型態)
**Q**uantity/time course (歷時長短/時相)
**O**nset mode (起病狀態或發作形式)
**P**recipitating or provocation factors (情境或誘發因素)
**E**xacerbating factors (加重因素)
**R**elieving factors (緩解因素)
**A**ccompanying symptoms (伴隨症狀)

LQQOPERA: 老匏匏唱歌仔戲 (The very old, singing Taiwan opera)

# 疼痛/不適感 (Pain/Distress)

此症狀的分析應包括下列 LQQOPERA 8項內涵
(Symptom analyses should include the following 8 items):

1. 位置 (Location)
   - 局部性 (localized - somatic)
   - 瀰漫性 (diffuse – visceral or diffuse somatic)
   - 移位性 (migratory), 放射性 (radiation) etc.
2. 形態 (Quality)
   - 刺痛 (needling), 銳利 (sharp pain),
   - 頓痛 (dull ache), 壓迫性 (oppressive),
   - 難忍的 (unbearable, excruciating) etc.

# 疼痛/不適感 (Pain/Distress)

3. 歷時/時相 (**Q**uantity/Process)
   - 持續性 (persistent)
   - 間歇性 (intermittent):
     - 其頻率 (frequency),
     - 單次持續時間 (duration of each episode),
     - 發作間隔 (intervals between episodes)
4. 起病狀態 (**O**nset mode)
   - 緩慢性 (insidious)、突然 (sudden)、驟然(abrupt)
5. 情境、誘發因素 (**P**recipitating factors)
6. 加重因素 (**E**xacerbating or aggravating factors)
7. 緩解因素 (**R**elieving factors)
8. 伴隨症狀 (**A**ccompanying symptoms)

# 超急性 (驟然, 晴天霹靂) 發作 (Abrupt/Dramatic Onset)

超急性發作 (abrupt onset) 代表:

1) 神經性疼痛 (neurogenic); or,
2) 組織、器官連續性突然喪失 (sudden loss of tissue/organ continuity)。如為後者，以系統類歸法舉例如下 (for exampples)：

## 系統類歸法 (systems approach - examples)

1. Integument: laceration;  2. HEENT: subarachnoid hemorrhage
3. Respiratory: pneumothorax
4. CV: aortic dissection, rupture of aneurysm, ~~(AMI)~~
5. GI: 1) Halo/solid organ rupture/perforation:
   esophagus, stomach, intestines, spleen, liver
   2) gall stone
6. GU: ureter stone, ectopic pregnancy, ovarian torsion
7. Musculoskeletal: tissue laceration, bone fracture, tendon rupture

# 疼痛/不適感 (Pain/Distress) - 加重因素 (Exacerbating factors)

1) Body position/motion

   Supine (仰臥), sitting up (起坐), leaning (前傾), turning (側躺), twisting (扭動) etc.

2) Tenderness (壓痛)

3) Coughing (咳嗽), sneezing (打噴涕), Inspiration (吸氣)

4) Food intake (進食), swallowing (吞嚥), defecation (排便), urination (排尿) etc.

5) Exercise

6) Emotional changes: anxiety (焦慮), rage etc.

7) Climatie change

# 問題剖析- LQQOPERA 法 - 修飾 (modification)



此剖析法原則上應包含 LQQOPERA 全8項,

In principle, alll 8 items are essential. For example, 例如

1) 疼痛/不適感之剖析 (analyses of pain/distress):
   LQQOPERA 8項必全項包含 (all 8 items, essential)
2) 黃疸 (jaundice): *LQQOPERA
   *L: skin, urine, sclerae, stool (color changes)

較特殊者可依情略去其中一些項目修飾 (for example): However, modification is applied depending on problem characteristic, as follows

1) 呼吸困難 (dyspnea): QQOPERA (位置 L 省略, omitted)
   P 規範呼吸困難型態 – P defines type of dyspnea (next slide)
2) 意識障礙 (consciouness change):
   QQOPERA (位置(L) 省略, omitted)
3) 發燒 (fever): QQA (3項權值較大)
   QQ 作 fever pattern 之參考 (as reference*)
   *Not necessarily reliable because of drug interference
   Drugs – aspirin, acetaminophen, steroids, prior antibiotics etc..
   Infant (inmature immuse system),
   Immune compromised hosts; elderly, DM, chemotherapy patients etc..

A (伴隨症狀): To identify or Search for pathological focus or foci (病灶) in organ systems (系統) and/or anatomic sites (部位)

# 問題提示分類、剖析、解決



| 1. 提示 Submission | 類型 Type | 2. 剖析* Analyses* | 3. 解決策略 Strategy |
|---|---|---|---|
| A. 症狀 Symptoms<br>B. 徵候 Signs<br>C. 定量性檢驗異常 Abnoramal Quantitative Lab tests | 定量 Quantitative | LQQOPERA法 | 依質量不減定律 (Mass preservation law), or 或經濟（會計）學法則 (Accounting rules) 剖析解決 |
| | 非定量 Non-Quantitative | LQQOPERA法 | Strategies (策略):<br>1) Systems<br>2) Anatomic<br>3) Pathophysiologic<br>4) Pathologic |
| D. 症候群/疾病（syndrome/disease | | 依指引綱領 (Guidelines) 剖析、解決 | |

*知己知彼 百戰不殆《孫子兵法 - 謀攻篇》

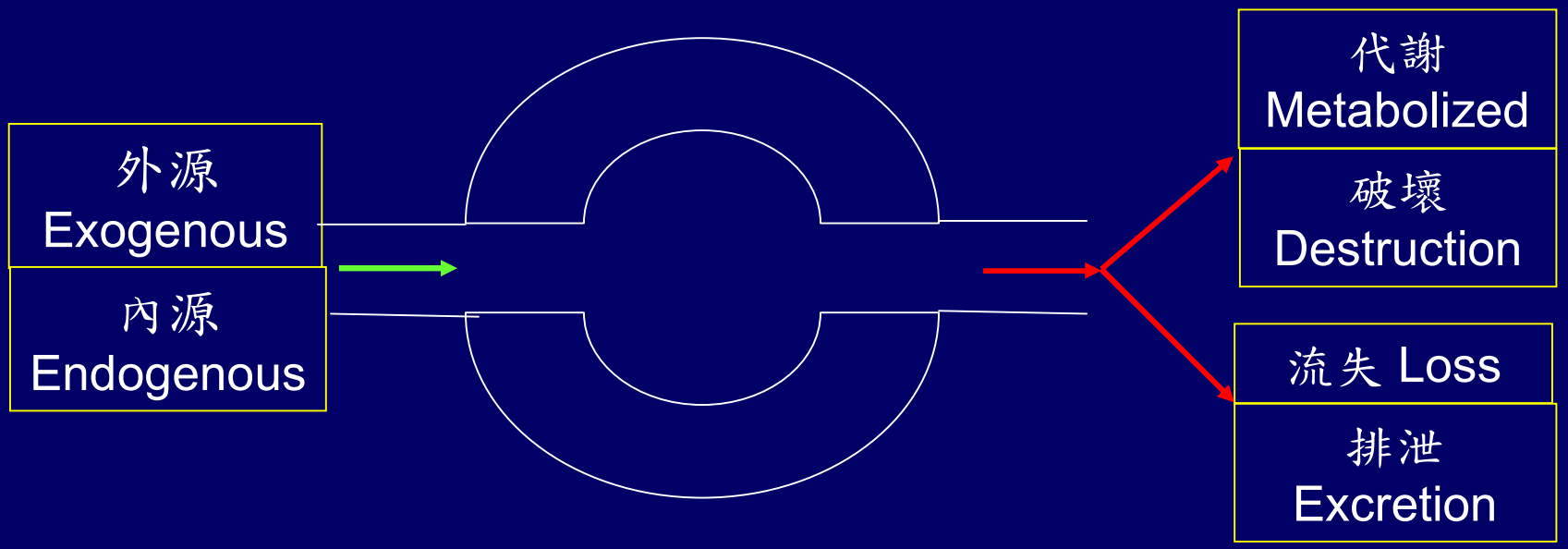
胡適作考證『在不疑處有疑』

# 3. Problem Solving (解決問題)

## A. 定量問題 (Quantitative problem)

此類問題依質量不減定律 (law of preservation), 或經濟 (會計) 學法則 (accounting rules) 考慮 1) 入 (來源攝取及吸收); 2) 分佈與 3) 出 (代謝、破壞、排泄及流失)

