自律神經檢查

三軍總醫院神經科部

大綱

- 病例報告
- 昏厥症原因及鑑別診斷
- 昏厥症分類及自律神經檢查
- 昏厥症治療
- 昏厥症預後

病例報告

- 王先生
- 男性50歲
- 貿易工作
- 糖尿病十五年，先接受降血糖藥物治療，但近半年血糖值及糖化血色素過高，經新陳代謝科醫師調整為胰島素注射治療

病例報告

症狀:

- 手腳麻木疼痛
- 心情低落，感到全身疲倦，當站立或步行一段時間後，常感到頭暈無力
- 近三個月發生十餘次短暫意識喪失，臉色蒼白，持續2-5分鐘方恢復意識

病例報告

檢查:

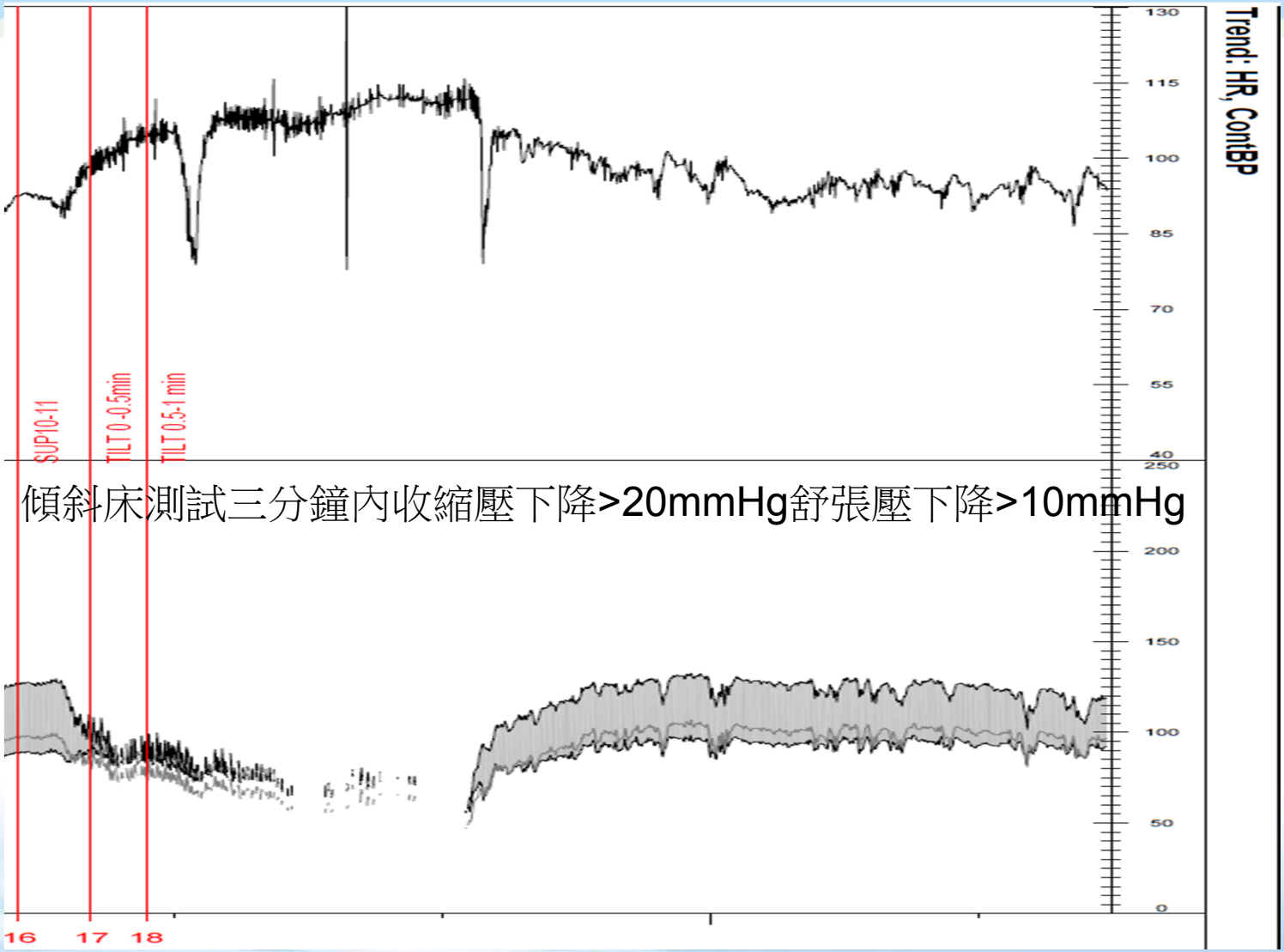
- 上下肢神經傳導檢查，確定為多發性神經病變(運動及感覺神經潛時,傳導速度,振幅均變差)
- 心臟超音波及二十四小時心電圖，結果均無明顯異常
- 轉介至神經科自律神經門診，病患接受傾斜床及腦血流超音波檢查，結果符合姿態性低血壓診斷，自律神經失調

上下肢神經傳導檢查報告

神經	潛時(毫秒)	傳導速度(公尺/秒)	振幅(μV)
運動神經	正常值<3.9	正常值>50(上肢) 及 40(下肢)	正常值 運動>15000 感覺>50
正中神經	5.3	45	11060
尺神經	3.5	52	11510
腓神經	無反應		
脛神經	4.6	31	1562
感覺神經			
橈神經	2.2	45	7
正中神經	4.1	34	5
尺神經	4.4	32	6
腓腸神經	無反應		

無交感皮膚反應

傾斜床檢查



傾斜床測試三分鐘內收縮壓下降>20mmHg舒張壓下降>10mmHg

病例報告

治療:

- 維他命B12治療多發性神經病變
- 抗癲癇藥物鎮頑癲(neurontin)及抗憂鬱藥興緩妥(cirzodone) 控制神經痛
- 升壓劑(midodrine)及衛教
- 無再昏厥且可從事輕便工作

姿態耐受不良分級

Grades of orthostatic intolerance
Grade 0
Normal orthostatic tolerance
Grade I
Orthostatic symptoms are infrequent or occur only under conditions of increased orthostatic stress.
Subject is able to stand > 15 minutes on most occasions.
Subject typically has unrestricted activities of daily living.

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姿態耐受不良分級

Grade II

Orthostatic symptoms are frequent, developing at least once a week. Orthostatic symptoms commonly develop with orthostatic stress.

Subject is able to stand > 5 minutes on most occasions.

Some limitation in activities of daily living is typical.

姿態耐受不良分級

Grade III

Orthostatic symptoms develop on most occasions and are regularly unmasked by orthostatic stresses.

Subject is able to stand > 1 minute on most occasions.

Patient is seriously incapacitated, being bed- or wheelchair-bound because of orthostatic intolerance.

Syncope/presyncope is common if patient attempts to stand. Symptoms may vary with time and state of hydration and circumstances.

Orthostatic stresses include prolonged standing, a meal, exertion, and head stress.

昏厥原因

- 神經心臟性(反射性)
- 姿態性低血壓
- 心律不整
- 心臟(心肌梗塞及心衰竭)或心肺疾病
- 腦血管意外

非昏厥原因

意識喪失:

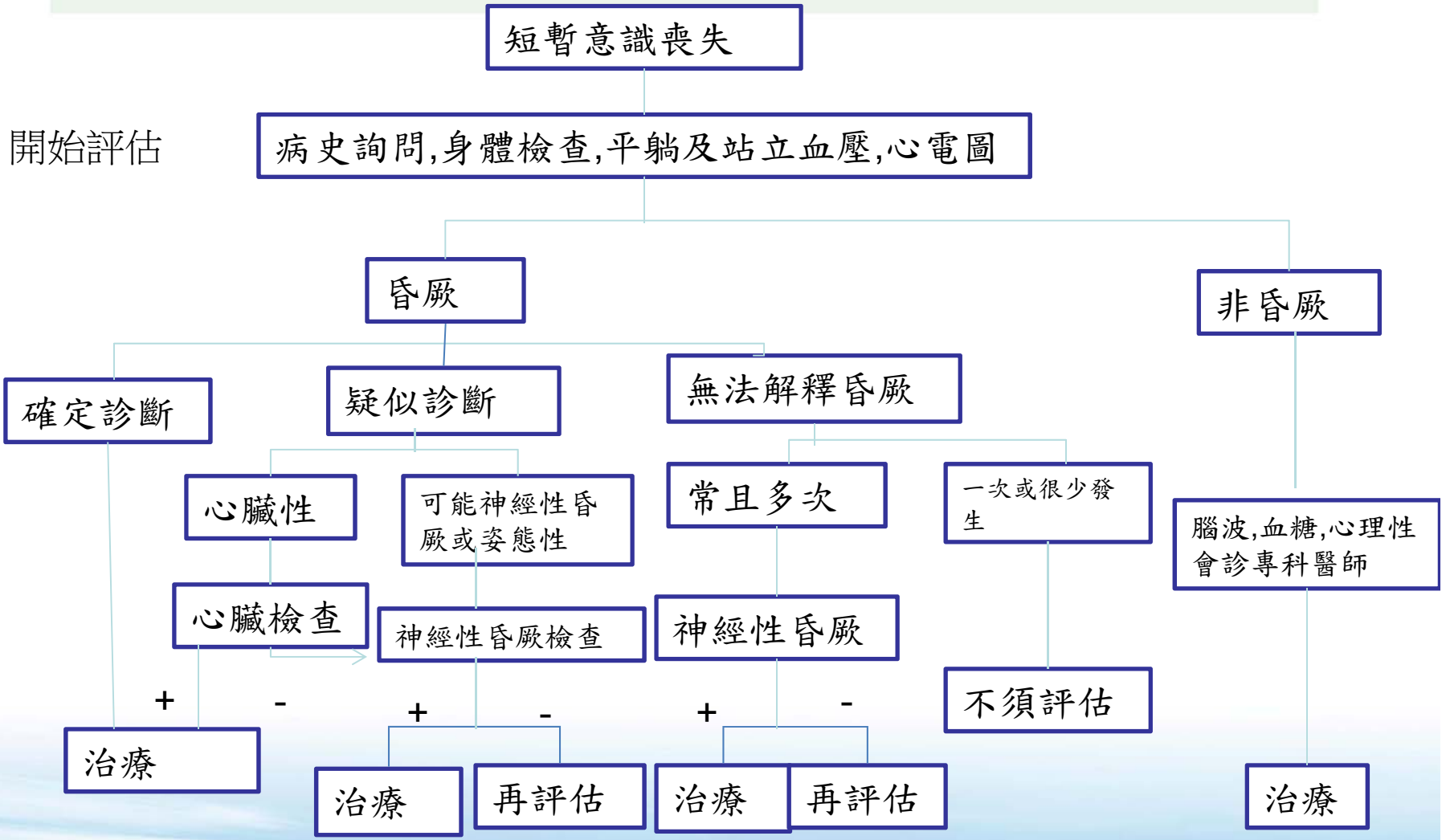
- 代謝性疾病:低血糖,缺氧,過度換氣併低二氧化碳血症(四肢發麻)
- 癲癇症
- 藥物過量
- 基底動脈短暫性腦缺血

