SYNCOPE

2025-4-18

CV劉開璽

DEFINITION

- Transient loss of consciousness associated with loss of postural tone
- Due to abrupt reduction or loss of cerebral perfusion and drop of blood pressure
- Relatively brief duration (8 to 10 seconds)
- Spontaneously self-limited.

意識不清 AEIOU TIPS

A：Alcohol酒精, Arrhythmia 心律不整
E：Electrolyte電解質
I：Insulin：高血糖、低血糖
O：overdose/oxygen：藥物過量/低血氧
U：Uremia：尿毒症
T：Trauma/Temperature/Tumor：創傷/體溫/腫瘤
I：Infection：腦膜炎/腦炎/敗血症
P：Psychogenic：精神科因素
S：Seizure/Stroke：癲癇/中風

EPIDEMIOLOGY

Syncope is a Common Clinical Problem With Significant Costs

- **–Over 1 million patients in the U.S.**
- **–More than 500,000 new patients per year**
- **–1-6% of hospital admissions**
- **–3% of emergency room visits per year**
- **–Ranked 37th among Medicare hospital DRG charges**
- **–$750 million annual cost (US inpatient only)**

IMPACT ON QUALITY OF LIFE

Syncope affects

- **Daily life activities in 76% of patients**
- **Driving 64%**
- **Physical Activities 56%**
- **Employment 39%**
- **Sexual Function 30%**
- **Relationships with family, spouse, friends 26%**

Syncope also causes anxiety/depression in 73% of patients

"COSTS"

Syncope patients frequently seek medical attention and incur significant costs

- **Average annual physician visits**
  - **-Cardiologist-3.2**
  - **-Family/General Practice-6.1**
  - **-Electrophysiologist-1.6**
  - **-Internist-2.6**
  - **-Neurologist-2.1**

- **$5500 annually for inpatient hospital stay**

"Those who suffer from frequent and severe fainting often die suddenly"

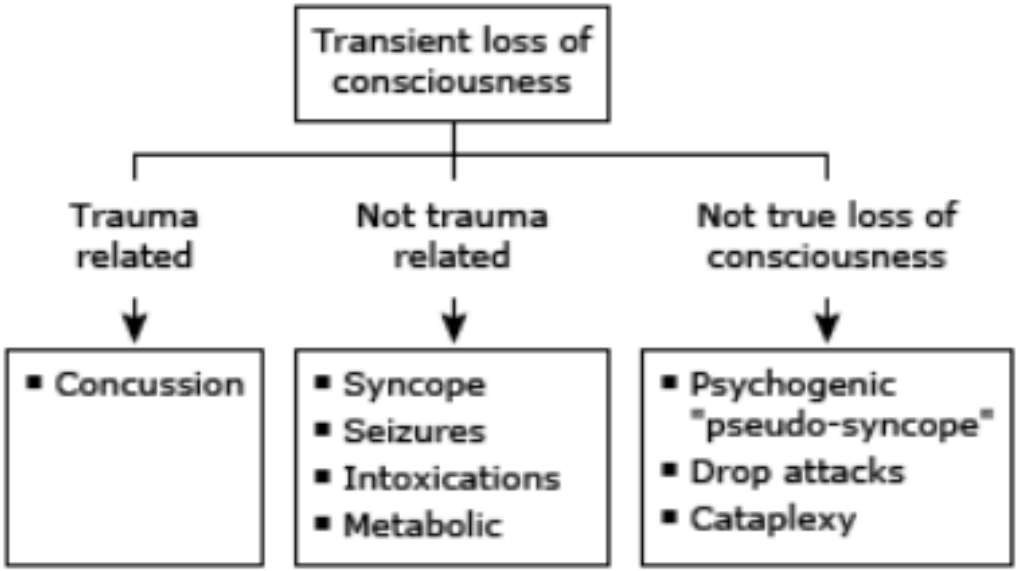
Hippocrates, 1000 BC

Syncope - Indications for Hospitalization

- Indicated
  - -Hx of CAD, CHF, ventricular arrhythmia
  - -Accompanying sx of chest pain
  - -Physical signs of significant valve dz, CHF, stroke, or focal neuro dz
  - -EKG - ischemia, arrhythmia, QT problems, BBB

- Often indicated
  - -Sudden LOC with injury, rapid heart action with exertional syncope
  - -Frequent spells, suspicion of CAD or arrythmia, meds suspicious of Torsades
  - -Moderate-to-severe orthostatic hypotension

Algorithmic approach to the transient loss of consciousness



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哥倫比亞28名學生妹玩「通靈板」 集體焦慮昏厥送醫

哥倫比亞28名少女玩完通靈板後，集體昏厥。（圖片擷取自推特@nypost）

2023/03/09 16:44

〔即時新聞／綜合報導〕哥倫比亞蘇克雷省一所學校，近期在學生群體間流傳一個遊戲「通靈板」（Ouija board），神似一般人較為熟知的碟仙，試圖透過板子與靈界溝通。然而，日前卻傳出參與者陸續出現極度焦慮的狀況，更有28名女學生直接昏厥送醫。家長懷疑遊戲是在課堂上進行，而校方則呼籲不要隨意發表臆測。

綜合外媒報導，這起詭異事件發生在哥倫比亞北部蘇克雷省（Sucre）加萊拉斯（Gales），當地一所學校的學生大玩「通靈板」後，集體出現極度焦慮的狀況，最終竟有高達28名女學生昏厥送醫。

家長們將此情形歸咎於通靈板遊戲，一名學生的母親說道，她在醫院工作，每天都會看到至少4至5個。更直言家長們要團結起來，一起查清楚學校到底發生什麼事，而且她很確定孩子們都吃得健康，不能推拖是營養不良造成的。

學校校長托雷斯（Hugo Torres）則拍了澄清說明影片回應道，對於28名學生出現焦慮症狀，某些社區成員開始散佈謠言，他強調這樣的行為非但沒辦法解決問題，反而會給雙方帶來不利。目前無法得知警方是否已介入調查，而院方仍在全力找出病源。

History taking

- L : X
- Q
  有無失去意識？失去意識多久？
- Q
  發生昏厥的頻率？
- O
  甚麼時候發生昏厥? 過去是否有類似的狀況？
- P
  在做甚麼事的時候發生昏厥? 當時在做甚麼事情？情緒激動？
  甚麼姿勢? 有無前兆？
- E
  在做甚麼事的時候更容易昏厥? 跟姿勢、情緒壓力或疼痛有關?
- R
  大概昏厥多久後清醒過來？
  這段期間，周遭的人有做什麼處置？

History taking

- A
  - 昏厥後常會跌倒，可以詢問是否有受傷
  - 是否有心悸？胸悶？胸痛？
  - 是否有局部肌肉無力？神經學缺損表現？
  - 排除類似的情況
    →TIA：是否有無力？說話不清楚？
    →Seizure：有無抽搐？有無小便失禁？有無受傷等？
- PH
  過去有無甚麼內科疾病?(特別要問高血壓、心臟疾病)
  最近有無頭部外傷? 最近有無動過甚麼手術?
- FH
  父母和兄弟姐妹有沒有哪些慢性疾病(心臟疾病、高血壓、糖尿病)或癌症？
- ABC
  有沒有抽菸喝酒嚼檳榔
- All
  對什麼食物藥物過敏？
  最近有沒有服用哪些藥物？(降血壓藥、促排尿藥物(alpha-blocker)等)

Is it really syncope?

- dizziness
- presyncope
- vertigo
- disequilibrium
- lightheadedne
- weak and dizz
- done fell out

IS IT REALLY SYNCOPE?

Dizziness

- Much more common than syncope
  - - 30% annual incidence in the elderly
  - - 1% of all clinic visits
- Good prognosis
  - - 28% improve by 2 weeks
  - - majority improve by 1 year
- Tests for syncope not often helpful
- 80% of elderly have no specific identifiable cause

Is it really syncope?

Seizure

- Seizure - blue face (not pale), frothing, tongue biting, disorientation after event, aching muscles, LOC >5 min, slow return to normal mental status
- Syncope - nausea or sweating before event, oriented after the event
- PROBLEMS

  - Injury, tongue-biting, incontinence not useful in discriminating "fit" from "faint"

  - Sz activity in assn with LOC does not define a seizure as its cause (convulsive syncope)

Is it really syncope?