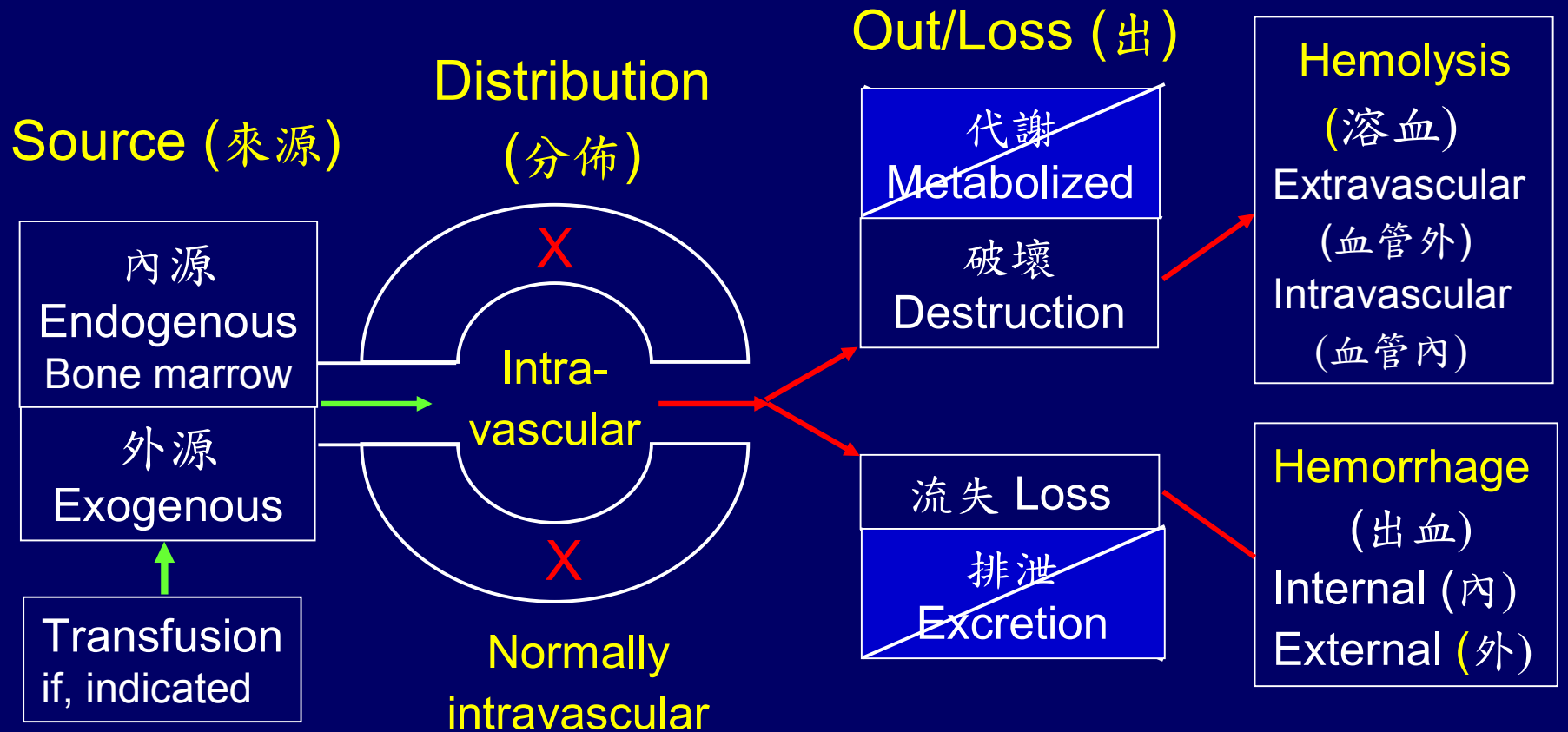
1) 來源 (source)　　2) 分佈 (distribution)　　3)出 (out, loss)



# A. 定量問題 (Quantitative problem) 貧血 (Anemia)

Means (方法) in Problem solving

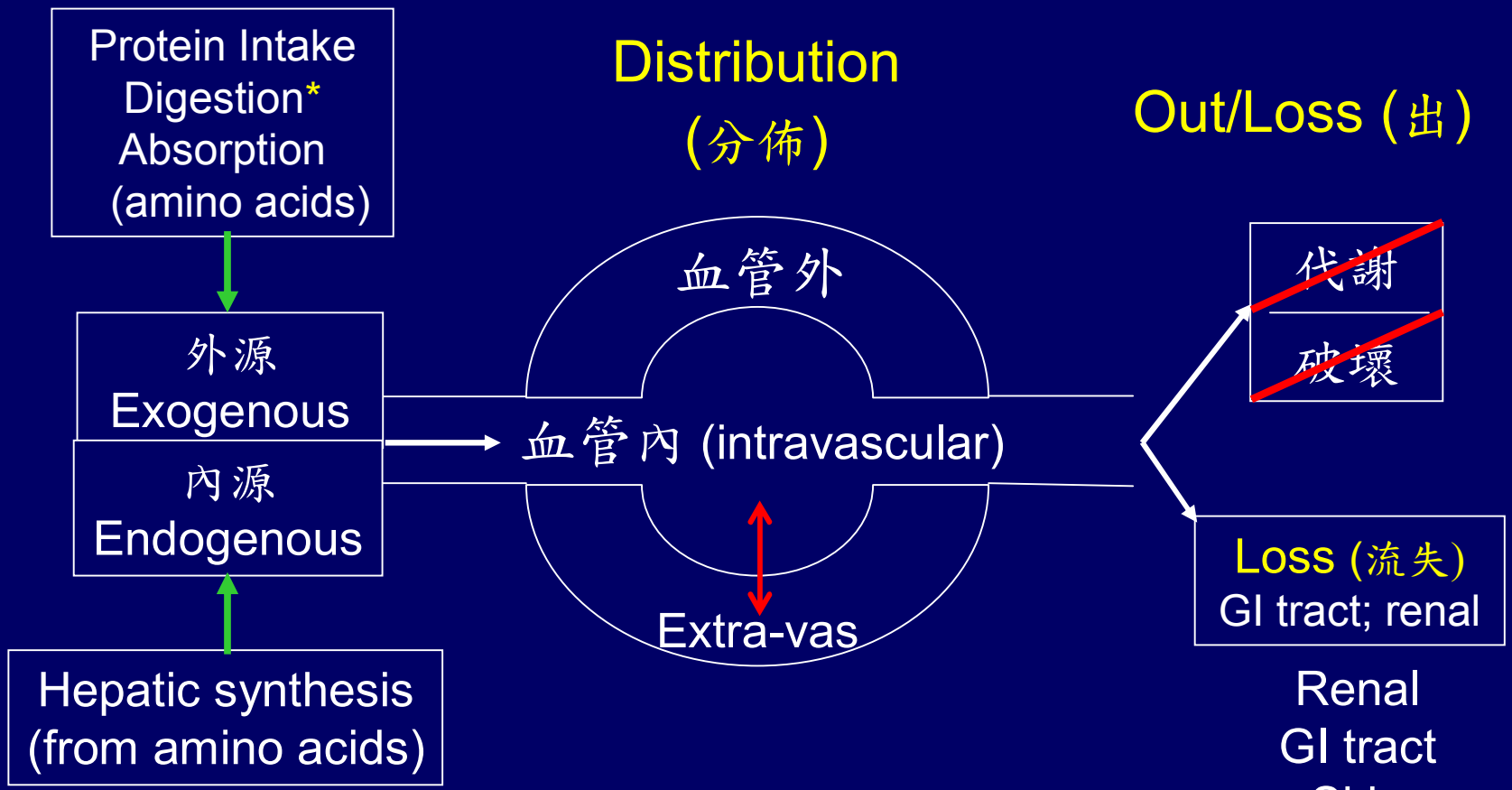
1) 病史 (History); 2) PE (身體診查); 3) 實驗室檢查 (Lab tests)



# A.定量問題 (Quantitative Problem)

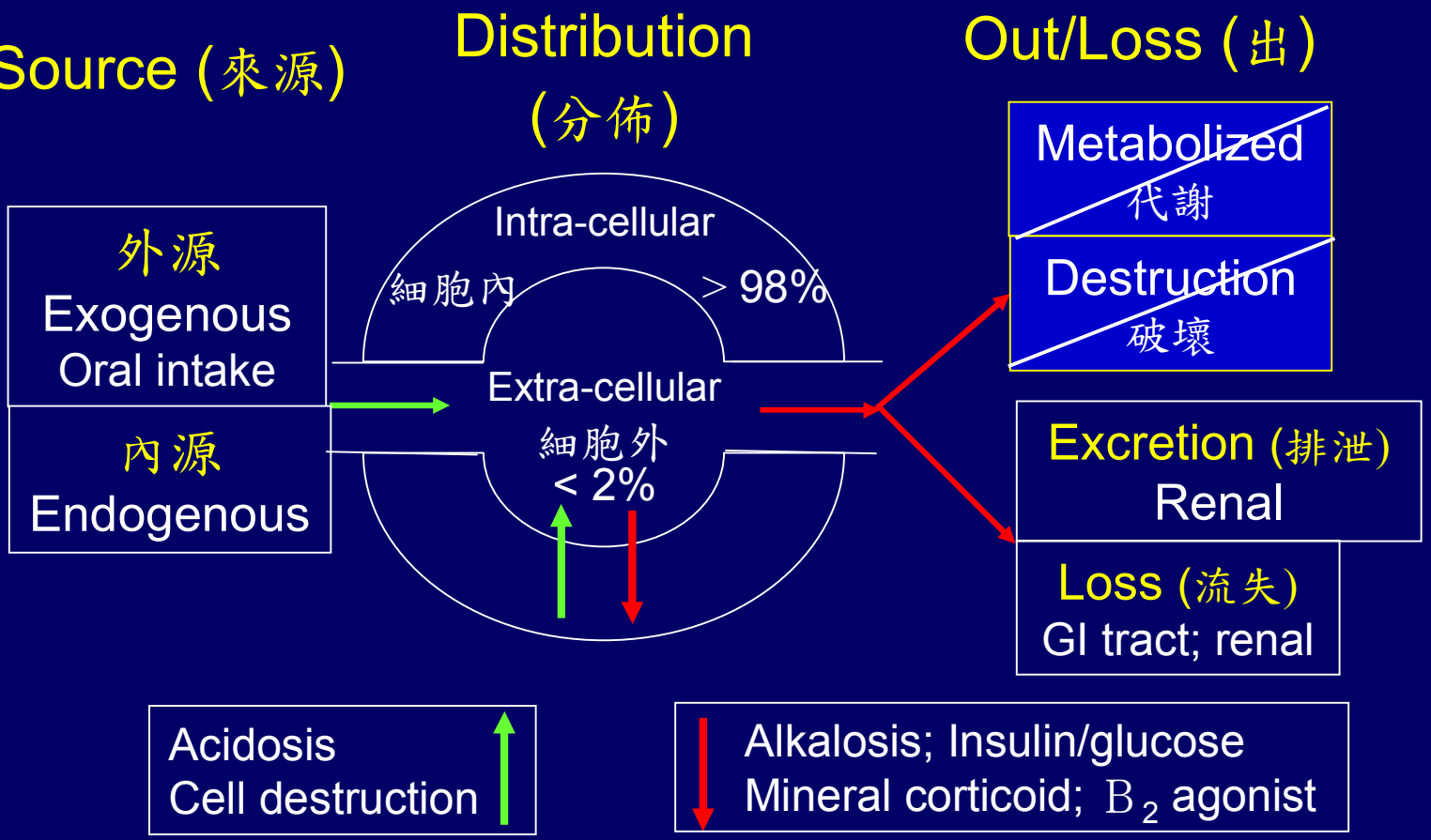
## 低白蛋白血症 (Hypoalbuminemia)

