臨床推理

Clinical Reasoning

陳祖裕

報告大綱

- 前言
- 促進鑑別診斷的方法
- 結語

鑑別診斷

- 診療的必要過程
- 基本的臨床能力

網路上有一些本國教師貢獻的資料可供參考：

臨床思路 - 問題解決 (1)

Logics in Clinical Problem Solving

洪瑞松

Dray Song Hong, MD, FACC, FAHA

Professor of Medicine,

China Medical University

中國醫藥大學

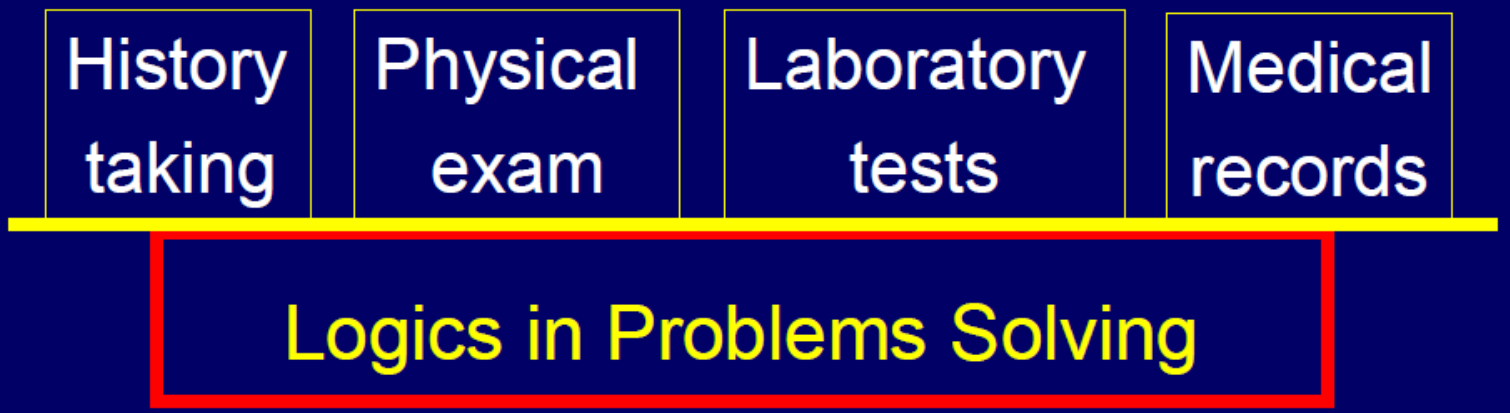
Taichung, Taiwan

台灣 台中

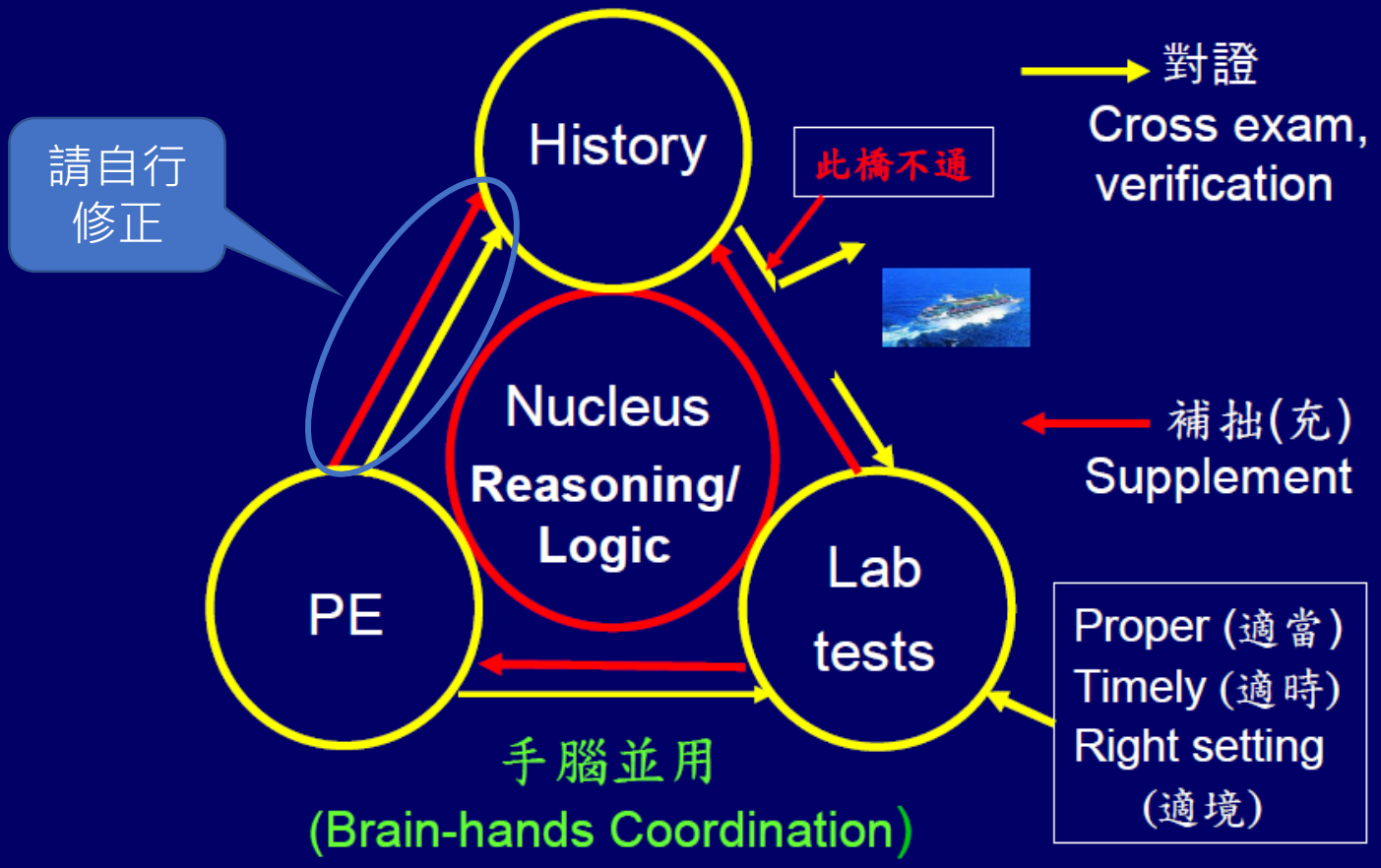
Logics in Problems Solving

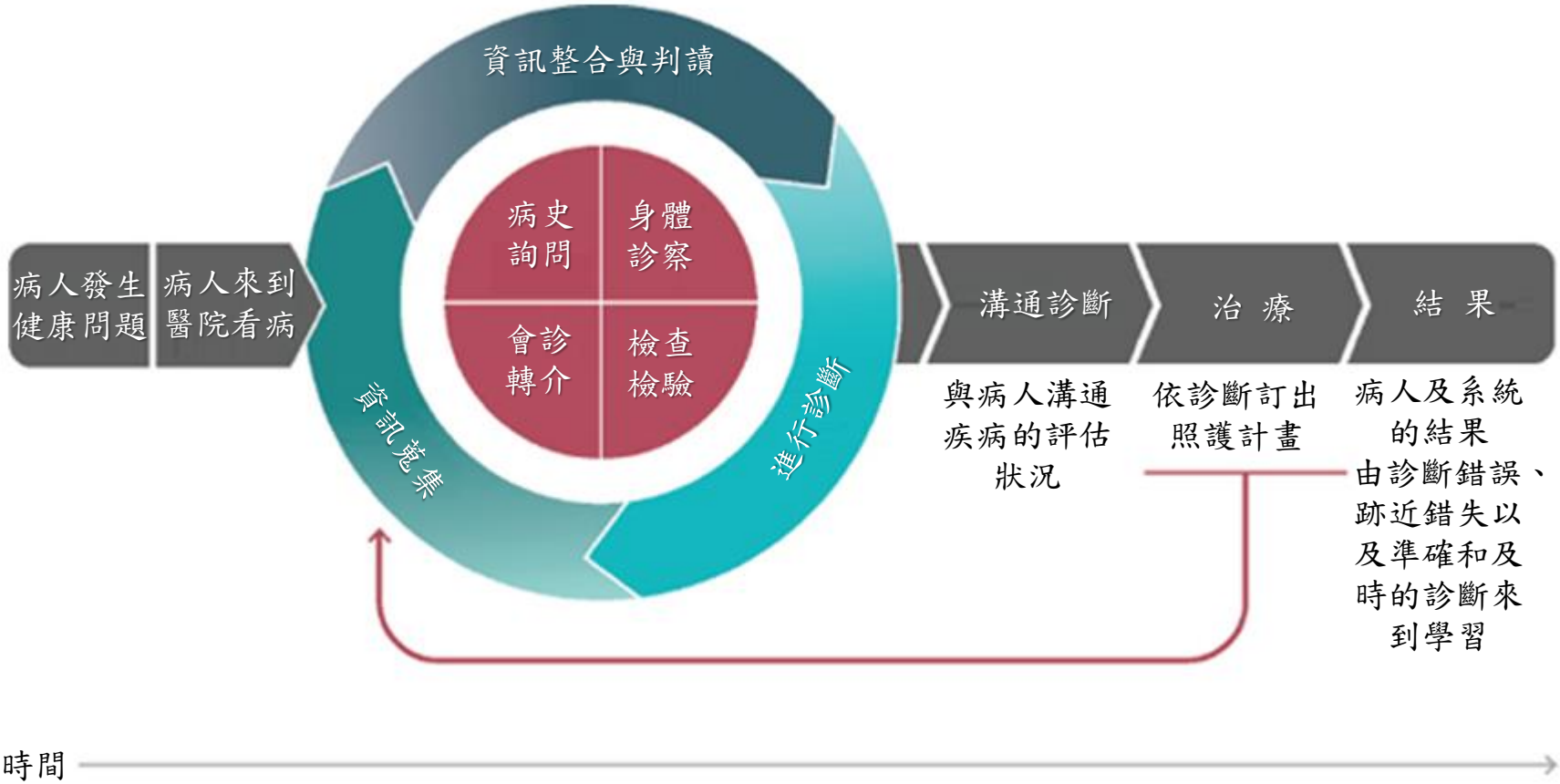
問題解決、臨床思路

A Foundation in Clinical Medicine



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





Source: National Academy of Medicine

學習目標

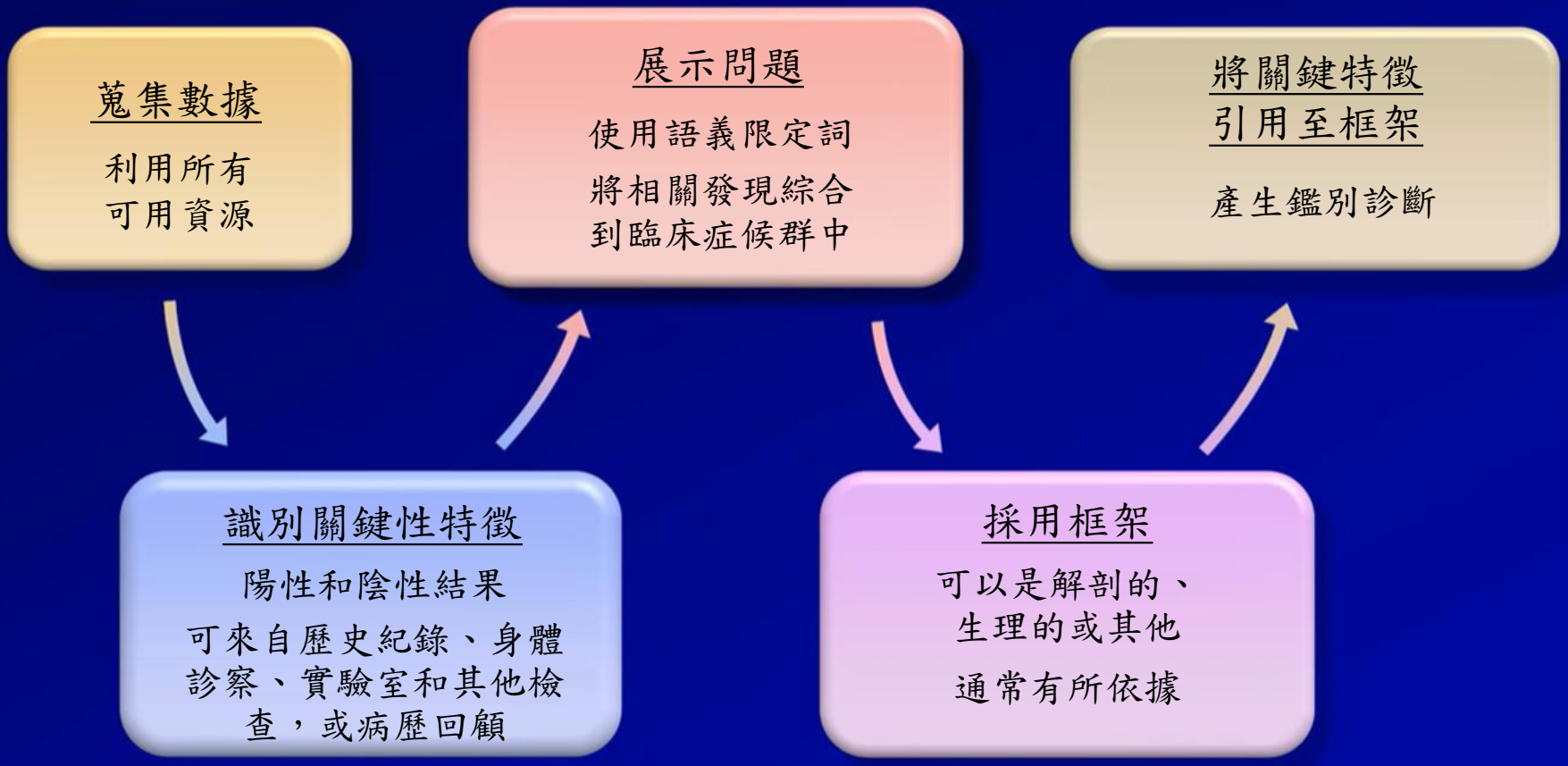
- 學習一套標準化方法：

病人的臨床表徵 ⟹ 鑑別診斷

臨床推理涉及...

- 取得資料後
  - 評估：準確性、有效性
  - 判讀：意涵
  - 整合：將片段式資料組合 ⇒ 具體的病情
- 應用促進鑑別診斷的方法
- 提出診斷的論據，並審慎評估
- 依分析結果作出決策

達成鑑診斷的五個步驟



Eric Strong, MD

Clinical Assistant Professor, Stanford University School of Medicine
Hospitalist, Palo Alto VA Health Care System

5 Steps to a Differential Diagnosis

1. 獲取數據：利用所有可用的資源
2. 找出主要特徵：陽性和陰性結果， 可能來自病史、身體診察、實驗室檢查，其他檢查或回顧病歷
3. 創建問題：使用語意限定詞（semantic qualifiers），將相關結果合成臨床綜合徵
4. 採用框架方式（可以是解剖、生理或其他）
5. 將主要臨床表徵套入框架⇒產生鑑別診斷

Eric Strong, MD

Clinical Assistant Professor, Stanford University School of Medicine
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- 什麼是語義限定詞？
  - 配對的、相對的或相反的描述語
  - 用於比較和對比診斷考量事項
  - 例子：
    - 時程
      - 復發 *vs.* 新發
      - 突然發作 *vs.* 逐漸發作
      - 急性 *vs.* 慢性
    - 性質的
      - 嚴重 *vs.* 輕度
      - Colicky *vs.* 內臟
      - 雙側 *vs.* 單側
      - 輻射 *vs.* 非輻射
    - 流行病學
      - 免疫功能低下
      - 過早的

5 Steps to a Differential Diagnosis

1. 獲取數據：使用所有可用的資源
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採用框架

問題陳述

「58歲的瓊斯先生有多重心血管危險因素，並且最近接受手術治療，表現出急性、陣發性、不一致的勞累性胸部不適。他血液動力學穩定、輕度缺氧、沒有急性梗塞的證據。」

解剖結構

胸部

心
- 不穩定型心絞痛 / ACS
- 心律不整
- 主動脈瓣狹窄

肺
- 肺栓塞
- 肺動脈高壓

主動脈
- 主動脈剝離

食道
- GERD
- 食道痙攣

胸壁
- 肋軟骨炎

腹部

胃
- 胃炎
- PUD

小腸/大腸
- 腸系膜缺血

心絞痛/心臟缺血

氧供應減少

CAD不穩定斑塊
冠狀動脈痙攣
冠狀動脈解剖異常
冠狀動脈血栓栓塞
（例如：感染性心內膜炎）

氧需求增加

心律不整
主動脈瓣狹窄
肥厚型心肌病
嗜鉻細胞瘤
私下使用興奮劑
肺動脈高壓

仿似心絞痛

主動脈剝離
肺栓塞
焦慮
胸壁疼痛

5 Steps to a Differential Diagnosis

1. 獲取數據：使用所有可用的資源
2. 找出主要特徵：陽性和陰性結果， 可能來自病史、身體診察、實驗室檢查，其他檢查或回顧病歷
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思考

Apply Key Features to the Framework

Decreased Oxygen Supply

- Unstable plaque from CAD
- Coronary vasospasm
- Anomalous coronary anatomy
- Coronary thromboembolism

Increased Oxygen Demand

- Tachyarrhythmia
- Aortic stenosis
- Hypertrophic cardiomyopathy
- Pheochromocytoma
- Surreptitious stimulant use
- Pulmonary hypertension

Angina Mimics

- Aortic dissection
- Pulmonary embolism
- Anxiety
- Chest wall pain

History (CC/HPI)

Male, 58 years old
Chest discomfort
Onset: 2 weeks ago
Episodic
Exertional?
Mid sternal
"Aching", "heaviness"
Spontaneously resolves
Associated w/ lightheadedness
No radiation, no other assoc. sx
Typically last ~10 minutes

History (Excl. CC/HPI)

Hypertension
Obesity
Smoker, active
Recent knee surgery

Exam

No physical distress
Appears anxious
BP 152/92
O_2 sat 94%
+ S4
Systolic murmur at LLSB

Tests

Routine labs normal
Troponin, CK normal
Tox screen negative
CXR: normal
EKG: LAD, ? LVH, no Q waves, no ST deviation

思考

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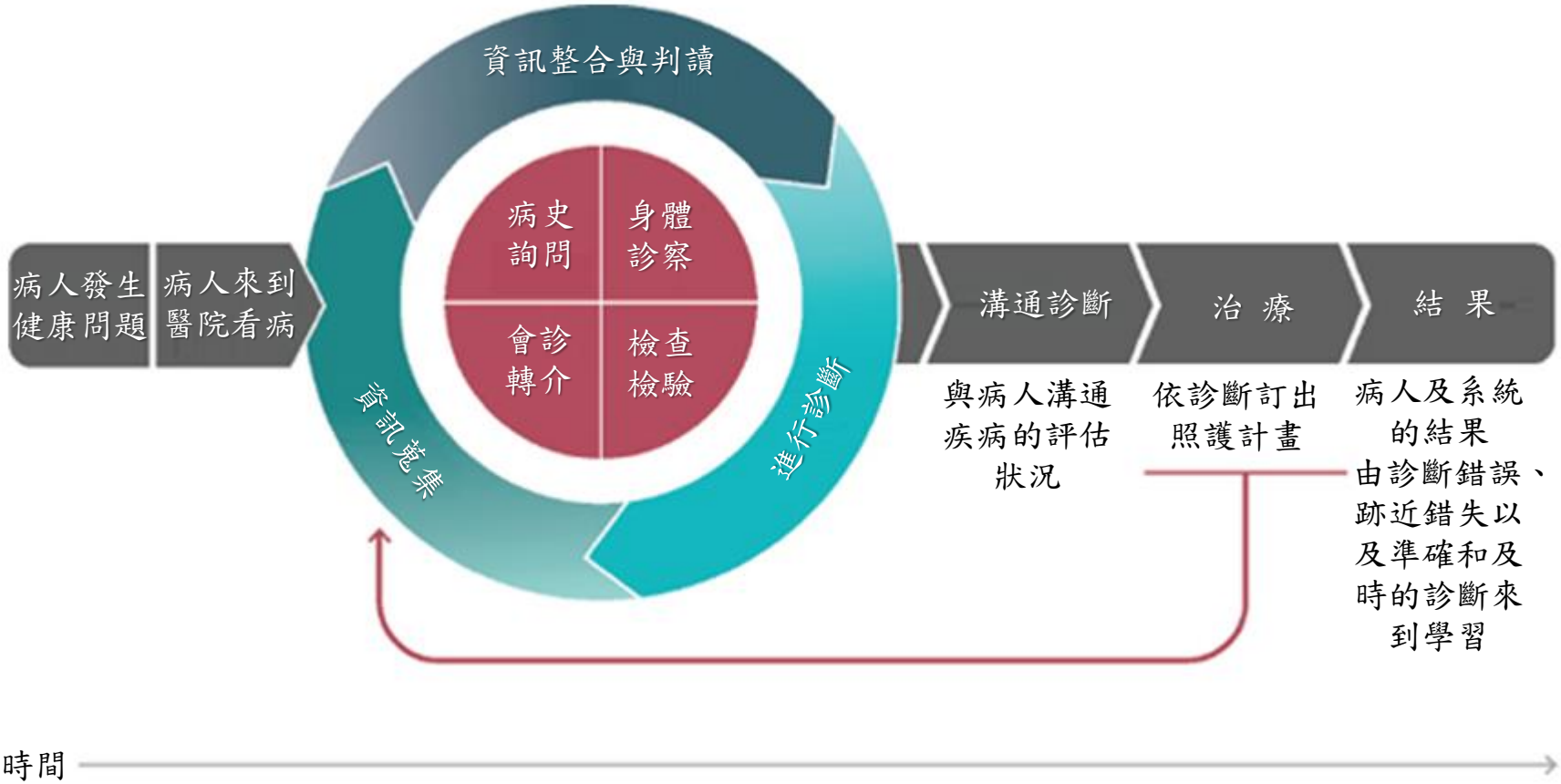
養成思辨能力