Stroke

- 6% of pts with TIA\stroke have LOC
- posterior circulation
  - supplies the RAS
  - drop attacks
- anterior circulation
  - would require bilateral compromise, only theoretically possible
- need focal neuro sx\signs to use TIA as dx

Syncope - Mechanisms

- global cerebral hypoperfusion
- interruption of sympathetic outflow
- increased vagal tone
- other mechanisms - edema, cerebral autoregulation, central serotonin pathways

The trigger for the switch in autonomic response remains one of the unresolved mysteries in cardiovascular physiology.

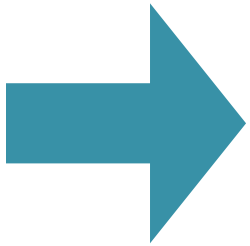
Hainsworth. Syncope: what is the trigger? Heart 2003;89:123-124

Syncope - Etiology

	ACP, 1997	Sarasin, 2001	Alboni, 2001	Blanc, 2002
	Retrospective	Prospective	Prospective	Prospective
n	1110	650	356	454
Study Characteristics	Systematic review	Sequential ED patients. Carotid massage part of P.E.	Referral Center. Dx < 2 months.	Excluded seizure, panic disorder, hypoglycemia, TIA
Unknown	34%	14%	18%	24%
Reflex-mediated	21%	36%	58%	48%
Cardiac	18%	11%	23%	10%
Neurologic	10%	5%	1%	
Orthostatic	8%	24%		

Syncope - Etiology

- Reflex mediated - 40%
- Unexplained - 25%
- Cardiac - 15%
- Others - 20%
  - Metabolic
  - Orthostatic hypotension
  - Medications
  - Psychiatric
  - Neurologic



Vasovagal
Situational
Other
  Carotid sinus
  Neuralgia

Differential Diagnosis of Syncope: Seizures vs Hypotension

Observation	Seizure	Inadequate Perfusion
Onset	Sudden	More gradual
Duration	Minutes	Seconds
Jerks	Frequent	Rare
Headache	Frequent (after)	Occasional (before)
Confusion after	Frequent	Rare
Incontinence	Frequent	Rare
Eye deviation	Horizontal	Vertical (or none)
Tongue biting	Frequent	Rare
Prodrome	Aura	Dizziness
EEG	Often abnormal	Usually normal

Causes of True Syncope

Neurally-Mediated

1

- VVS
- CSS
- Situational
  - Cough
  - Post-Micturition

Orthostatic

2

- Drug-Induced
- ANS Failure
  - Primary
  - Secondary

Cardiac Arrhythmia

3

- Brady
  - SN Dysfunction
  - AV Block
- Tachy
  - VT
  - SVT
- Long QT Syndrome

Structural Cardio-Pulmonary

4

- Acute Myocardial Ischemia
- Aortic Stenosis
- HCM
- Pulmonary Hypertension
- Aortic Dissection

Unexplained Causes = Approximately 1/3

Causes of Syncope

Framingham Cohort[1] (N=727)		Composite Data (Linzer[2]) (N=1,002)	
Cause	**Prevalence Mean %**	**Cause**	**Prevalence Mean %**
Vasovagal	21	Vasovagal	18
Orthostatic	9.3	Orthostatic	8
Cardiac	10	Cardiac	18
Seizure	5.2	Neurologic	10
Medication	6.8	Medication	3
Stroke/TIA	4.2	Situational	5
Other	7.8	Carotid Sinus	1
Unknown	35.9	Unknown	34

[1]Soteriades ES, et al. *NEJM.* 2002;347:878-885.
[2] Linzer M, et al. *Ann Intern Med.* 1997;126:989-996.

Causes of Syncope by Age

Younger Patient

- Vasovagal
- Situational
- Psychiatric
- Long QT*
- Brugada syndrome*
- WPW syndrome*
- RV dysplasia*
- Hypertrophic cardiomyopathy*
- Catecholaminergic VT
- Other genetic syndromes

Older Patient

- Cardiac**
  - Mechanical
  - Arrhythmic
- Orthostatic hypotension
- Drug-induced
- Neurally mediated
- Multifactorial

Underlined: benign
* Rare, not benign
** Not benign

SYNCOPE – DIAGNOSTIC STRATEGY

- History
  - Presyncopal
    - Positional, activities (exertional?), warning sx (palpitations), environment
  - Syncopal (witness)
    - Duration, seizure activity, skin color, diaphoresis, injury
  - Postsyncopal
    - Time to recovery
  - Past episodes , frequency of syncope
  - Past cardiac and other medical history
  - Medications

Syncope - Diagnostic Strategy

- Alboni et al, 2001
  - Best predictors of a cardiac cause
    - Patients with certain or suspected heart disease, syncope in supine position or during effort, blurred vision, convulsive synope
  - Only hx of heart disease is an independent predictor of cardiac cause of syncope (sens 95%, spec 45%)

Syncope - Diagnostic Strategy

Medications Associated with Syncope

- Antidepressants
  Antiarrhythmics
  Antihypertensives
  Beta blockers
  Ca blockers
  Cardiac glycosides
  Diuretics
  Nitrates
  Phenothiazines
  Recreational drugs
    Alcohol
    Cocaine
    Marijuana
  Hypoglycemics

Syncope - Diagnostic Strategy

- Physical examination
  - Complete
  - orthostatic hypotension
    - systolic change of 20 mmHg
    - sitting BP unreliable
  - cardiovascular
    - difference in BP between arm
  - Neurologic
  - Carotid sinus**

Syncope - Diagnostic Strategy

- ECG
  - yield for specific diagnosis low (5%)
    - risk free and relatively inexpensive.
  - abnormalities (BBB, previous MI, nonsustained VT) guide further evaluation
    - recommended in almost all patients

Syncope - Diagnostic Strategy

- Hx and PE and EKG

50%	50%
Diagnostic	Suggestive	Unexplained

Syncope - Diagnostic Strategy

- Hx and PE and EKG

Diagnostic Suggestive Unexplained

Laboratory Tests

- Routine use not recommended
- Should be done only if specifically suggested by H&P.
- Pregnancy testing should be considered in women of child-bearing age, especially in those for whom tilt-table or EP testing is being considered.

Syncope - Diagnostic Strategy

- Hx and PE and EKG

Diagnostic Suggestive Unexplained

Neurologic testing

- EEG - not useful unless seizures
- Brain imaging - not useful unless focality
- Neurovascular studies
  - no studies
  - may be useful if bruits, or hx suggests vertebrobasilar insufficiency

Syncope - Diagnostic Strategy

- Hx and PE and EKG

Diagnostic Suggestive Unexplained

Echocardiography

- Recommended in patients when cardiac disease is suspected
- Only makes the diagnosis in severe AS and atrial myxoma
- Findings may be useful to stratify the risk of cardiac substrate

Syncope - Diagnostic Strategy

- Hx and PE and EKG

Diagnostic Suggestive Unexplained

Examples

- vasovagal
- situational
- orthostatic hypotension
- polypharmacy in the elderly

Vasovagal Syncope

- - most common cause of syncope
  - confusing terms (Bezold-Jarisch reflex, cardioinhibitory, neurocardiogenic, neurally mediated)
  - compensatory increase in sympathetic tone interrupted
  - mediated by excessive activation of cardiac mechanoreceptors that have connections to brainstem
- - appropriate setting (fear, injury, illness, sight of blood, etc.)
  - upright posture
  - warning period of progressive symptoms
    (warmth, lightheadedness, nausea, roaring in ears, dimming vision)
  - prompt recovery (seconds)
    (beware of the well meaning bystander)

Vasovagal Syncope

- Graham LA, Kenney RA. Clinical characteristics of patients with vasovagal reactions presenting as unexplained syncope. Europace 2001;3:141-46