非昏厥原因

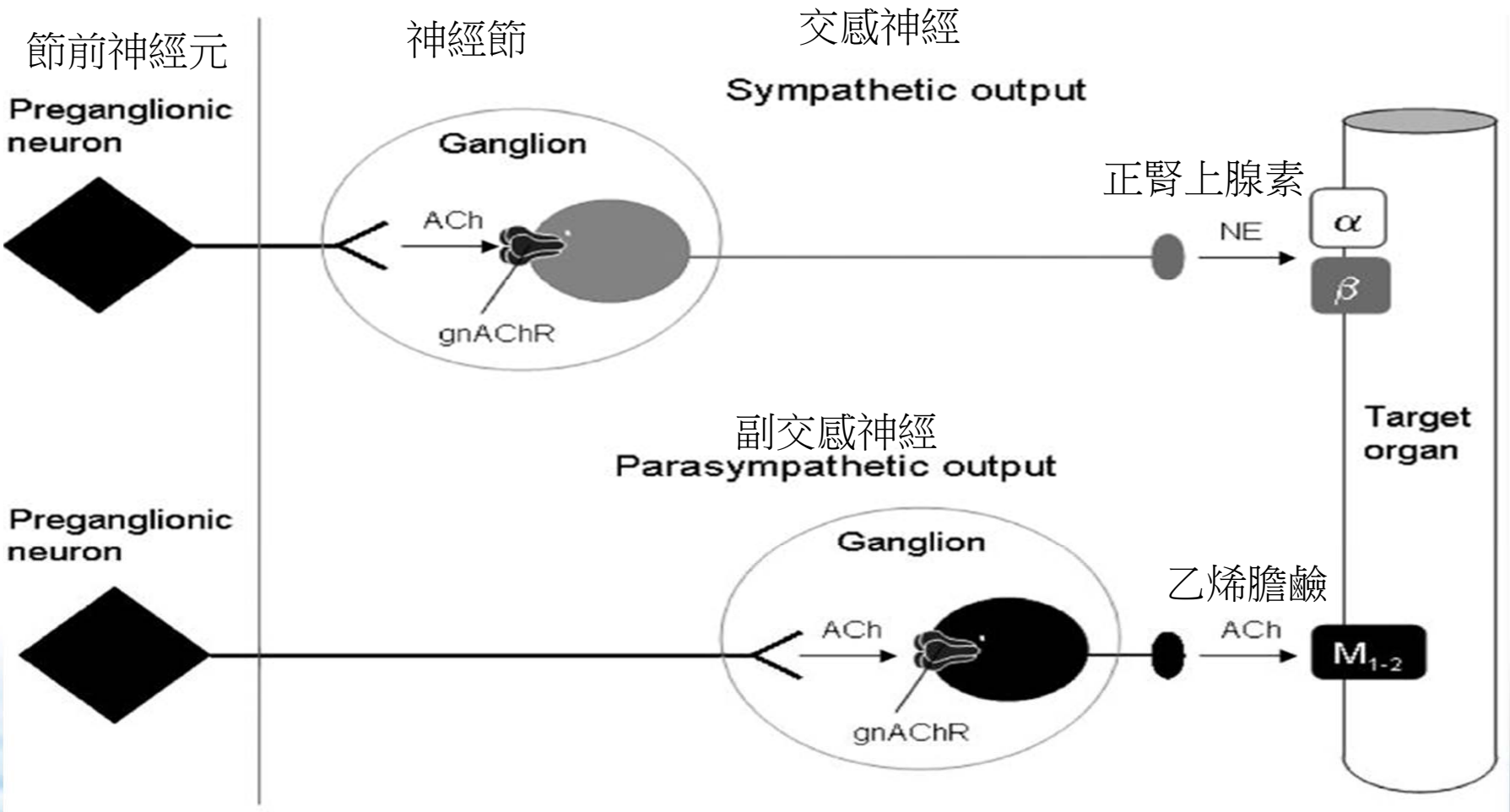
無意識喪失:

- 跌倒
- 猝睡症
- 疲勞倒下
- 心理性偽昏厥
- 頸動脈短暫性腦缺血

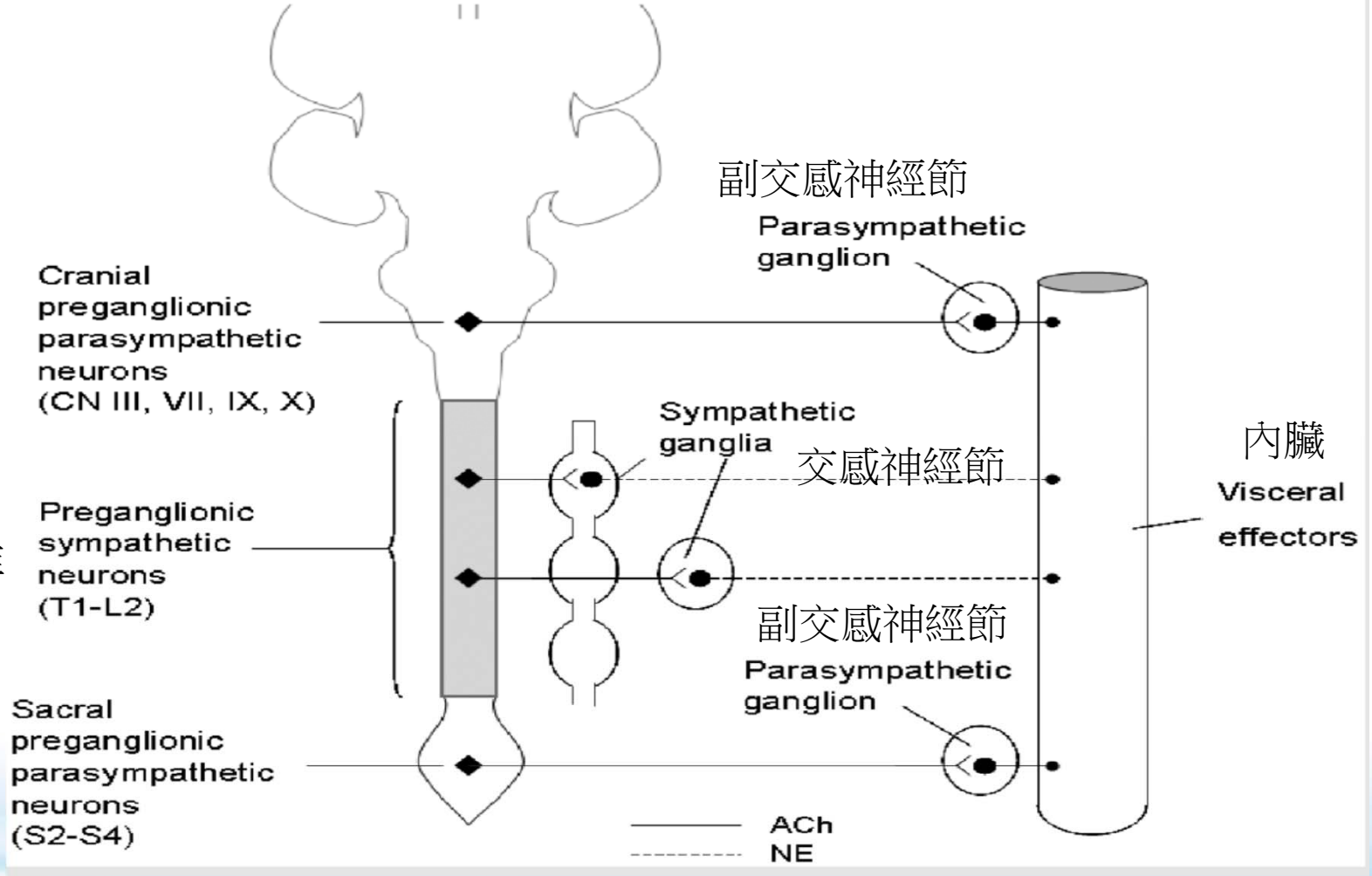
昏厥症診斷


短暫意識喪失
開始評估
病史詢問,身體檢查,平躺及站立血壓,心電圖
昏厥
非昏厥
確定診斷
疑似診斷
無法解釋昏厥
心臟性
可能神經性昏厥或姿態性
常且多次
一次或很少發生
腦波,血糖,心理性會診專科醫師
心臟檢查
神經性昏厥檢查
神經性昏厥
不須評估
+
-
+
-
+
-
治療
治療
再評估
治療
再評估
治療

自律神經系統


節前神經元
神經節
交感神經
Sympathetic output
Preganglionic neuron
Ganglion
ACh
gnAChR
正腎上腺素
NE
α
β
Target organ
副交感神經
Parasympathetic output
Preganglionic neuron
Ganglion
ACh
gnAChR
乙烯膽鹼
ACh
M1-2