需要假以時日

真的是這樣嗎？

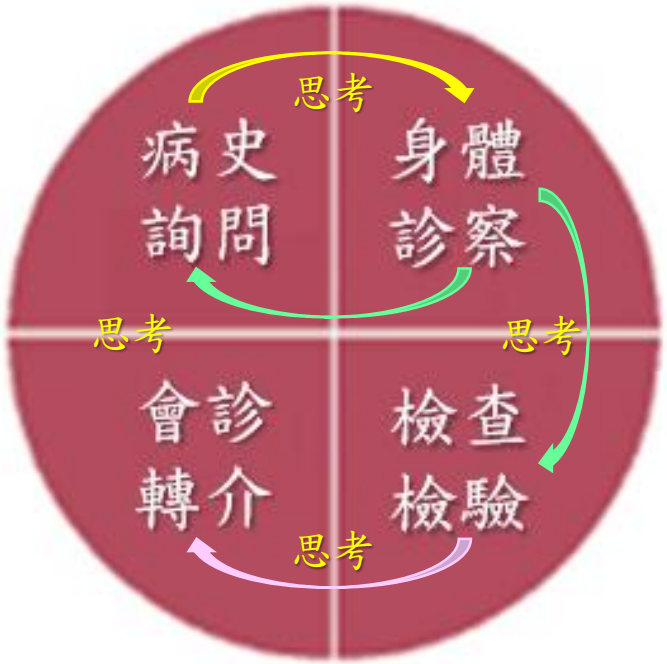


Source: National Academy of Medicine

診斷過程

- Hx → PE → Lab/Imaging/Consultation
  - 鑑別診斷 (1)
  - 鑑別診斷 (2)
  - 鑑別診斷 (3)

病人的臨床表徵 → 診斷



Source：陳，2020。

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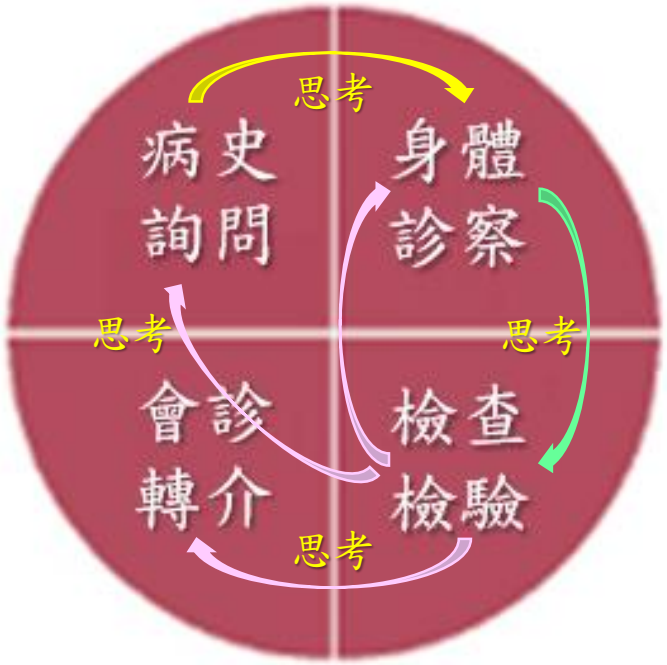

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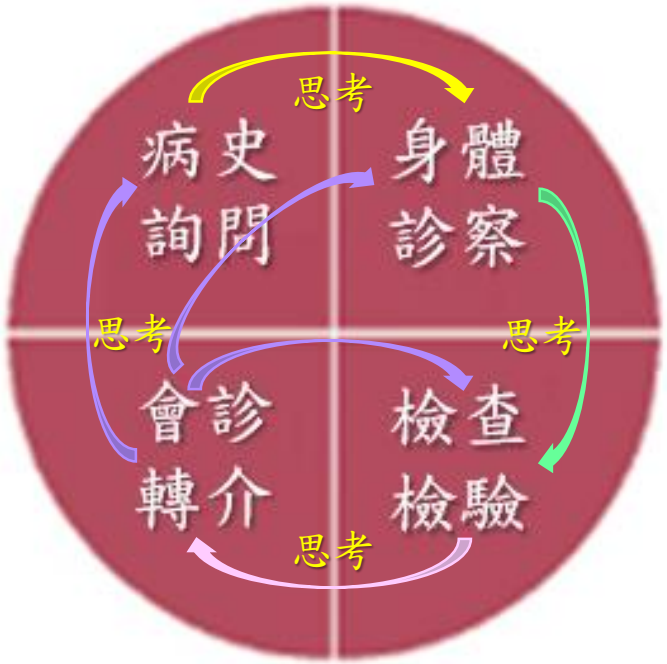

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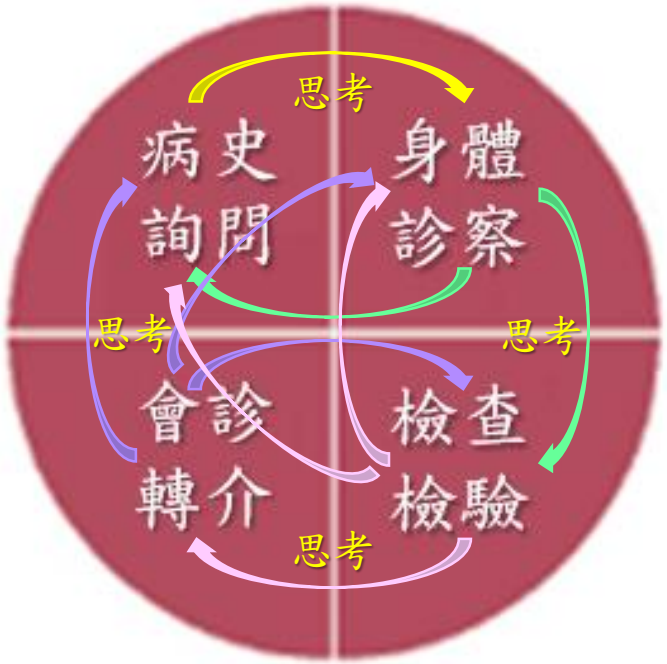
病人的臨床表徵 → 診斷



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報告大綱

- 前言
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- 結語

促進鑑別診斷的方法

- 傳統方法
- 創新方法

促進鑑別診斷的傳統方法

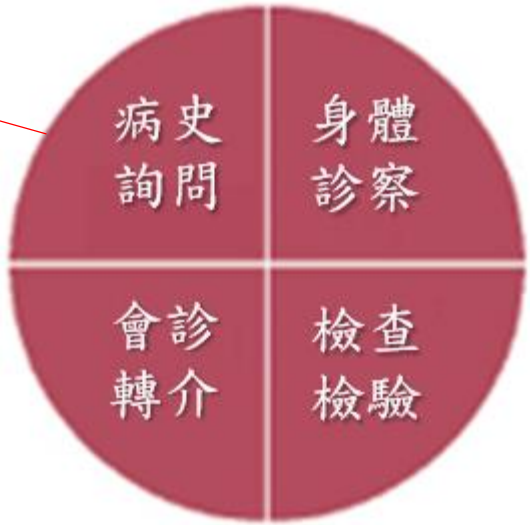
- 記憶字
- 流程圖

傳統鑑別診斷的方法──記憶字

- LQQ-OPERA
- VINDICATE-P
- AEIOU-TIPS

病人的臨床表徵 ⟹ 鑑別診斷

LQQ-OPERA
OLD CARTS



OLD CARTS

- O: onset
- L: location/radiation
- D: duration
- C: character
- A: aggravating / associated factors
- R: relieving factors
- T: temporal factors
- S: severity of symptoms

OLD CARTS

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鑑別診斷之重要依據

很重要

建議架構

LQQ OPERA

- L: location (including radiation)
- Q: quality
- Q: quantity（痛：要用pain scale）
- O: onset mode and time factors
- P: precipitating factors
- E: exaggerating factors
- R: relieving factors
- A: accompanying symptoms ← 集中火力

創作者：洪瑞松醫師

病人的臨床表徵 → 鑑別診斷

VINDICATE-P
AEIOU-TIPS

VINDICATE-P

V = vascular

I = infection, inflammatory

N = neoplasm

D = degenerative, drug

I = iatrogenic, idiopathic

C = congenital

A = autoimmune

T = trauma

E = endocrine, environmental

P = psychiatric, psychogenic

Jaundice

VINDICATE

V: vascular
- Hemobilia
- Microangiopahtic hemolytic anemia MAHA)
- Hemolysis

I: infection/inflammatory/autoimmune
- Sepsis
- Malaria
- Viral hepatitis
- Cholangitis

N: Neoplasm (primary or metastatic)
- Hepatic metastases
- Hepatoma
- Pancreatic cancer
- Cholangiocarcinoma

D: Durgs
- EtOH
- Medications: isoniazid, statins augmentin, etc
- Contraceptives

Iatrogenic
- Pancreatitis s/p ERCP
- Surgical strictures
- Primary sclerosing cholangitis

Congenital/developmental inherited
- Hereditary spherocytosis
- Dubin-Johnson & Rotor Syndrome
- Gilbert's syndrome & Crigler-Najjar Types 1 & 2
- Biliary atresia
- G6PD deficiency

Anatomic
- Strictures
- Biliary atresia

Trauma
- Soft tissue injury with large hematoma
- Hepatic trauma

Environomental exposures/endocrine/metabolic
- Parenteral hyperalimentation

VINDICATE-P
V = vascular
I = infection, inflammatory
N = neoplasm
D = degenerative, drug
I = iatrogenic, idiopathic
C = congenital
A = autoimmune
T = trauma
E = endocrine, environmental
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思考：**Fever**有哪些DDx？

VINDICATE-P
V = vascular
I = infection, inflammatory
N = neoplasm
D = degenerative, drug
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A = autoimmune
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E = endocrine, environmental
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思考：**Mono-arthralgias**有哪些DDx？

VINDICATE-P
V = vascular
I = infection, inflammatory
N = neoplasm
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C = congenital
A = autoimmune
T = trauma
E = endocrine, environmental
P = psychiatric, psychogenic

思考：**Coma**有哪些DDx？

Fever

V = vasculitis, intravascular infection
I = bacteria, virus, fungus, …
N = lymphoma, leukemia, multiple myeloma, RCC, HCC, sarcoma, …
D =
I = idiopathic, drug fever
C =
A = autoimmune diseases – SLE, RA, Still's disease, …
T = trauma with hematoma/secondary infection
E = adrenal insufficiency, hyperthyroidism, pheochromocytoma, …
P = acute psychological stress

Mono-arthralgia/arthritis

V = osteonecrosis
I = septic arthritis
N = leukemia
D = osteoarthritis
I = iatrogenic
C =
A = RA, psoriatic arthritis, seronegative spnodyloarthritis
T = trauma
E = gout, pseudogout, …
P =

Coma

V = CVA, shock
I = CNS infections
N = brain tumor
D = Creutzfeldt – Jakob disease
I = drugs, CO intoxication, toxins
C = critical congenital heart disease
A = SLE, alcohol, …
T = trauma
E = liver failure, uremia, hypoglycemia, adrenal crisis, thyroid storm, …
P = psychiatric

AEIOU – TIPPS

- A：alcohol
- E：epilepsy, electrolytes, encephalopathy (HE)
- I ：insulin
- O：opium
- U：uremia
- T：trauma
- I：infection（sepsis/CNS）
- P：poison
- P：psychiatric
- S：shock

請選出10個最常用的診斷記憶字

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

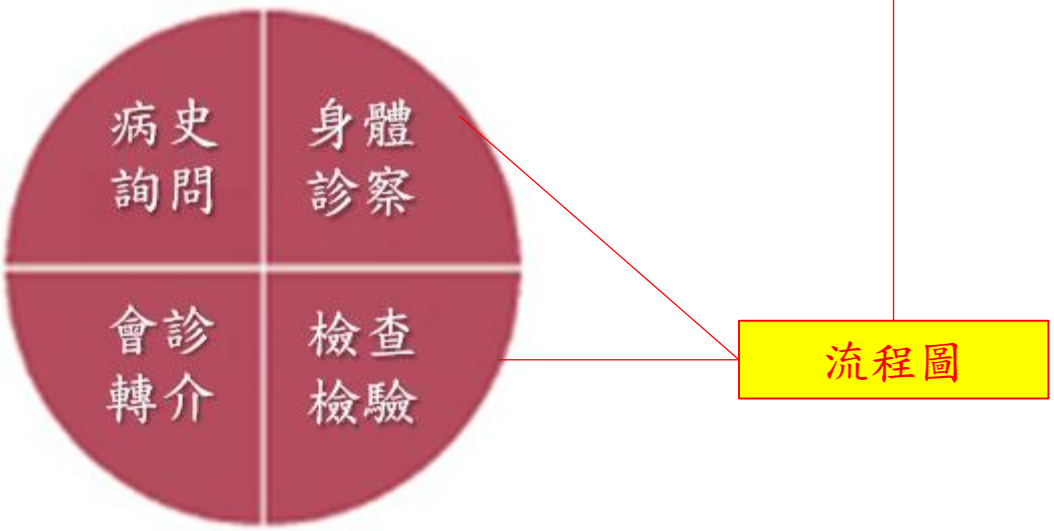
https://en.wikipedia.org/wiki/List_of_medical_mnemonics

請選出10個最常用的診斷記憶字

1. 叫叫CAB
2. DOPE
3. LQQ-OPERA
4. PAID – PASS
5. VINDICATE-P
6. AEIOU-TIPS
7. PET-MAC
8. SPIKES
9. DEMENTIA / VANISHED
10. SOAP BRAIN MD

https://en.wikipedia.org/wiki/List_of_medical_mnemonics

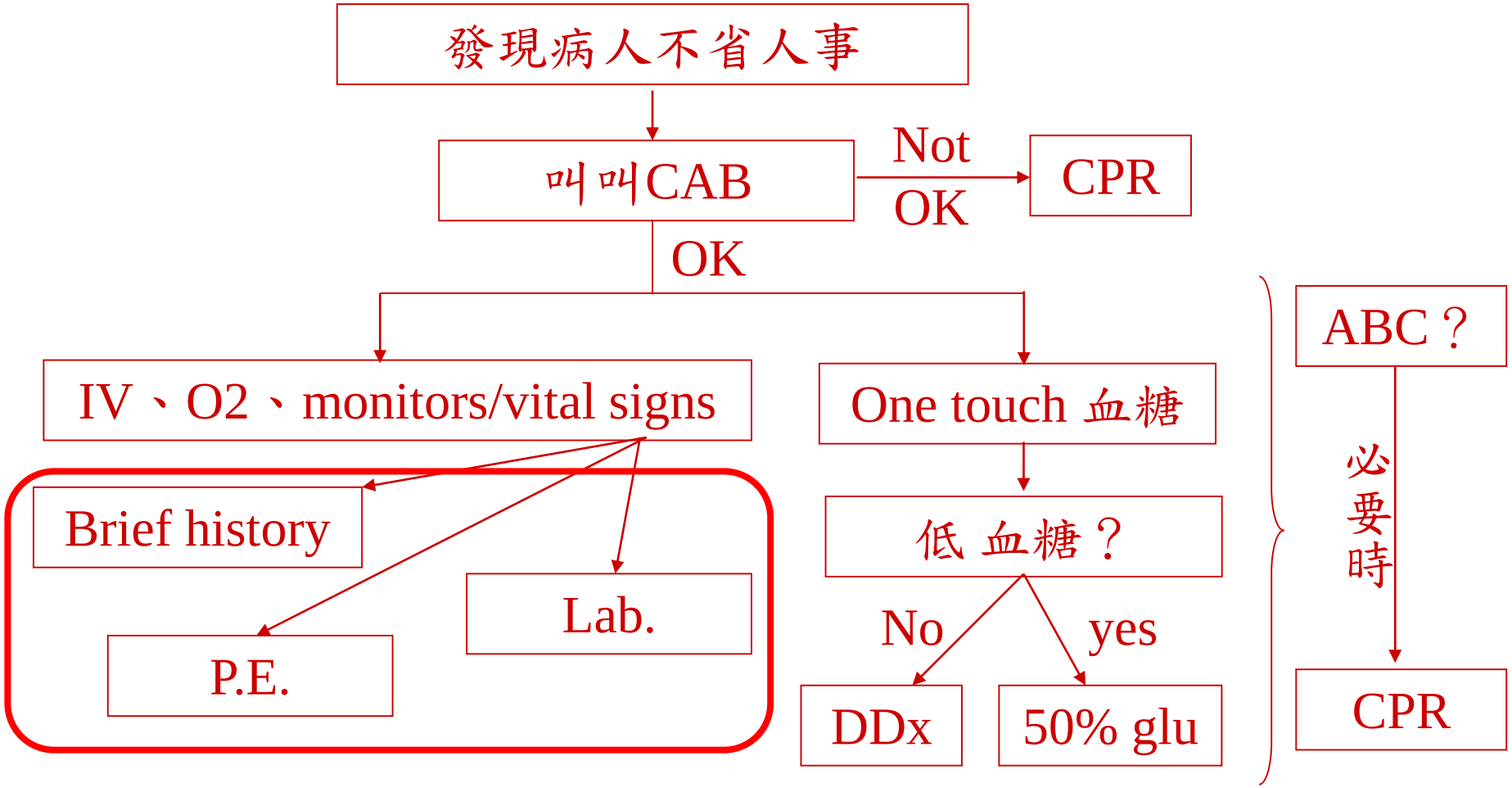
病人的臨床表徵 ➡ 鑑別診斷



傳統鑑別診斷的方法──流程圖

- 昏迷
- 黃疸
- 貧血
- 低血鈉
- ……

COMA的處理流程


發現病人不省人事
叫叫CAB
Not
OK
CPR
OK
IV、O2、monitors/vital signs
One touch 血糖
Brief history
Lab.
P.E.
低 血糖？
No
yes
DDx
50% glu
ABC？
必要時
CPR

COMA的處理流程：Brief History

- 人：疾病史、目前用藥
- 事：意識喪失時發生何事
- 時：喪失意識的快慢
- 地：發生場所
- 物：有否暴露於毒物中

COMA的處理流程：PE

- CAB最優先
- 有否頭部外傷：hemotympanum、Battle′s sign
- 昏迷程度：Glasgow Coma Scale
- Vital signs
- 眼：瞳孔、眼球運動
- 呼吸型式
- Nuchal rigidity（須確定無外傷）

Battle′s sign：耳後及近乳突處出現瘀斑 ⇒ 顱底後窩骨折 or 顳骨骨折

COMA的處理流程：Lab

- A：alcohol, acidosis, alkalosis ⇒ ethanol, ABG
- E：epilepsy, electrolytes, encephalopathy (HE), environmental ⇒ Na, K, Ca, Mg, NH3
- I ：insulin, infection (sepsis) ⇒ Glucose, CBC
- O：opium, oxygen ⇒ ABG
- U：uremia ⇒ BUN, Cr
- T：trauma, tumor ⇒ CBC
- I ：iatrogenic, idiopathic ⇒ drug level
- P：poison, psychiatric ⇒ poison screening
- S：shock, sugar ⇒ Glucose

COMA的處理流程：Coma Routine

- ABG analysis
- Biochemistry
  - Electrolytes
  - Glucose (one touch)
  - BUN, Cr
  - NH3
- CBC
- Poison screening

ABCP

肝腎電糖

傳統鑑別診斷的方法──流程圖

- 昏迷
- 黃疸
- 貧血
- 低血鈉
- ……

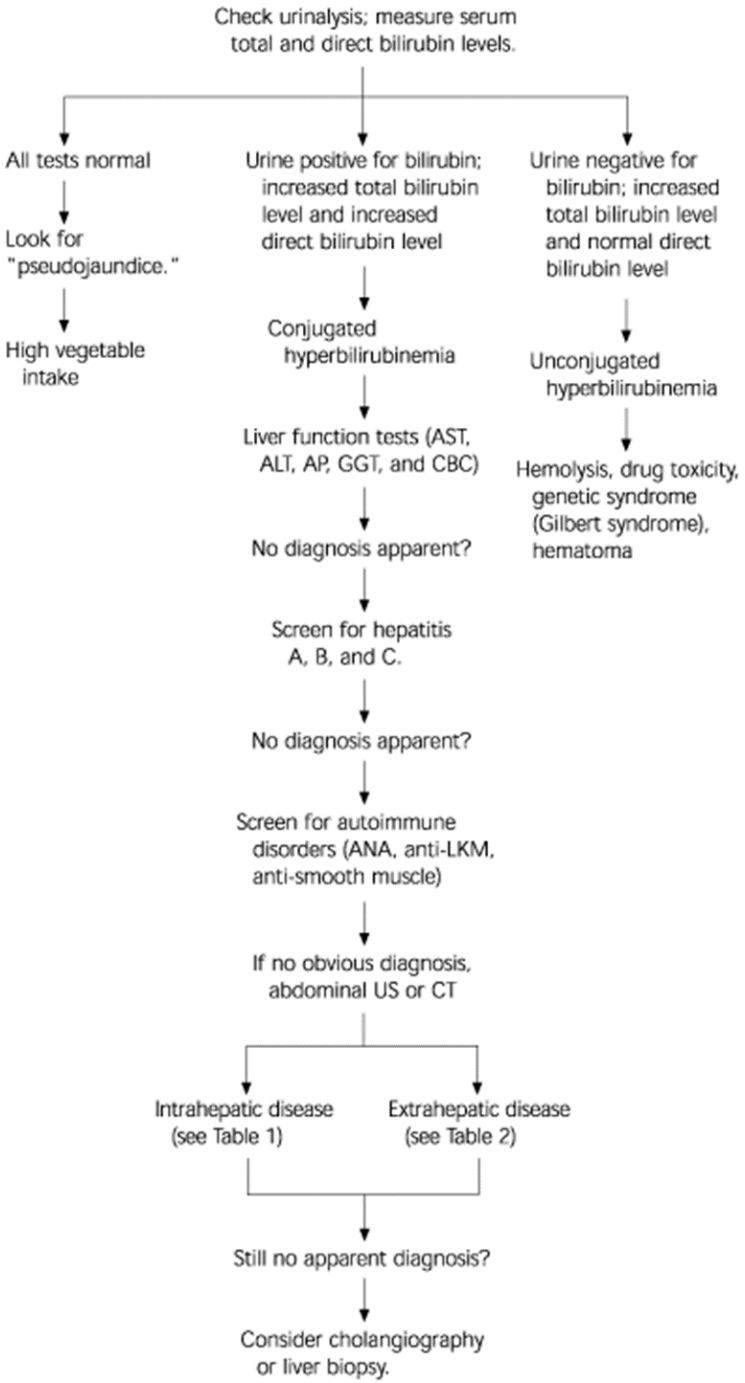
黃疸的DDx很簡單，生化檢查已可歸為三類：

應為Hepatocellular

Urine and blood biochemistry in jaundice.

Biochemical parameter	Prehepatic	Hepatic	Cholestatic
Blood			
Bilirubin			
Unconjugated	↑	N/↑	N
Conjugated	N	N/↑	↑
Alkaline phosphatase	N	N/↑	↑↑
Transaminases	N	↑	N/↑
Urine			
Bilirubin	0	↑	↑
Urobilinogen	N/↑	↑	↓↓/0

N, normal; 0, no bilirubin present in urine.