Table 2 Precipitants of vasovagal syncope

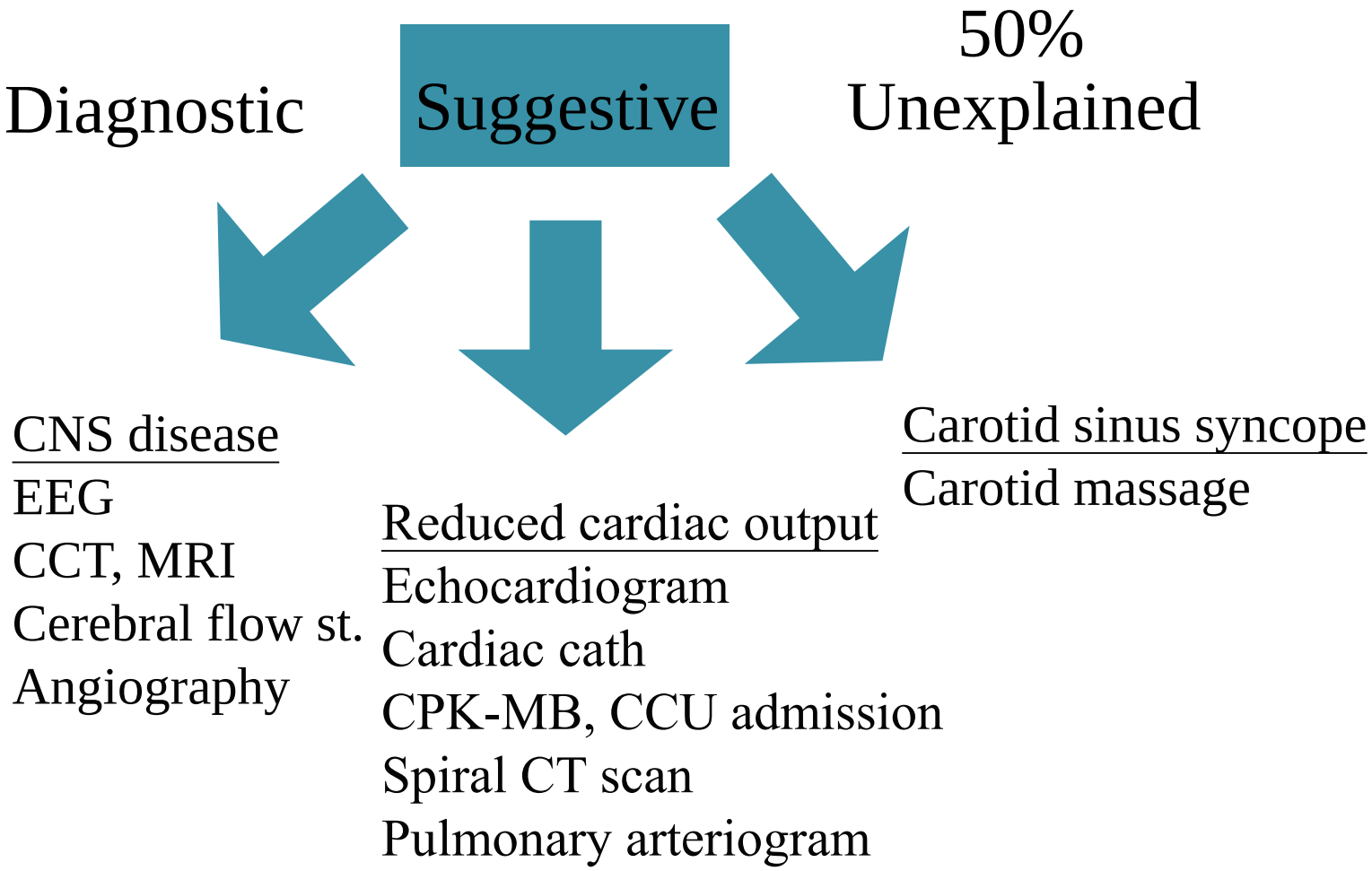
Precipitant	Number (n=62)	%
Hot weather	23	37
Prolonged standing	17	27
Lack of food	14	23
Emotion	13	21
Head movement	13	21
Sitting	12	19
Early mornings	10	16
Venepuncture	7	11
Post-prandial	7	11
Cold weather	7	11
Alcohol	6	10
Medication	6	10
Illness	4	6·5
Hairdressers	4	6·5
Pregnancy	4	6·5
Saunas	4	6·5
Fear	4	6·5

Table 3 Prodromal features of vasovagal syncope

Symptom	Number (n=38)	%
Light-headedness	35	92
Fatigue	26	68
Blurred vision	26	68
Sweating	25	66
Nausea	23	60
Fading vision	16	42
Palpitations	14	37
Shortness of breath	14	37
Headache	11	29
Coldness	11	29
Chest pain	8	21
Tingling	7	18
Flushing	7	18
Abdominal pain	2	5
Dizziness	2	5
Apprehension/fear	2	5