### Source (來源、入)




*Proteolytic enzymes: pepsin, chymotrypsin. trypsin

# A.定量問題 (Quantitative Problem)
## 低血鉀症 (Hypokalemia)




Es = - KT x Ln ($[K_i/K_o]$) = - KT (150/4) = - 90 mV;

KT – constant; $[K_i/K_o]$, Ko change, critical, as Ki **>>** Ko

# TTPG (Transtubular Potassium Gradient)

$TTPG = [K_S/K_U]/[O_S/O_U]$

$K_S$ = serum potassium

$K_U$ = urine potassium

$O_S$ = serum osmolarity

$O_U$ = urine osmolarity

Renal $K^+$ loss - TTPG > 7

---

Spot urine during hypokalemia

$K^+$ > 20 meq/L suggests renal K loss

# 問題提示分類、剖析、解決



| 1. 提示 Submission | 類型 Type | 2. 剖析* Analyses* | 3. 解決策略 Strategy |
|---|---|---|---|
| A. 症狀 Symptoms<br>B. 徵候 Signs<br>C. 定量性檢驗異常 Abnoramal Quantitative Lab tests | 定量 Quantitative | LQQOPERA法 | 依質量不減定律 (Mass preservation law), or 或經濟（會計）學法則 (Accounting rules) 剖析解決 |
| | 非定量 Non-Quantitative | LQQOPERA法 | Strategies (策略):<br>1) Systems<br>2) Anatomic<br>3) Pathophysiologic<br>4) Pathologic |
| D. 症候群/疾病（syndrome/disease | | 依指引綱領 (Guidelines) 剖析、解決 | |

*知己知彼 百戰不殆《孫子兵法 - 謀攻篇》

胡適作考證『在不疑處有疑』

# 問題提示分類、剖析、解決

| 1. 提示 | 類型 | 2. 剖析* | 3. 解決策略 |
|---|---|---|---|
| A. 症狀 | 定量 | LQQOPERA法 | 依質量不減定律或經濟（會計）學法則剖析解決 |
| B. 徵候<br>C. 定量性檢驗異常 | 非定量 | LQQOPERA法 | Approaches (策略):<br>1) Systems<br>2) Anatomic<br>3) Pathophysiologic<br>4) Pathologic |
| D. 症候群/疾病 | | 依指引綱領 (Guidelines) 剖析、解決 | |

*知己知彼 百戰不殆《孫子兵法 - 謀攻篇》

胡適作考證『在不疑處有疑』

# 人體構造10系統排列順序
# 10 systems in human body – listing order

位置
sites

包覆全身
Cover whole body

1. Integument*
2. HEENT**
3. Respiratory
4. Cardiovascular
5. Gatrointestinal
6. Genitourinary
7. Hematologic
8. Metabolic/endocrine
9. Muscloskeletal**
10. Neuropsychiatric*

胸部 (chest)

腹部 (abdomen)

全身 (wide distribution)

*皮膚系統包含毛髮指甲
(including hairs and nails)

由上到下
Top to down

3/4; 5/6 - 順序 (order)
可對調 (exchangable)

**肌肉與神經關係密切，故排第9

*精神系統為抽象，故放在最後第10

HEENT **
= head, eyes, ears, nose and throat

# 胸痛 (Chest Pain)
# Systems Approach (系統類別法)

1. Integument (skin, hair and nails) (皮膚)
~~2. HEENT (頭、眼、耳、鼻、喉)~~
3. Respiratory (呼吸系統)
4. Cardiovascular (心血管系統)
5. Gastrointestinal (消化系統)
~~6. Genitourinary (泌尿系統)~~
~~7. Metabolic and endocrine (新陳代謝/內分泌系統)~~
8. Hematologic (血液系統)
9. Musculoskeletal (肌肉骨骼系統)
10. Neuropsychiatry (神經精神系統)

# 腹痛 (Abdominal Pain)
# Systems Approach (系統類別法)

1. Integument (skin, hair and nails) (皮膚)
2. ~~HEENT (頭、眼、耳、鼻、喉)~~
3. Respiratory (呼吸系統)
4. Cardiovascular (心血管系統)
5. Gastrointestinal (消化系統)
6. Genitourinary (泌尿系統)
7. Metabolic and endocrine (新陳代謝/內分泌系統)
8. Hematologic (血液系統)
9. Musculoskeletal (肌肉骨骼系統)
10. Neuropsychiatry (神經精神系統)

# 後腹腔結構 (Retroperitoneal Structures)
## 1) Systems Approach (系統類別法)

1. Integument (skin, hair and nails) (皮膚)
2. HEENT (頭、眼、耳、鼻、喉)
3. Respiratory (呼吸系統)
4. Cardiovascular (心血管系統)
5. Gastrointestinal (消化系統)
6. Genitourinary (泌尿系統 )
7. Metabolic and endocrine (新陳代謝/內分泌系統)
8. Hematologic (血液系統)
9. Musculoskeletal (肌肉骨骼系統)
10. Neuropsychiatry (神經精神系統 )

# 頭痛(Headache)
# Systems Approach (系統類別法)

(5 sytems)

1. Integument
2. HEENT
3. ~~Respiratory~~
4. Cardiovascular
5. ~~Gastrointestinal~~
6. ~~Genitourinary~~
7. ~~Metabolic and endocrine~~
8. ~~Hematologic~~
9. Musculoskeletal
10. Neuropsychiatry

# B.非定量問題 (Non-quantitative Problem)
## 1) Systems Approach (系統類別法)

呼吸困難 (Dyspnea)

問題之分析
QQOPERA
問題解決
系統類別法

(5 sytems)

~~1. Integument (IT)~~
~~2. HEENT (HT)~~
3. Respiratory
4. Cardiovascular
~~5. Gastrointestinal (GI)~~
~~6. Genitourinary (GU)~~
7. Metabolic/endocrine*
8. Hematologic**
~~9. Musculoskeletal (MS)~~
10. Neuropsychiatry

*Hyperthyroidism
**Anemia

# 呼吸困難之剖析- QQOPERA 法

## P規範呼吸困難型態 (Dyspnea classification, based on “P”)

1) Exertional (QOPERA)

Specify level of exertion and accompanying symptoms (A), if any: wheezing, chest tightness

e.g. “Three months before admission, the patient developed non-progressive exertional dyspnea on 1 flight of stairs, associated with chest tightness” (QQOPERA)

2) Positional

Supine - orthopnea, PND

Lateral decubitus - trepopnea

Upright – platypnea (Hepatopumonary stndrome – liver cirrhosis )

3) Non-exertional/non-positional – anytime, any setting

Asthma attack, acute pulmonary edema (any cause), pulmonary embolism, pneumothorax

Neuropsychiatric disorder – myasthenia, anxiety, panic disorder

# Trepopnea

## Infrequent or Rare Positional Dyspnea

Dyspnea that is sensed while lying on one side but not on the other. It results from respiratory (one lung, one major bronchus), or cardiac disease (chronic CHF)

Respiratory –

1) unilateral intrapulmonary disorders (e.g. destroyed parenchyma, major airway obstruction)

Contra-lateral decubitus (dyspnea better on "good side down") because, bad-side down – increase in V/Q mismatch

2) Pleural effusion, massive (better, "bad side down") psi-lateral decubitus)

Chronic CHF - left decubitus ("heart-side down", feeling better)

- Severely impaired LV filling - marked cardiomegaly
- better blood return, better cardiac output

# Anatomy of Respiratory Ventilation System

## "Computer controlled ventilation hardware"

*Central control system*

Respiratory centers

Cerebral cortex

*Nerves (wires)**

*Neuromuscular junction*

*(socket)*

*Respiratory apparatus*

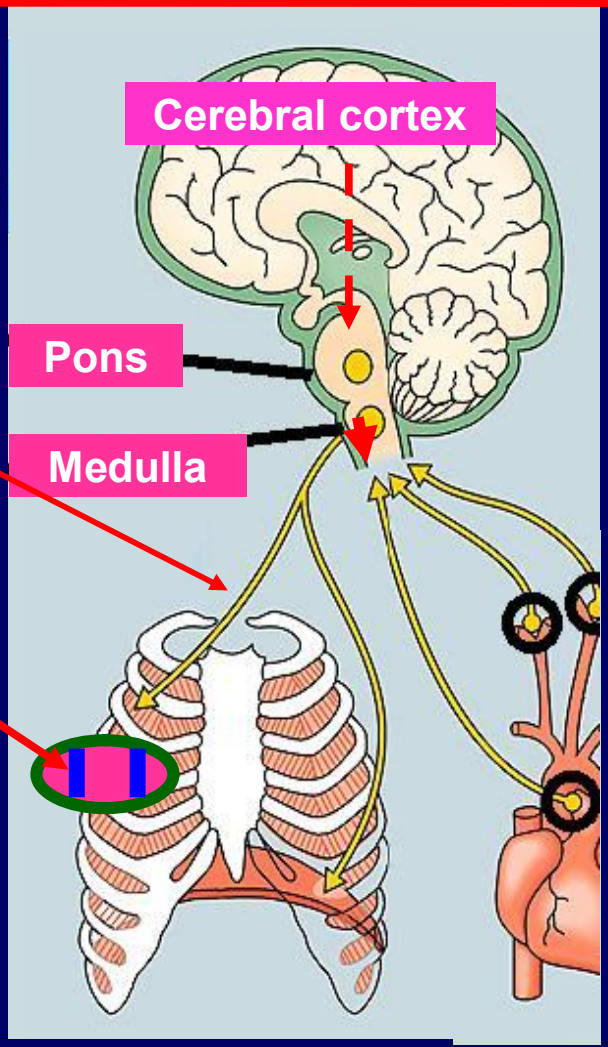
*(hardwares)*

Thorax (胸廓)