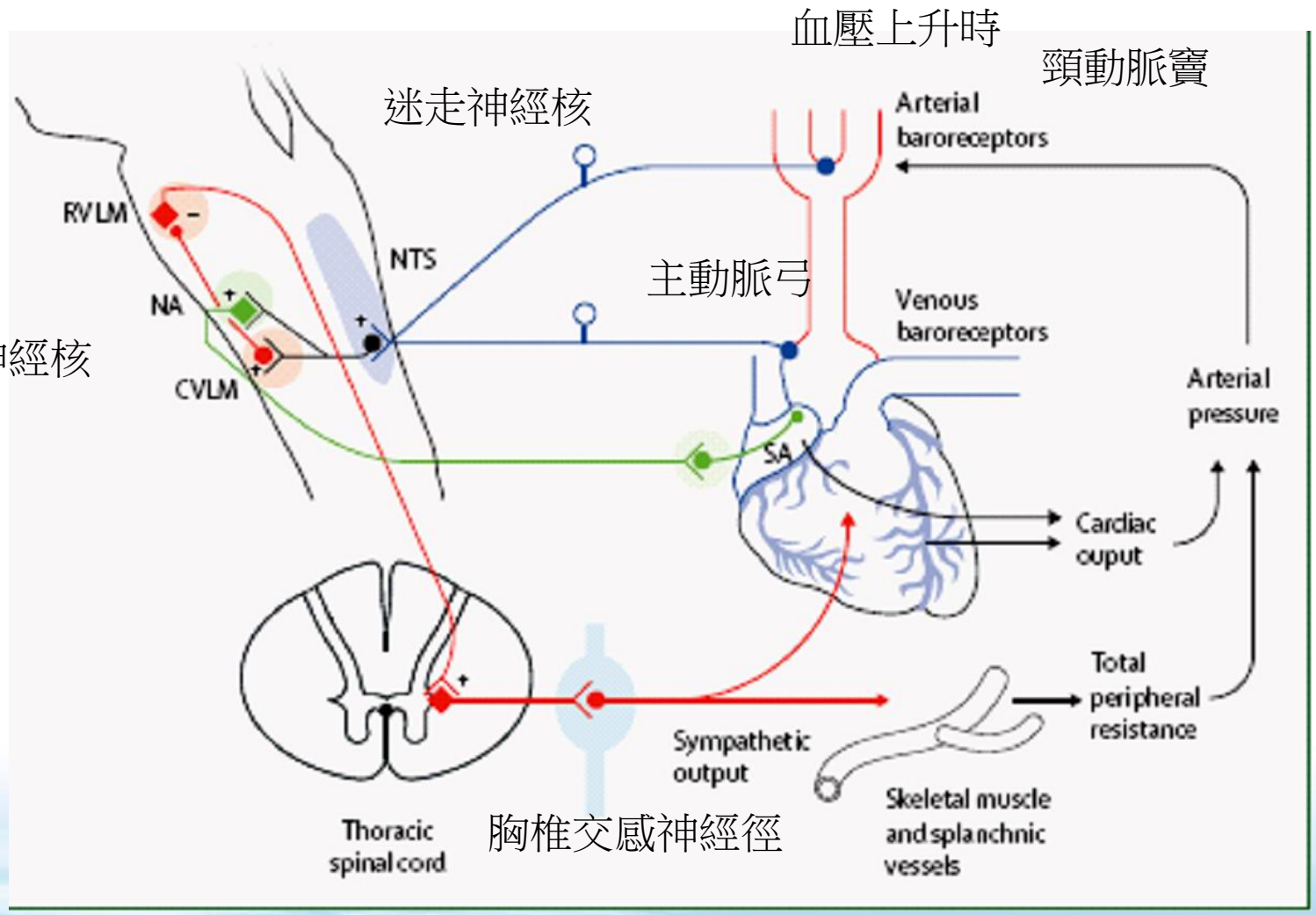
自律神經系統


副交感神經節
Parasympathetic ganglion
顱神經
Cranial preganglionic parasympathetic neurons (CN III, VII, IX, X)
Sympathetic ganglia
交感神經節
內臟
Visceral effectors
胸腰椎
Preganglionic sympathetic neurons (T1-L2)
副交感神經節
Parasympathetic ganglion
薦椎
Sacral preganglionic parasympathetic neurons (S2-S4)
ACh
NE

自律神經系統

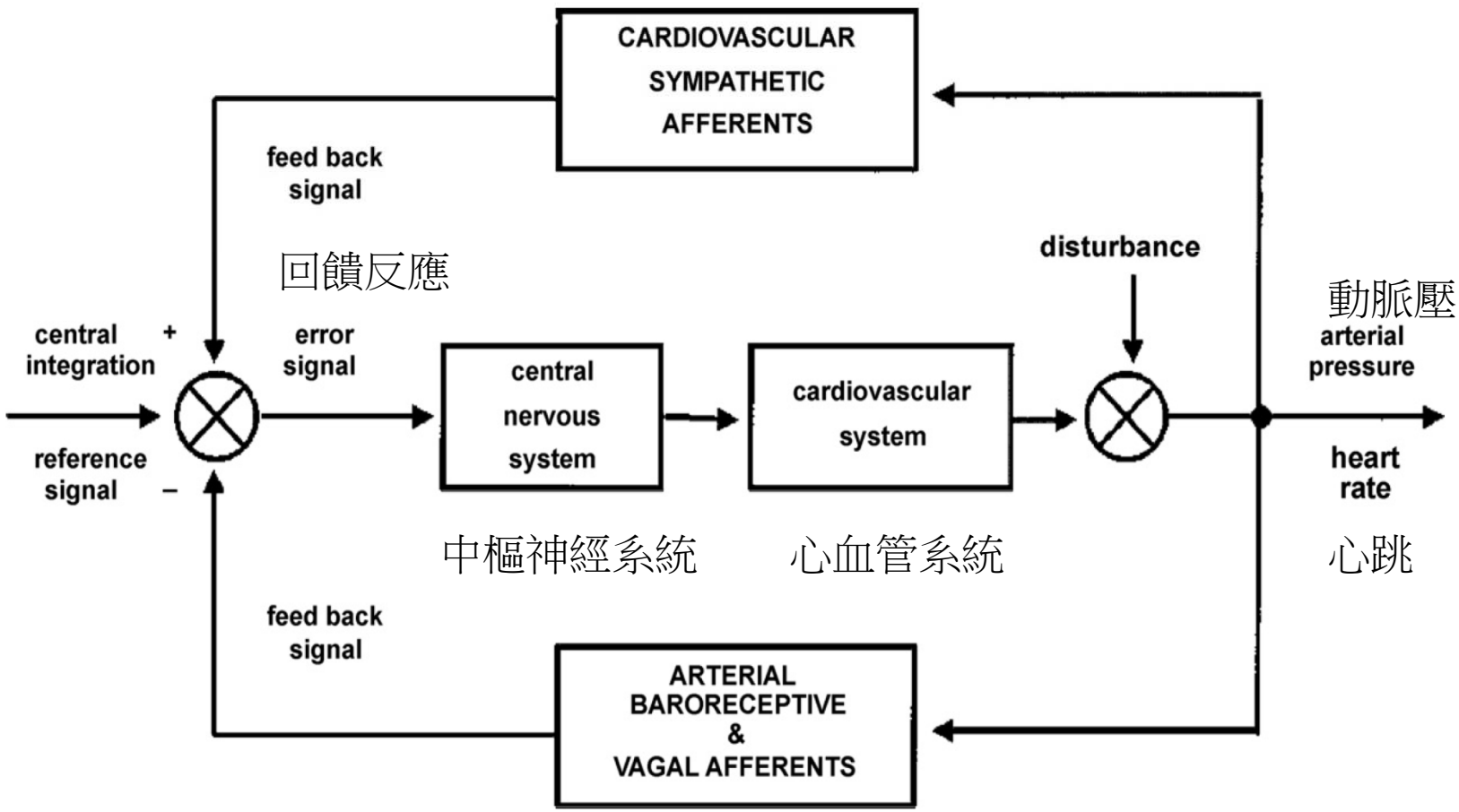
器官	交感神經	副交感神經
瞳孔	放大(α1)	縮小
心臟	刺激(β1)	抑制
血管	收縮(α1)	舒張
腸胃蠕動	抑制(β2)	收縮
膀胱收縮肌	抑制(β2)	刺激
肛門括約肌	抑制(β2)	刺激

感壓反射


血壓上升時
頸動脈竇
迷走神經核
Arterial baroreceptors
RVLM
NTS
主動脈弓
NA
Venous baroreceptors
交感神經核
CVLM
Arterial pressure
SA
Cardiac ouput
Total peripheral resistance
Sympathetic output
Skeletal muscle and splanchnic vessels
Thoracic spinal cord
胸椎交感神經徑