Syncope - Diagnostic Strategy

- Hx and PE and EKG



Syncope - Diagnostic Strategy

- Hx and PE and EKG

Diagnostic

Suggestive

50%

Unexplained

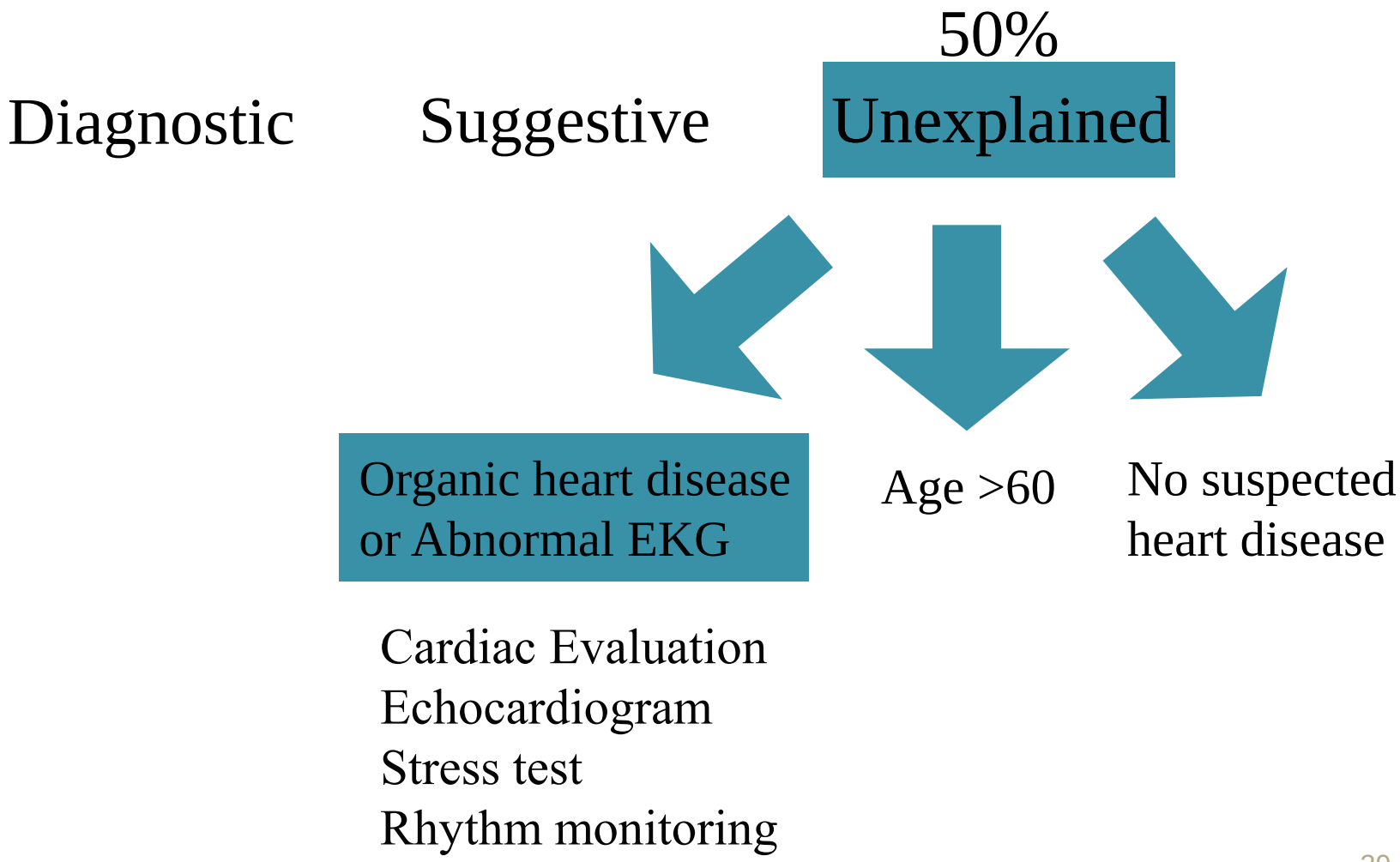
Organic heart disease or Abnormal EKG

Age >60

No suspected heart disease

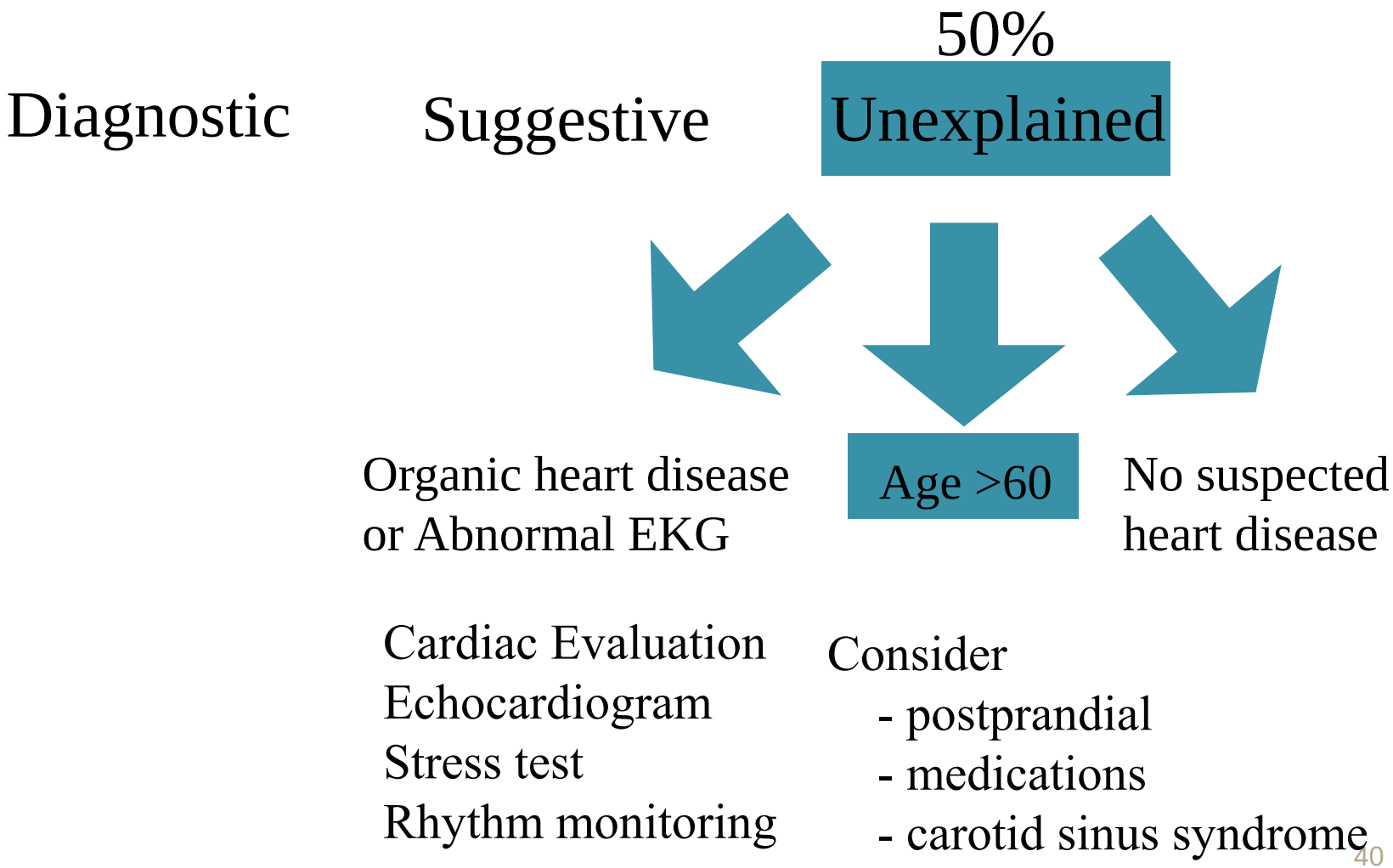
Syncope - Diagnostic Strategy

- Hx and PE and EKG



Syncope - Diagnostic Strategy

- Hx and PE and EKG




怪我咯?!

Carotid Sinus Syndrome

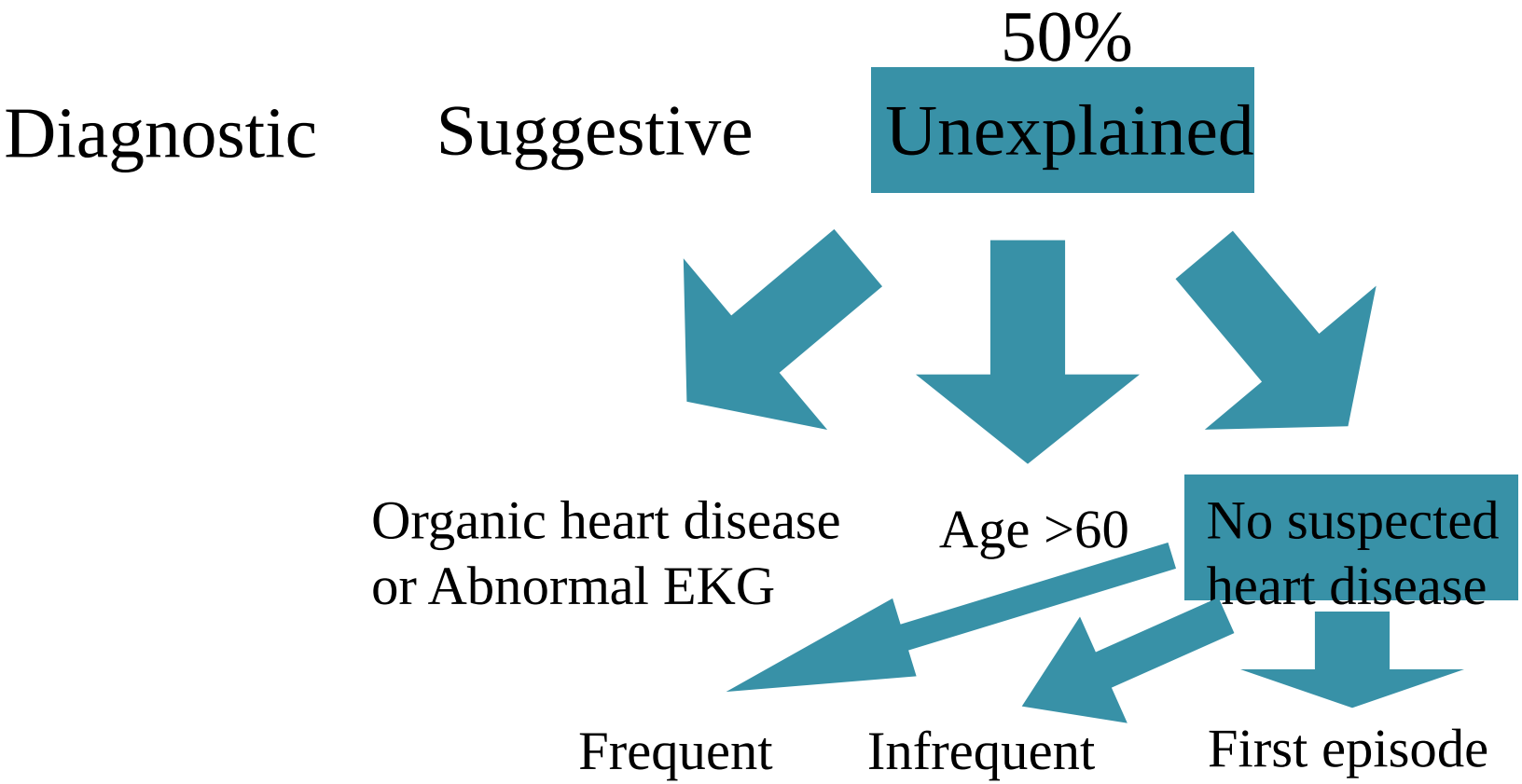
- associated with
  - pathologic abnormalities of the neck
  - meds - digoxin, alphamethyldopa, propanolol
- two types
  - cardioinhibitory
  - vasodepressor
- suspect in elderly patients (tight collar, shaving, head turning)