Pleural cavity

Lungs parenchyma

Airways




**Spinal cord and its its motor neurons to respiratory mucles*

# Central Regulation of Breathing
## (rate, depth and rhythm)

**Respiratory Centers**

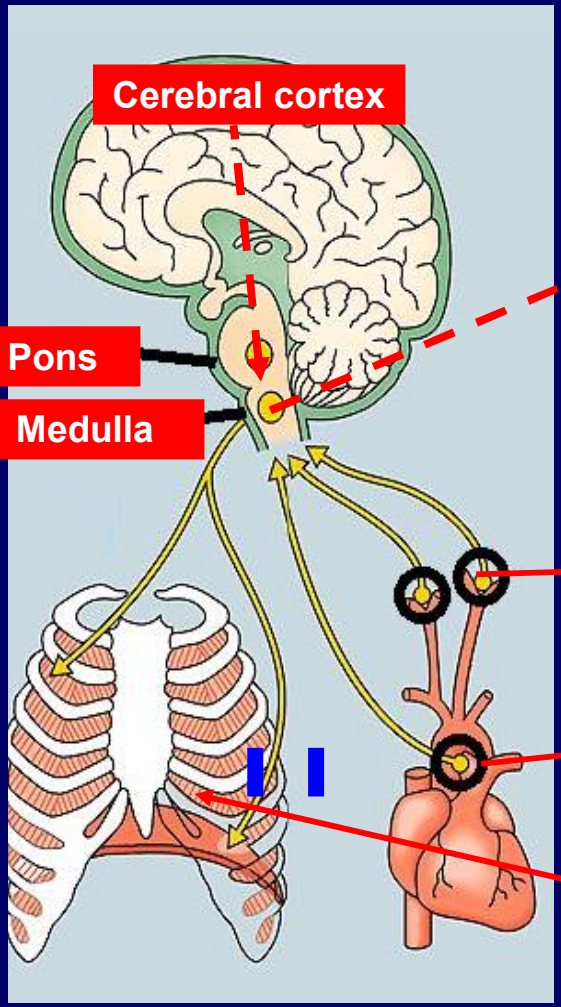
(Control rate, depth/rhythm )

Pons
- upper pons –
  - pneumotaxic center
  - inhibits inspiration/ control rate
- lower pons –
  - apneustic center

Medulla – rhythm control

---

**(Cerebral cortex)**




**Feedback systems**

1) Chemoreceptors

a) **Central (medulla)**
$H^+$ sensor

b) **Peripheral**

**Carotid body** –
$pO_2/pCO_2$ sensor

**Aortic body** –
$pO_2$ sensor

2) Stretch receptor

**Thorax**

# Central Regulation of Breathing
## (rate, depth and rhythm)

**Respiratory Centers**

(Control rate, depth/rhythm )

Pons
- upper pons –
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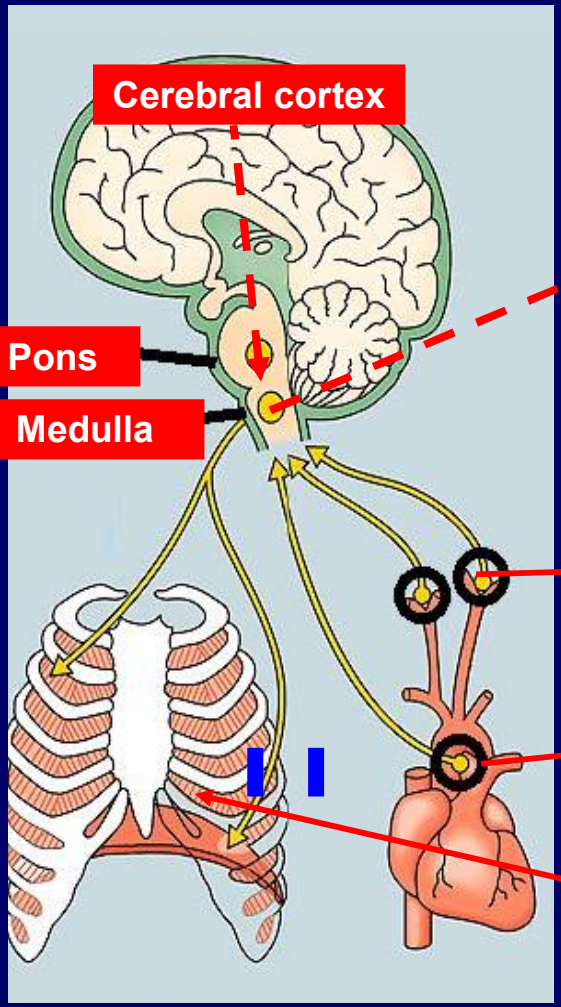
Medulla – rhythm control

---

**(Cerebral cortex)**




**Feedback systems**

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b) **Peripheral**

**Carotid body** –
$pO_2/pCO_2$ sensor

**Aortic body** –
$pO_2$ sensor

2) Stretch receptor

**Thorax**

# 3) Dyspnea, Anytime, Any setting

Anatomy of Respiratory Ventilation System

*Central control system*

Respiratory centers

Cerebral cortex

*Nerves (wires)**

*Neuromuscular junction (socket)*

*Respiratory apparatus (hardwares)*

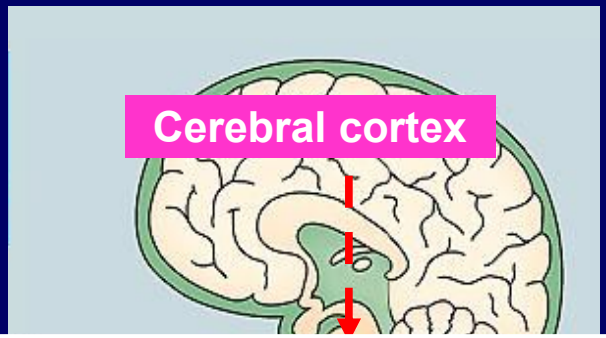
Thorax (胸廓)

Pleural cavity

Lungs parenchyma

Airways

**Spinal cord and its its motor neurons to respiratory mucles*




**Dyspnea**

**Any time, Any setting**

**Malfunction of any of following components:**

**1) Computer programming system**

**2) Program transmission**

**3) Hardware**

# Dyspnea of Acute Onset (seconds to hours)

1) Respiratory System
   - Airway resistance: functional (spasm): organic (obstruction)
   - Lung parenchyma:
     - Acute non-cardiogenic pulmonary edema
       - ARDS; flush pulmonary (renal artery stenosis), noxious agents; high altitude
   - Pulmonary vasculature: acute pulmonary embolism
   - Pleural space: pneumothorax; hemothorax
   - Respiratory muscles: acute paralysis, myasthenia crisis

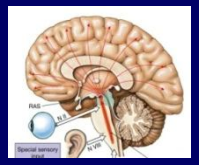
2) Cardiovascular: acute cardiogenic pulmonary edema

~~3) Endocrine/metabolic~~

~~4) Hematology~~

5) Neuropsychiatric: Up-regulated respiratory drive
   - Hyperventilation (anxiety neurosis/panic disorder)

# B.非定量問題 (Non-quantitative Problem)
## 1) Systems Approach (系統類別法)



### 意識障礙 (Consciousness Disturbance)*

問題之分析 (analysis)

QQOPERA

問題解決 (strategy)

系統類別法 (systems)

**(3 sytems)**

1. ~~Integument~~
2. ~~HEENT~~
3. ~~Respiratory~~
4. Cardiovascular
5. ~~Gastrointestinal~~
6. ~~Genitourinary~~
7. Metabolic/endocrine
8. ~~Hematologic~~
9. ~~Musculoskeletal~~
10. Neuropsychiatry

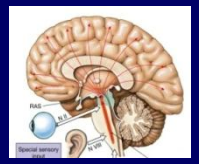
*類比 (analog)

Engine dysfunction

汽、機車引擎

(automobile/motor cycle)

# 意識障礙 (Consciousness Disturbance)
# Systems Approach (系統類別法)



問題之分析 (analysis): Q QOPERA

(意識狀態描述): Alert/well oriented; irritable; agitated; drowsy; somnolent; confused; stupor; obtunded; semi-comatous; comatous

解決方法 - Systems approach

1) 中樞神經精神系統 (Neuropschiatry)

器質性病變(感染、腦瘤) 或精神性疾病

2) 心血管系統 (Cardiovascular)

血管性腦病變、低血壓、 休克 (shock)