Check urinalysis; measure serum total and direct bilirubin levels.
All tests normal
Look for "pseudojaundice."
High vegetable intake
Urine positive for bilirubin; increased total bilirubin level and increased direct bilirubin level
Conjugated hyperbilirubinemia
Liver function tests (AST, ALT, AP, GGT, and CBC)
No diagnosis apparent?
Screen for hepatitis A, B, and C.
No diagnosis apparent?
Screen for autoimmune disorders (ANA, anti-LKM, anti-smooth muscle)
If no obvious diagnosis, abdominal US or CT
Intrahepatic disease (see Table 1)
Extrahepatic disease (see Table 2)
Still no apparent diagnosis?
Consider cholangiography or liver biopsy.
Urine negative for bilirubin; increased total bilirubin level and normal direct bilirubin level
Unconjugated hyperbilirubinemia
Hemolysis, drug toxicity, genetic syndrome (Gilbert syndrome), hematoma

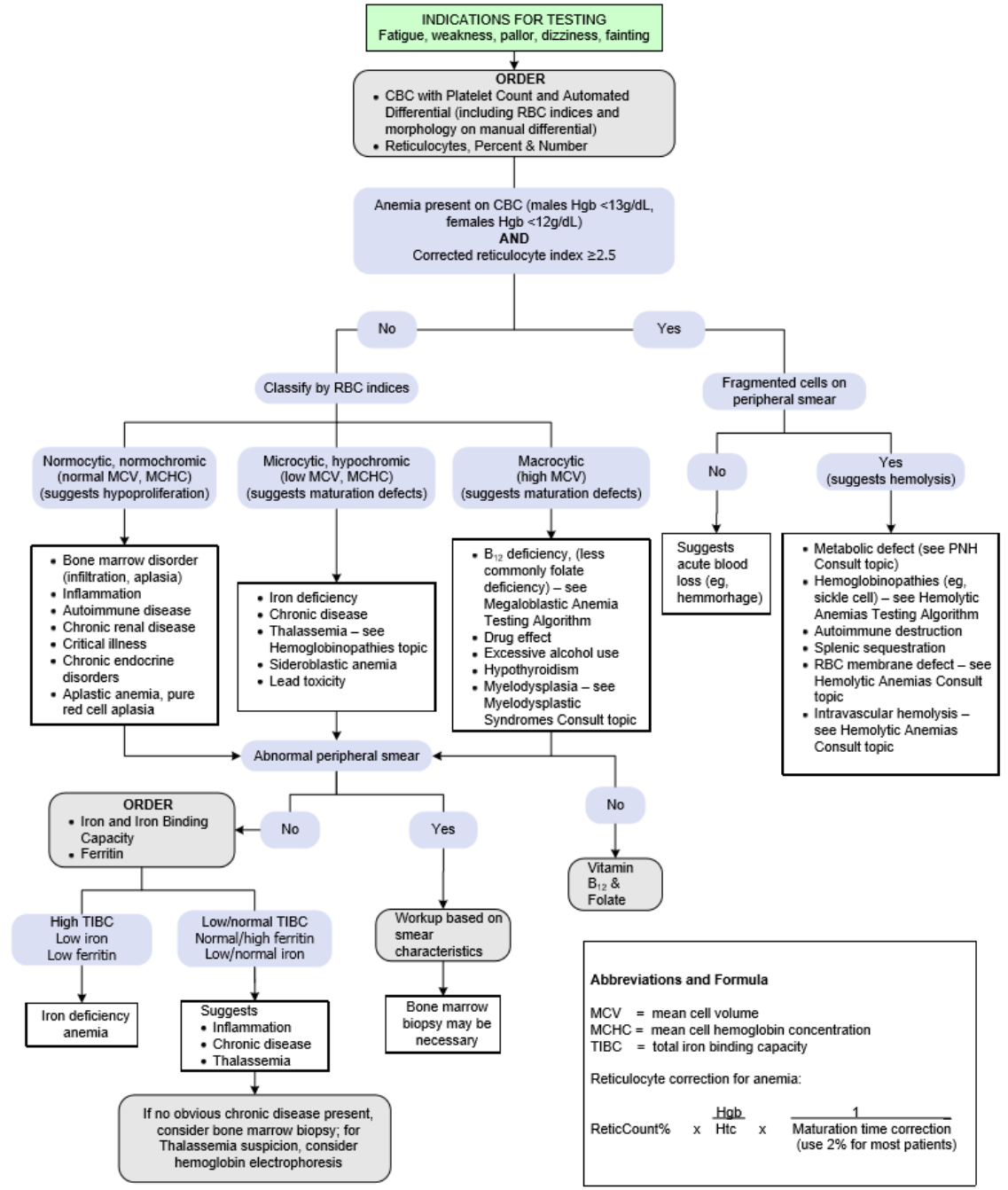
傳統鑑別診斷的方法──流程圖

- 昏迷
- 黃疸
- 貧血
- 低血鈉
- ……

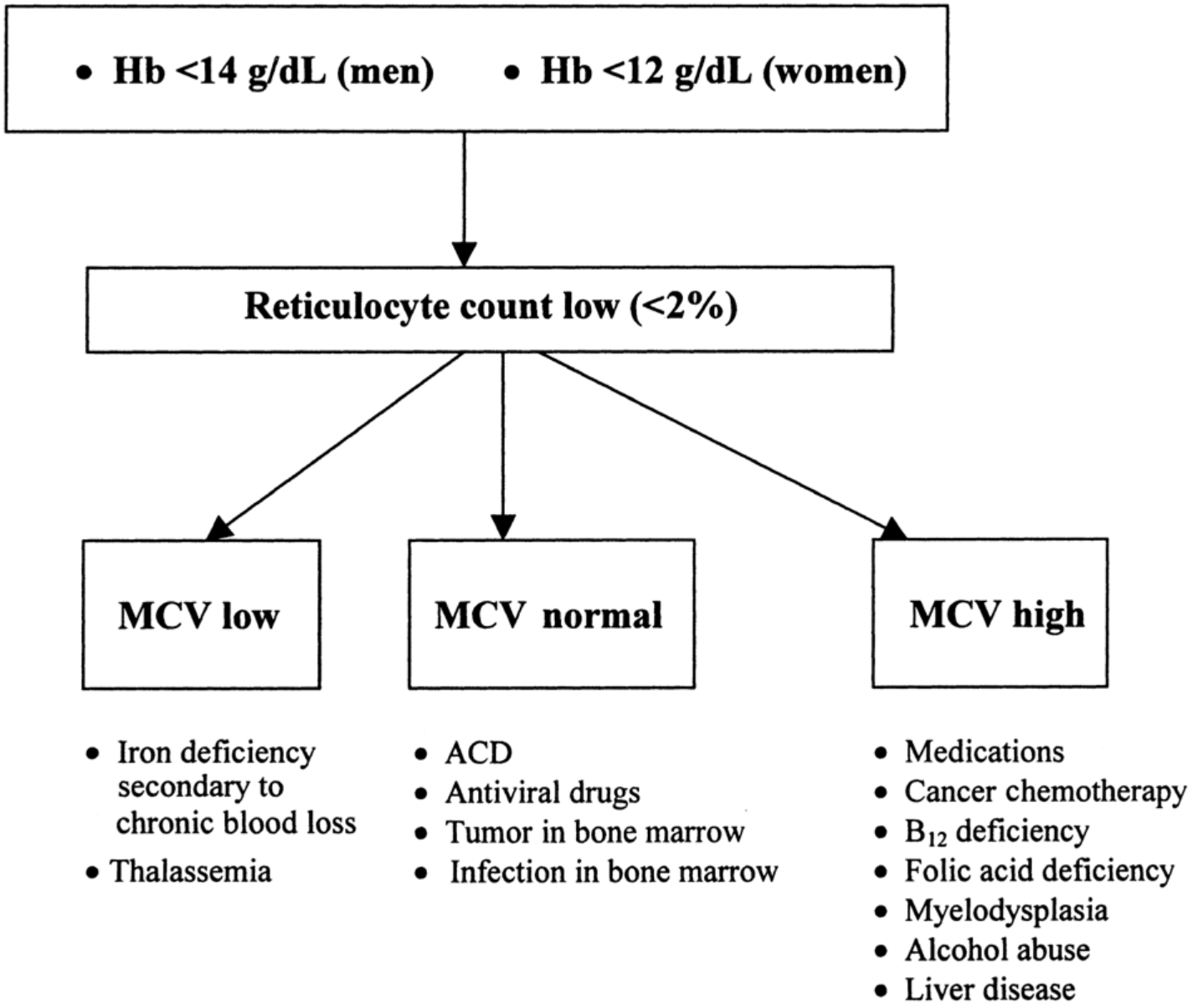
ARUP Consult

Anemia Testing

Click here for topics associated with this algorithm



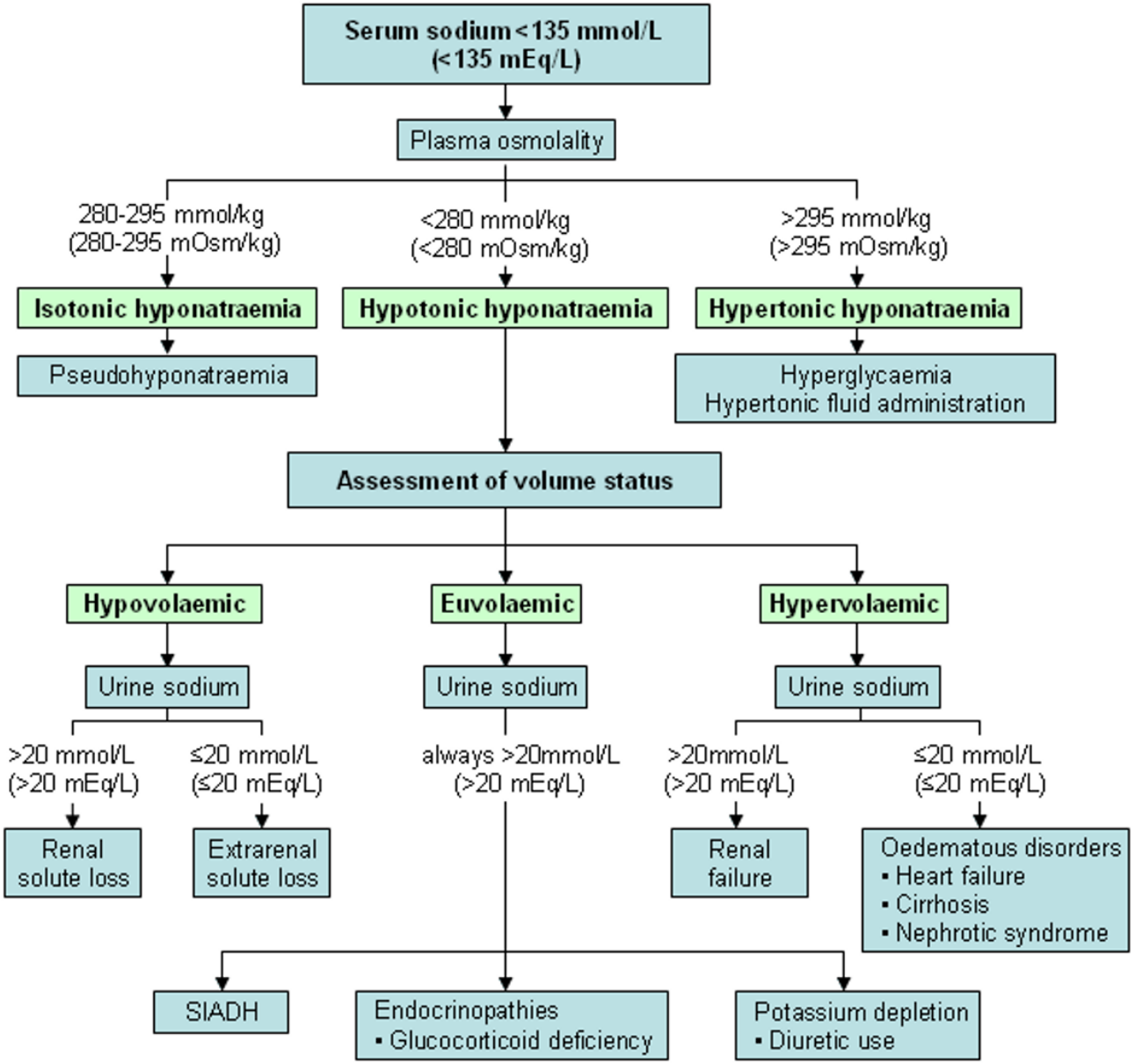
貧血的DDx記簡單的流程圖即可：

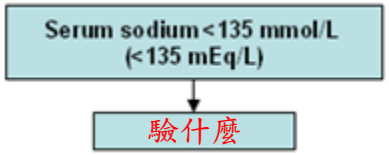


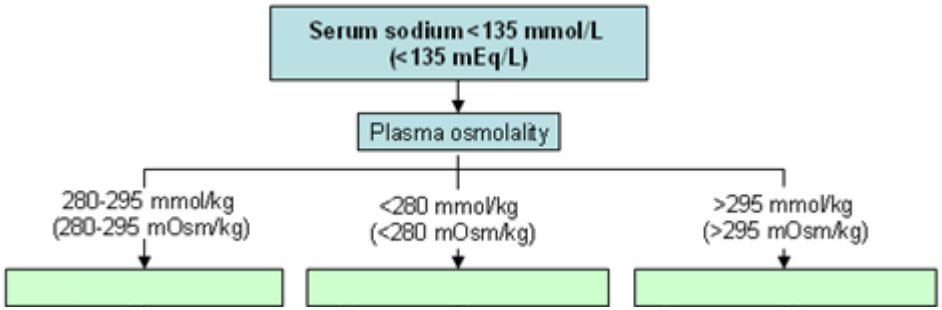
傳統鑑別診斷的方法──流程圖

- 昏迷
- 黃疸
- 貧血
- 低血鈉
- ……

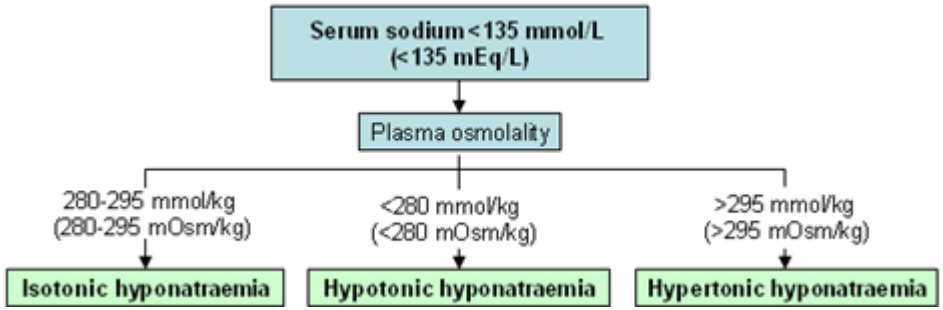
低血鈉的DDx用流程圖幫助很大：




Serum sodium<135 mmol/L
(<135 mEq/L)
驗什麼


Serum sodium < 135 mmol/L
(< 135 mEq/L)
Plasma osmolality
280-295 mmol/kg
(280-295 mOsm/kg)
<280 mmol/kg
(<280 mOsm/kg)
>295 mmol/kg
(>295 mOsm/kg)

⇦分哪三類？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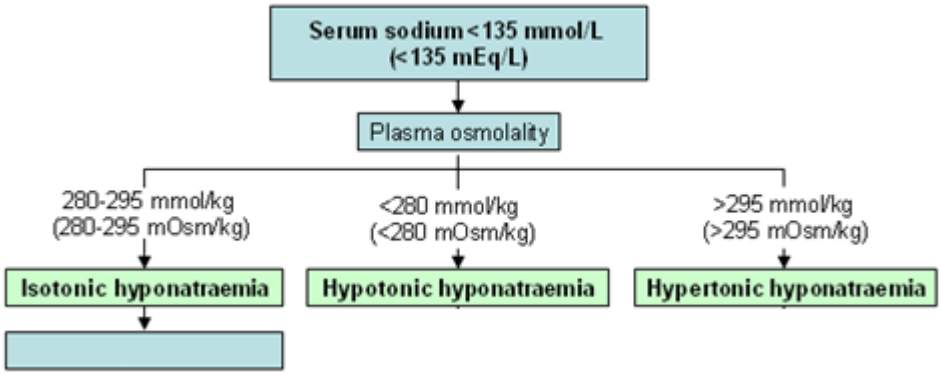
Plasma osmolality
280-295 mmol/kg
(280-295 mOsm/kg)
<280 mmol/kg
(<280 mOsm/kg)
>295 mmol/kg
(>295 mOsm/kg)
Isotonic hyponatraemia
Hypotonic hyponatraemia
Hypertonic hyponatraemia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<280 mmol/kg
(<280 mOsm/kg)
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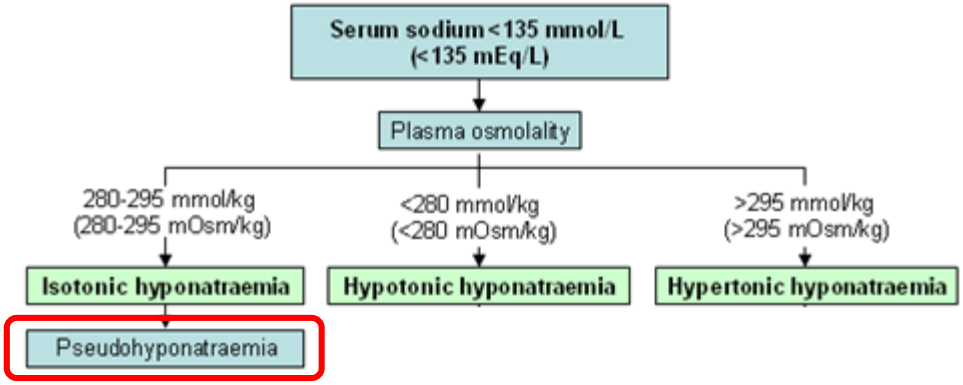
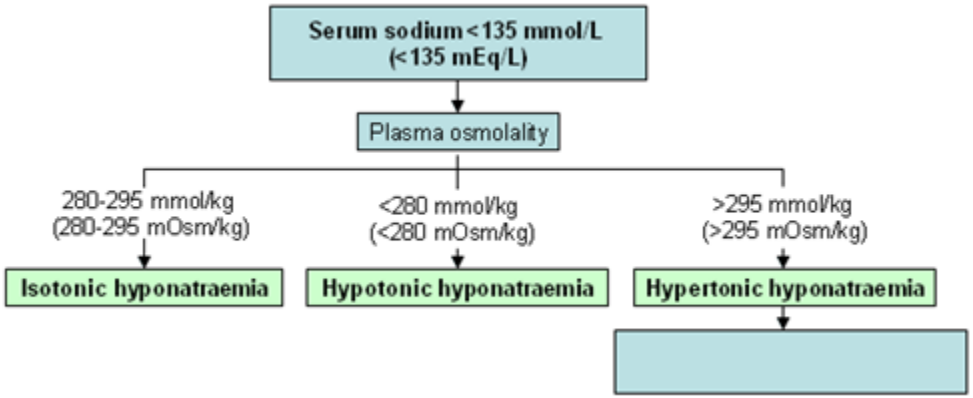
(>295 mOsm/kg)
Isotonic hyponatraemia
Hypotonic hyponatraemia
Hypertonic hyponatraemia

這叫什麼？⇨



Pseudohyponatremia = a decreased serum sodium concentration that does not correspond to a real hypotonic disorder, i.e., the serum osmolality is normal. It occurs when hyperlipemia increases the serum non-water volume or hyperproteinemia increases the serum non-sodium solute.