Carotid Sinus Syndrome

- - examine for carotid bruits
  - estabish venous access and cardiac monitor, with atropine available
  - with patient supine, massage each carotid 5-10 secs while monitoring HR and BP
  - positive reponse is asystole of 3 seconds or drop in systolic BP of 50 mmHg
  - if vasodepressor type is suggested, redo in sitting and standing position with fall protection
  - nonspecific - 25% of nonsyncopal elderly pts will have a positive response

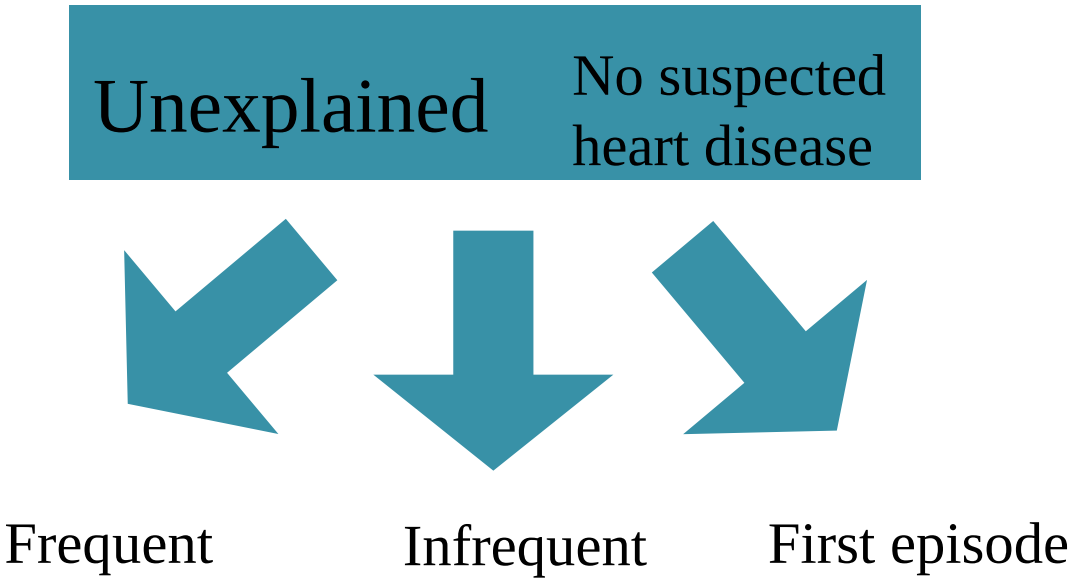
Syncope - Diagnostic Strategy

- Hx and PE and EKG



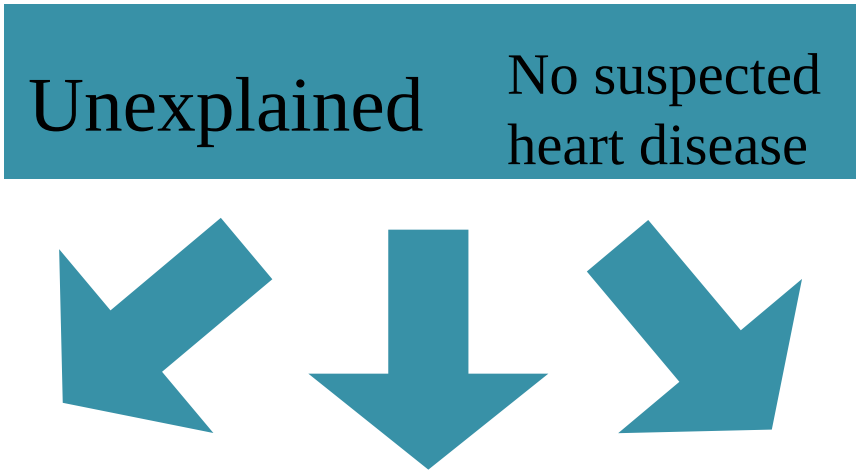
Syncope - Diagnostic Strategy

- Hx and PE and EKG



Syncope - Diagnostic Strategy

- Hx and PE and EKG



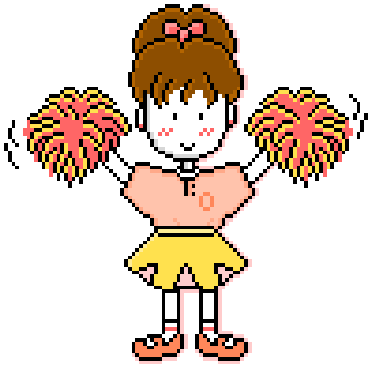
consider
tilt table
psycheval
rhythm monitoring

STOP
workup

Syncope - Diagnostic Strategy

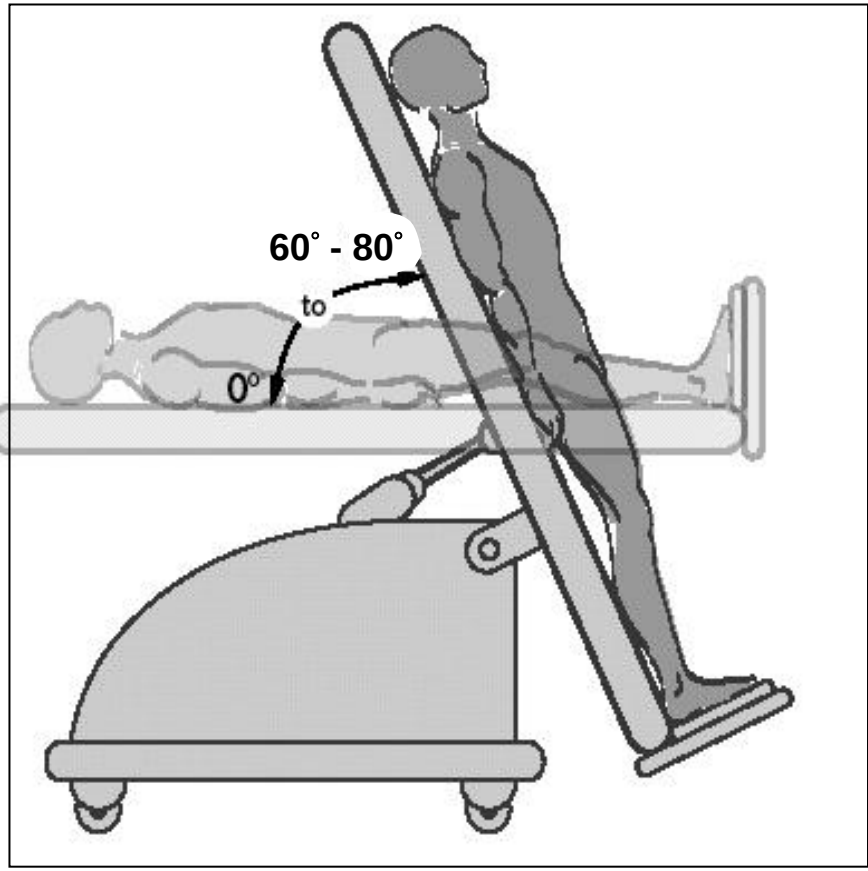
Tilt Table testing

- Tilt table testing
  - passive (60 degrees, 45 min)
  - isoproterenol, nitroglycerin
  - 50% with unexplained syncope had positive response
  - 2/3 of responses cardioinhibitory



Head-Up Tilt Test (HUT)

- Protocols vary
- Useful as diagnostic adjunct in atypical syncope cases
- Useful in teaching patients to recognize prodromal symptoms
- Not useful in assessing treatment