3) 內分泌/新陳代謝系統 (metabolic encephalopathy

Ph changes; low $pO_2$, high $pCO_2$; hyper-, or hypo-osmolarity

Osmolarity (滲透壓) = $2Na^+$ + glucose/18 + BUN/2.8 + $\alpha$ ($\geq 0$)

$\alpha > 0$

mannitol, contrast media, ethanol, methanol etc

電解值不平衡：高鈉或低鈉血症 ($Na^+$), 高鈣或低鈣血症 ($Ca^{++}$)

糖尿病 (DM): 低血糖症 (hypoglycemia); HHS; ketoacidosis

甲狀腺功能低下 (myxoedematous coma)

Endogenous chemicals {hepatic/renal failure);

Exogenous chemicals (drugs,alcohol, CO etc)

Analog - Engine malfunction*

1) Mechanical
2) Gasoline shortage (quantity)
3) Changes in gasoline quality

# 3. Problem Solving (解決問題)

## B. 非定量問題 (Non-quantitative problem)

此類問題, 從下列四類策略 (strategy or approach) 中首先選擇一項或2項搭配, 再循序式搭配其他策略, 漸進分析解決

1) Systems approach (系統類別法)
2) Anatomic approach (解剖類別法)
3) Pathophysiologic approach (病態生理類別法)
4) Pathologic approach (病理類別法)

# B.非定量問題 (Non-quantitative problem)

## 2) Anatomic Approach (解剖類別法)

Used in conjunction with, or as an auxiliary (輔助) strategy to Systems Approach

For examples:

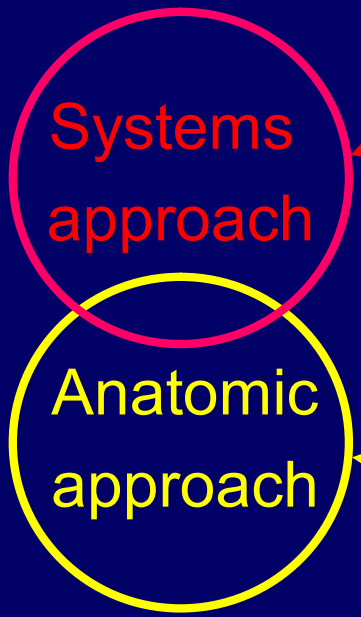
- Pain/distress,
  - Chest pain; abdominal pain etc.
- Fever
- Lesions (病灶)
  - Palpable lesions (PE)
  - Abnormal lesions (imaging tests)

# B.非定量問題 (Non-quantitative problem)
## 2) Systems/Anatomy Combined Approach

### 胸痛 (Chest Pain)

問題分析: LQQOPERA 法

解決方法:




1. Integument
2. ~~HEENT~~
3. Respiratory
4. Cardiovascular
5. Gastrointestinal
6. ~~Genitourinary~~
7. ~~Metabolic/endocrine~~
8. Hematologic
9. Musculoskeletal
10. Neuropsychiatric

Downwards - abdomen
Upwards - neck

?Any bad neighbors (?惡鄰居)
upstairs (樓上)? Downstairs (樓下)?

# B.非定量問題 (Non-quantitative problem)
## 1) Systems and 2) Anatomic Approach

Problem: Chest pain (胸痛);

Analysis (問題分析): LQQOPERA

Strategy (解決策略): Bad neighbors downstairs? (樓下惡鄰居?)

1. Integument
~~2. HEENT~~
3. Respiratory
4. Cardiovascular
5. Gastrointestinal
6. Genitourinary
7. Metabolic/endocrine
8. Hematologic
9. Musculoskeletal
10. Neuropsychiatry

Abdomen

→

GERD
Mallory Weiss syndrome
Boerhaave's syndrome
Peptic ulcer
Acute cholecystitis
Acute pancreatitis

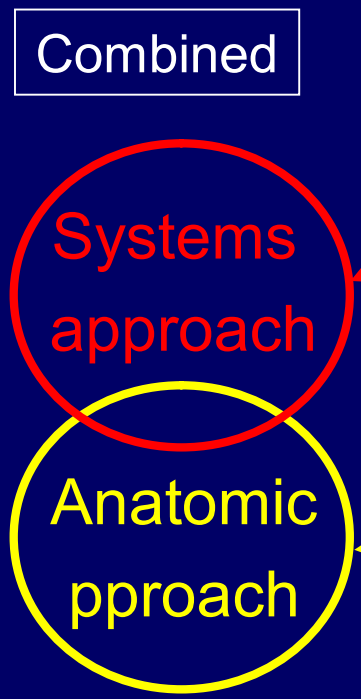
Esophageal tears

# B.非定量問題 (Non-quantitative problem)
## 1) Systems and 2) Anatomic Approach

Problem: abdominal Pain (腹痛)

Analysis (問題分析): LQQOPERA

Strategy (解決策略):




1. Integument
2. HEENT
3. Respiratory
4. Cardiovascular
5. Gastrointestinal
6. Genitourinary
7. Metabolic/endocrine
8. Hematologic
9. Musculoskeletal
10. Neuropsychiatry

Upwards – chest
Downwards – inguinal hernia, testis torsion

?Any bad neighbors (?惡鄰居)
upstairs (樓上)? Downstairs (樓下)?

# B.非定量問題 (Non-quantitative problem)
# 1) Systems and 2) Anatomic Approach

Problem: abdominal Pain (腹痛)

Analysis (問題分析): LQQOPERA

Strategy (解決策略): Bad neighbors, upstairs? (樓上惡鄰居?)

1. Integument
~~2. HEENT~~
3. Respiratory
4. Cardiovascular
5. Gastrointestinal
~~6. Genitourinary~~
~~7. Metabolic/endocrine~~
8. Hematologic
9. Musculoskeletal
10. Neuropsychiatric

Chest

→ Pneumonia (esp. lower lobe

→ Myocardial ischemia (angina, AMI)
Aortic dissection
Right heart failure – congested liver
Boerhaave's syndrome

→ Mallory Weiss syndrome
Boerhaave's syndrome

# B.非定量問題
# 3) Pathophysiologic Approach（病態生理類別法）
## - Edema (水腫)

Definition - Excessive accumulation (蓄積)
of water/$Na^+$ in interstitial tissues (間質組織)

Analyses - LQQOPERA

Solving – pathophysiologic approach

1) Excessive extravasation (水和鈉從毛血管內滲出毛血管外)
   a) Hydrostatic pressure (靜水壓)
   b) Colloid oncotic pressure (albumin) → 定量問題 quantitative problem
   c) Capillary permeability (毛細管滲透性)
   [a), b) and c) – variables in Starling's equation]

2) Impaired drainage – lymphedema（淋巴腫）

# B.非定量問題 - 意識障礙

意識狀態描述 (description of metal status):

QQOPERA

(意識狀態描述): alert; well oriented; irritable; agitated; drowsy; somnolent; confused; stupor; obtunded; comatose

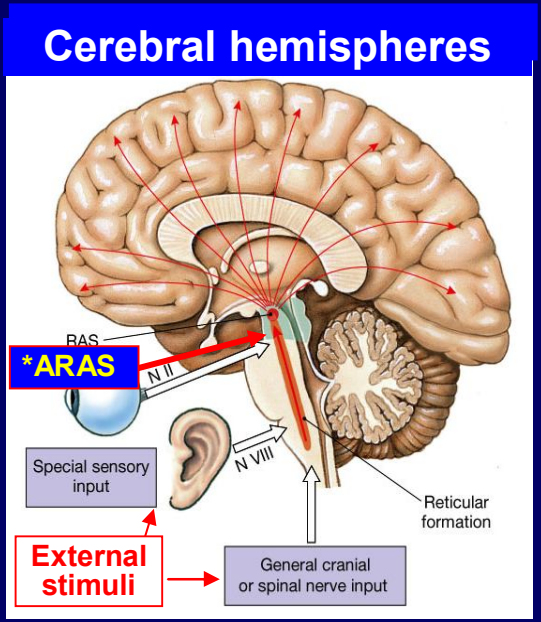
意識 (consciousness) 形成兩要件

1) 基本意識 (basic) - 清醒 (arousal)

腦幹 (brainstem) *ARAS專司清醒和睡眠

2) 高階意識 (high level) - 認知 (awareness)

大腦兩半球 (hemispheres) 主司認知能力




Pearson education Inc. 2003

意識障礙 pathophysiology: organic or functional dysfunction

Organic: brainstem (small lesion); cerebral hemispheres (diffuse)

Functional: brain stem (diffuse); cerebral hemispheres (diffuse)

基本的腦幹arousal喪失, 造成大腦無法認知（腦死 brain death)

基本的腦幹arousal清醒, 大腦 diffuse dysfunction 無認知（植物人）

*ARAS = ascending reticular activating system)

# B.非定量問題 (Non-quantitative Problem)
## 4) Pathologic Approach (病理類別法)

1) Infectious (inflammatory) (感染性發炎)
2) Non-infectious (inflammatory) (非感染性發炎)
3) Neoplasm (新生物)
    Benign (良性)
    Malignant (惡性)
        原發性 (primary)或轉移性 (metastaatic)
4) Circulatory (循環)
5) Metabolic/endocrine (新陳代謝/內分泌)
6) Hematologic (血液)
7) Degeneration(退化性)
8) Physical/chemical injury (物理/化學性傷害)

# B.非定量問題 (non-quantitative Problem)
## 4) Pathologic Approach (病理類別法)

1) Infectious (inflammation)
2) Non-infectious (inflammation)
3) Neoplasm
   Benign
   Malignant (primary, metastatic)
4) Circulatory
5) Metabolic/endocrine
6) Hematologic
7) Degeneration
8) Physical/chemical injury

### Applications

1) Lesion
   by PE, Imaging tests
2) Specimen
   by biopsy, surgery etc.
3) Others
   fever
   structural
   abnormality etc..