心血管系統

心臟交感神經輸入

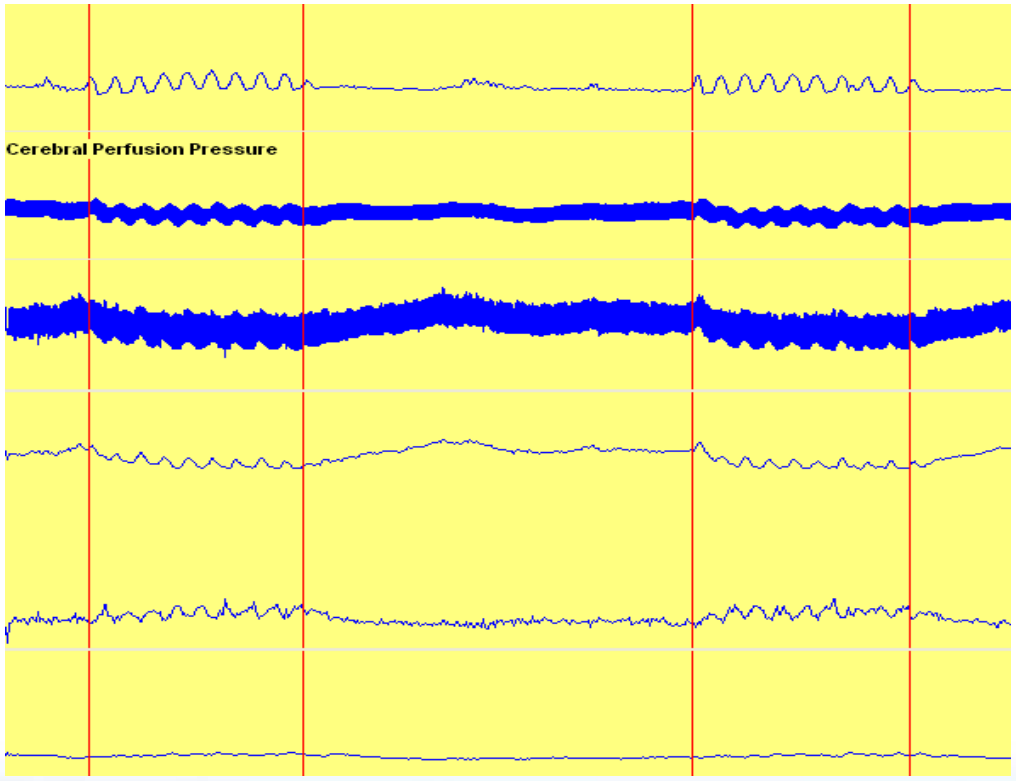


動脈感壓接受及
副交感神經輸入

自律神經檢查

- 深呼吸測試
- 吐氣Valsalva maneuver
- 傾斜床測試

深呼吸測試

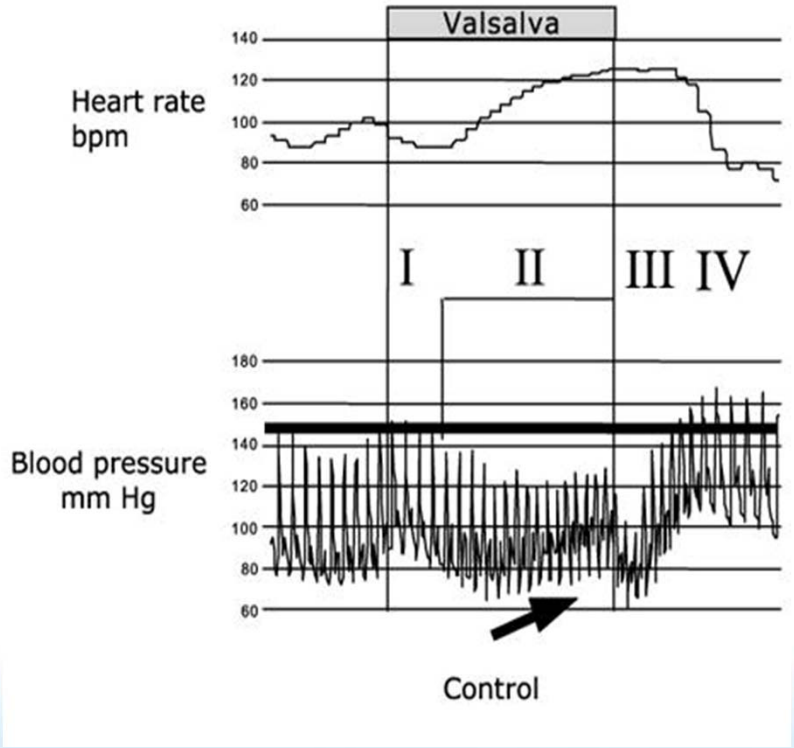


深呼吸(5-6次/分鐘)
吸氣胸內壓上升-心跳加快
深呼吸吸氣及吐氣心跳差>12下
吐/吸比值>1.1
:副交感神經功能

有氧運動增加副交感神經反應及調節交感反應

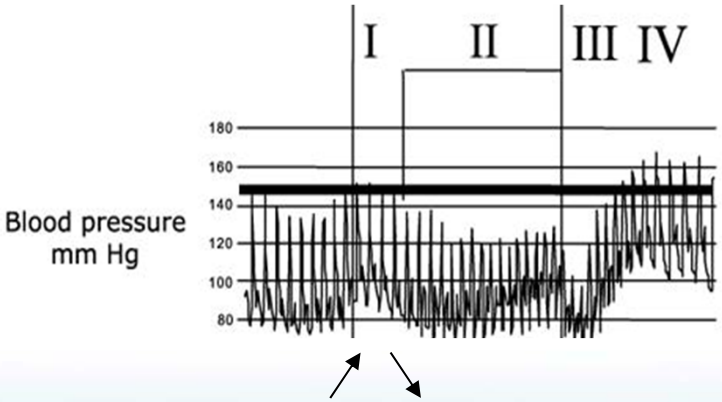
吐氣Valsalva maneuver

- 吐氣40mmHg持續15秒



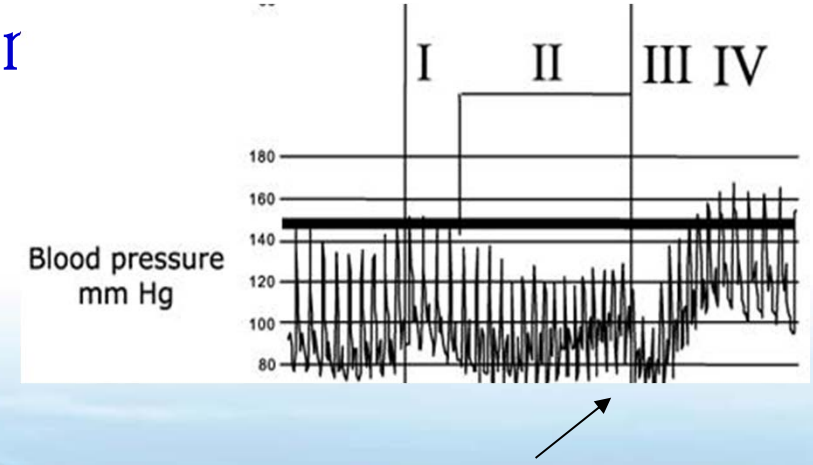
吐氣Valsalva maneuver

- 第一期 Phase I: 短暫血壓上升 transient BP↑
  胸內及腹內壓上升:機械性壓迫動脈
- 第二期早期 Early phase II:血壓下降 BP ↓
  心輸量下降 ->靜脈回流及心搏量下降
  副交感下降->心跳加快

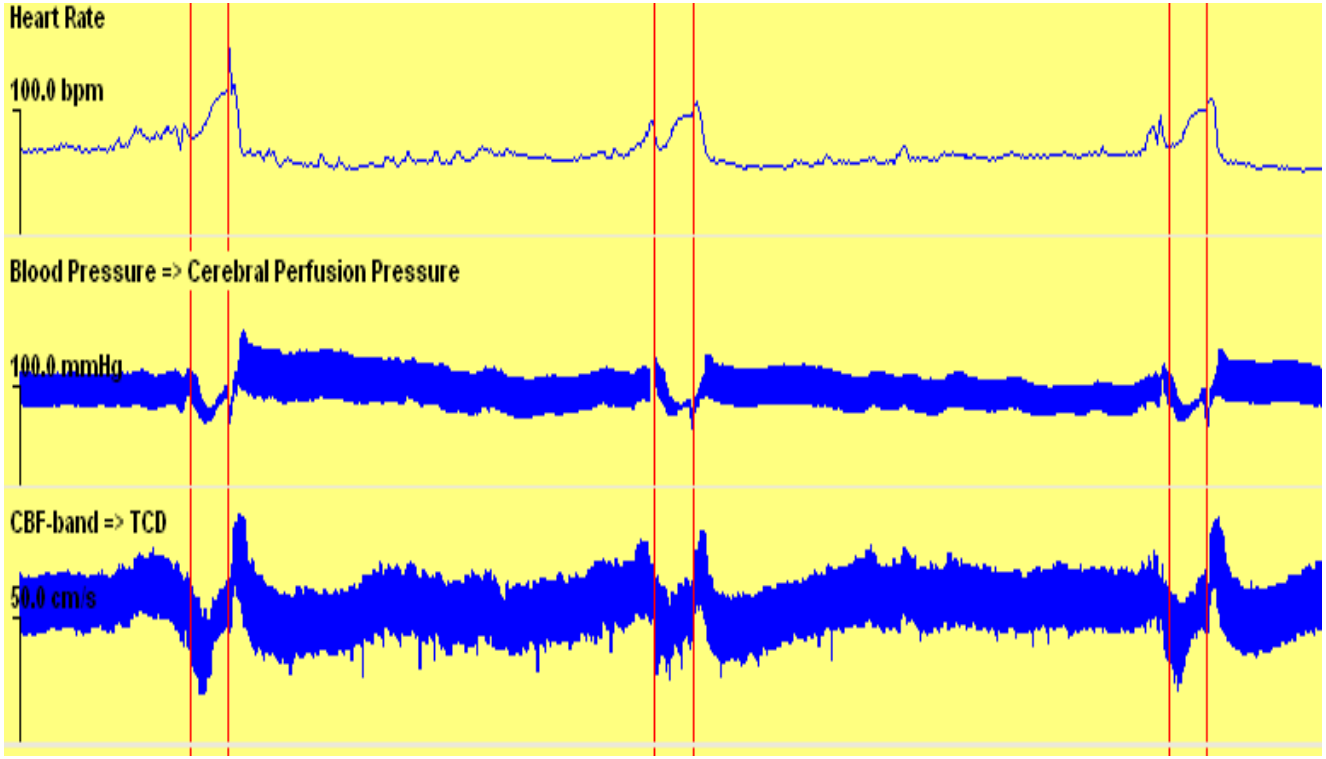


吐氣Valsalva maneuver

- 第二期後期 Late phase II:血壓上升 BP ↑
  周邊交感及正腎上腺素上升 -->系統阻力上升
- 第三期Phase III:短暫血壓下降 BP ↓
  胸內及腹內壓下降
- 第四期Phase IV:短暫血壓上升 transient BP overshoot 靜脈回流及心搏量上升-->(心臟交感神經 cardiac adrer

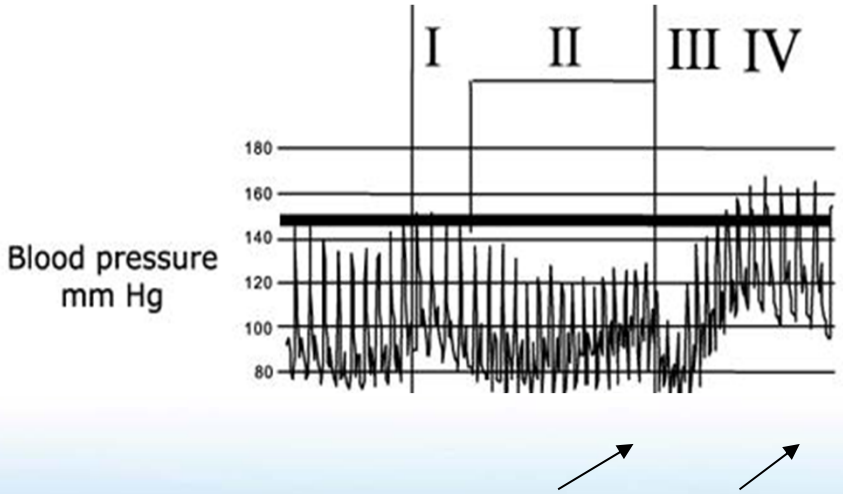


吐氣Valsalva maneuver



吐氣交感活性

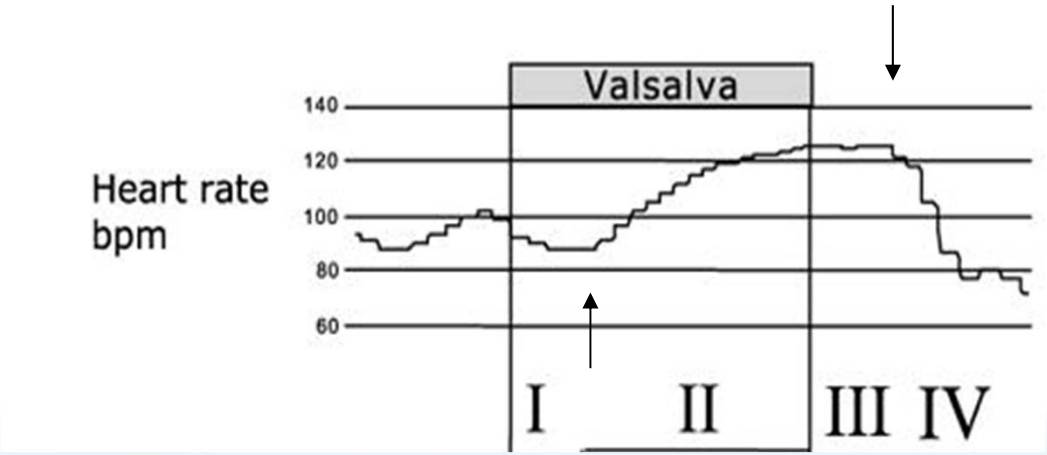
- 第二期後期血壓恢復:周邊血管收縮
- 第四期恢復:心臟收縮反應



副交感活性

- 第二期感壓反射心跳變快及第四期感壓反射心跳變慢

  Valsalva ratio>1.2 (快/慢)