假低鈉血症 = 血清鈉濃度降低並非真正的低滲病症，即血清滲透壓是正常的。可發生於高脂血症（增加血清中非水的容積）或高蛋白血症（增加血清中非鈉的溶質）。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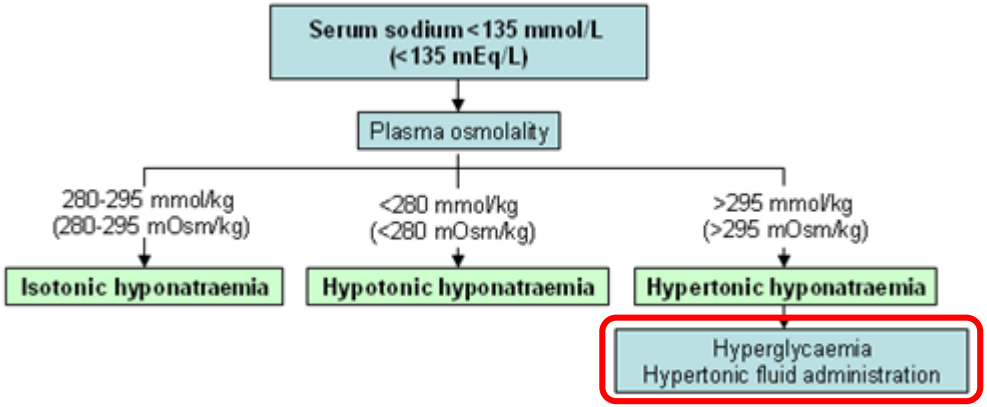
(< 135 mEq/L)
Plasma osmolality
280-295 mmol/kg
(280-295 mOsm/kg)
<280 mmol/kg
(<280 mOsm/kg)
>295 mmol/kg
(>295 mOsm/kg)
Isotonic hyponatraemia
Hypotonic hyponatraemia
Hypertonic hyponatraemia

ㄘ這又是什麼？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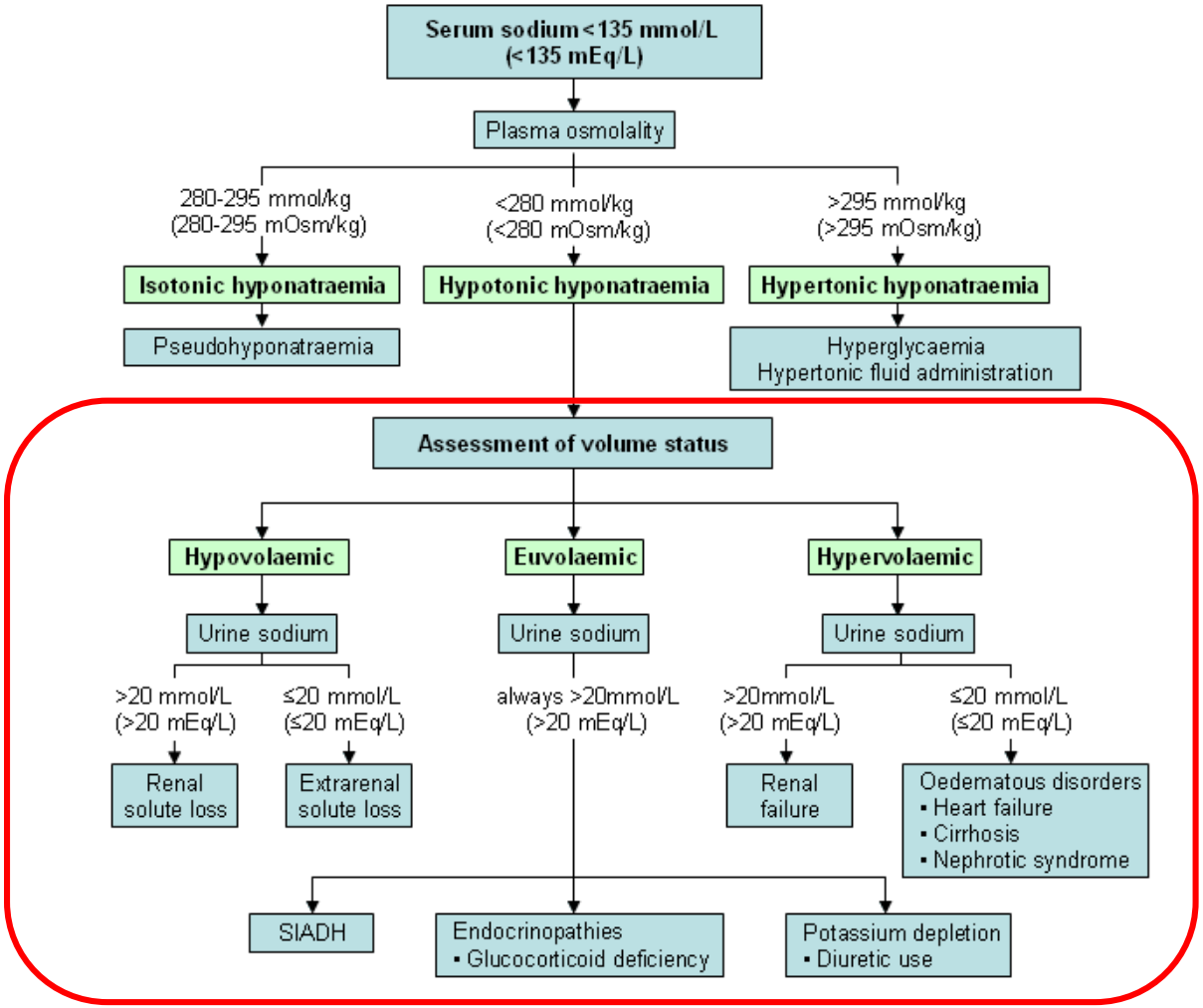
(<280 mOsm/kg)
>295 mmol/kg
(>295 mOsm/kg)
Isotonic hyponatraemia
Hypotonic hyponatraemia
Hypertonic hyponatraemia
Hyperglycaemia
Hypertonic fluid administration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Hypertonic hyponatraemia
Pseudohyponatraemia
Hyperglycaemia
Hypertonic fluid administration
Assessment of volume status
Hypovolaemic
Euvolaemic
Hypervolaemic
Urine sodium
Urine sodium
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>20 mmol/L
(>20 mEq/L)
≤20 mmol/L
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always >20mmol/L
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>20mmol/L
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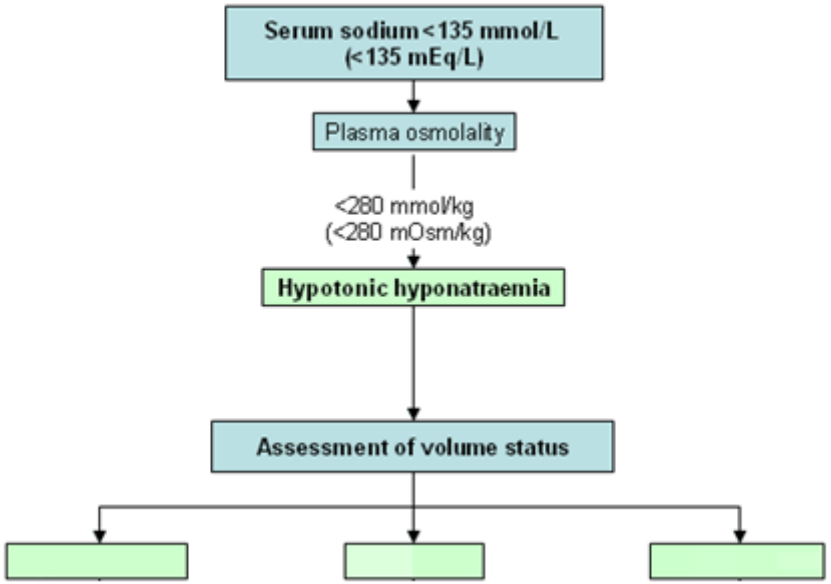
Renal
solute loss
Extrarenal
solute loss
Renal
failure
Oedematous disorders
▪ Heart failure
▪ Cirrhosis
▪ Nephrotic syndrome
SIADH
Endocrinopathies
▪ Glucocorticoid deficiency
Potassium depletion
▪ Diuretic use


Serum sodium < 135 mmol/L
(< 135 mEq/L)
Plasma osmolality
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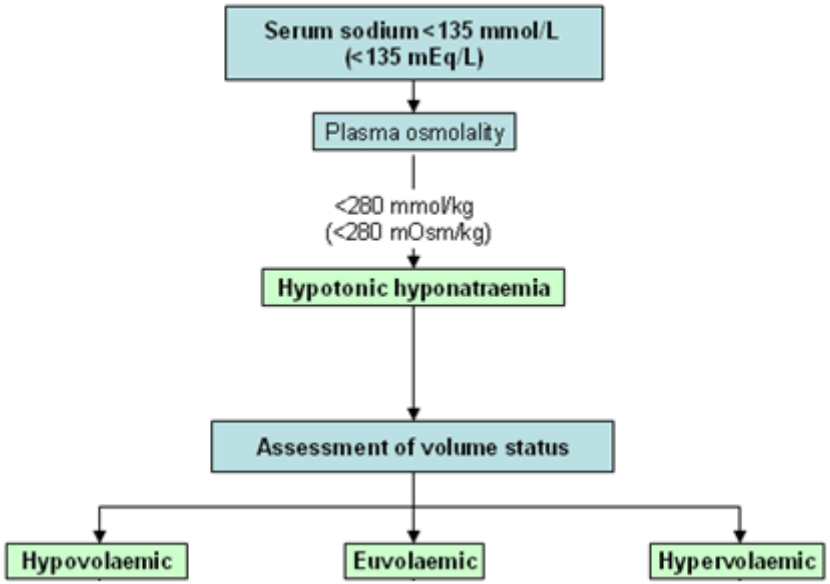
(<280 mOsm/kg)
Hypotonic hyponatraemia
Assessment of volume status

⇦要檢查什麼？


Serum sodium < 135 mmol/L
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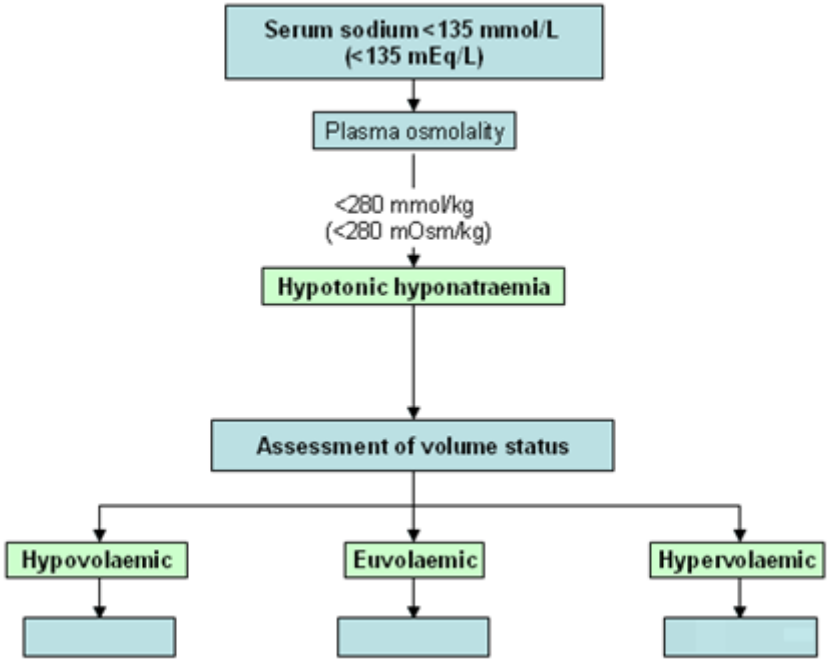
Hypotonic hyponatraemia
Assessment of volume status
Hypovolaemic
Euvolaemic
Hypervolaemic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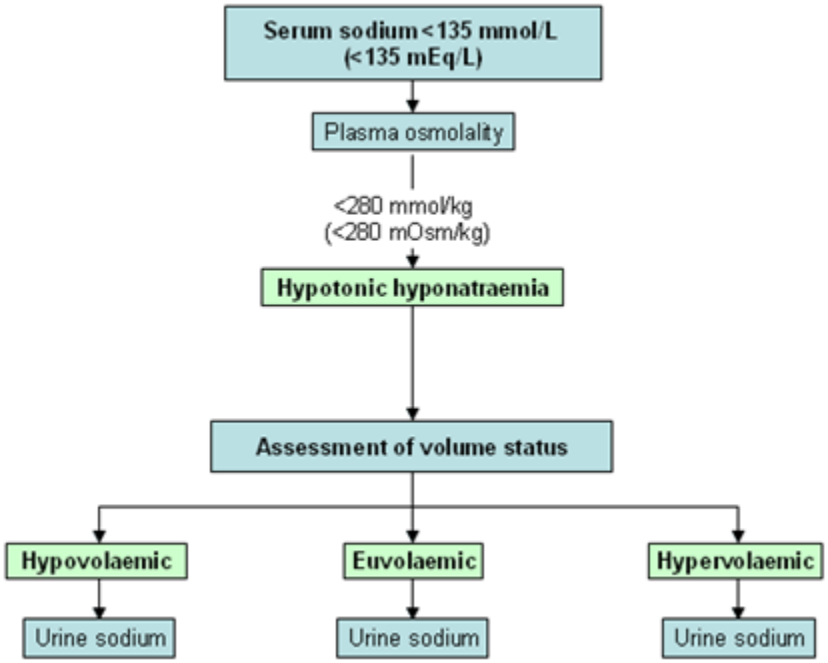
⇦要檢查什麼？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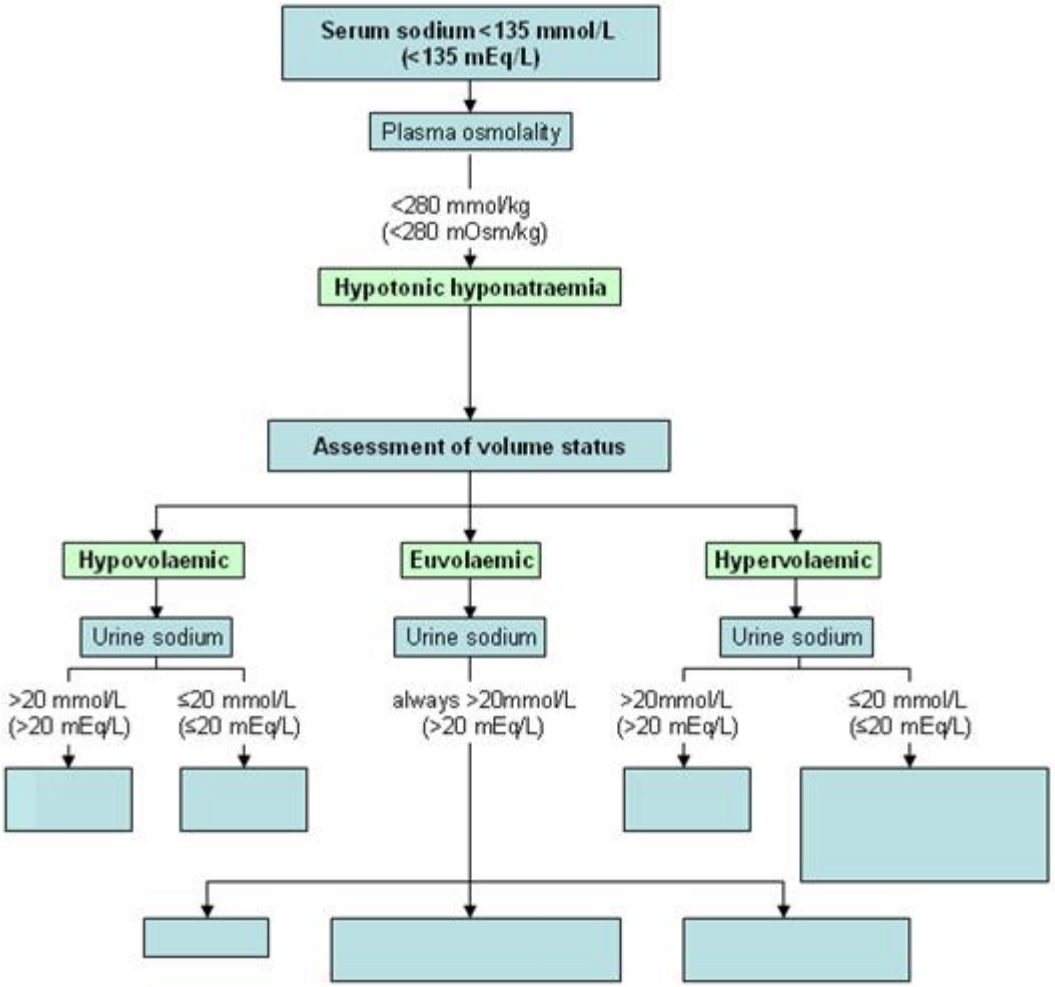
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>20mmol/L
(>20 mEq/L)
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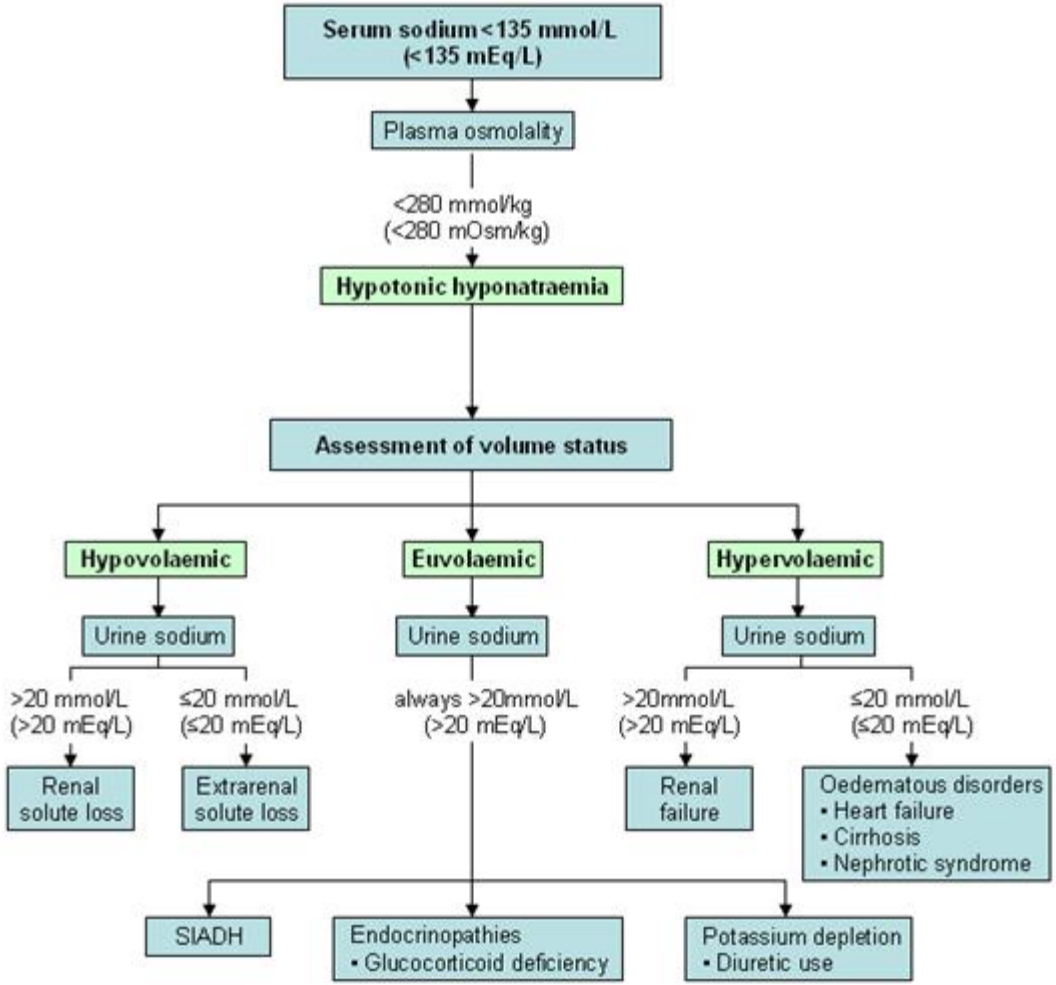
(≤20 mEq/L)

⇦是什麼情況？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• Heart failure
• Cirrhosis
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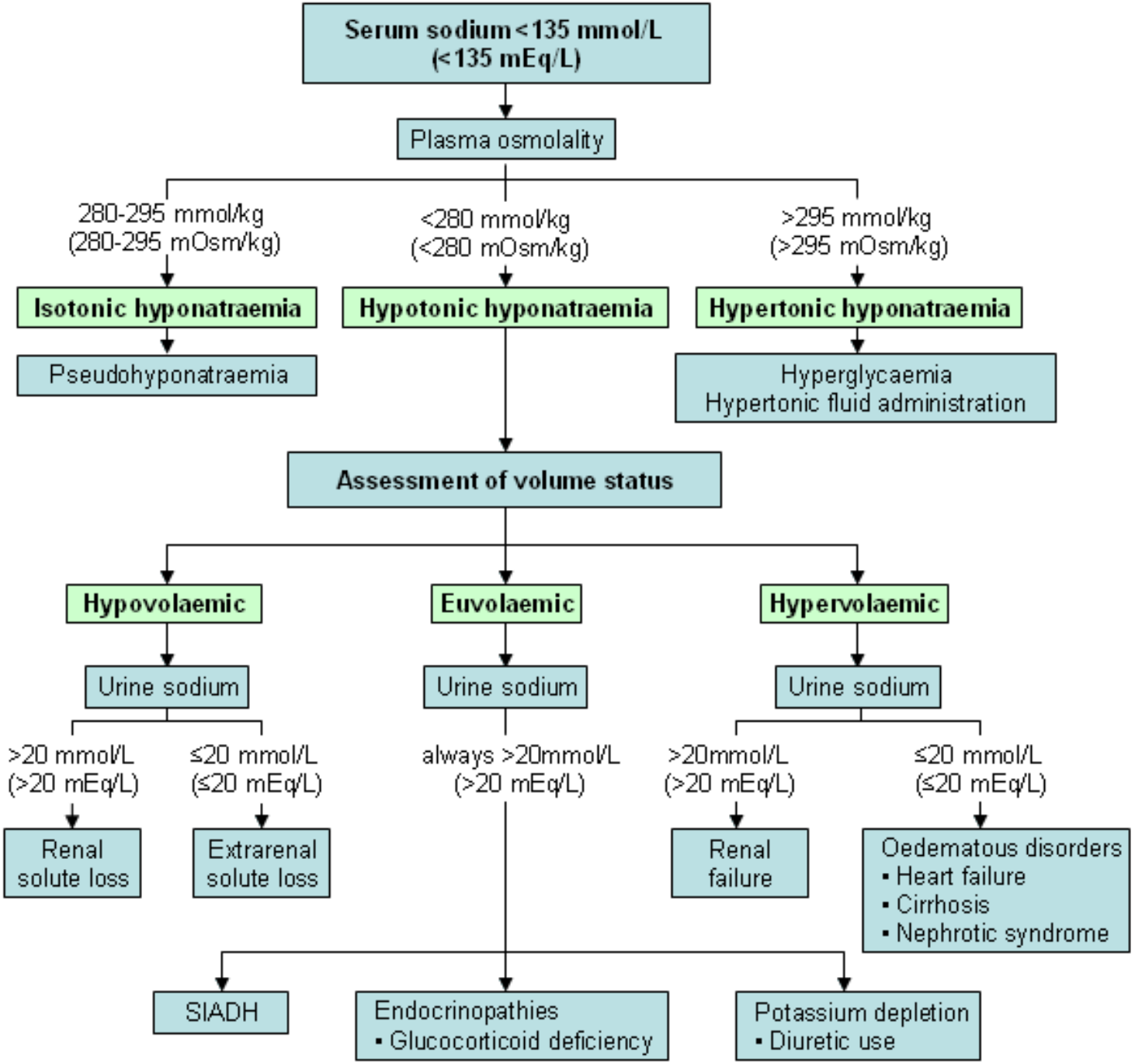
SIADH
Endocrinopathies
• Glucocorticoid deficiency
Potassium depletion
• Diuretic use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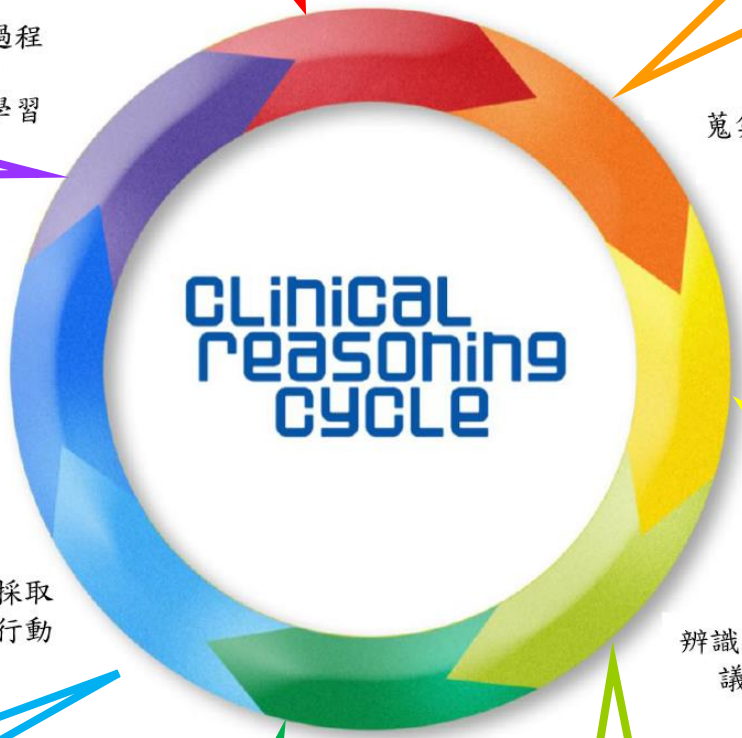
促進鑑別診斷的傳統方法