# B.非定量問題 (Non-quantitative Problem)

## 4) Pathologic Approach (病理類別法)

Arthropathy
Joint diseases

1) Infectious (inflammatory)
2) Non-infectious (inflammatory)
3) Neoplasm
   Benign
   Malignant
~~4) Circulatory~~
5) Metabolic/endocrine
6) Hematologic
7) Degeneration
8) Physical/chemical injury

# B. Non-quantitative Problem
## 4) Pathologic Approach

Elevated
Body temperature
(體溫上升)

1) Fever (發燒)
   Set point elevation
   in hypothalamus
2) Hyperthermia
   Heat dissipation <
   Production* or
   acquisition**

*Endogenous –
Hyperthyroidism

**Exogenous –
heat stroke, fire

台灣霹靂火, fire

1) Infectious (inflammatory)
2) Non-infectious (inflammatory)
3) Neoplasm
   Benign
   Malignant
~~4) Circulatory~~
5) Metabolic/endocrine
6) Hematologic
~~7) Degeneration~~
8) Physical/chemical* injury

* Always consider inclusion of drugs

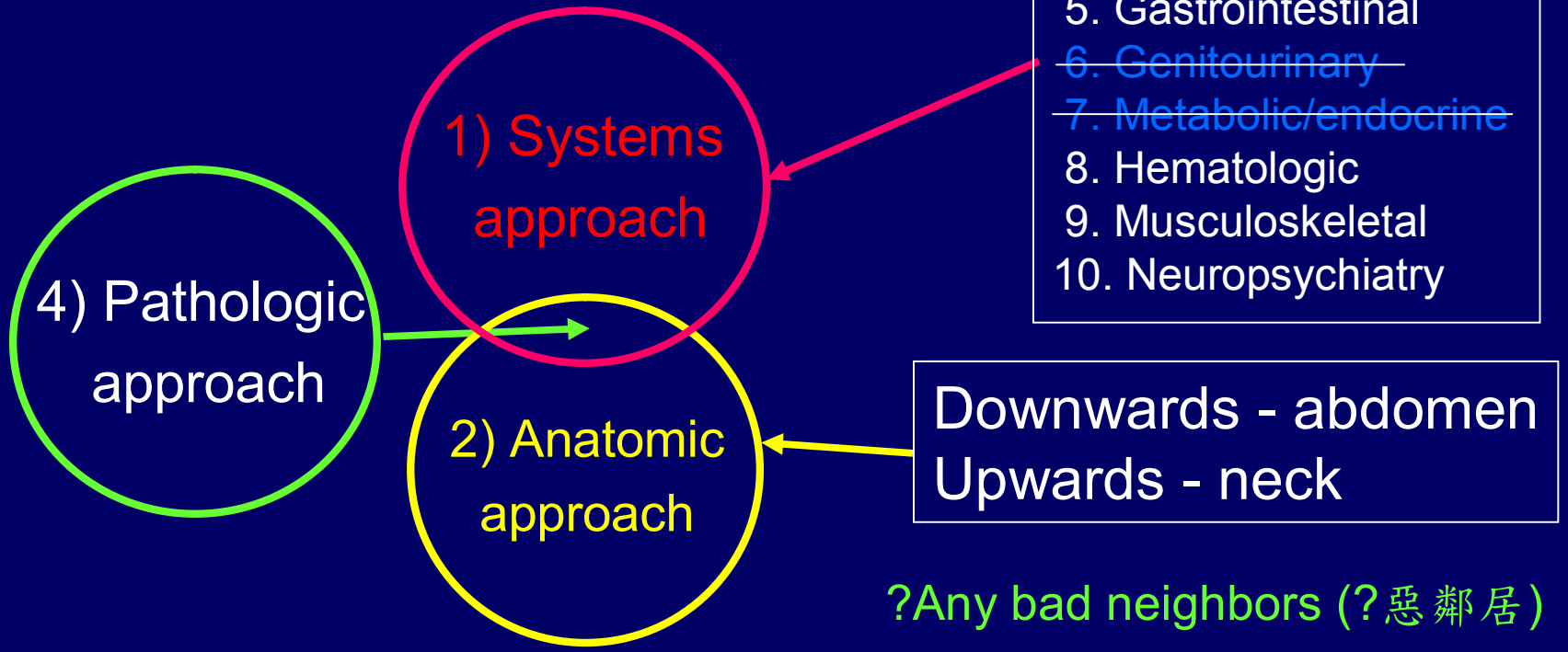
# B.非定量問題 (Non-quantitative problem)

## Combined/Sequential Approaches

### 胸痛 (Chest Pain)

問題分析: LQQOPERA 法

Strategy (解決策略): [1) + 2)] + 4)



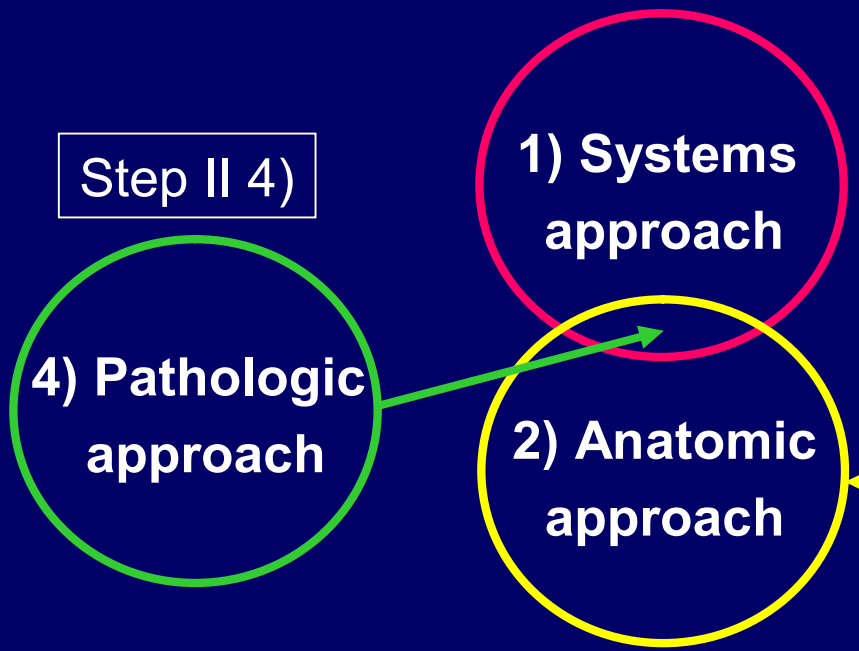
# B.非定量問題 (Non-quantitative problem)
# Combined/Sequential Approaches

腹痛 (abdominal Pain)

問題分析: LQQOPERA 法

解決方法:

Step I. 1) + 2)




Step II 4)

1. Integument
~~2. HEENT~~
3. Respiratory
4. Cardiovascular
5. Gastrointestinal
6. Genitourinary
7. Metabolic/endocrine
8. Hematologic
9. Musculoskeletal
10. Neuropsychiatry

Upwards – chest
Downwards – inguinal hernia, testis torsion

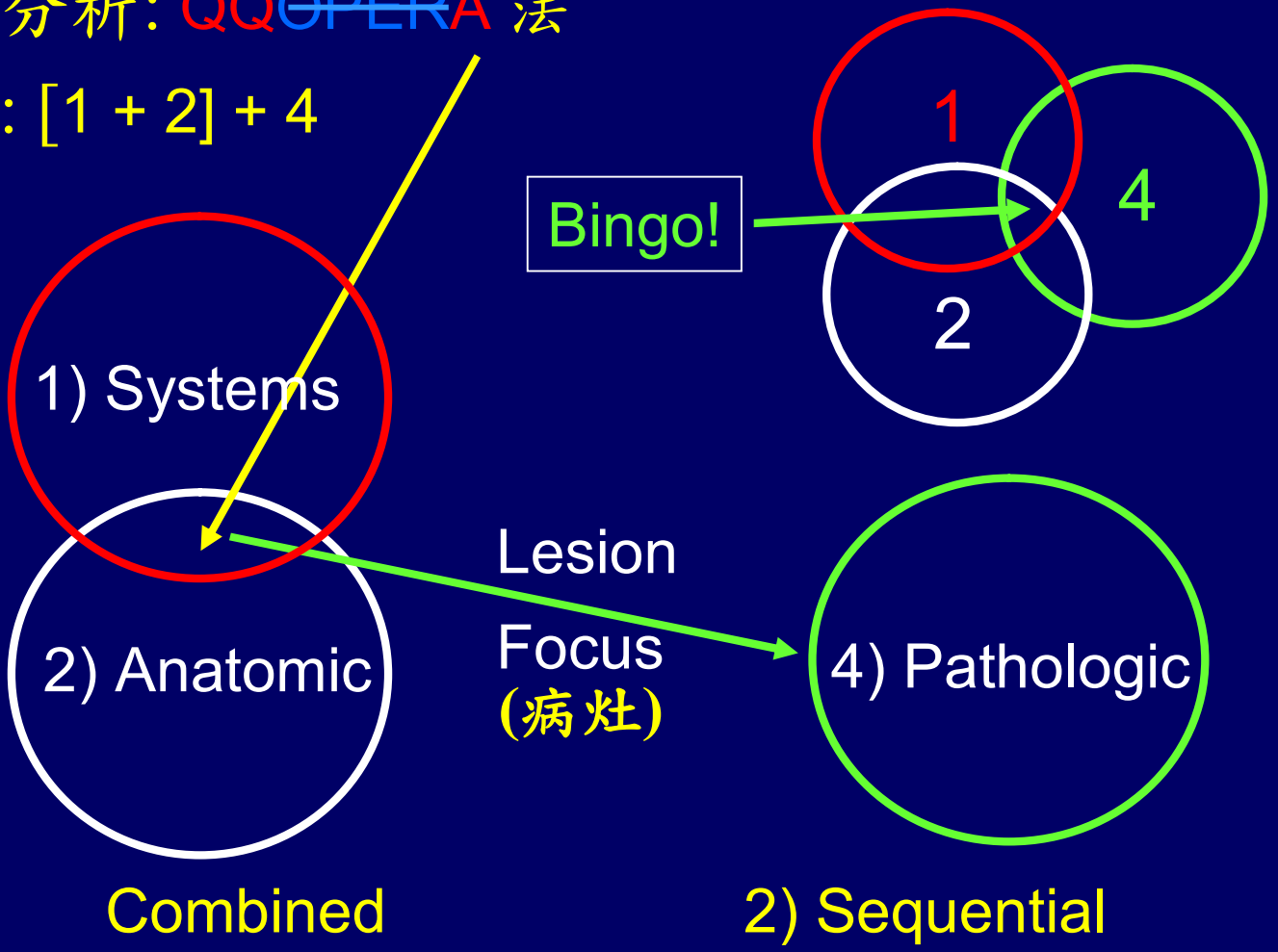
?Any bad neighbors (惡鄰居)