正常與姿態性心搏過速

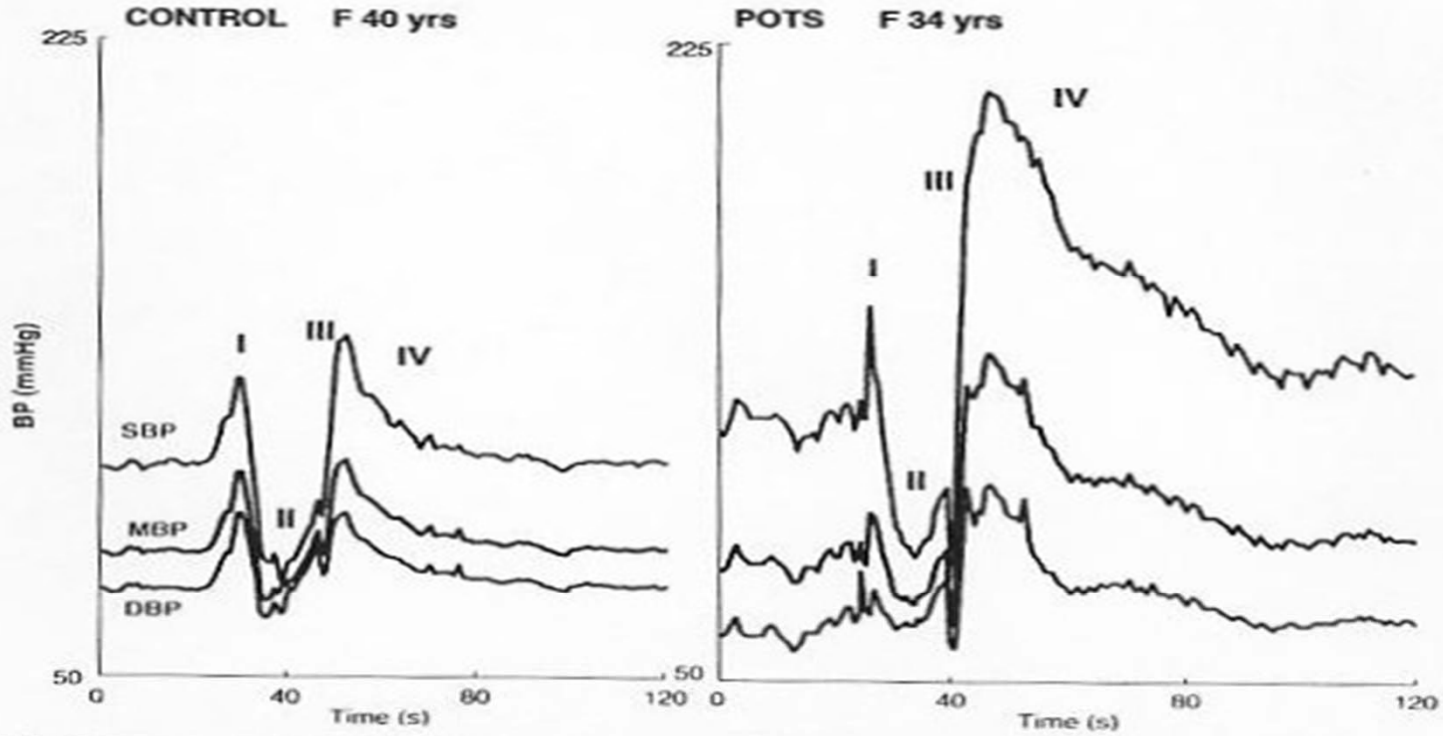


FIGURE 36.1 Normal Valsalva maneuver and that from a patient with postural tachycardia syndrome (POTS). The blood pressure (BP) responses from the POTS patient are characterized by an excessive BP (phase IV) overshoot.

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姿態性低血壓與姿態性心搏過速

TABLE 36.3

Comparison of Neurogenic Orthostatic Hypotension (OH) Patients with POTS

Parameter	*Neurogenic OH*	*POTS*
Orthostatic dizziness	Variably present	Present
Orthostatic tremulousness	Absent	Common
Orthostatic palpitations	Absent	Common
Orthostatic hypotension	Consistent	Usually absent
Orthostatic tachycardia	Reduced	Exaggerated
Supine norepinephrine	Usually reduced	Normal or increased
Standing norepinephrine	Reduced	Increased or normal
HR response to deep breathing	Reduced	Normal
Valsalva ratio	Reduced	Normal or increased
BP_{BB} to VM		
Early phase II	Markedly increased	Increased
Late phase II	Absent	Normal or reduced
Phase IV	Absent	Increased

BP_{BB}, beat-to-beat blood pressure; HR, heart rate; POTS, postural tachycardia syndrome; VM, Valsalva maneuver.

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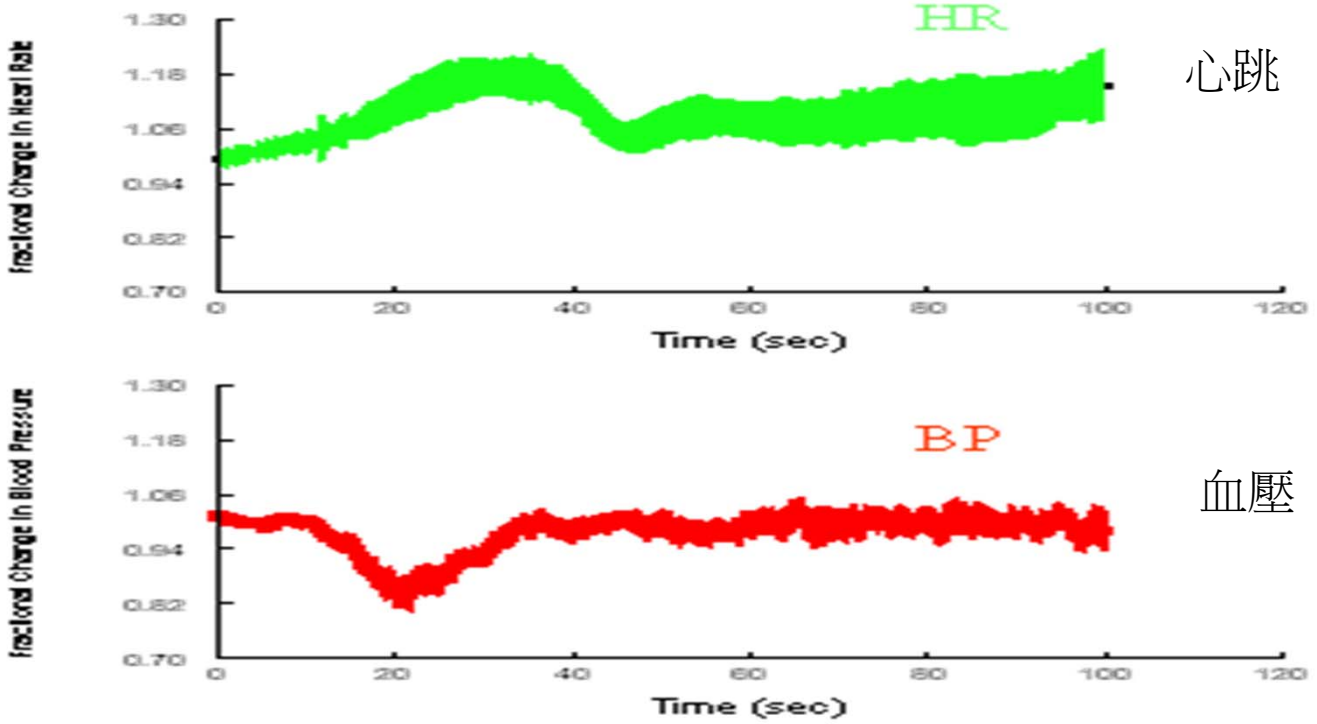
傾斜床測試(Task Force Monitor)

傾斜床測試

臨床上須安排傾斜床測試 之狀況:

- 與癲癇症鑑別診斷之昏厥併肢體抽動
- 近期多次原因不明昏厥(>50歲；無心臟疾病；>2次)
- 近期多次昏厥前驅症狀或暈眩

姿態改變之血壓及心跳變化



收縮壓/舒張壓變化: 正常小於-20/-10mmHg

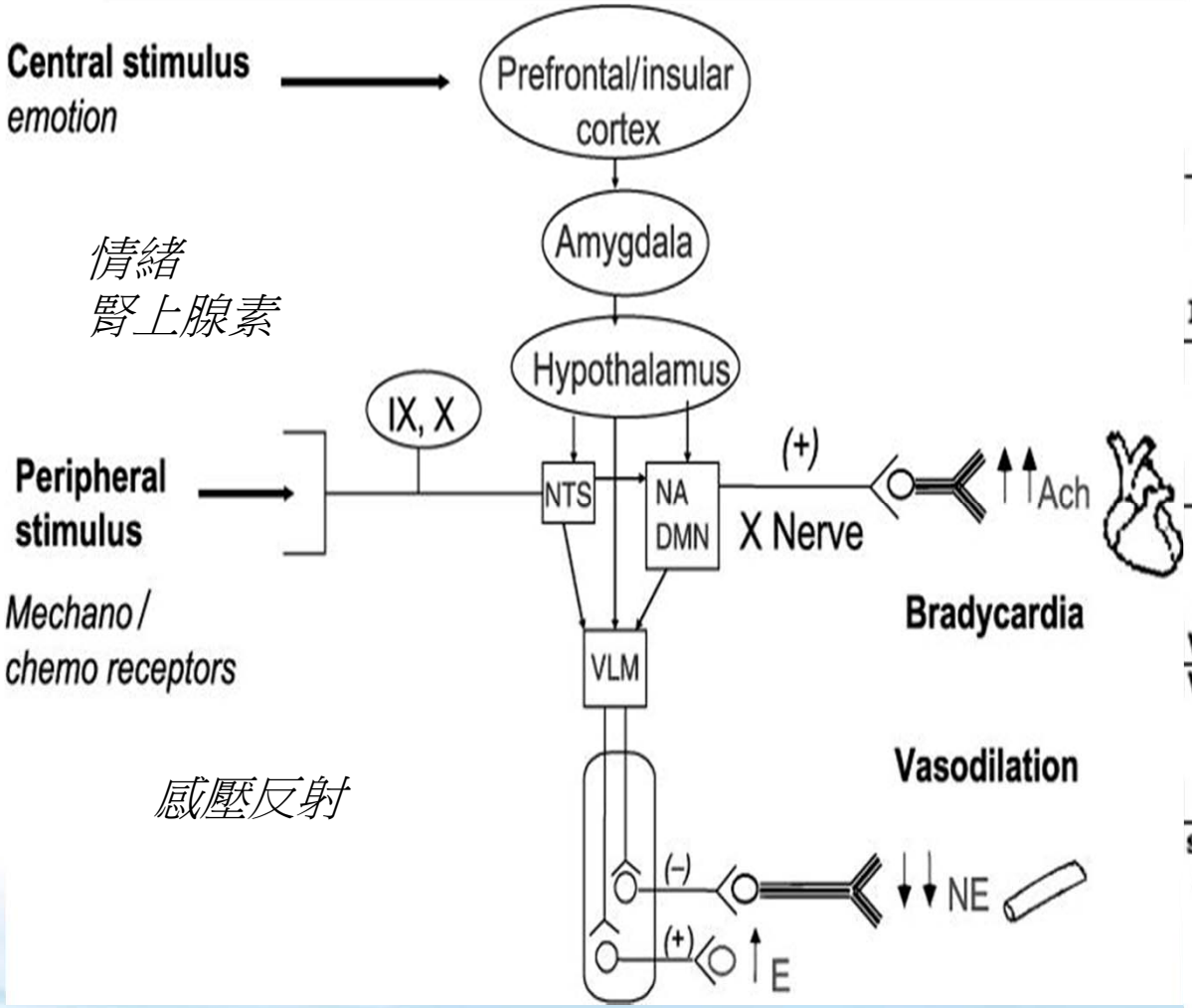
心跳變化小於30跳 /分

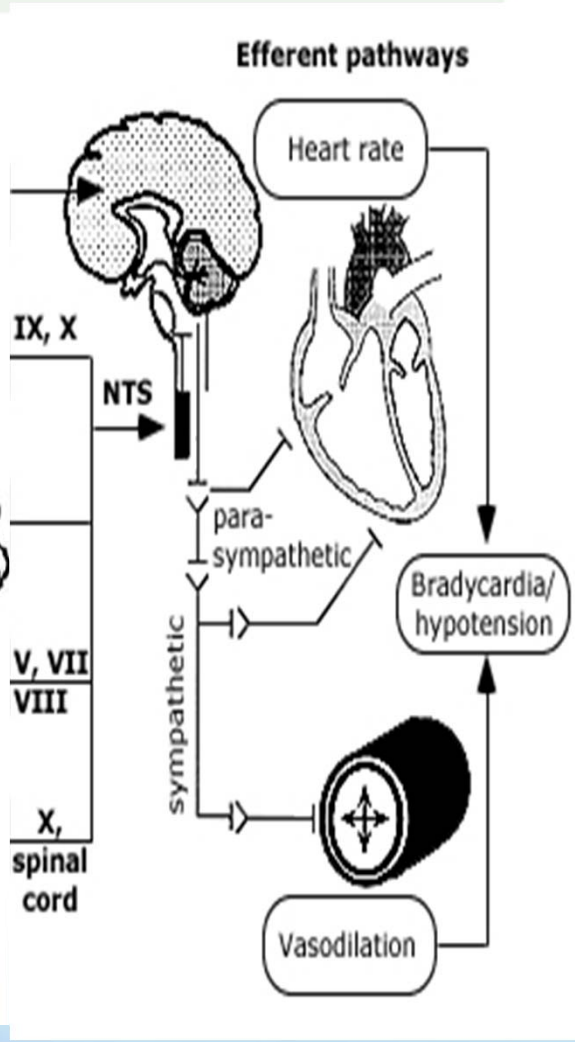
迷走神經昏厥症

誘發因子:

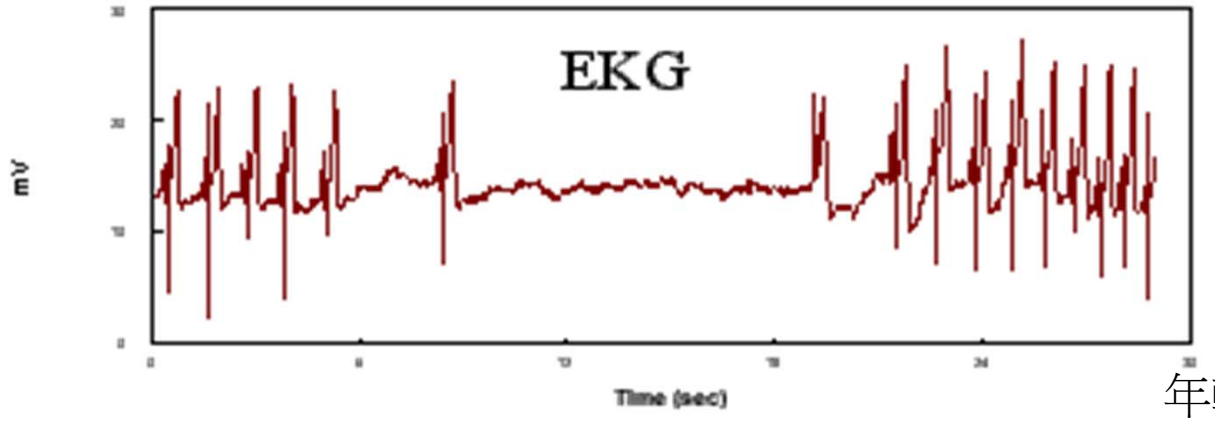
- 情緒或姿態性壓力:
- 抽血，疼痛或焦慮刺激，害怕身體受傷，久站，太熱或運動。

迷走神經性昏厥症


Central stimulus
emotion
Prefrontal/insular cortex
Amygdala
Hypothalamus
情緒
腎上腺素
IX, X
Peripheral stimulus
Mechano / chemo receptors
NTS
NA DMN
(+)
X Nerve
Ach
Bradycardia
VLM
Vasodilation
感壓反射
(-)
NE
(+)
E

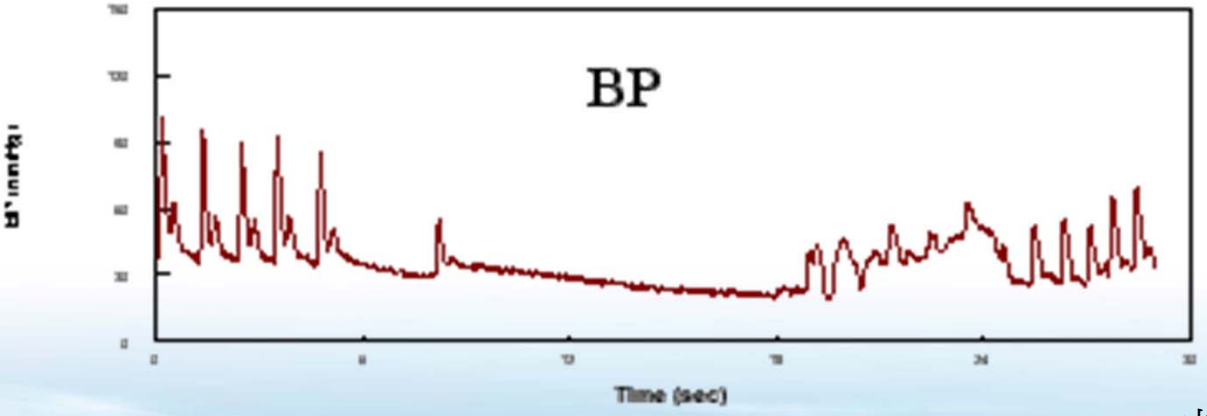

Efferent pathways
Heart rate
IX, X
NTS
para-sympathetic
Bradycardia/ hypotension
V, VII VIII
sympathetic
X, spinal cord
Vasodilation