- 傳統方法
- 創新方法？

鑑別診斷的程序

- 臨床推理（Clinical Reasoning）
- 醫師將其想法轉化為可能診斷的過程，涉及「模式識別」和「假設演繹推理」的混合程序
- 用於評估和治療病人的思維和決策過程


考量病人
狀況
蒐集線索/
資訊
處理
資訊
辨識問題/
議題
建立
目的
採取
行動
評估
結果
反思過程
和
新的學習
clinical
reasoning
cycle



考量病人狀況

描述或列出事實、背景，對像或人。

蒐集線索/資訊

回顧當前信息（例如交班報告、病史、病歷，檢查結果以及之前進行的護理/醫療評估）
蒐集新信息（例如進行病人評估）
回憶知識（例如生理學、病理生理學、藥理學、流行病學、治療學、文化、照護背景、倫理、法律等）

處理資訊

解釋：分析數據以了解症狀或徵候。 比較正常與異常。
判別：區分相關信息和無關信息；識別不一致性，將信息縮小到最重要的事物，並識別收集的線索中的差距。
相關：發現新的關係或模式；集中線索以識別它們之間的關係。
推斷：經由解釋主觀和客觀線索，進行邏輯推理或形成意見；考慮替代方案和後果。
比對當前與過去的情況或當前與過去的病人（通常是專家思考過程）。
預測結果（通常是專家思考過程）。

辨識問題/議題

綜合事實和推論，對病人的問題做出明確的診斷。

建立目的

描述你想要發生的事情、期望的結果、時間框架。

採取行動

選擇不同替代方案之間的行動方案。

評估結果

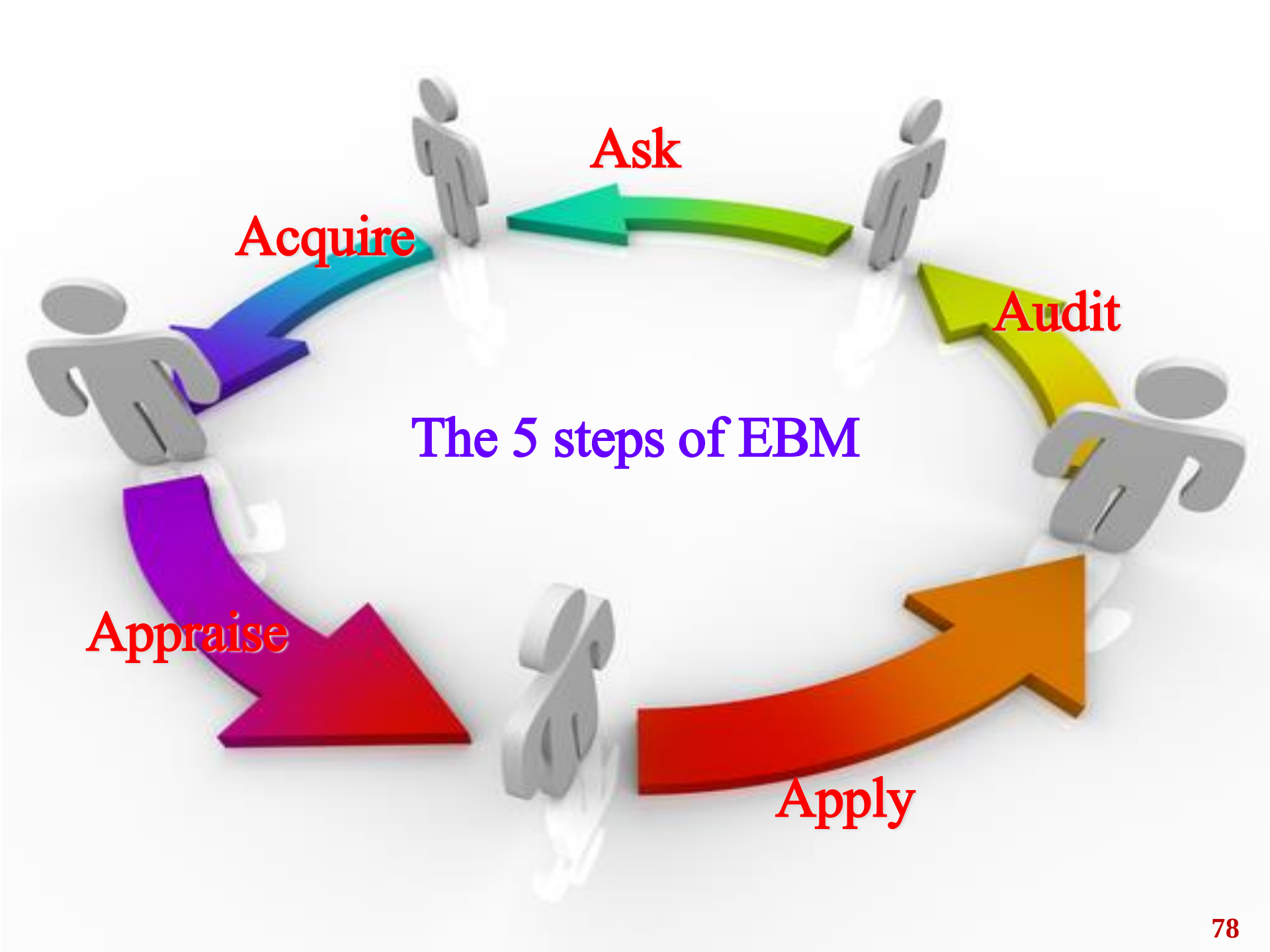
評估效果和行動結果。 問：「情況有所改善嗎？」

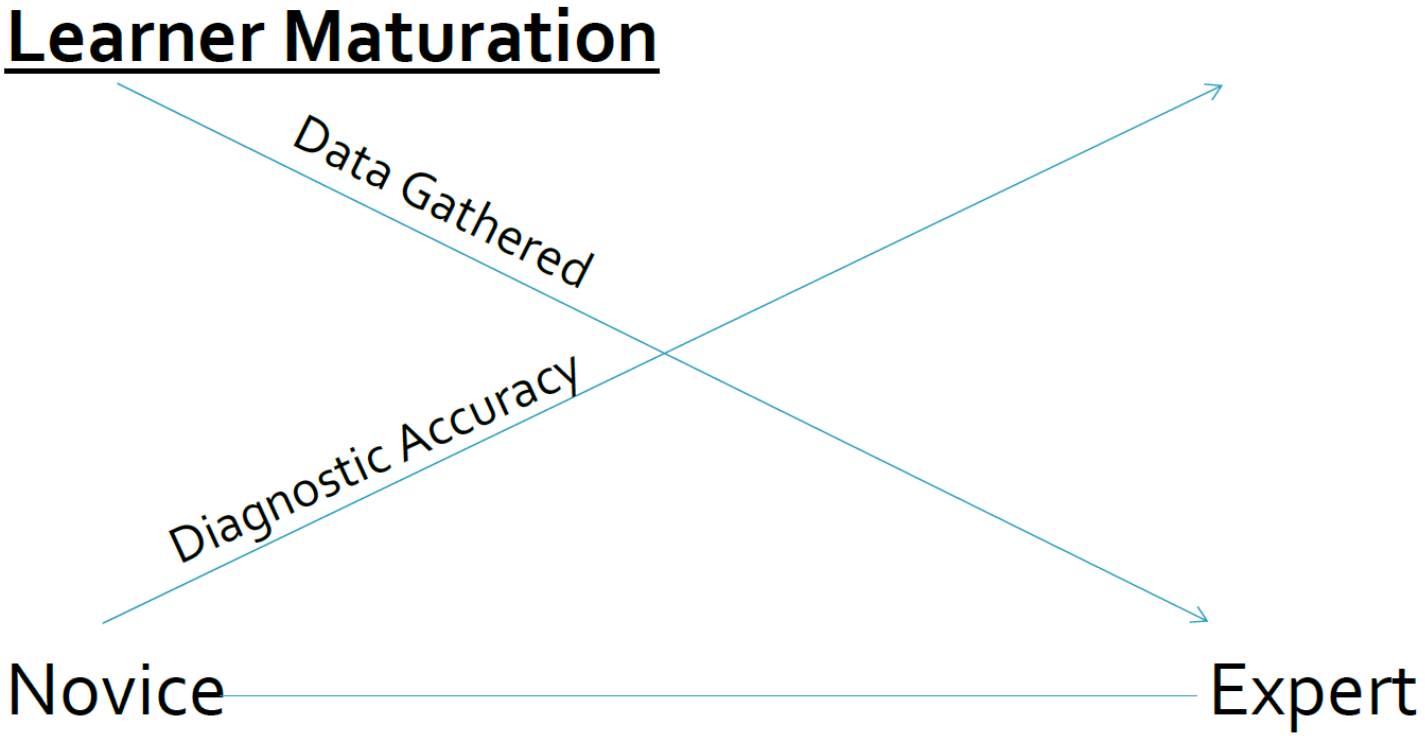
反思過程和新的學習

沉思您從這過程中學到的知識以及您可以採取的不同方式。

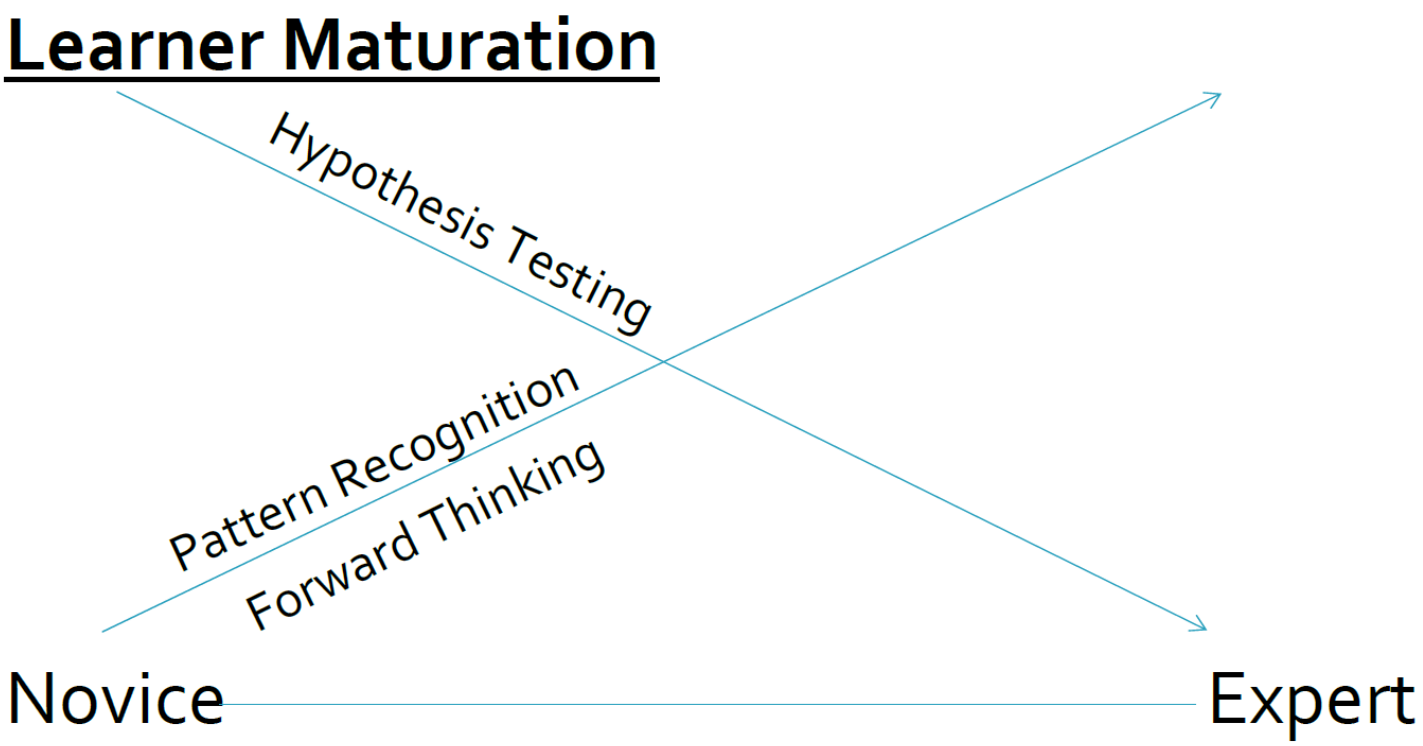
鑑別診斷的建議程序

- 形成問題、提出假設
- 蒐集資訊
  - 例行資訊
  - 因狀況而加強蒐集之資訊
- 分析資訊、作出結論
- 依計進行
- 評估檢討


Ask
Acquire
Audit
The 5 steps of EBM
Appraise
Apply



愈是初入門，愈要用心蒐集數據



愈是初入門，愈需要用心思量

能查得到的都不用記？

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

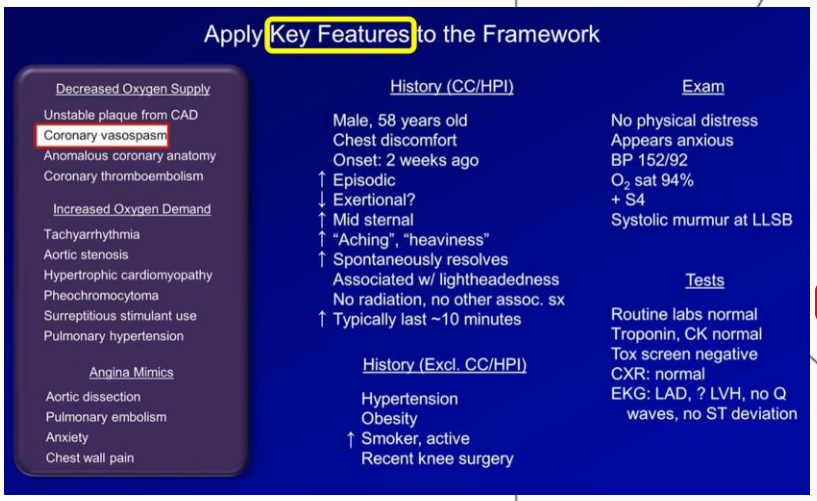
MEDICAL EDUCATION

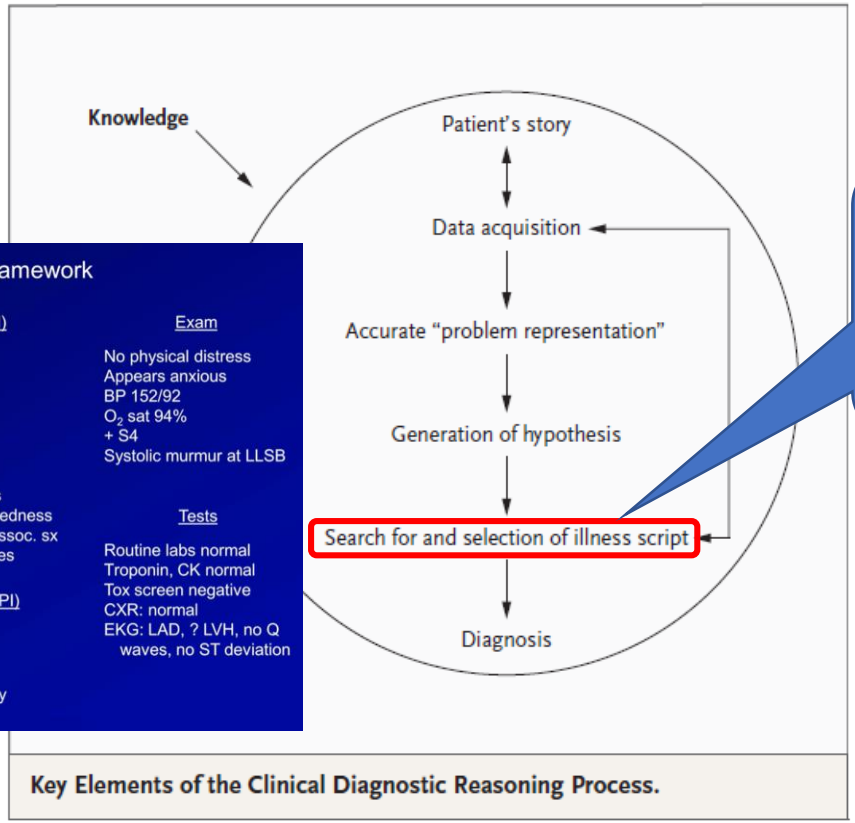
Malcolm Cox, M.D., and David M. Irby, Ph.D., Editors 2006;355:2217-25.

Educational Strategies to Promote Clinical Diagnostic Reasoning

Judith L. Bowen, M.D.

教導學生





Key Elements of the Clinical Diagnostic Reasoning Process.

Search for and selection of **illness script**

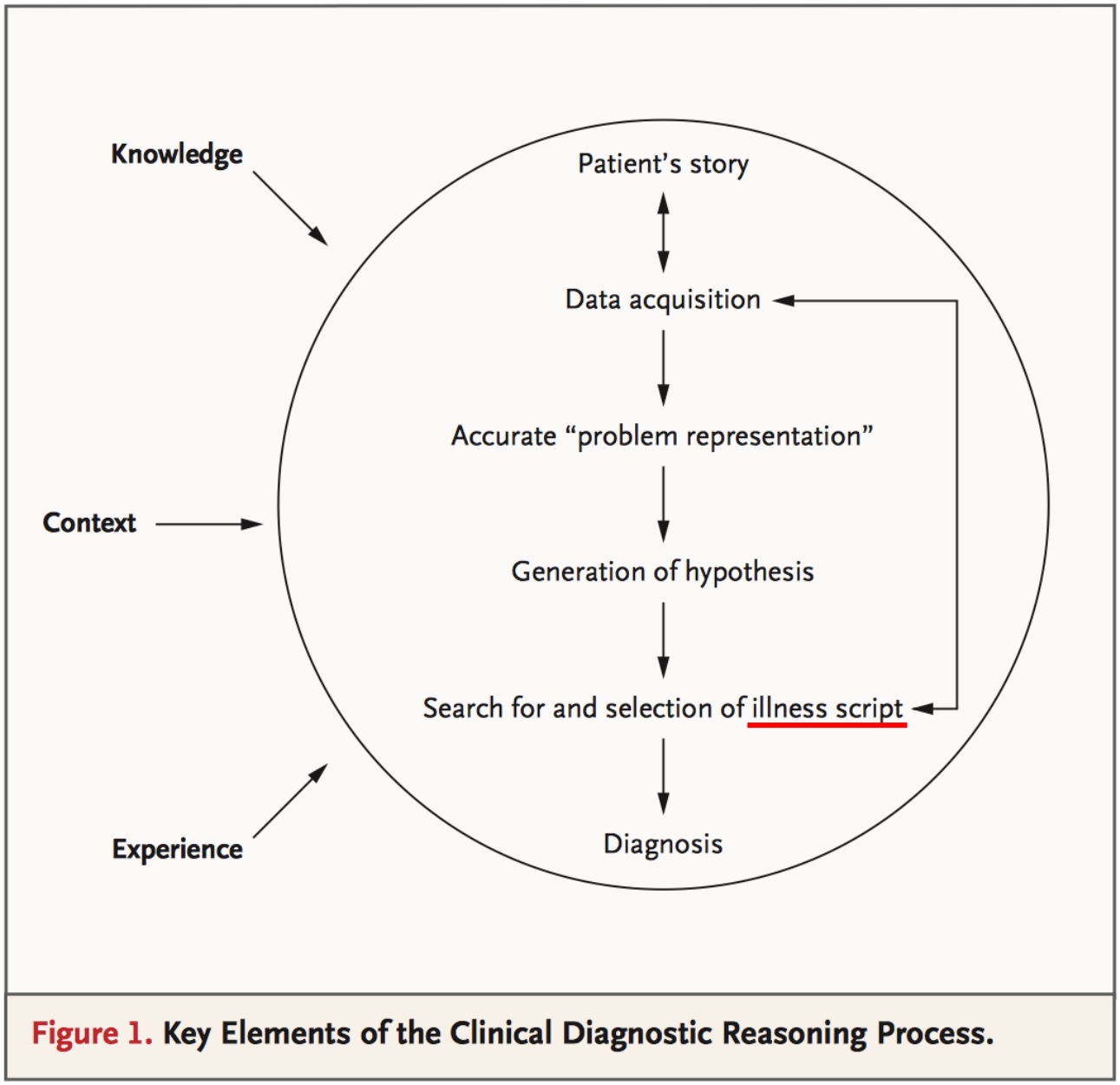


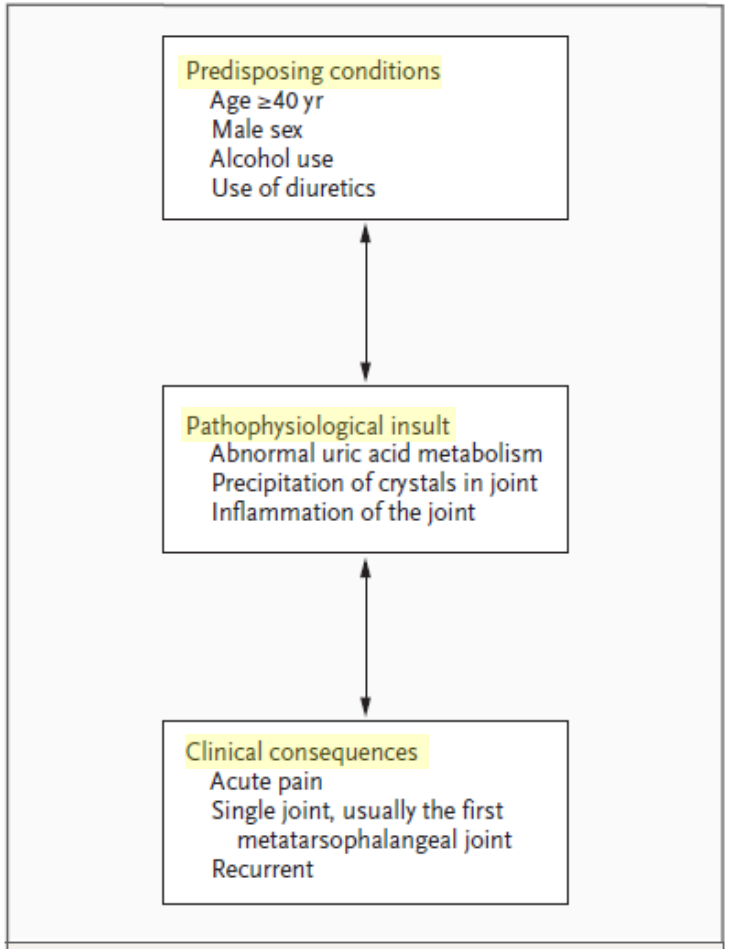
Figure 1. Key Elements of the Clinical Diagnostic Reasoning Process.