# Combined/Sequential Approaches

## Fever (發燒) - 非定量問題

問題分析: QQ~~OPERA~~ 法

解決方法: [1 + 2] + 4



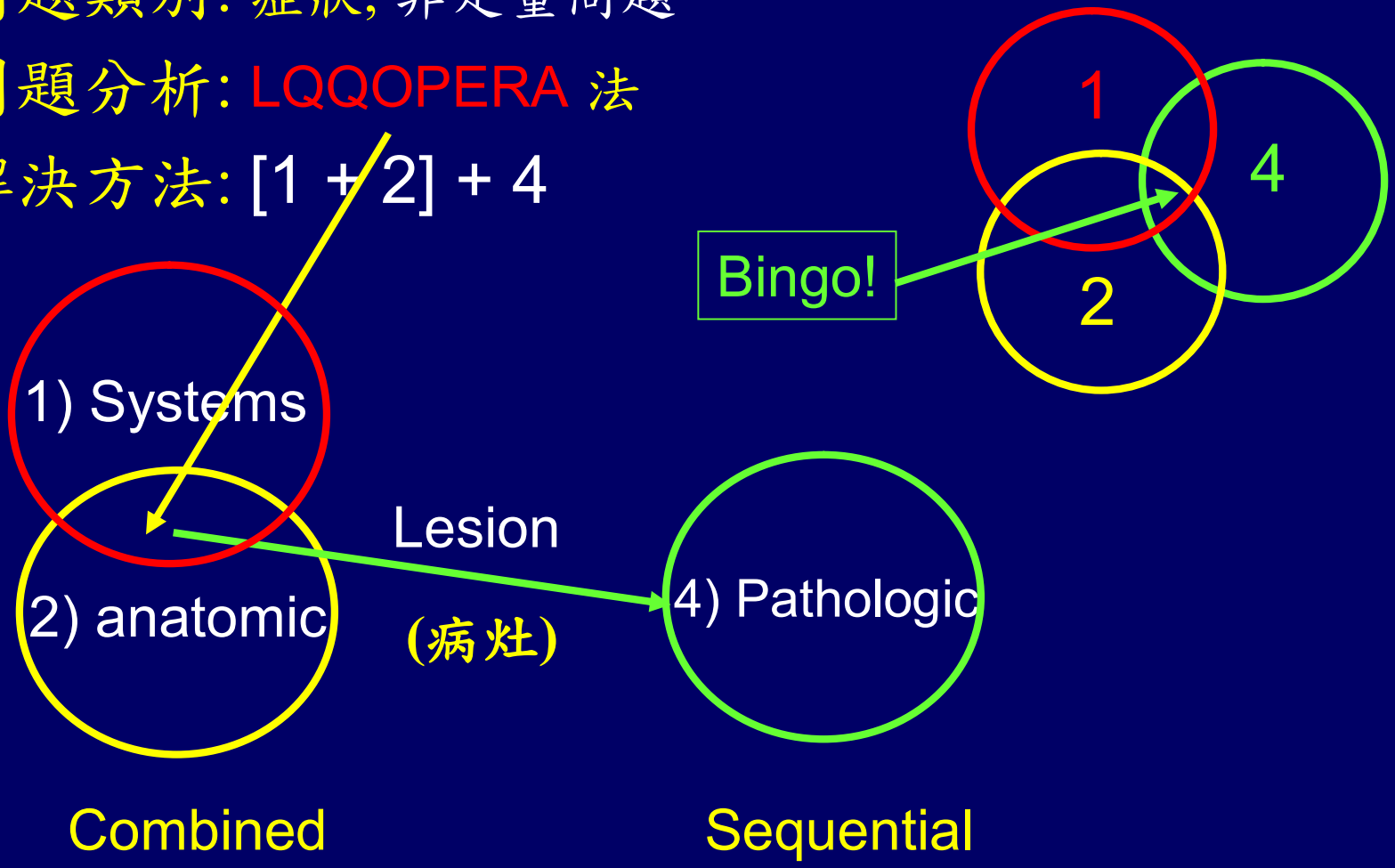
# Combined/Sequential Approaches

## 疼痛/不適感 (pain/distress), e.g. abdominal pain

問題類別: 症狀, 非定量問題

問題分析: LQQOPERA 法

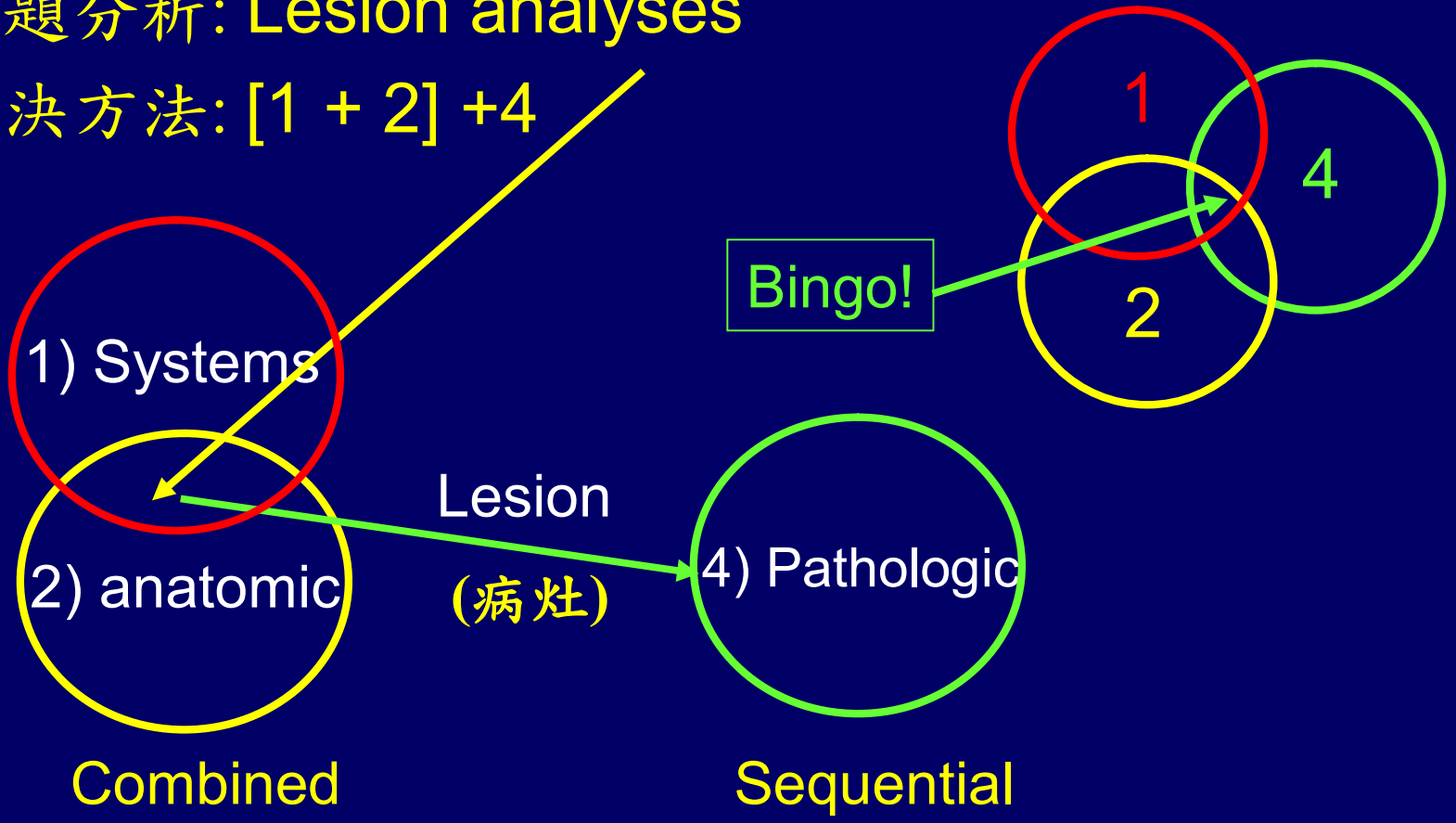
解決方法: [1 + 2] + 4



# Combined/Sequential Approaches
# Abnormal Lesion on Imaging test
# (e.g. chest X-ray, ultraound, CT, PE etc)

問題分析: Lesion analyses

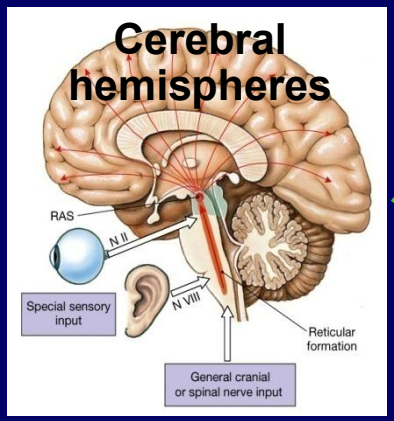
解決方法: [1 + 2] +4



# Sequential Combined Approaches
## 意識障礙 (Consciousness Disturbance)

問題分析:

QQOPERA 法




解決方法 (Solving)

1) → 2) → 4)

Or

3) → 2) → 4)

1) Neuro-psychiatry
2) CV system
3) Endocrine/ metabolic

3.Patho-pysiology

Or

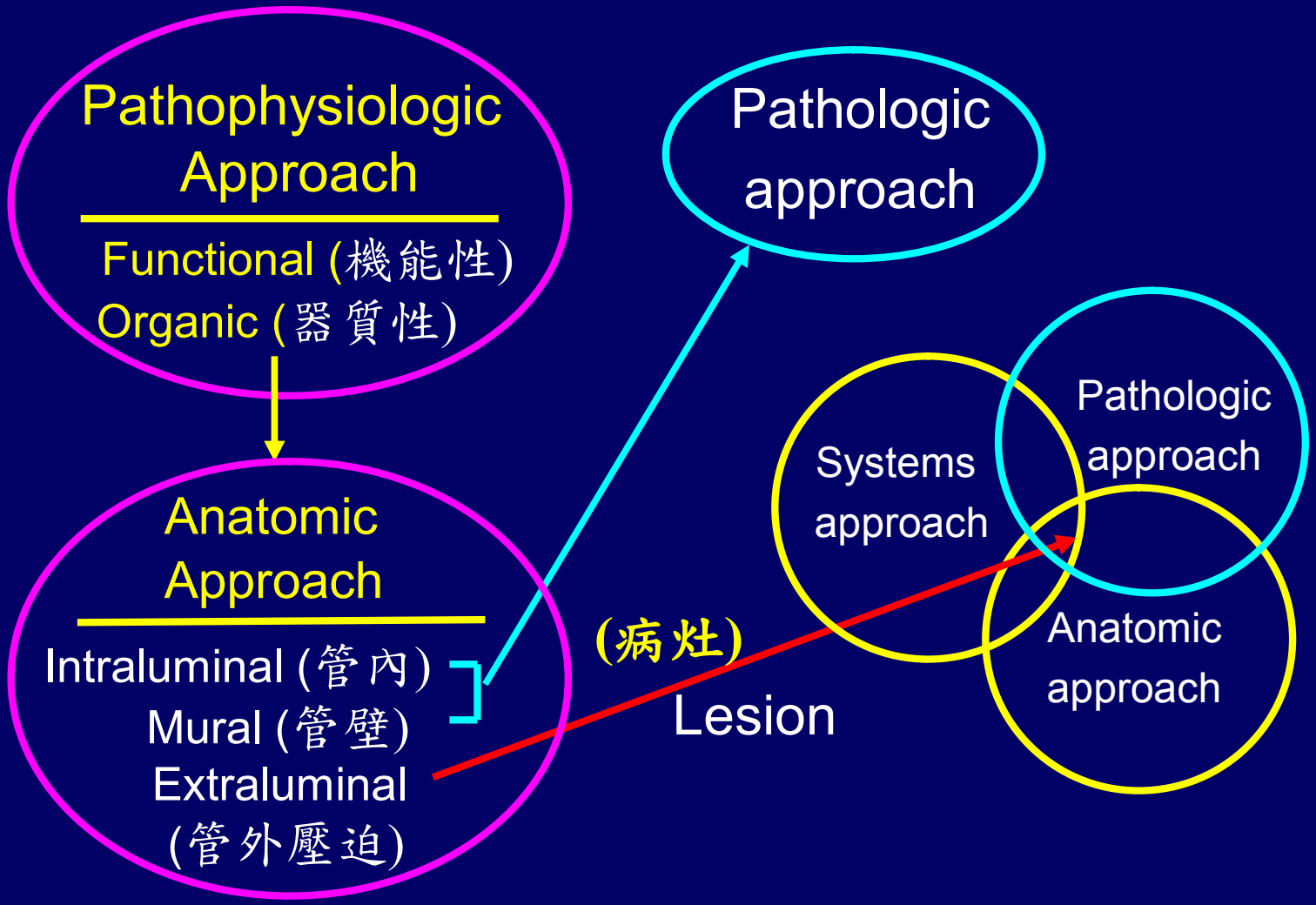
1.Systems

4.Pathologic

Lesion (病灶)

2. Anatomic

# Problem Solving - Combined Approaches
# Obstruction of Tubular Structure



# 問題提示分類、剖析、解決

| 1. 提示 Submission | 類型 Type | 2. 剖析* Analyses* | 3. 解決策略 Strategy |
|---|---|---|---|
| A. 症狀 Symptoms<br>B. 徵候 Signs<br>C. 定量性檢驗異常 Abnoramal Quantitative Lab tests | 定量 Quantitative | LQQOPERA法 | 依質量不減定律 (Mass preservation law), or 或經濟（會計）學法則 (Accounting rules) 剖析解決 |
| | 非定量 Non-Quantitative | LQQOPERA法 | Strategies (策略):<br>1) Systems<br>2) Anatomic<br>3) Pathophysiologic<br>4) Pathologic |
| D. 症候群/疾病（syndrome/disease | | 依指引綱領 (Guidelines) 剖析、解決 | |

*知己知彼 百戰不殆《孫子兵法 - 謀攻篇》

胡適作考證『在不疑處有疑』

# 高血壓 (HTN) 評估準則 (Evaluation Guidelines)

1) 高血壓本身(Hypertension per se)

如何及何時被診斷 (detected, when/how)、嚴重程度 (severety – staging)、過往的治療 (past treatments)及其療效與副作用(effectiveness: side effects)、 current medications

2) 高血壓的原因 (Etiology)

本態性 (essential) 或續發性 (secondary)

3) 有無併發症 (Complications)

眼病變: 視網膜血管病變:

心血管病變: 腦、腎病變、冠狀動脈、aortic dissection

左心室功能異常

4) 是否伴有其它危險因子 (Associated risk factors)

如糖尿病 (DM)、抽煙 (smoking)、高脂血症 (hyperlipemia) etc.等

5) 同時罹患的疾病 (Co-morbidity)

此會影響治療的決策：如罹患氣喘病者禁用乙型抑制劑 (beta-blockers); 患有前列腺肥大者可優先考 慮使用甲型抑制劑 (alpha-blockers); hyperuricemia, gout – 避用thiazide

**方法**

1) 病史
2) 理學檢查
3) 實驗室檢查

# 糖尿病 (DM) 評估準則(Evaluation Guidelines)

1) 糖尿病本身：如何及何時被診斷 、嚴重程度、過往的治療及其療效與副作用

2) 糖尿病類型： 第1型或第2型、慢性胰臟炎、藥物 (drugs, e.g. steroids)、懷孕型糖尿病等；

3) 有無併發症 (Complications?)

急性 (acute)：低血糖、DKA、HHS (HHNK)

慢性 (chronic): Microangiopathy: 眼、神經、腎臟

Macroangiopathy: CAD, CVD, 周邊血管 (PAOD)

4) 合併其他危險因子：(如高血壓、高血脂症、肥胖、高尿酸血症、抽菸及喝酒等)。

5) 同時罹患的疾病 (co-morbidity):

如周邊血管疾病少用β-blockers;

姿勢性低血壓者少用α- blockers;

高血脂症者少用β-blockers等

# 腸胃道出血評估準則

1) 出血本身(出血處、量、時相過程)
2) 出血原因(etiology)
3) 有無併發症(Complications)
    1. 急性- hypovolemia, 其他重要器官功能異常
    2. 慢性 – anemia
4) 是否併有其他危險因子
    e.g.出血 tendency, drugs (NSAID, anticoagulants, anti-platelets, etc)
5) 同時罹患的疾病(Co-morbidity)
    Liver cirrhosis → hepatic encephalopathy
    CAD → acute coronary syndrome
    CKD → acute renal failure

→ Precipitation?

# 肺癌 (Lung cancer) 評估準則 (Evaluation Guidelines)

1) 肺癌本身(lung cancer per se)

如何及何時被診斷、嚴重程度(TNM, stage)、過往的治療及其療效與副作用、 current medications and last date of C/T

2)肺癌的原因 (Etiology)

病理分類 (pathological classification)、基因突變 (gene mutation)

3) 有無併發症 (Complications)

局部 (local): 胸壁/心臟/血管/神經等侵犯、咳血、壓迫等

轉移 (metastasis): 肺、骨骼 (bone)、腦 (brain)、肝臟 (liver) 等

Paraneoplastic syndrome: 低血鈉 (hyponatremia)、近端肢體無力(Eaton Lambert Syndrome - SCLC)、高血鈣 (hypercalcemia -SqCC)、DVT (AdC)等 etc.

4) 是否伴有其它危險因子 (Associated risk factors)

如抽煙、環境因素、家族病史等

5) 同時罹患的疾病 (Co-morbidity)

此會影響治療的決策：慢性腎病變(避免Cisplatin)、骨髓疾病(骨髓抑制)、心律不整、 神經病變(避免Taxol)等