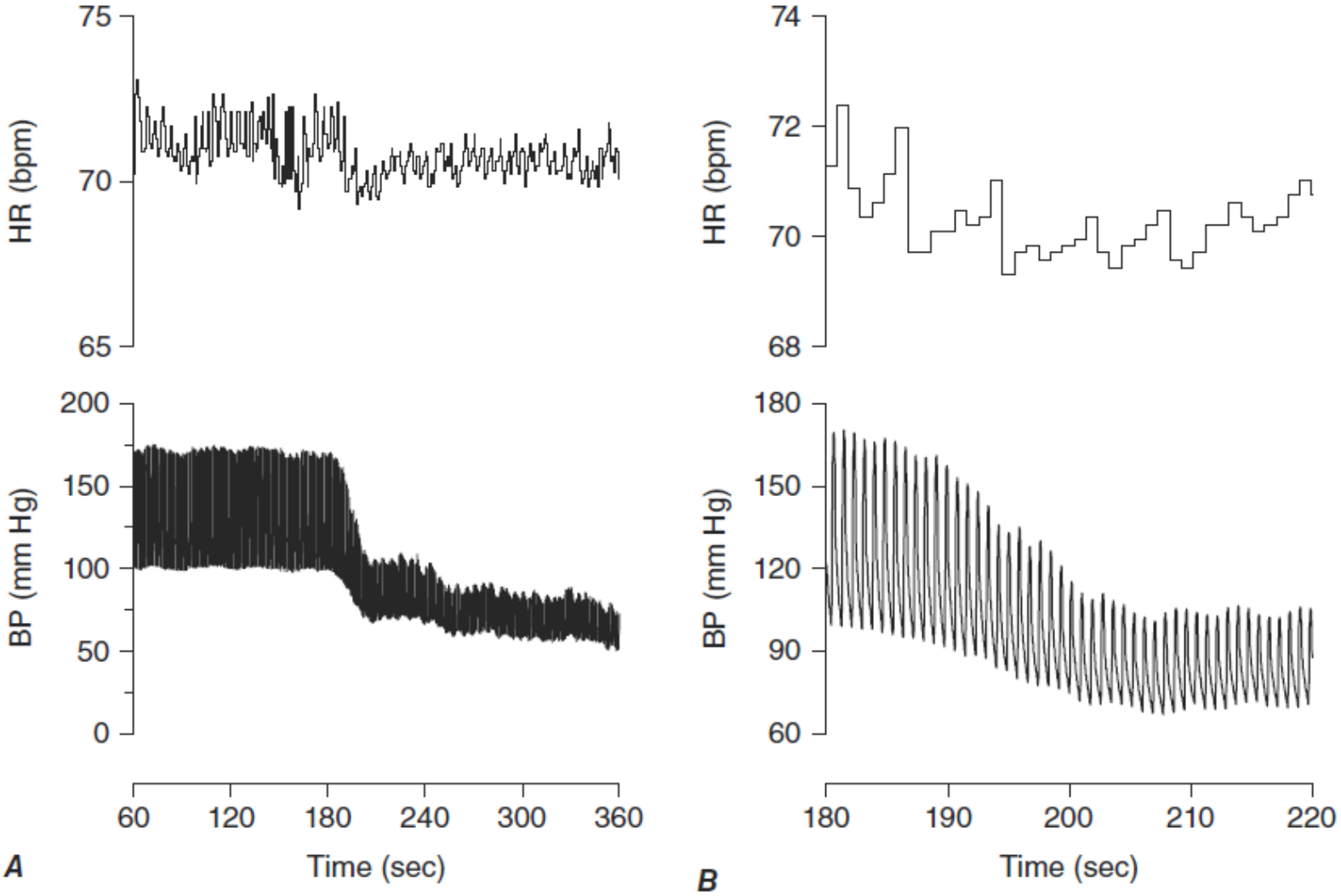
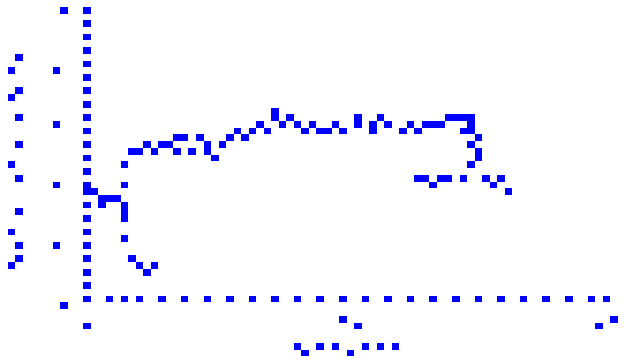
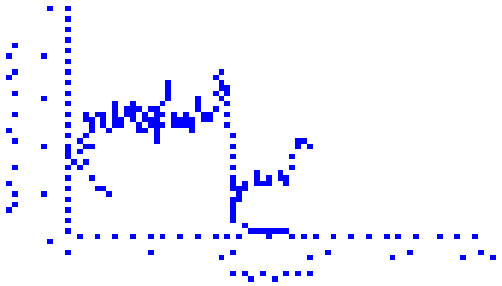
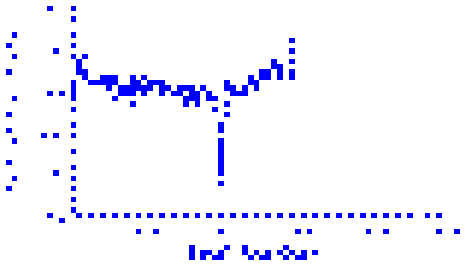


FIGURE 27-4 ***A.*** The gradual fall in blood pressure without a compensatory heart rate increase that is characteristic of orthostatic hypotension due to autonomic failure. Blood pressure and heart rate are shown over 5 min (from 60 to 360 s) of an upright tilt on a tilt table. ***B.*** The same tracing expanded to show 40 s of the episode (from 180 to 220 s). BP, blood pressure; bpm, beats per minute; HR, heart rate.

Response to Tilt Table Testing



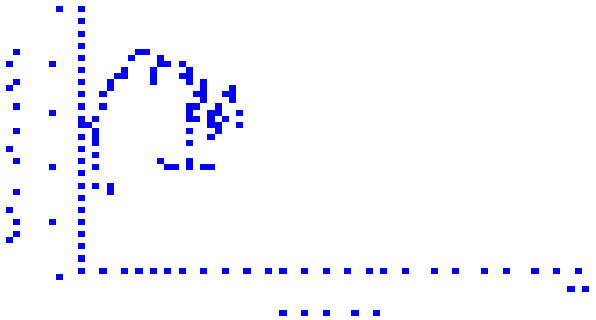


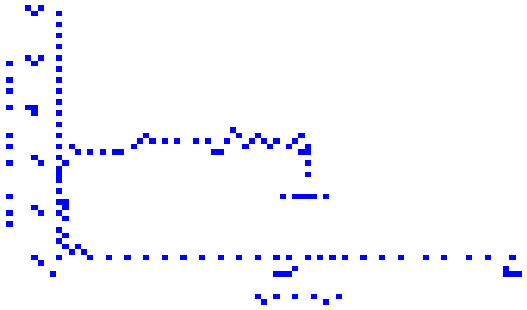


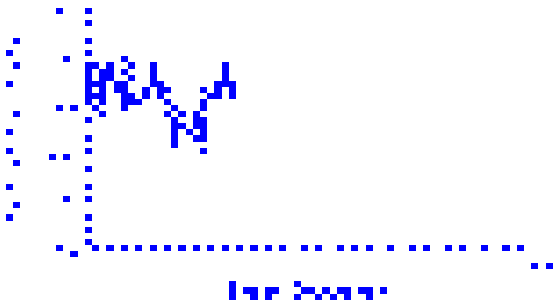
Normal

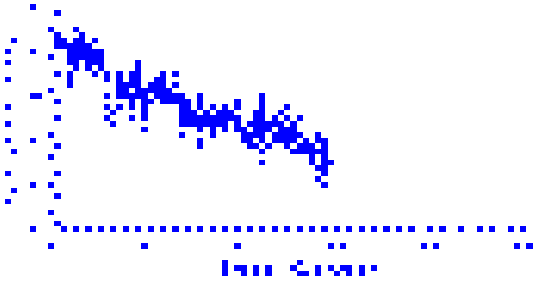
Vasal vagal

Response to Tilt Table Testing









POTS

Dysautonomia

Indication for Tilt Table Testing

- The evaluation of recurrent syncope, or a single syncopal event accompanied by physical injury, motor vehicle accident, or in high risk setting in which clinical features suggest vasovagal
- In patients in whom dysautonomias may contribute to symptomatic hypotension
- Evaluation of recurrent exercise induced syncope in patients without structural heart disease