Bowen J. ***N Engl J Med*** 2006; 355:2217-25.

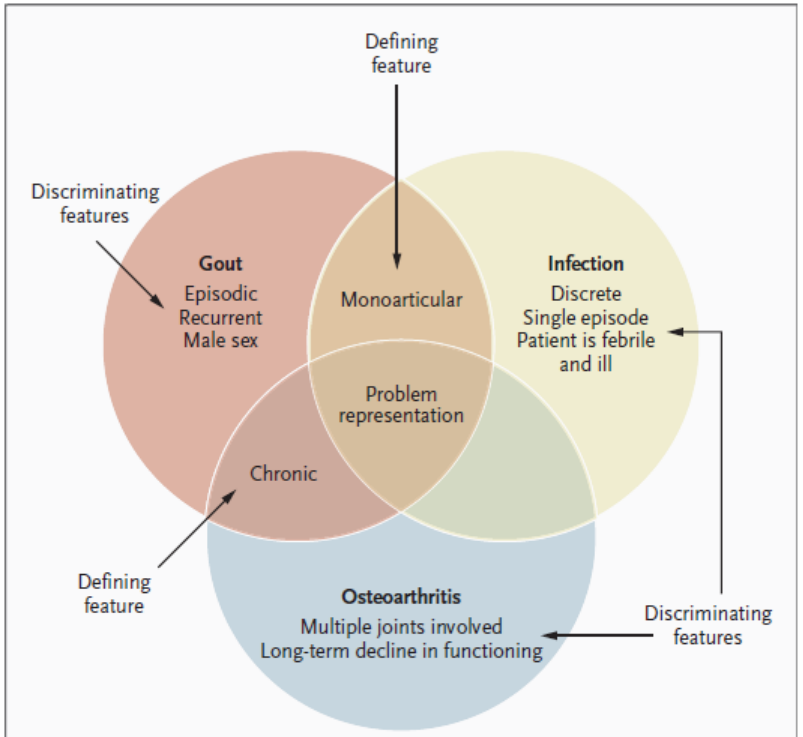
The Illness Script

- 模式識別（pattern recognition）的關鍵
  - 疾病特定資訊的組套
    - 由閱讀和經驗形成
  - 專家的存儲策略
  - 結構：頗為刻板
    - 流行病學/誘發因素
    - 致病機制/病理生理學
    - 臨床表徵
  - 內容：區分相似疾病的元素

Illness Scripts



Example of an Illness Script for Gout.



Defining and Discriminating Features of a Set of Diagnostic Hypotheses for Acute Arthritis.

The problem representation is "acute onset of a recurrent, painful, monoarticular process in an otherwise healthy middle-aged man." Defining features are descriptors that are characteristic of the diagnoses (e.g., gout, septic arthritis, osteoarthritis). Discriminating features are descriptors that are useful for distinguishing the diagnoses from one another.

Teaching Clinical Reasoning

On Doctoring Faculty Development

Dartmouth
GEISEL SCHOOL OF
MEDICINE

U.S.News & WORLD REPORT EDUCATION

Education Rankings & Advice

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Search: Select a program (required) | School name (optional)

Dartmouth College (Geisel)

College | Grad School | Global | All Graduate School Rankings

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- Business
- Medicine
  - Admissions
  - Academics
  - Ranking
  - Student Body
  - Cost
  - Residency

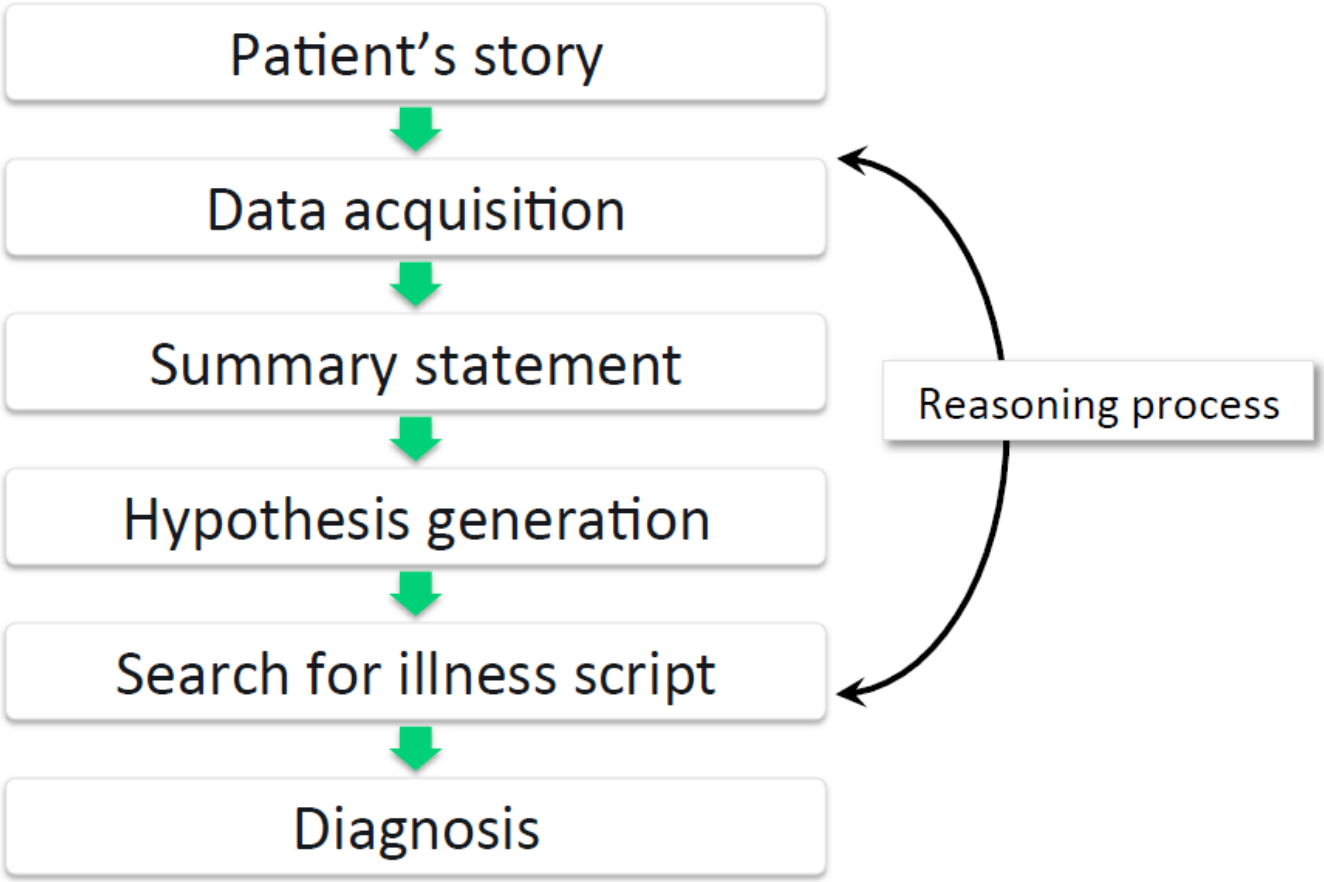
2020 Rankings

Medical School Program Rankings

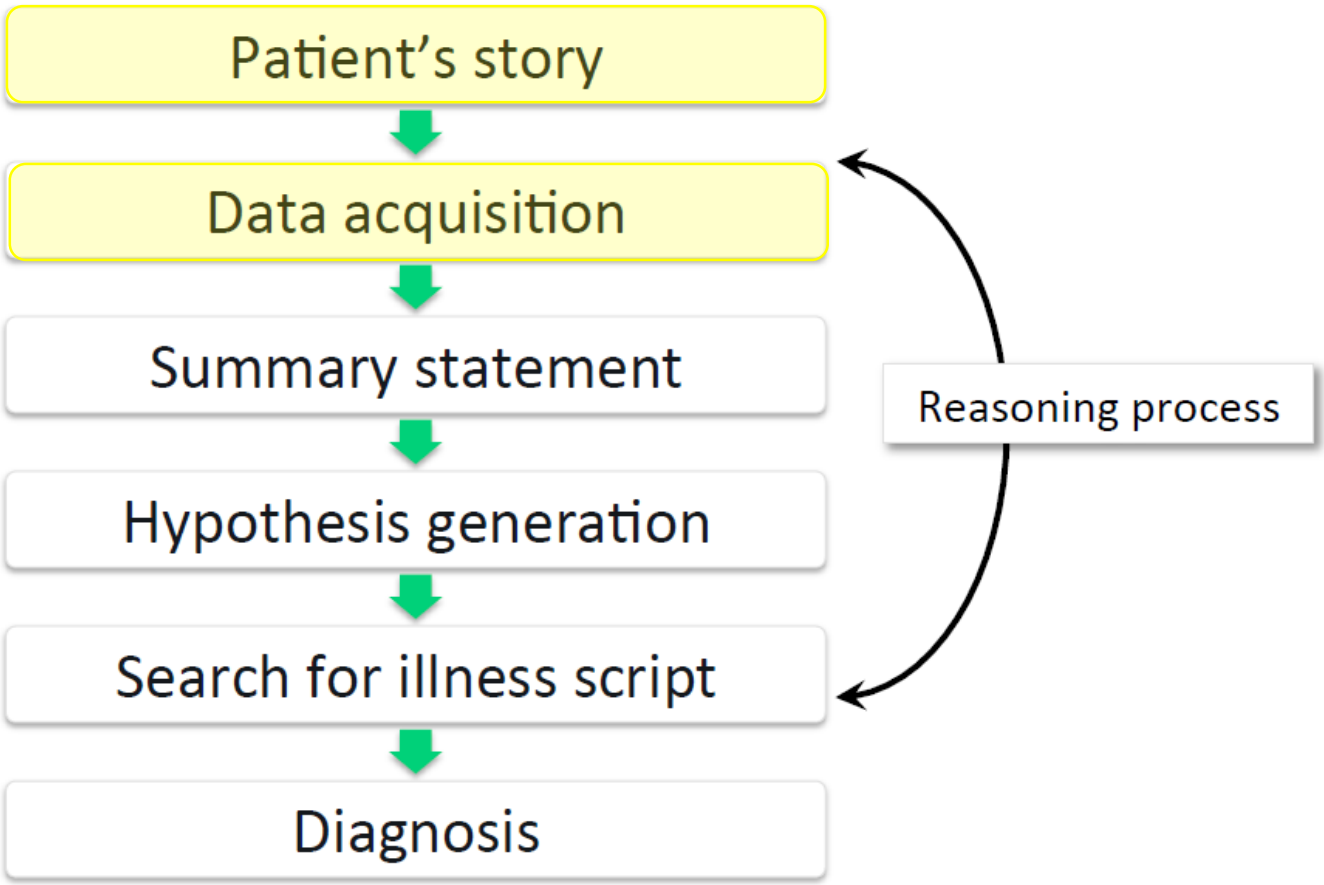
#45 in **Best Medical Schools: Research**

#18 in **Best Medical Schools: Primary Care**

Diagnostic Reasoning (an unconscious iterative process)



Diagnostic Reasoning (an unconscious iterative process)



Case Discussion

- 27歲失業男子因發燒、顫抖和冒汗4天到急診
- 在運動時會呼吸短促和輕微頭痛已3天
- 食慾差，但沒有其他腸胃道症狀，體液狀態和排尿正常
- 病人述說在一週前他被朋友的貓咬到
- ROS：右眼於一天之前持續45秒的瞬時視力喪失
- 社交史：和父母一起生活，關係並不親密
- 習慣：吸菸10包–年，每週飲啤酒4–5瓶
- PE：
  - 顫抖、有毒性徵候；BT：103°F，PR 124，BP 110/40
  - 右前臂有穿刺性傷口，無蜂窩織炎或膿瘍
  - HEENT：左眼眼底呈火焰形出血
  - Aortic area：2/6早期舒張期雜音
  - 肺清澈，脾觸診不到

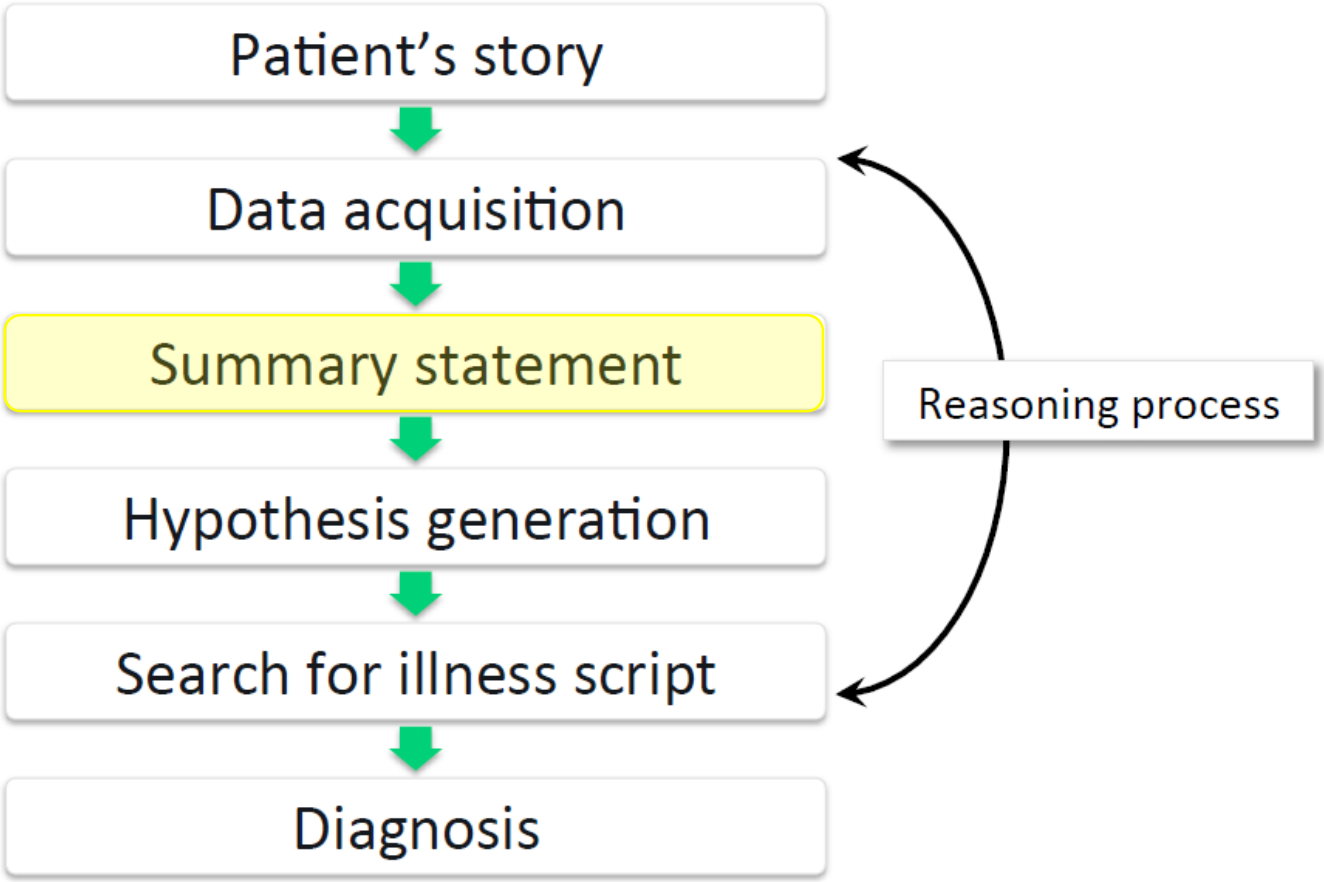
激活以前的知識：PE

- 高的pulse pressure意味著什麼？是什麼導致？
- 火焰狀出血的原因是什麼？
- 舒張期雜音的原因是什麼？

Stimulate Self Questioning

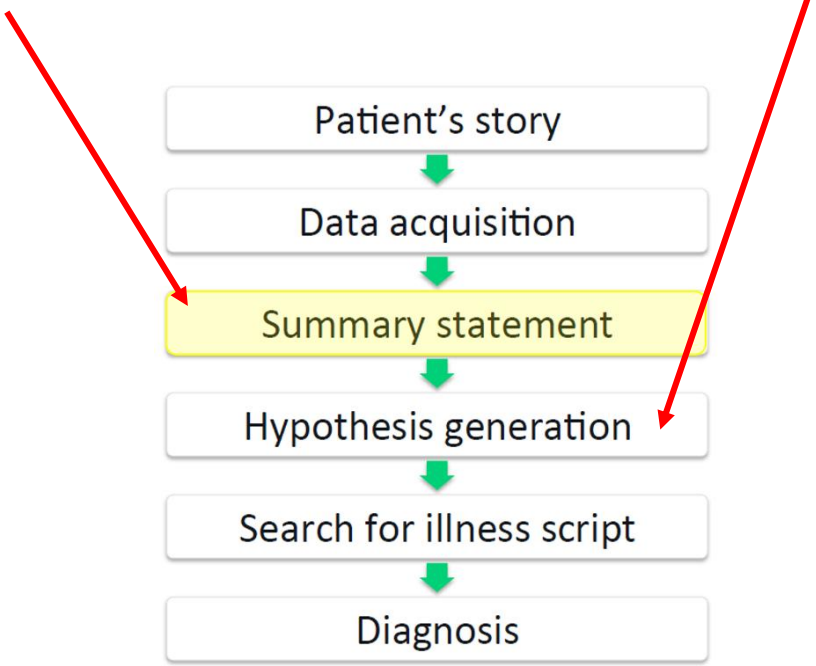
- 解釋為什麼…
- 解釋如何…
- 什麼是主要的想法… ？
- …的另一個想法是什麼？
- 如果…則會發生什麼？
- …和…之間有什麼不同？
- …對…會有怎樣的影響？
- …有哪些優點和缺點？

Diagnostic Reasoning (an unconscious iterative process)