迷走性昏厥



心跳

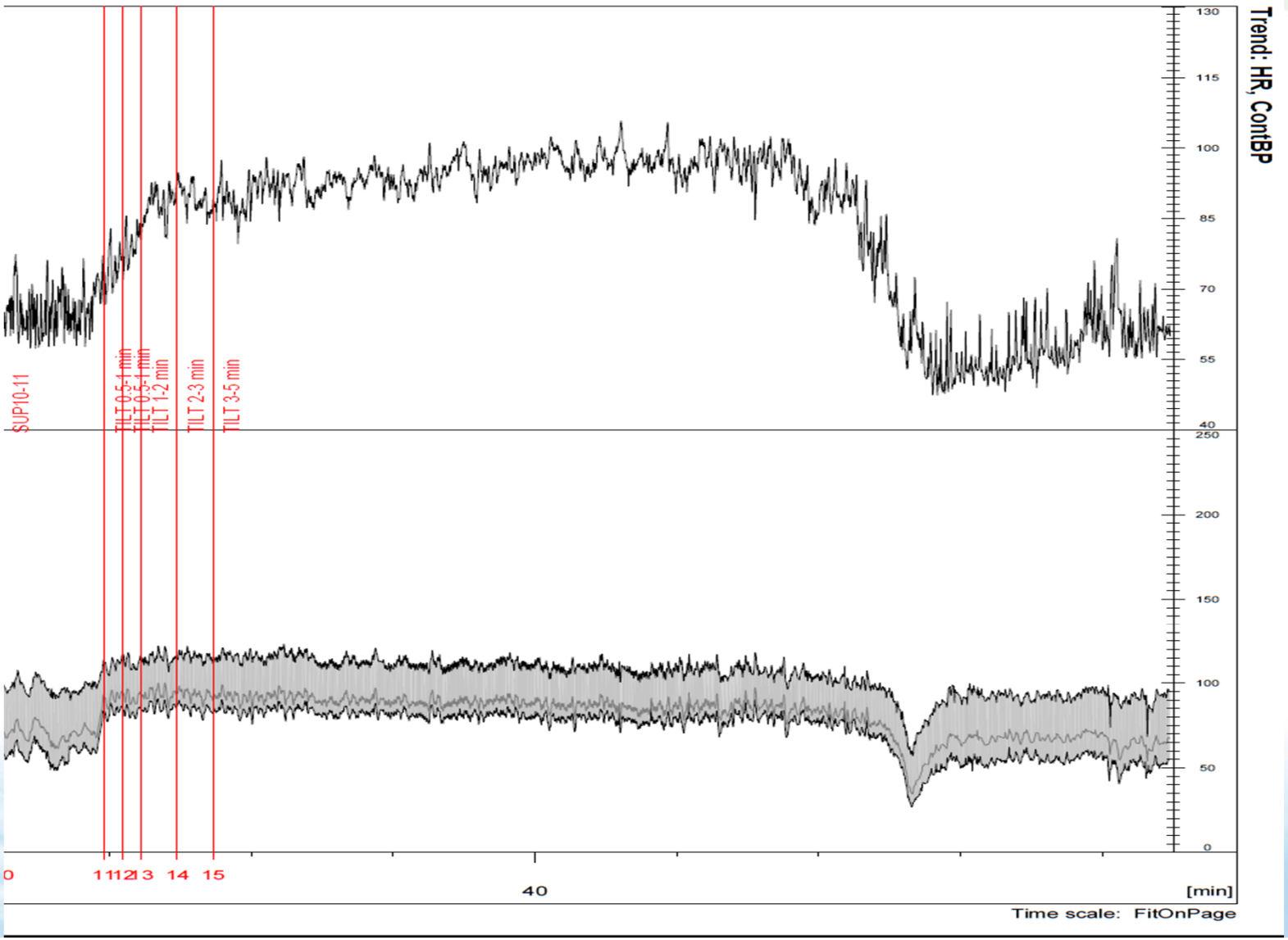
年輕人多心臟抑制



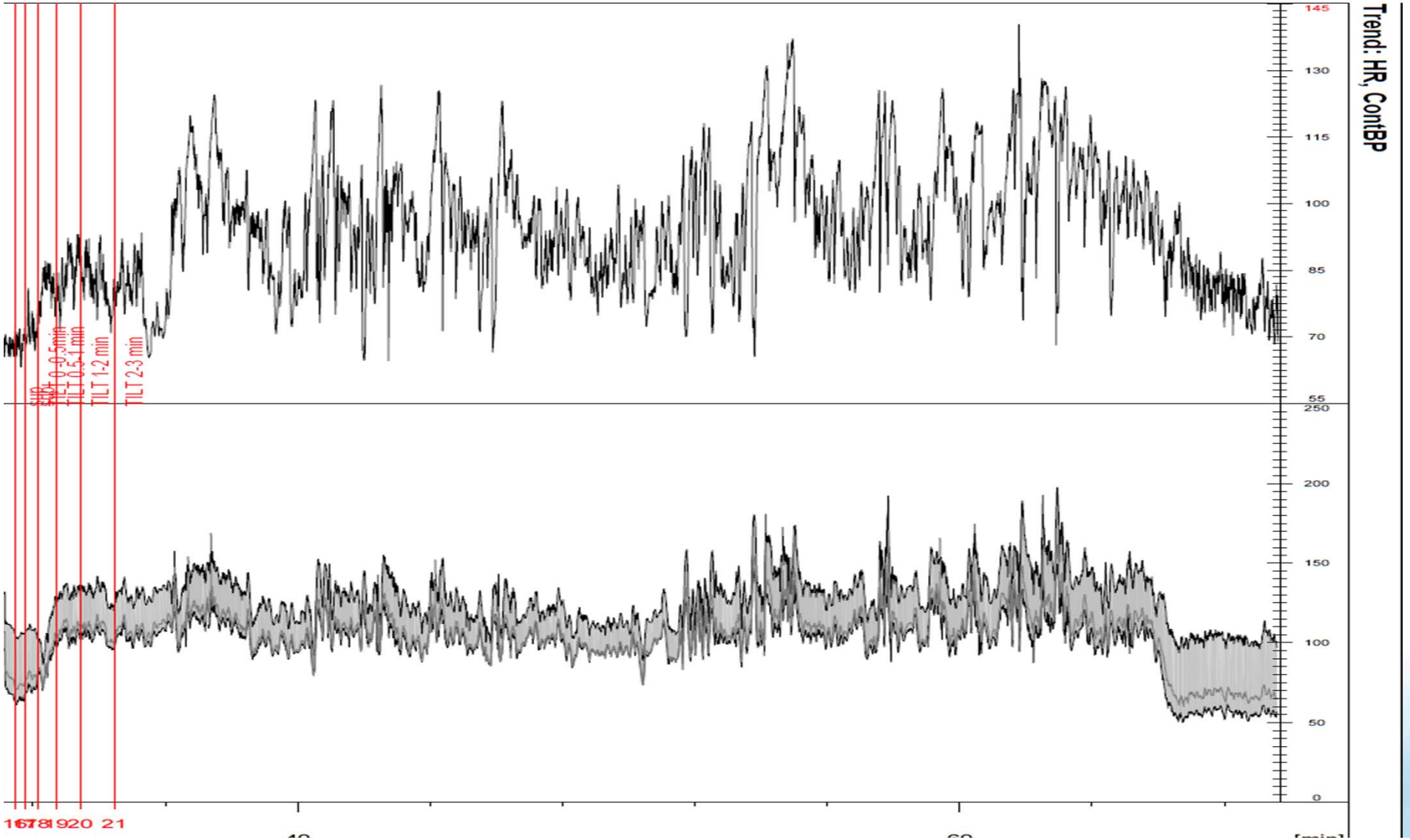
血壓

老年人多血壓下降

迷走性昏厥(22歲男性軍人集合摔斷牙齒)



姿態性心搏過速症候群(軍人)



穿顱超音波

- 在傾斜床測試時，當一般腦血流下降50%會產生昏厥現象。
- 正常人在傾斜床測試時約下降10%。

normocapnic postural tachycardia syndrome

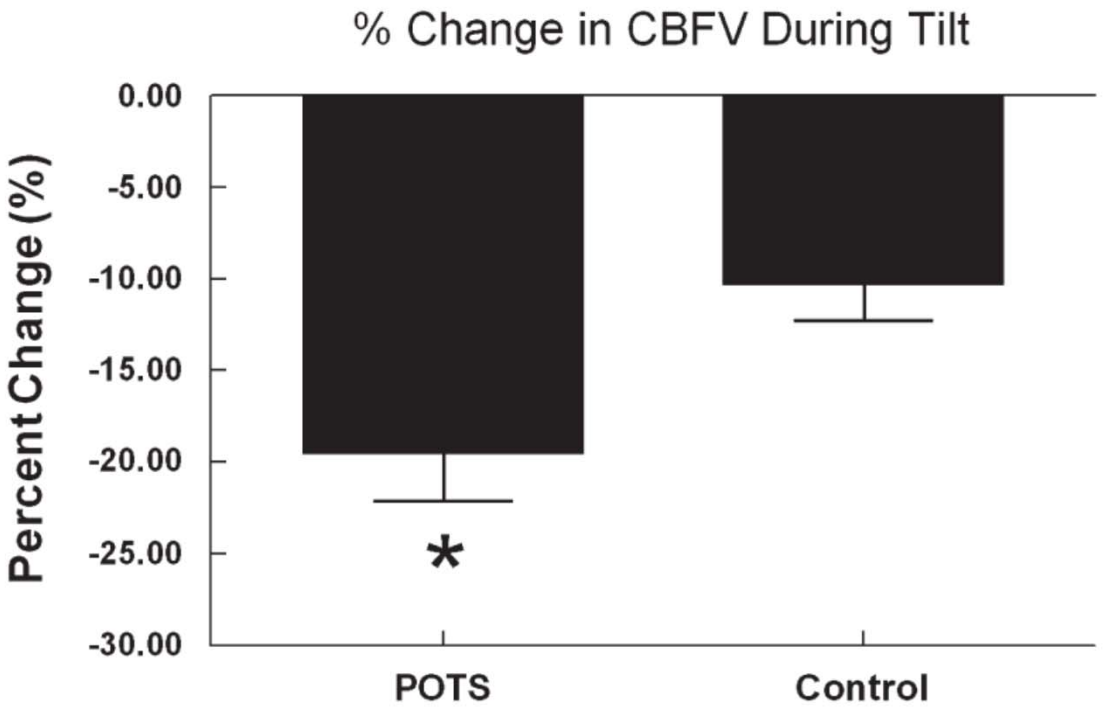
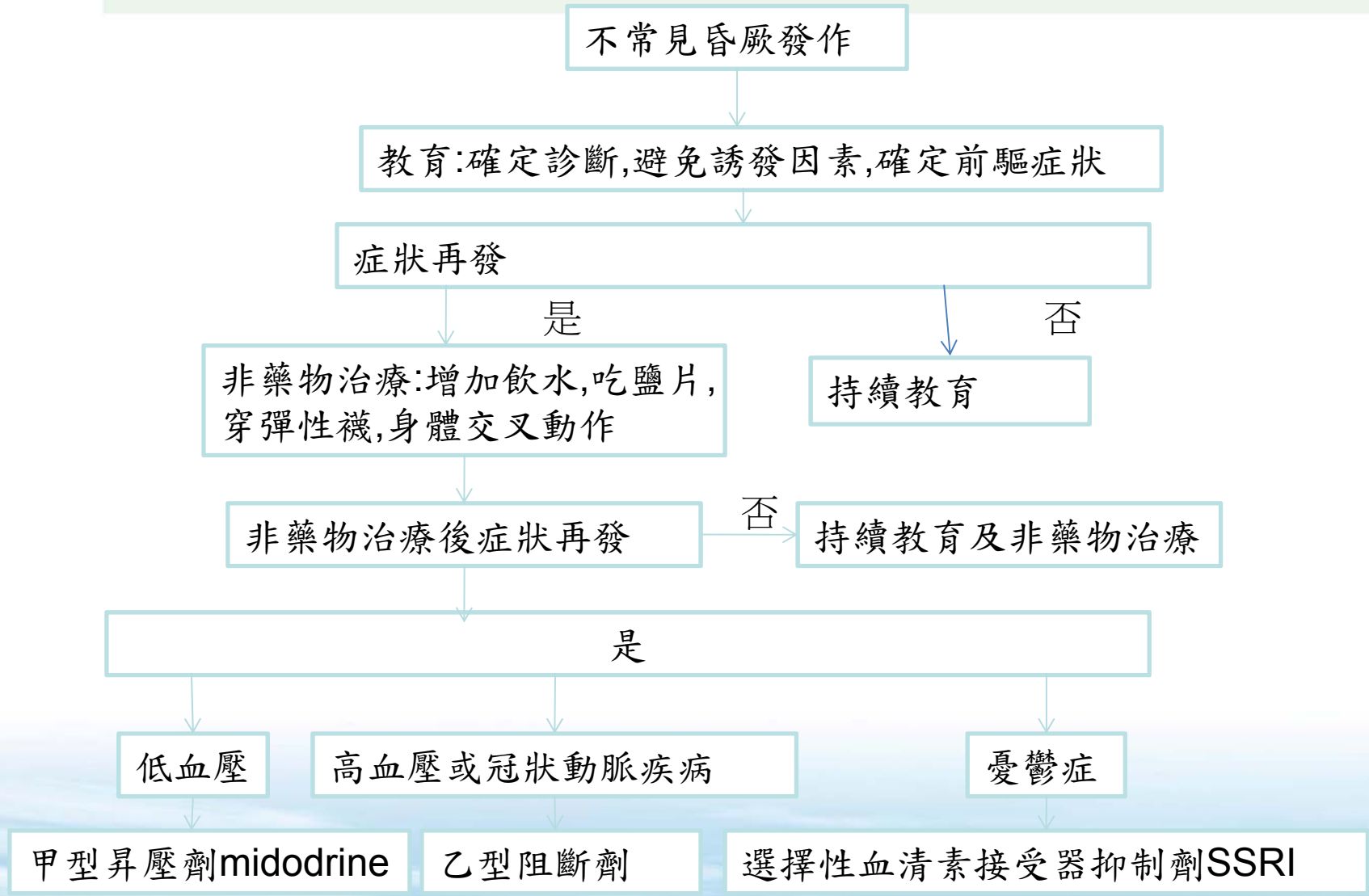


Fig. 1. Percent change in cerebral blood flow velocity (CBFV) during tilt. Postural tachycardia syndrome (POTS) subjects, during tilt, exhibited an ~20% decrease in CBFV, whereas controls exhibited an ~10% decrease. *$P < 0.05$ compared with controls.

Am J Physiol Heart Circ Physiol 297:664-673, 2009.