Syncope - Diagnostic Strategy

Rhythm monitoring

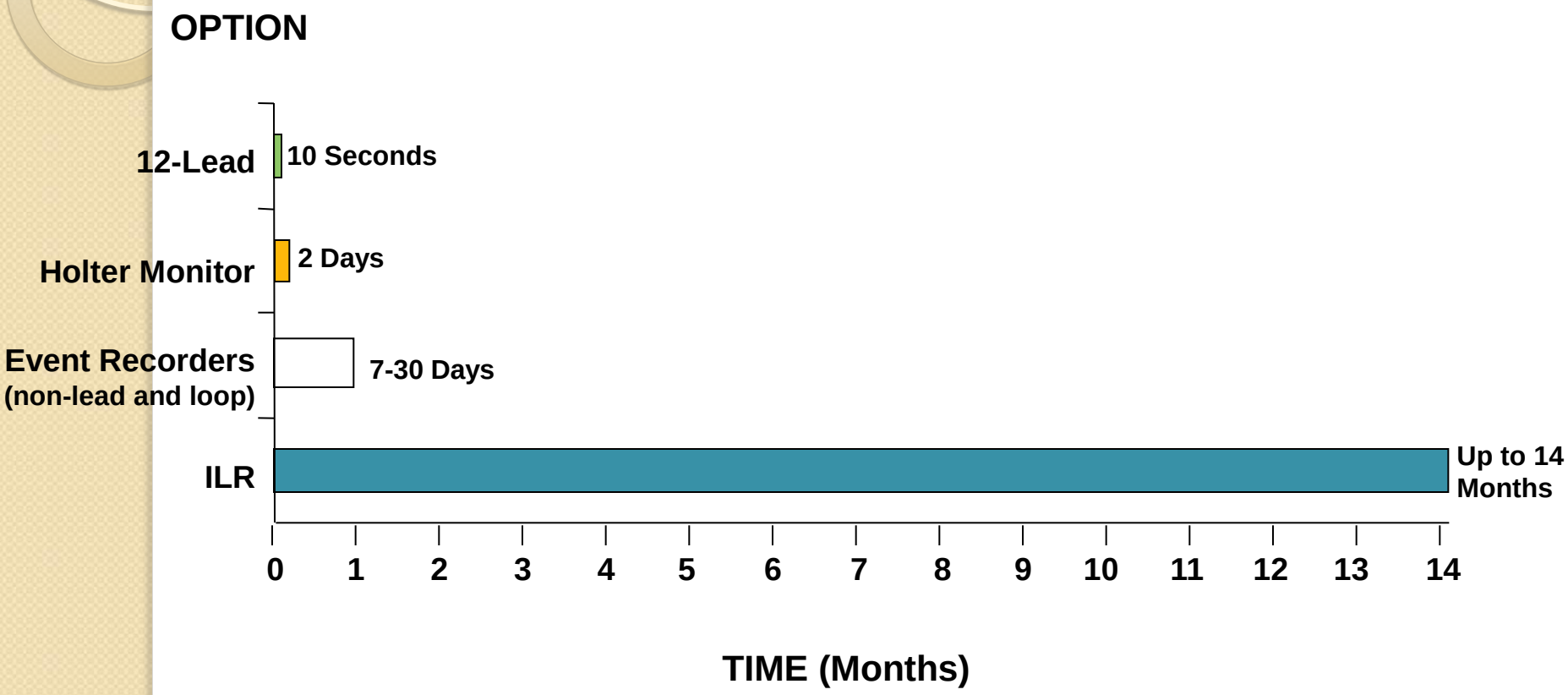
- Event monitors
  - highest yield with palpitations and recurrent events
  - requires a compliant patient

Diagnostic Methods and Yields

Procedure	**Yield***
History and Physical Exam	25-35%[1]
ECG	2-11%[2]
Monitoring	
Holter Monitoring	2%[3]
External Loop Recorder	20% [3]
Insertable Loop Recorder	43-88%[4,5,6]
Test/Procedure	
Tilt Table	11-87% [1,7]
EP Study without SHD**	11% [8]
EP Study with SHD	49% [1]

**Structural Heart Disease

Heart Monitoring Options



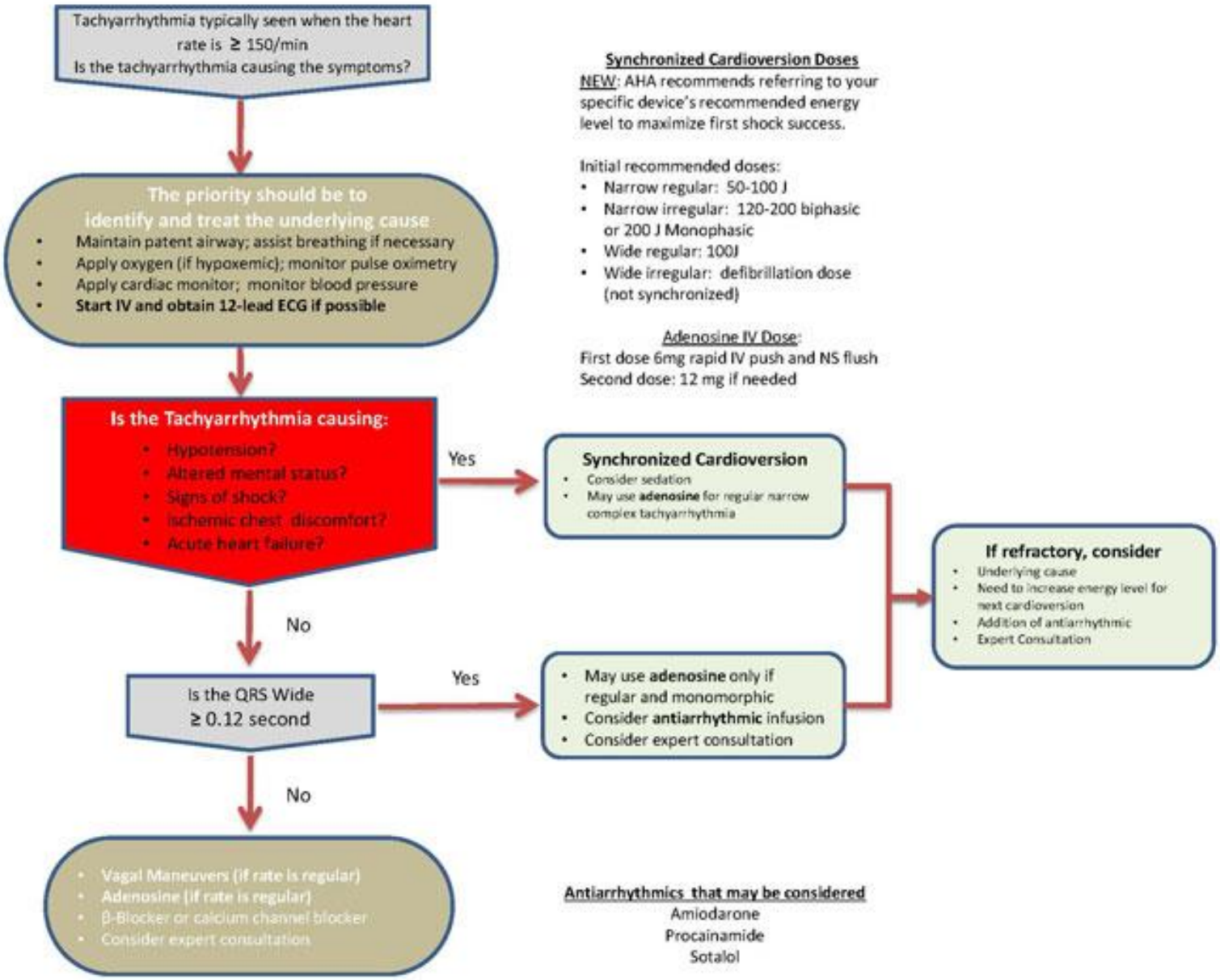
Syncope - Diagnostic Strategy

Psychiatric causes

- Consider when
  - frequent fainting in young patients
  - syncope that does not cause injury
  - many symptoms
- Hyperventilation maneuver and psychiatric screening instruments recommended. Hyperventilation maneuver
  - open mouth; slow, deep breaths
  - 20X/minute for 3 minutes
  - endpoint - target sx