摘要陳述

- 準確的「摘要陳述」觸發並指引「假設形成」（下一步）
- 需要刻意練習

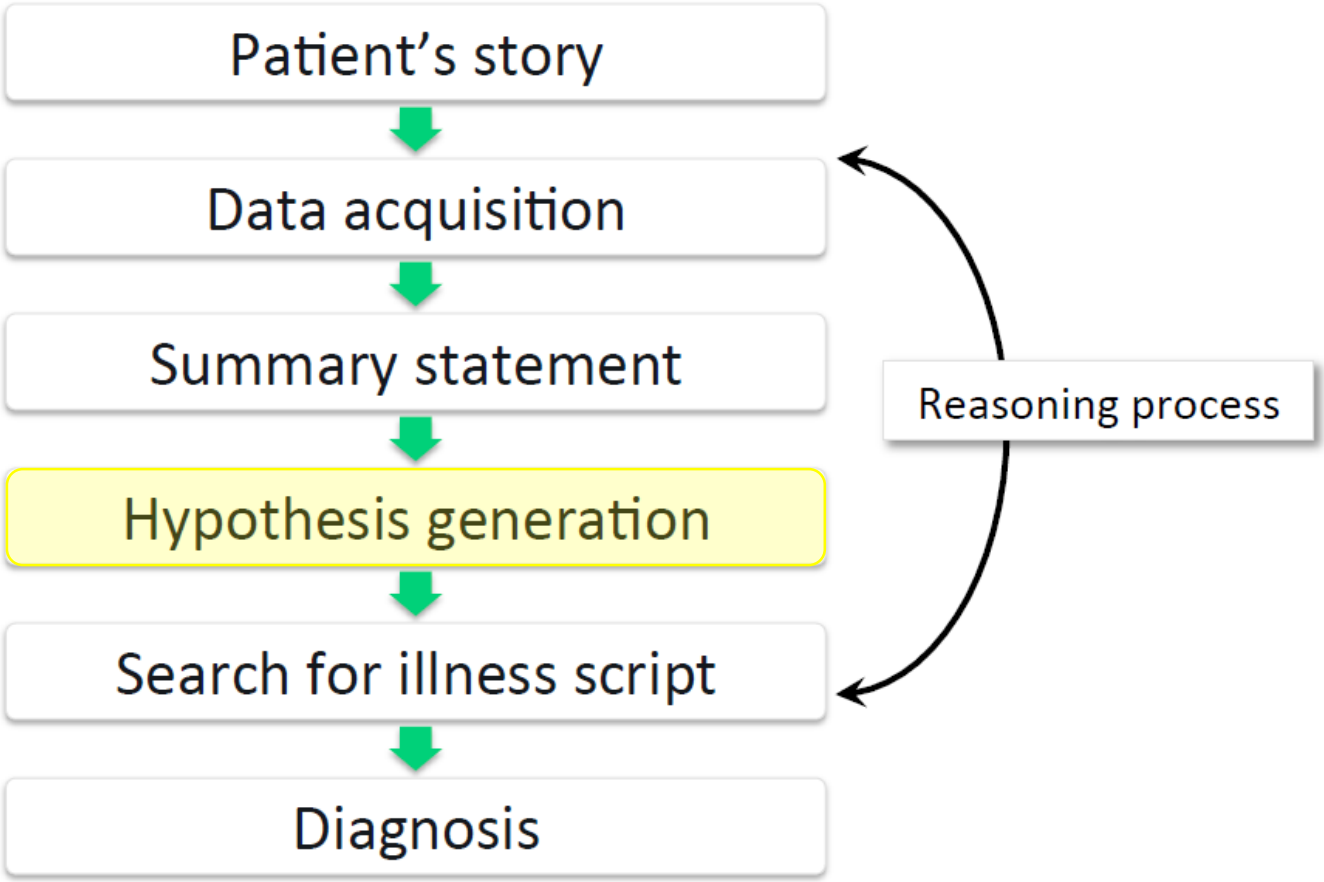


Case :Summary Statement

Case: Summary Statement

- 27歲男性，患有發燒、發冷、短暫視力喪失，並有低血壓、火焰狀出血和新的舒張期雜音，有貓咬史

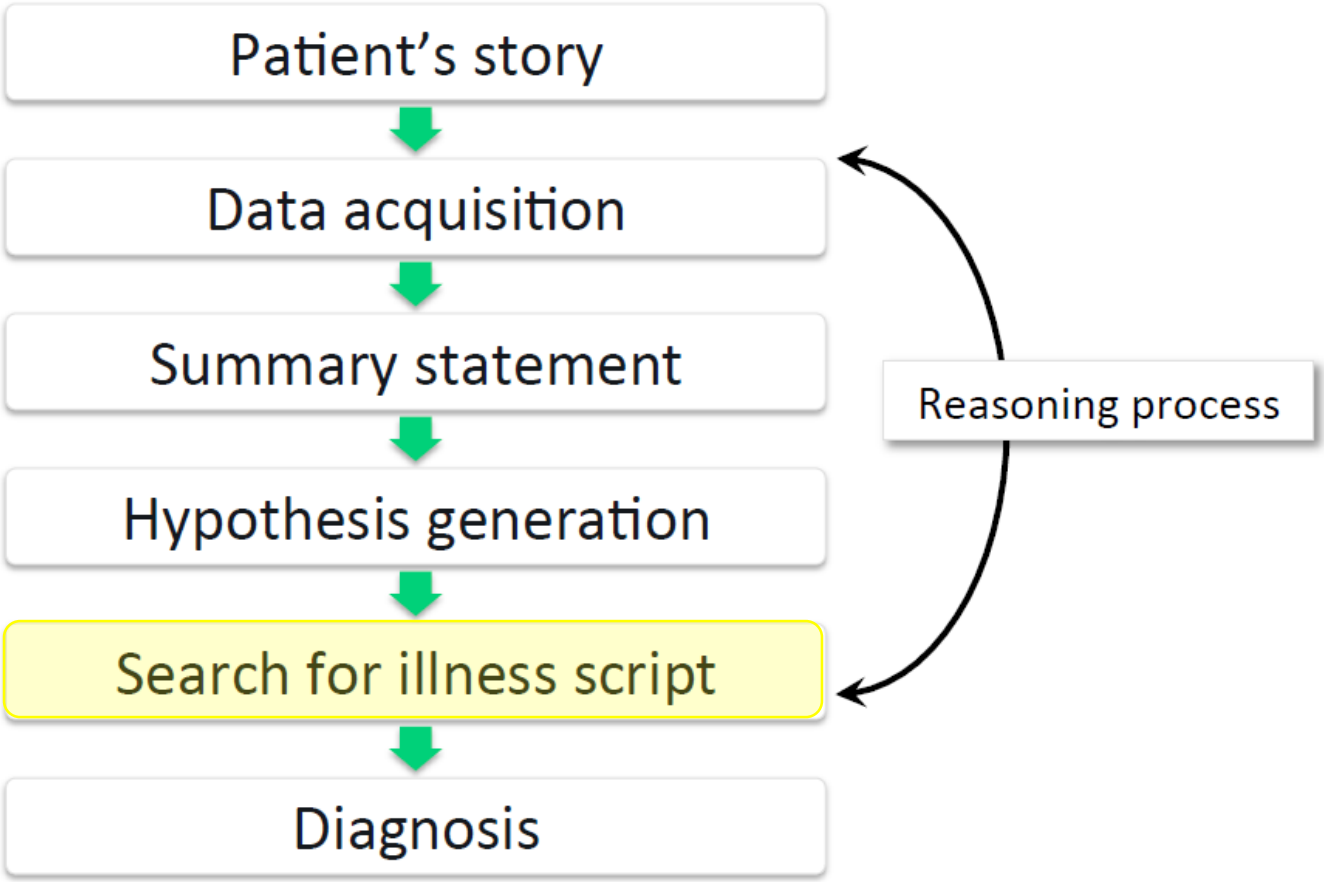
Diagnostic Reasoning (an unconscious iterative process)



Case: Hypothesis Generation

- 貓咬傷相關感染並侵犯心臟和全身性敗血性栓子

Diagnostic Reasoning (an unconscious iterative process)



Animal Bite-associated Infections

Microbiology and Treatment

Nicole Thomas; Itzhak Brook Expert Rev Anti Infect Ther. 2011;9(2):215-226.

Cat Bites

Cats are responsible for approximately 10–20% of animal bites in the USA. These occur more frequently in adult women and are often associated with handling the animal.[3,34] Bite location is most commonly on the face and upper extremities, with the injury usually consisting of a deep puncture wound with only a small opening. Although these bites are not as damaging as those inflicted by dogs, wounds are often more difficult to debride and disinfect, and the mechanism of injury is more commonly associated with infection as well as soft tissue abscess and osteomyelitis.[35] It is reported that anywhere from 20–80% of cat bites may become infected.[36]

As with other bite-associated infections, those due to cats are polymicrobial, with a mix of aerobes and anaerobes. Common aerobic pathogens in cat bites include *Streptococcus* species (including *Streptococcus pyogenes*), *Staphylococcus* species, especially *S. aureus* and *Moraxella*. *Pasteurella multocida*, a small (0.2–2.0 µm) facultatively anaerobic, Gram-negative, nonmotile, non-spore-forming, pleomorphic coccobacillus is the most common organism isolated in cat bites. *Pasteurella* is part of the natural oral flora of domestic cats, with up to a 90% carriage rate.[37] Infection with *P. multocida* generally presents as a rapidly spreading cellulitis, usually occurring within 24 h of the bite. If untreated, complications range from pneumonia to osteomyelitis, brain abscess or endocarditis.[38] *Bartonella henslae*, the organism associated with 'cat scratch fever', may be transmitted by a cat bite or scratch (usually by a kitten). Disease is usually self-limited, but may present with lymphadenitis, osteomyelitis or prolonged fever. *Bacillary angiomatosis* (cutaneous nodules due to *Bartonella* species) may develop in patients with AIDS. Associated anaerobes, like those seen in dog bite infection, include Fusobacterium, bacteroides and porphyromonas species. Rare diseases that have been reported from cat bites include ulceroglandular tularemia,[39,40] human plague[41] and sporotrichosis.[42,43] Owing to the concern for serious infection, especially with Pasteurella, empiric antibiotics are recommended for all cat bites (see Table 1).

Infective Endocarditis

Updated: Aug 09, 2017 | Author: John L Brusch, MD, FACP; Chief Editor: Michael Stuart Bronze, MD more...

Signs and symptoms

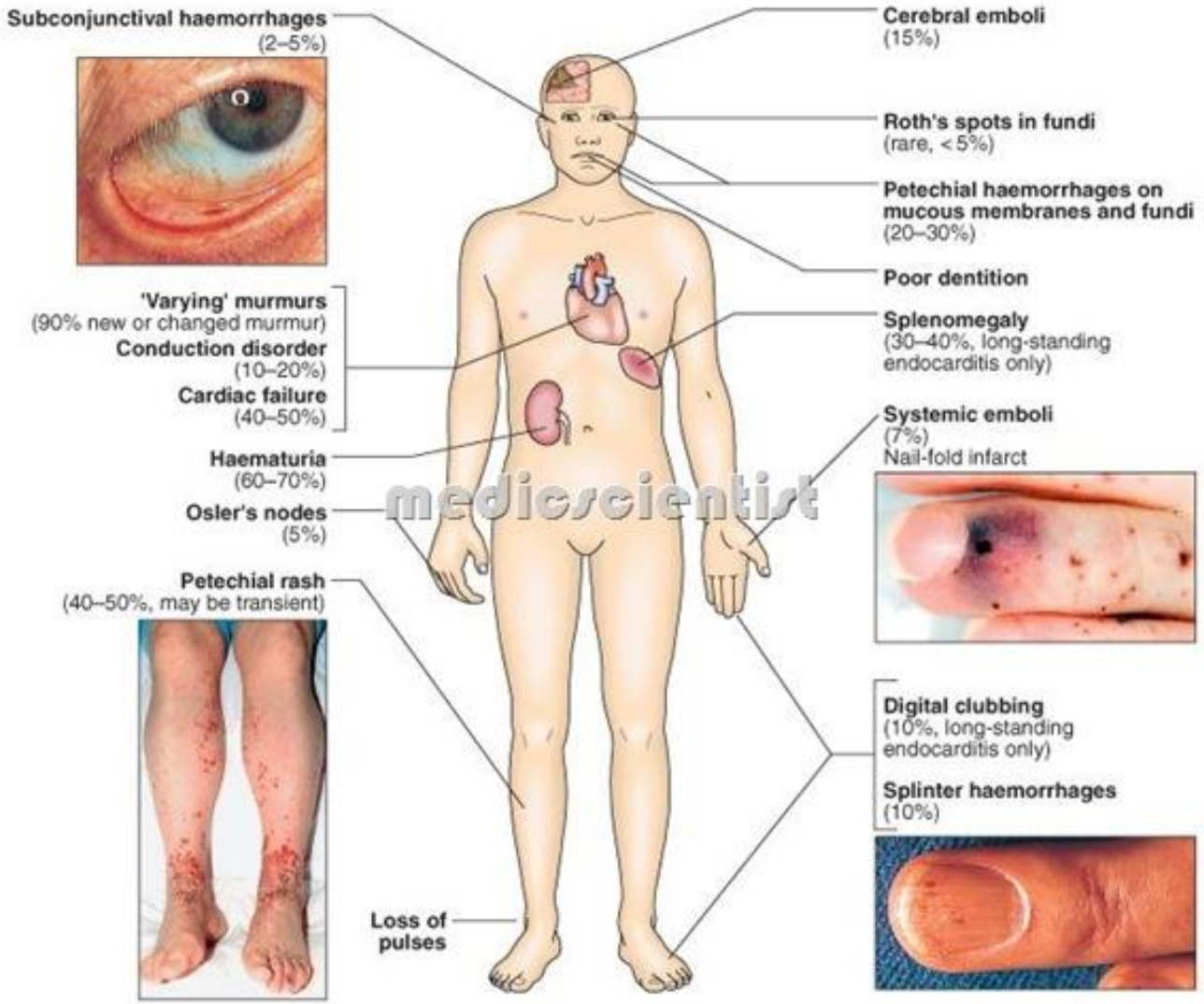
Fever, possibly low-grade and intermittent, is present in 90% of patients with IE. Heart murmurs are heard in approximately 85% of patients.

One or more classic signs of IE are found in as many as 50% of patients. They include the following:

- Petechiae: Common, but nonspecific, finding
- Subungual (splinter) hemorrhages: Dark-red, linear lesions in the nail beds
- Osler nodes: Tender subcutaneous nodules usually found on the distal pads of the digits
- Janeway lesions: Nontender maculae on the palms and soles
- Roth spots: Retinal hemorrhages with small, clear centers; rare

Signs of neurologic disease, which occur in as many as 40% of patients, include the following [1]:

- Embolic stroke with focal neurologic deficits: The most common neurologic sign
- Intracerebral hemorrhage
- Multiple microabscesses


Subconjunctival haemorrhages
(2–5%)
'Varying' murmurs
(90% new or changed murmur)
Conduction disorder
(10–20%)
Cardiac failure
(40–50%)
Haematuria
(60–70%)
Osler's nodes
(5%)
Petechial rash
(40–50%, may be transient)
Loss of pulses
Cerebral emboli
(15%)
Roth's spots in fundi
(rare, < 5%)
Petechial haemorrhages on mucous membranes and fundi
(20–30%)
Poor dentition
Splenomegaly
(30–40%, long-standing endocarditis only)
Systemic emboli
(7%)
Nail-fold infarct
Digital clubbing
(10%, long-standing endocarditis only)
Splinter haemorrhages
(10%)
mediscientist

An angry cat causing *Pasteurella multocida* endocarditis and aortic valve replacement—A case report

Anders Ahlsson, Örjan Friberg, Jan Källman

Introduction

Cat bite infections usually involve a mix of anaerobic and aerobic bacteria including species of *Pasteurella*, *Streptococcus*, *Staphylococcus*, *Bacteroides*, and *Fusobacterium*. We report a case of *Pasteurella multocida* infection from cat bites leading to endocarditis and subsequent aortic valve replacement.

Presentation of case

A 70-year-old male was admitted because of fever, tachycardia, and malaise. He had a history of alcohol abuse and was living alone with a cat in a rural area. A sepsis of unknown origin was suspected, and intravenous treatment with gentamicin and cefotaxime was initiated. Blood cultures yielded *Pasteurella multocida*, and the patient history revealed repeated cat bites. After four days, the patient was discharged with oral penicillin V treatment. Two weeks later, the patient returned with fever and a new systolic murmur. An aortic valve endocarditis was diagnosed, and it became clear that the patient had not completed the prescribed penicillin V treatment. The patient underwent a biological aortic valve replacement with debridement of an annular abscess, and the postoperative course was uneventful.

Discussion

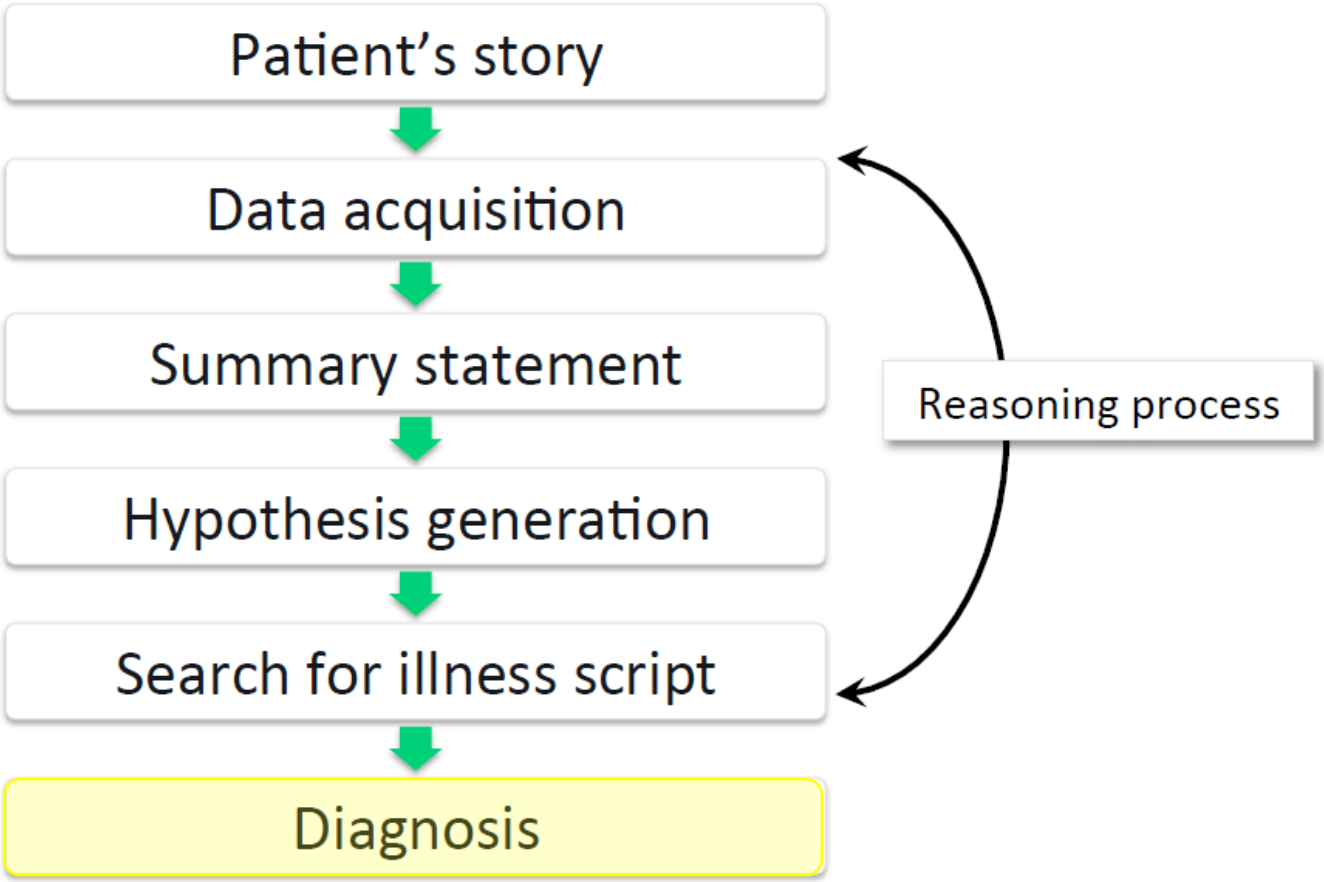
Endocarditis due to *Pasteurella* is extremely rare, and there are only a few reports in the literature. Predisposing factors in the present case were alcohol abuse and reduced compliance to treatment.

Conclusion

Cat bites are often deep, and in rare circumstances can lead to life-threatening endocarditis. Proper surgical revision, antibiotic treatment, and patient compliance are necessary components in patient care to avoid this complication.

Keywords: Endocarditis, Aortic valve replacement, Case report

Diagnostic Reasoning (an unconscious iterative process)



Case: Diagnosis

- 貓咬傷導致心內膜炎

Clinical Reasoning and Presentations

- Common Presentation Pitfalls
  - Disembodied
    - Generic differential for the initial complaint rather than one specific to the patient
  - Silo
    - Separate DDx for each symptom or key finding vs. one for the constellation of findings
  - Frozen
    - Includes items on the DDx that have been ruled out or includes a multi-item DDx after a final diagnosis has been confirmed
  - Unprioritized
    - Inappropriate weight/probability to items
  - Zebra
    - Includes ≥1 rare, esoteric, highly unlikely diagnosis

案例分析常見的五種錯誤

- 脫離現況：對主訴提出一般性鑑別，而不是特定於病人
- Silo：對每個症狀或關鍵發現分開作DDx，而不是整合思維
- 凍結：將已排除的診斷仍列入DDx項目，或已確認診斷時仍有多項DDx
- 未優先排序：未以重要性和可能性作合宜排序
- 不合常情：包含一項以上的罕見、深奧、極不可能的診斷


SILO


SILO

案例分析常見的五種錯誤

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案例分析常見的五種錯誤

- 脫離現況
- Silo
- 凍結
- 未優先排序
- 不合常情

Case 1

15歲男性，胸痛1天

它位於胸部中間，也位於身體兩側，無心悸、無發燒

以前從沒有過這經驗

當他移動或接觸胸部時疼痛更加嚴重

PE：肌肉發達（他是舉重運動員）、心搏過速，但無m/r/g

DDx：R/O MI、PE、心包積液

m/r/g = murmurs, rubs, gallops

Case 1的評論

- 缺少相關的PE信息
- 鑑別診斷不具體（對於年齡或活動）

案例分析常見的五種錯誤– Case 1

- 脫離現況：對主訴提出一般性鑑別，而不是特定於病人
- Silo：對每個症狀或關鍵發現分開作DDx，而不是整合思維
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- 未優先排序：未以重要性和可能性作合宜排序
- 不合常情：包含一項以上的罕見、深奧、極不可能的診斷

Case 1

15歲男性舉重運動員新發胸痛1天

疼痛會輻射到身體兩側，運動和觸診會更加嚴重

否認心悸和發燒

PE：

生命徵正常（包括SaO_2）、無不適貌；剛開始心臟檢查有心率過速，但到ER一會之後心率恢復正常，沒有m/r/g

觸診發現肋間肌有壓痛；呼吸音正常；四肢：無水腫

心電圖：NSR

DDx：由於舉重活動引起肋間肌肉拉傷

m/r/g = murmurs, rubs, gallops
NSR = normal sinus rhythm

Case 2

9歲男孩過往無特別疾病，一天以來有急性咽喉疼痛和發燒至39.5°C，疼痛分數8分，無法吞嚥固體食物

他也有頭痛，並且有一次嘔吐

PE ：BT：39°C，其餘生命徵正常

口腭部發紅、雙側扁桃體2+伴有滲出物、腭有瘀點

雙側頸淋巴腺明顯

其餘檢查正常，包括腹部、神經系統和眼底檢查

總結：這是一個以前健康的9歲男孩，患有咽喉疼痛和發燒1天，今天有頭痛和嘔吐症狀

DDx：張力性頭痛、偏頭痛、腦腫瘤、川崎症、病毒性URI，單核細胞增多症、鏈球菌性咽喉炎

因擔憂的是腦腫瘤，故安排頭部電腦斷層掃描

Case 2的評論

- Hx並不算差
- PE很相關，但遺漏一些重要細節（流口水、牙關緊閉、頸淋巴腺的狀況）
- assessment及plan陳述不佳
- DDx沒有優先次序：咽炎和大腦腫瘤？

案例分析常見的五種錯誤– Case 2

- 脫離現況：對主訴提出一般性鑑別，而不是特定於病人
- Silo：對每個症狀或關鍵發現分開作DDx，而不是整合思維
- 凍結：將已排除的診斷仍列入DDx項目，或已確認診斷時仍有多項DDx
- 未優先排序：未以重要性和可能性作合宜排序
- 不合常情：包含一項以上的罕見、深奧、極不可能的診斷

Case 2

9歲過去健康的男孩出現急性咽喉疼痛和發燒至39.5度1天
疼痛分數8分，無法吞嚥固體食物
ROS：今天早些時候的前額頭痛和NB / NB嘔吐
PE ：BT：39°C，其餘生命徵正常
口腭部發紅、雙側扁桃體2+伴有滲出物、腭有瘀點
雙側頸淋巴腺<1cm；沒有牙關緊閉、脖子ROM正常
其餘檢查包括腹部、神經系統和眼底檢查均正常
總結：這是一個以前健康的9歲男孩患有咽炎，最可能的原因是鏈球菌或病毒
由於症狀持續時間和正常的腹部檢查，Mono不太可能
頭痛可能是由於同一種病毒或鏈球菌導致咽炎
淋巴結炎、咽後膿腫和腦膜炎則不太可能

NB/NB = non bloody/non bilious; Mono = infectious mononucleosis

Case 3

8個月大女嬰，4天前腹股溝區出現紅腫，她的狀況尚好

培養結果為MRSA，對clindamycin敏感

在過去24小時她沒再發燒，仍然服用clindamycin

PE：她睡著了、生命徵穩定、頸柔軟

心臟檢查正常、心率快、沒有m/r/g

兩側呼吸音及腹部檢查正常

右側陰唇有輕微的紅斑，有白色的膿液排出

總結： 8個月大女嬰腹股溝紅腫4天，培養結果為MRSA；我們應該繼續使用IV clindamycin以充分治療感染

Case 3的評論

- 如果已有診斷，應改變最初的臆斷
- 缺少一些臨床信息
- 無關的檢查信息
- 不完整的檢查（是否有硬結？病灶是否有波動？）
- 處置：什麼是治療的終點

案例分析常見的五種錯誤– Case 3

- 脫離現況：對主訴提出一般性鑑別，而不是特定於病人
- Silo：對每個症狀或關鍵發現分開作DDx，而不是整合思維
- 凍結：將已排除的診斷仍列入DDx項目，或已確認診斷時仍有多項DDx
- 未優先排序：未以重要性和可能性作合宜排序
- 不合常情：包含一項以上的罕見、深奧、極不可能的診斷

Case 3

8個月大嬰因陰唇MRSA膿腫在ER接受I&D

她已經無發燒> 24小時了，膿腫繼續引流

PE ：

生命徵正常、心臟和肺部檢查是正常

右側陰唇輕微紅斑（從昨天起有所改善）並且有白色膿液積極引流，沒有硬化或波動的區域

總結：

8個月大女嬰患有MRSA陰唇膿腫，其對clindamycin有反應，即使膿腫仍在引流，我計畫讓她出院接受口服clindamycin 10天的療程，我們應該鼓勵媽媽繼續溫壓該部位以幫助引流

Clinical Reasoning & Presentations Tips

- Reverse Presentation = ASOaP
- DDx Reframe
- Working on the Assessment: IDEA

Reverse Presentation = ASOaP

- ASOaP
  - Assessment
  - Subjective
  - Objective
  - (*assessment*) Plan
- 在呈現臨床數據之前，首先提出總結陳述（評估）和最可能的診斷
- 迫使您要呈現及強調詳細的資訊來支持您所作的評估

ASOaP Example

一名3歲男孩因發燒和腿部疼痛住院，臆斷為骨髓炎。他以前狀況良好，直到5天前開始下肢疼痛，期間沒有創傷。在3天前開始發燒高達39.5°C，而其他生命徵都正常。

PE：他看起來很好，唯一相關部分發現是右下脛骨觸診有壓痛並有輕度腫脹，但沒有上覆紅斑。病人的右腿仍可承擔體重，但會疼痛。

Lab：WBC 30,000，Seg 80%、Band 5%；CRP 10、ESR

血培養：pending。

Summary：這是一名3歲男孩，最初出現發燒和右腿疼痛，發現其右下脛骨有壓痛，以及炎症標誌升高—這可能患有骨髓炎。

Plan：繼續用克林黴素靜脈注射、會診骨科、明天MRI檢查

DDx Reframe

- Traditional: **VINDICATE** (vascular, infectious/ inflammatory, neoplastic, degenerative, iatrogenic/ idiopathic, congenital, autoimmune/allergic, toxin/trauma, endocrine)
- Alternative:
  - Common
  - Common
  - Common
  - Atypical presentation
  - Rare
  - Don’t miss it

DDx Reframe Example (1/2)

一名16歲過去有憂鬱症病史的肥胖女性因新發生的嚴重頭痛住院。頭痛位於正面，在3天前開始。頭痛是間歇性的，用Motrin（Ibuprofen）只有部分改善。頭痛不致使她衰弱（可以繼續定期進行日常活動，但有痛苦）。 她否認畏光、嘔吐、發燒、四肢刺痛和視覺變化。
過去的重要病史是2年診斷為憂鬱症，使用Zoloft治療，那是她唯一的用藥。 她從未接受任何手術。
家族史：無偏頭痛或凝血障礙。個人史： 不抽菸。ROS ：無特殊。病人否認當前有憂鬱症狀。並否認SI/HI（Suicidal ideation/homicidal ideation）。
PE：肥胖；血壓118/70，心率80 ；無發燒。相關的PE發現：眼底檢查有雙側視乳頭水腫，神經學檢查正常、步態正常、她是A + Ox3，並且她有正常的力量/感覺。 實驗室檢查無明顯異常。

DDx Reframe Example (2/2)

摘要：這名16歲肥胖女性，有PMH憂鬱症病史，新發嚴重頭痛，目前病因不明。基於身體的狀況和檢查，最有可能是假性腦瘤。 它也可能是偏頭痛，但病人沒有先兆。 他們也可能是緊張性頭痛，可能會被病人的精神疾病加劇，但考慮到頭痛和視乳頭水腫的嚴重程度，須排除其他的可能。更罕見的是顱內腫瘤，但隨著症狀的急性發作，這診斷似乎不太可能。雖然也不太可能，但我們不想錯過顱內出血（由於動脈瘤或竇血栓形成），所以我想首先進行MRI檢查。如果MRI正常，我們應該考慮做一個治療性和診斷性腰椎穿刺。我想照會神經科醫師，徵詢他們的意見。

Working on the Assessment: IDEA

- **I**: interpretative summary – problem representation using semantic qualifiers
- **D**: differential with commitment to most likely Dx
- **E**: explanation of reasoning in choosing the most likely Dx
- **A**: alternative Dx and explanation and why they are less likely

Working on the Assessment: IDEA

Interpretative：解讀性摘要—使用語義限定符來表示的問題

Differential：致力鑑別出最可能的診斷

Explanation：推理選出最可能的診斷的解釋

Alternative：其他診斷並的解釋以及為什麼它們不太可能

IDEA Example (In Clinic)

一名5歲女孩出現1天的排尿困難史，她在嬰兒時有III級膀胱輸尿管逆流（ vesicoureteral reflux ，VUR ）病史，現已解決。這可能是刺激性陰道炎或UTI。我認為病人很可能因衛生不佳以及頻繁的泡泡浴而導致陰道炎。由於她有UTI病史，即使她沒有發燒和腹痛而我認為UTI不太可能，我仍想為她驗尿。如果驗尿是陰性結果便會是陰道炎，我們應該告訴媽媽有關擦拭行為，還要停止泡泡浴。如果病人有中度的不適，可在患處一天兩次塗抹hydrocortisone 1% 。

VUR = vesicoureteral reflux

Summary

- 臨床推理帶回家點
  - 語義限定符
  - 識別模式
  - 疾病劇本
- 展示您的臨床推理技巧
  - 過濾資訊
  - DDx：優先排序、具體
- 如何將鑑別診斷作presentation—試試看…
  - 在ER或轉送到病房/ PICU /NICU：ASOaP
  - 病房病情較複雜的病人：DDx Reframe
  - 在門診：“IDEA”

鑑別診斷的建議程序

- 收集病人的所有資訊，並建立一個症狀列表
- 列出症狀的所有可能原因（候選條件）
- 將最緊急危險的可能原因置於列表最優先處
- 從最緊急危險的狀況開始，從列表中排除可能的原因

報告大綱

- 前言
- 促進鑑別診斷的方法
- 結語

結語

- 勿忘傳統方法
- 搭配創新流程
- 運用實證技巧
- 持續 **P D C A**

請選一項並列出相關之illness scripts

1. **Shock**
2. Chest pain/discomfort
3. RUQ pain
4. Mono-arthritis
5. Dizziness/vertigo
6. Fever with skin rashes
7. Others …

電子書 查詢結果 共 9 筆

到 電子資料庫 | 電子期刊 | 網路資源 查詢結果

狀態	電子書名稱	電子書概述	收錄年代	連線範圍
★	Chapman & Nakielny's Aids to Radiological Differential Diagnosis	收錄於ClinicalKey (Elsevier)	6th edition (2014)	總院院內直接使用/院外需認證
★	Chest Radiology: Patterns and Differential Diagnoses	收錄於ClinicalKey (Elsevier)	7th edition (2019)	總院院內直接使用/院外需認證
★	Churchill's Pocketbook of Differential Diagnosis	收錄於ClinicalKey (Elsevier)	4th edition (2014)	總院院內直接使用/院外需認證
★	Differential Diagnosis in Surgical Pathology	收錄於ClinicalKey (Elsevier)	3rd edition (2015)	總院院內直接使用/院外需認證
★	Differential Diagnosis of Common Complaints	收錄於ClinicalKey (Elsevier)	6th edition (2012)	總院院內直接使用/院外需認證
★	Differential Diagnosis of Common Complaints	收錄於ClinicalKey (Elsevier)	7th edition (2018)	總院院內直接使用/院外需認證
★	Ferri's Differential Diagnosis	收錄於ClinicalKey (Elsevier)	2nd edition (2011)	總院院內直接使用/院外需認證
★	Neuroradiology: Key Differential Diagnoses and Clinical Questions	收錄於ClinicalKey (Elsevier)	1st edition (2013)	總院院內直接使用/院外需認證
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Churchill's Pocketbook of Differential Diagnosis, Fourth Edition

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Thrombocytosis

Raftery, Andrew T., BSc MB ChB(Hons) MD FRCS(Eng) FRCS(Ed); Lim, Eric, MB ChB MD MSc FRCS(C-Th); Östör, Andrew J.K., MB BS FRACP

BOOK

Differential Diagnosis of Common Complaints, Seventh Edition

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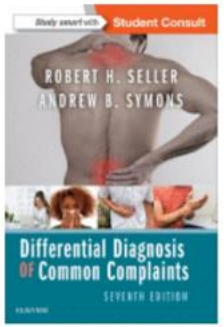

Seller, Robert H., MD; Symons, Andrew B., MD, MS

BOOK

Ferri's Differential Diagnosis, Second Edition

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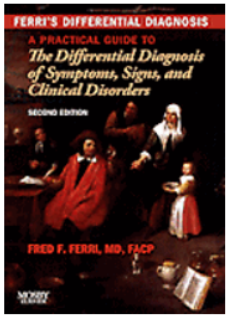

Ferri, Fred F., MD, FACP

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Shock

Churchill's Pocketbook of Differential Diagnosis, 421-424.

Shock is an abnormality of the circulation that results in inadequate organ perfusion and tissue oxygenation.

Causes

Hypovolaemic: Haemorrhage, Burns, Gastrointestinal losses
Cardiogenic: Myocardial infarction, Acute valvular damage, Arrhythmia
Distributive: Sepsis, Anaphylaxis, Neurogenic shock (spinal injury)
Obstructive: Massive pulmonary embolism, Tension pneumothorax, Cardiac tamponade

History

Trauma

Trauma is a pertinent feature in the history, as haemorrhage invariably accompanies penetrating trauma. The site and approximate amount of blood loss should be assessed. Blunt trauma to the chest is associated with tension pneumothorax, myocardial contusion and cardiac tamponade. Trauma to the pelvis and long bones can result in closed fractures, causing significant haemorrhage that may not always be apparent to the observer. Thermal injury can occur with patients involved in fires, water-heater explosions and gas explosions. Acute onset of paralysis following trauma may be due to spinal or peripheral nerve injury. Disruption to the descending sympathetic pathways with spinal injuries, results in loss of vasomotor tone and consequently hypotension.

Dyspnoea

Although tachypnoea is a physiological accompaniment to blood loss, when dyspnoea is the predominant symptom you should consider pulmonary oedema from the causes of cardiogenic shock. In addition, dyspnoea is also a prominent feature of all the causes of obstructive shock.

Chest pain

The consequences of blunt trauma to the chest have been described above. In the absence of trauma, the presence of chest pain should lead you to consider myocardial infarction (central crushing) and pulmonary embolism (pleuritic).

Precipitating factors

Occasionally patients may be aware of allergens that provoke anaphylaxis. In the community, food products (shellfish, eggs, peanuts) and insect venom (bees, wasps) are common causes. In hospital, penicillin, anaesthetic agents and intravenous contrast media are the major provoking factors. Detailed systemic enquiry for presence of infection may elucidate the offending focus for patients in septic shock. A history of profuse vomiting, diarrhoea or intestinal obstruction (vomiting, constipation, colicky abdominal pain and distension) would indicate gastrointestinal losses as the cause for hypovolaemia.

Examination

Inspection

A thorough systematic inspection should be undertaken; burns and sites of bleeding from penetrating trauma may be obvious. Cyanosis is a feature of large pulmonary emboli and tension pneumothoraces. Patients with anaphylaxis often exhibit angio-oedema and urticaria.

Temperature

Patients in shock are generally cold and clammy. With septic shock, however, the skin is warm to the touch and the patient is usually pyrexial.

Pulse

A tachycardia is the earliest measurable indicator of shock; however, it may not be elevated in cases of neurogenic shock. The character of the pulse is usually weak. The rhythm may suggest an arrhythmia as the precipitating factor in cardiogenic shock. Pulsus paradoxus (decrease in amplitude of the pulse on inspiration) is consistent with cardiac tamponade.

JVP

A low JVP is a useful discriminator for hypovolaemic shock, as it will usually be elevated with all causes of cardiogenic and obstructive shock.

Auscultation

Bronchospasm, and consequently wheezing, may be prominent in anaphylactic shock. Unilateral absent breath sounds indicate a pneumothorax, while muffled heart sounds are features of cardiac tamponade. The presence of a new murmur can be due to acute valvular insufficiency as a cause for cardiogenic shock.

General Investigations

- **Pulse oximetry:** Although low saturation per se is not very discriminatory, severe impairment of oxygen saturation is associated with pulmonary embolus and pneumothorax. This may be confirmed with ABGs.
- **FBC:** With blood loss, a low Hb may be noted, although this will not be evident immediately. A raised WCC occurs with infection. Unfortunately, it will also be raised in most causes of acute physiological stress.
- **U&Es:** With significant gastrointestinal losses, low serum sodium and potassium accompanied by raised urea and creatinine are the usual abnormalities.
- **ECG:** The ECG may reveal myocardial infarction or the presence of an arrhythmia as the precipitating aetiology. Electrical alternans (alternating large and small QRS complexes) is a specific indicator of pericardial tamponade. Widespread low-amplitude complexes are common in significant pericardial effusion.
- **CXR:** May reveal a pneumothorax with deviation of the trachea (although the diagnosis of a tension pneumothorax should be clinical and relieved before a chest X-ray is performed). The cardiac silhouette may be globular in the presence of a pericardial effusion; however, tamponade is still possible with a normal-appearing chest film.

Specific Investigations

- **Blood cultures:** Blood and site-specific cultures are essential in suspected septic shock. The underlying organism may be isolated.
- **Echocardiography:** An echocardiogram will be able to demonstrate valvular dysfunction, the presence of tamponade and massive pulmonary embolism (when right heart failure is present).
- **CT pulmonary angiography:** For the diagnosis of pulmonary embolism in the presence of shock. Emergency therapeutic measures (such as thrombolysis) may require a formal contrast pulmonary angiogram.
- **CT/MRI spine:** May be required to assess the extent and confirm the level of injury.

- **When assessing patients in shock, it is important to appreciate that low blood pressure is a relatively late feature.**
- **In patients with massive haemorrhage, low blood count is also a late feature and cannot be relied upon to assess the initial degree of blood loss.**

休克

Churchill's Pocketbook of Differential Diagnosis, 421-424.

休克是循環系統的異常，導致器官灌注不足和組織氧合不足。

原因

低血容：出血、燒傷、腸胃道流失
心源性：心肌梗塞、急性瓣膜損傷、心律不整
分佈性：敗血症、過敏反應、神經源性休克（脊髓損傷）
阻塞性：大量肺栓塞、張力性氣胸、心包填塞

病史

創傷

創傷是病史的重要訊息，因為出血總是伴隨著穿透性創傷。應評估失血部位和失血量。胸部鈍性創傷與張力性氣胸、心肌挫傷和心包填塞有關。骨盆和長骨的外傷可能導致閉合性骨折，引起嚴重的出血，這種出血並非總是顯而易見的。涉及火災、熱水器爆炸和瓦斯爆炸的病人可能會發生熱傷害。創傷後的急性麻痺發作可能是由於脊髓或周圍神經損傷所致。伴有脊柱損傷的下行交感路徑中斷會導致血管舒縮張力（vasomotor tone）喪失，從而導致低血壓。

呼吸困難

儘管失血可伴隨呼吸急促，但以呼吸困難為主要症狀時，應考慮心源性休克導致肺水腫。此外，呼吸困難也是阻塞性休克的明顯特徵。

胸痛

上面已經描述了鈍傷胸部的後果。在沒有外傷的情況下，胸痛須考慮心肌梗塞（中央壓迫）和肺栓塞（胸膜炎）。

誘發因素

有時病人可能意識到引起過敏反應的過敏原。在社區，食品（貝類、雞蛋、花生）和昆蟲毒液（蜜蜂、黃蜂）是常見原因。在醫院，青黴素、麻醉劑和靜脈造影劑是主要的誘因。對感染的存在進行系統的詳細詢問可以闡明敗血性休克病人的感染部位。有大量嘔吐、腹瀉或腸阻塞症狀（嘔吐、便秘、腹部絞痛和腹脹）的病史指向胃腸道流失是低血容量的原因。

身體診察

視診

應徹底執行系統性檢查；燒傷和穿透性創傷的部位可能很明顯。發紺是大量肺栓塞和張力性氣胸的特徵。過敏反應病人常表現出血管性水腫和蕁麻疹。

體溫

休克的病人通常會呈現冰冷。但是，在敗血性休克的情況下，皮膚摸起來會很溫暖，病人通常會發燒。

脈搏

心搏過速是最早可測量的休克指標。但是，在神經源性休克的情況下心搏可能不會升高。脈搏通常很弱。節律指向心律不整是心源性休克的誘發因素。奇脈（pulsus paradoxus，吸氣時脈搏幅度降低）符合心包填塞。

頸靜脈壓（JVP）

較低的 JVP 可作為低血容性休克的有用判別徵候，因為心源性和阻塞性休克通常 JVP 會升高。

聽診

在過敏性休克，支氣管痙攣以及隨之而來的喘鳴聲可能很明顯。單側無呼吸音表示氣胸，而心音遙遠是心包填塞的特徵。出現新的雜音可能是由於急性瓣膜功能不全而引起的心源性休克。

一般檢查

- 脈搏血氧飽和度：儘管低飽和度本身不是很明顯，但氧飽和度的嚴重降低與肺栓塞和氣胸有關。可作動脈血液氣體分析（ABG）來確認。
- FBC：由於失血，可能會呈現血色素降低，儘管這不會立即顯現。感染引起 WBC 升高。然而，大多數原因引致的 stress 也會引起 WBC 升高。
- U&E：胃腸道大量流失時，常見低血鈉和低血鉀，伴有尿素和肌酐升高。
- 心電圖：心電圖可能顯示出心肌梗塞或心律異常。電交替（electrical laternans，QRS 形態交替變化）是心包填塞的特異指標。廣泛的低振幅 QRS 在明顯的心包積液中很常見。
- CXR：可能顯示氣管偏移（儘管張力性氣胸應以臨床表徵診斷，並且在進行 CXR 檢查前應予緩解）。存在心包積液時，心臟輪廓可能呈球形。但即是 CXR 正常，仍不能排除心包填塞。

特殊檢查

- 血液培養：血液和特定部位的培養對於疑似敗血性休克至關重要。感染原可以被分離。
- 心臟超音波：心臟超音波能夠顯示瓣膜功能障礙、心包填塞和大量肺栓塞（出現右心衰竭時）。
- CT 肺血管造影：在休克存在時用於診斷肺栓塞。緊急治療措施（例如血栓溶解）可能需要進行正式的造影劑肺血管造影。
- 脊柱 CT / MRI：可能需要評估其範圍並確認受損程度。

- 在評估休克病人時，重要的是要意識到低血壓是一個相對較晚的特徵。
- 對於有大量出血的病人，低血球計數也是較晚的特徵，不能依靠它來評估最初的失血程度。

休 克

Churchill's Pocketbook of Differential Diagnosis, 421-424.

休克是循環系統的異常，導致器官灌注不足和組織氧合不足。

原因

低血容：出血、燒傷、腸胃道流失

心源性：心肌梗塞、急性瓣膜損傷、心律不整

分佈性：敗血症、過敏反應、神經源性休克（脊髓損傷）

阻塞性：大量肺栓塞、張力性氣胸、心包填塞

病史

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休克的病人通常會呈現冰冷。但是，在敗血性休克的情況下，皮膚摸起來會很溫暖，病人通常會發燒。

脈搏

心搏過速是最早可測量的休克指標。但是，在神經源性休克的情況下心搏可能不會升高。脈搏通常很弱。節律指向心律不整是心源性休克的誘發因素。奇脈（pulsus paradoxus，吸氣時脈搏幅度降低）符合心包填塞。

頸靜脈壓（JVP）

較低的 JVP 可作為低血容性休克的有用判別徵候，因為心源性和阻塞性休克通常 JVP 會升高。

聽診

在過敏性休克，支氣管痙攣以及隨之而來的喘鳴聲可能很明顯。單側無呼吸音表示氣胸，而心音遙遠是心包填塞的特徵。出現新的雜音可能是由於急性瓣膜功能不全而引起的心源性休克。

一般檢查

- 脈搏血氧飽和度：儘管低飽和度本身不是很明顯，但氧飽和度的嚴重降低與肺栓塞和氣胸有關。可作動脈血液氣體分析（ABG）來確認。
- FBC：由於失血，可能會呈現血色素降低，儘管這不會立即顯現。感染引起 WBC 升高。然而，大多數原因引致的 stress 也會引起 WBC 升高。
- U&E：胃腸道大量流失時，常見低血鈉和低血鉀，伴有尿素和肌酐升高。
- 心電圖：心電圖可能顯示出心肌梗塞或心律異常。電交替（electrical laternans，QRS 形態交替變化）是心包填塞的特異指標。廣泛的低振幅 QRS 在明顯的心包積液中很常見。
- CXR：可能顯示氣管偏移（儘管張力性氣胸應以臨床表徵診斷，並且在進行 CXR 檢查前應予緩解）。存在心包積液時，心臟輪廓可能呈球形。但即是 CXR 正常，仍不能排除心包填塞。

特殊檢查

- 血液培養：血液和特定部位的培養對於疑似敗血性休克至關重要。感染原可以被分離。
- 心臟超音波：心臟超音波能夠顯示瓣膜功能障礙、心包填塞和大量肺栓塞（出現右心衰竭時）。
- CT 肺血管造影：在休克存在時用於診斷肺栓塞。緊急治療措施（例如血栓溶解）可能需要進行正式的造影劑肺血管造影。
- 脊柱 CT / MRI：可能需要評估其範圍並確認受損程度。

- 在評估休克病人時，重要的是要意識到低血壓是一個相對較晚的特徵。
- 對於有大量出血的病人，低血球計數也是較晚的特徵，不能依靠它來評估最初的失血程度。

Illness Script

Predisposing conditions

Pathophysiological insult

Clinical consequences