AHA ACLS Adult Tachycardia Algorithm

(With A Pulse)



心搏過緩相關處理

學習目標

1. 瞭解心搏過慢的定義與原因
2. 熟悉心搏過慢常見的心電圖變化
3. 熟知心搏過慢的處理流程與用藥
4. 學會操作經皮心律調節器(TCP)

定　義

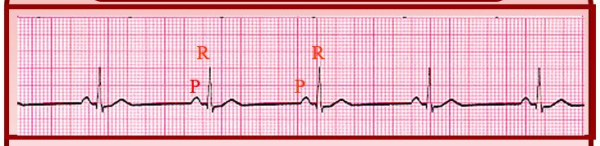
- 「絕對性」心搏過慢: HR<60/min
- 「相對性」心搏過慢: 心跳速率不夠身體所需

原　因

- 傳導障礙:
  SA node /AV node dysfunction， conduction block
- 藥物造成:
  如β-blocker，Ca^{+2}-blocker， digoxin， amiodarone
- 電解質不平衡: 如K^{+} ，Ca^{+2} ，Mg^{+2}
- 心肌缺氧/壞死/發炎
- 其它: 甲狀腺功能低下，低體溫

Bradycardia EKG1

Sinus bradycardia



☑ 辨識重點:

- 規則，窄的QRS波
- 正常規則的PR interval
- 正常的P wave
- HR: < 60/min

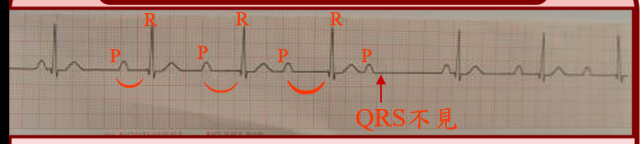
1° AV block

☑ 辨識重點:

- 規則的PR interval
- PR interval > 0.2秒

Bradycardia EKG2

2 ° AV block, Mobitz type I



☑ 辨識重點:

- 規則固定的P-P interval
- PR interval 愈來愈長，直到loss 一個QRS波

2 ° AV block, Mobitz typeII

☑ 辨識重點:

- 規則固定的P波
- PR interval 固定，但會突然loss一個QRS波

Bradycardia EKG3

Third degree AV block

▲ : QRS內躲著1個P wave

☑ 辨識重點:

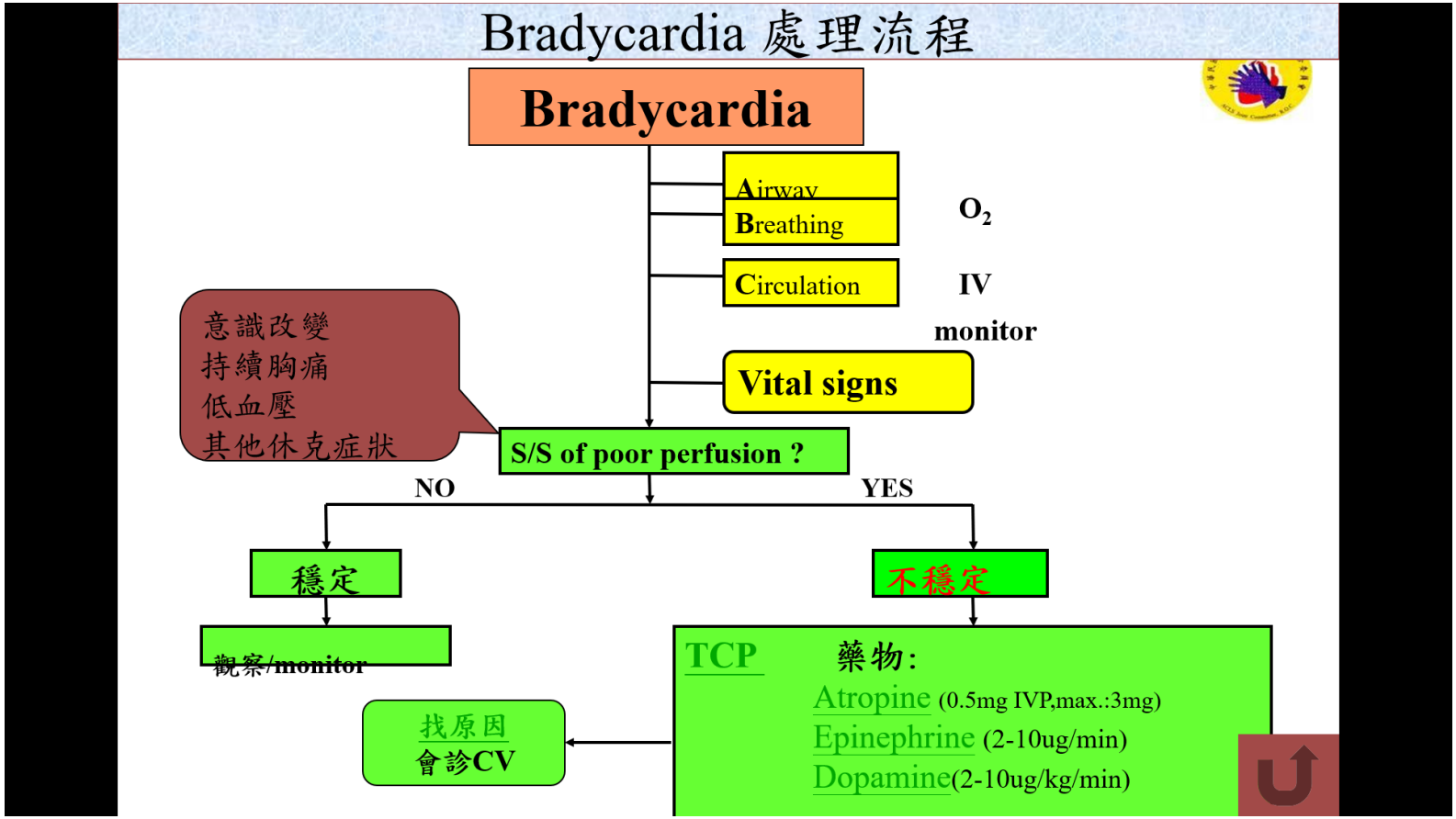
- 規則的P波
- 規則的QRS波(通常是寬的)
- P波的數目比QRS波多。
- P波與QRS波各自獨立，互不相關(AV dissociation)。

Idioventricular rhythm

☑ 辨識重點:

- 規則，寬的QRS波
- 無P波
- Rate: 30~40/min

Bradycardia 處理流程



Pacing: Transcutaneous pacemaker (Class I)

適應症

當病患因心搏過慢
出現嚴重症狀時使用
(即有明顯
S/S of poor perfusion)

是class I 的治療

需具備~

電擊器

連接線

電擊貼片

藥物治療

第一線

Atropine

第二線

Epinephrine

Dopamine

設定TCP

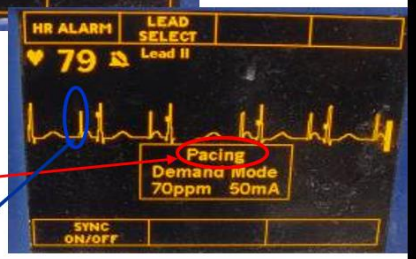
先將電擊器、連接線、
電擊貼片接好，
將pads貼於病人身上

打開power ➡
按控制面版的”Pacer”鈕 1
出現預設畫面

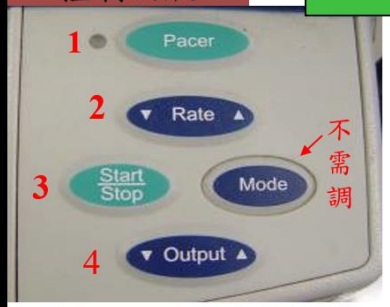
按”Rate”鈕 2 ➡設所需的心率

按”Start/Stop”鈕 3

按”Output”鈕 4，調整電量 ➡
使每個spike後面均能跟一個QRS波



控制面版



**使用TCP於意識清醒的病人，需先給予麻醉性止痛劑或鎮靜劑

祝福大家，順利過關