昏厥治療

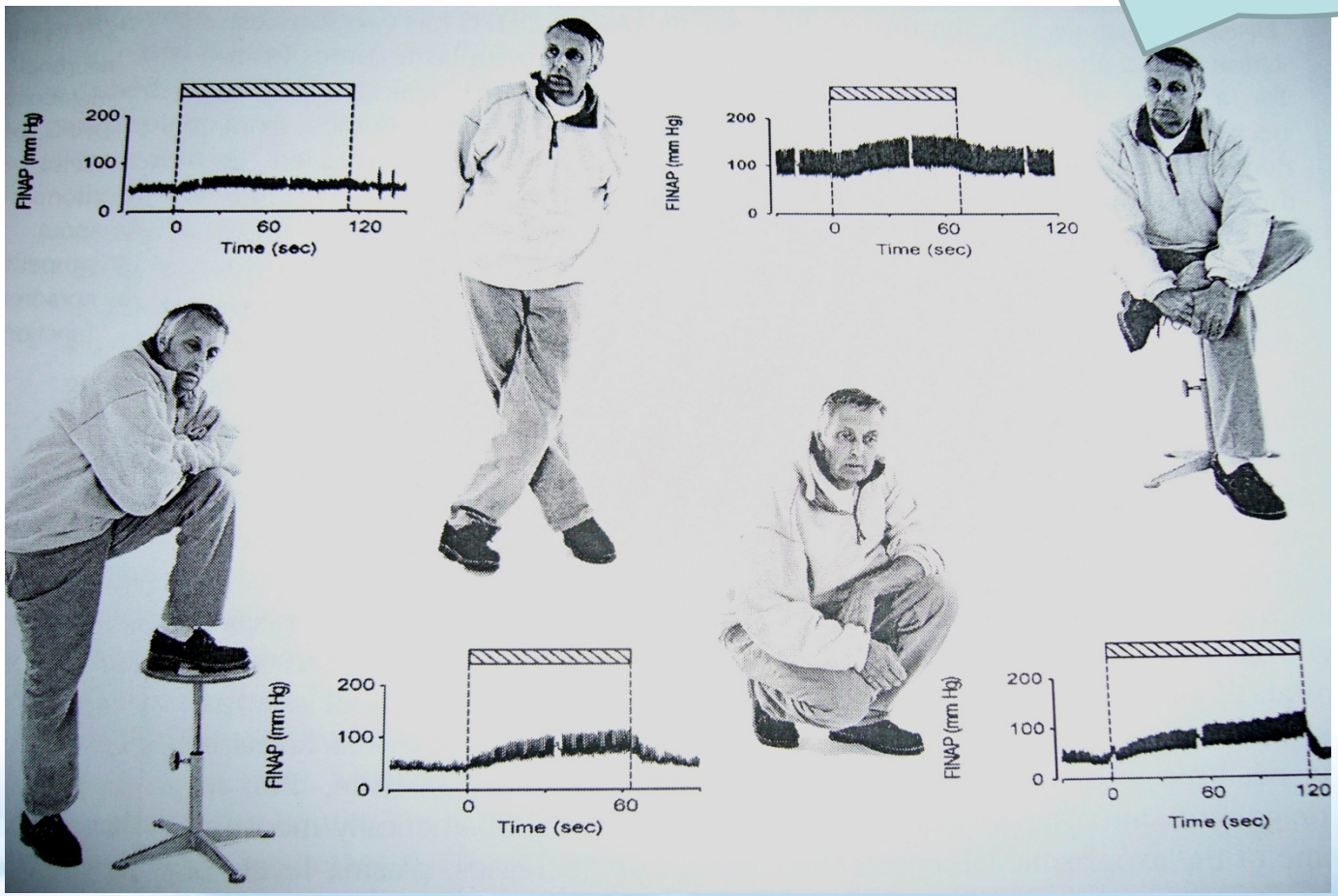

不常見昏厥發作
教育:確定診斷,避免誘發因素,確定前驅症狀
症狀再發
是
否
非藥物治療:增加飲水,吃鹽片,穿彈性襪,身體交叉動作
持續教育
非藥物治療後症狀再發
否
持續教育及非藥物治療
是
低血壓
高血壓或冠狀動脈疾病
憂鬱症
甲型昇壓劑midodrine
乙型阻斷劑
選擇性血清素接受器抑制劑SSRI

昏厥治療

- 昏厥病患症狀為腦血流循環不良所造成，多起因於脫水或交感神經失常。
- 需多飲水一日達2500cc以上(增加血量)
- 增加鹽分攝取達1.5克以上(增加血量)
- 建議穿彈性襪(增加血液回流)
- 多從事有氧運動(增加血液回流)
- 藥物治療:使用升壓劑(增加血壓)，以改善腦血流;抗憂鬱藥物及大力丸(改善交感神經)。

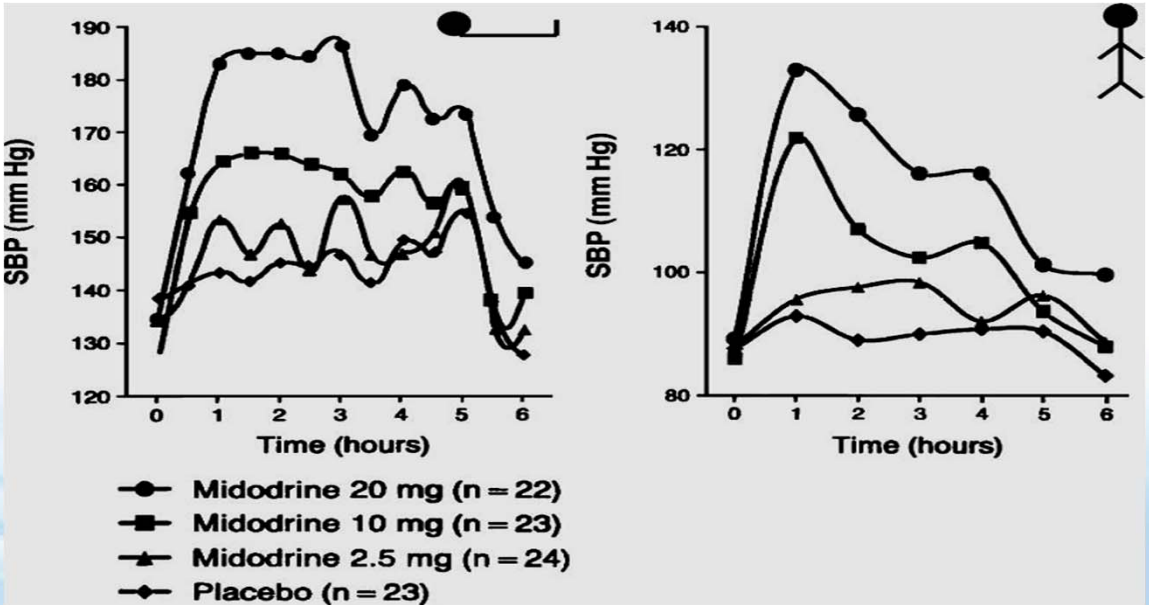
身體昇壓動作

大家跟我一起做運動



升壓劑Midodrine

- 30分鐘開始作用
- 作用持續二至四小時
- 副作用:平躺姿態性高血壓
- 注意事項:睡前二小時勿服用



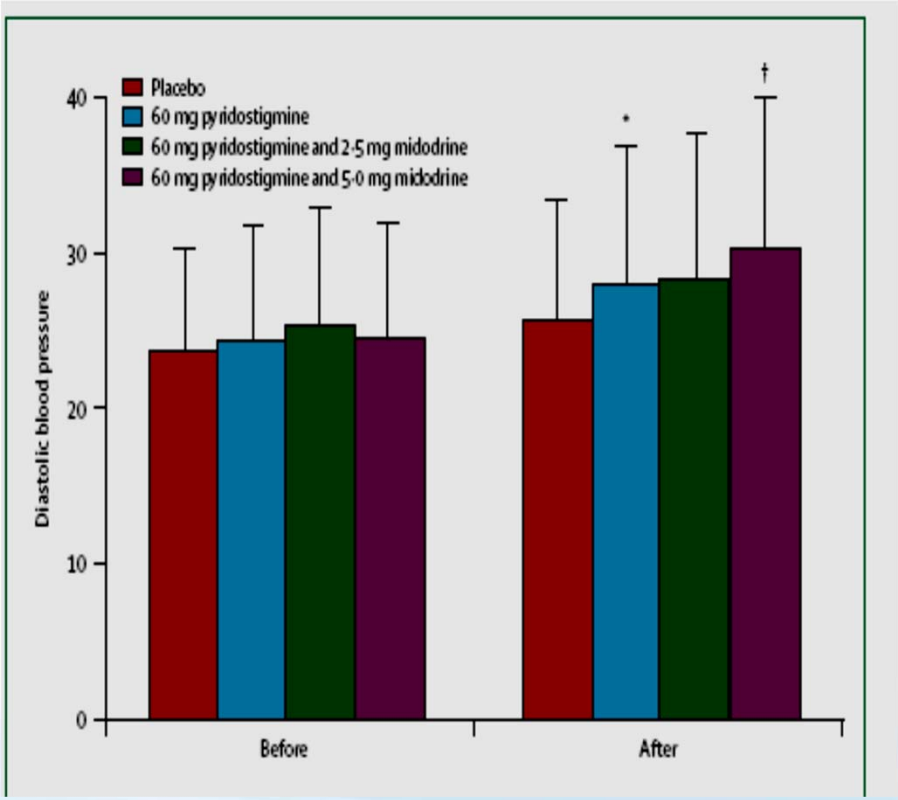
Neurology 1998;51:120-124

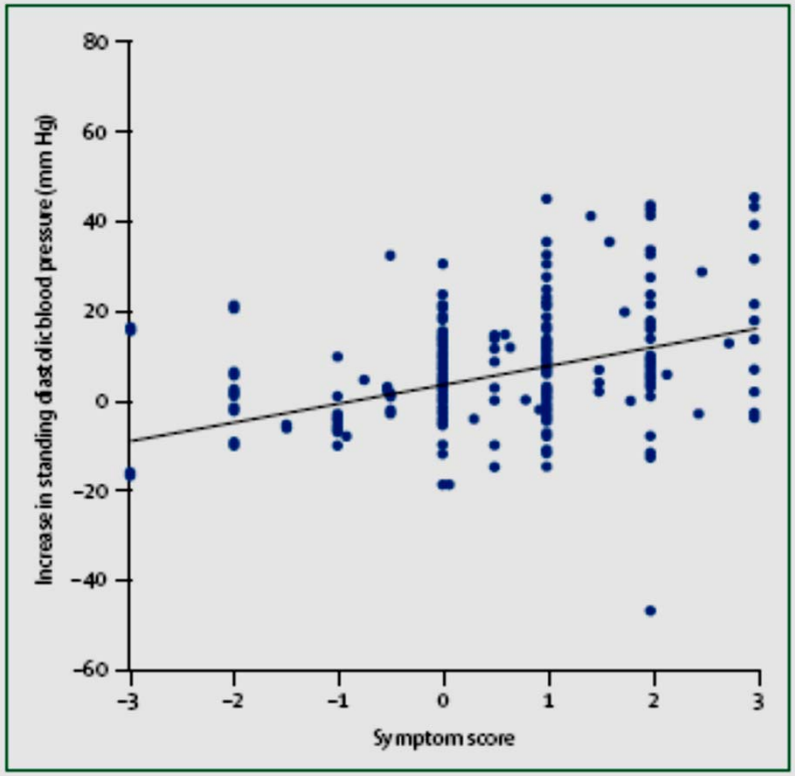
抗憂鬱藥

- 百憂解，千憂解，速悅及樂復得主要提高腦中血清素及正腎上腺素，可以改善憂鬱症狀及交感神經活性治療昏厥。

大力丸

改善舒張壓呈現劑量反應





JNNP 2003;74:1294-98

姿態性心搏過速治療

Table 2 Summary of treatment options existing for POTS with the corresponding levels of evidence

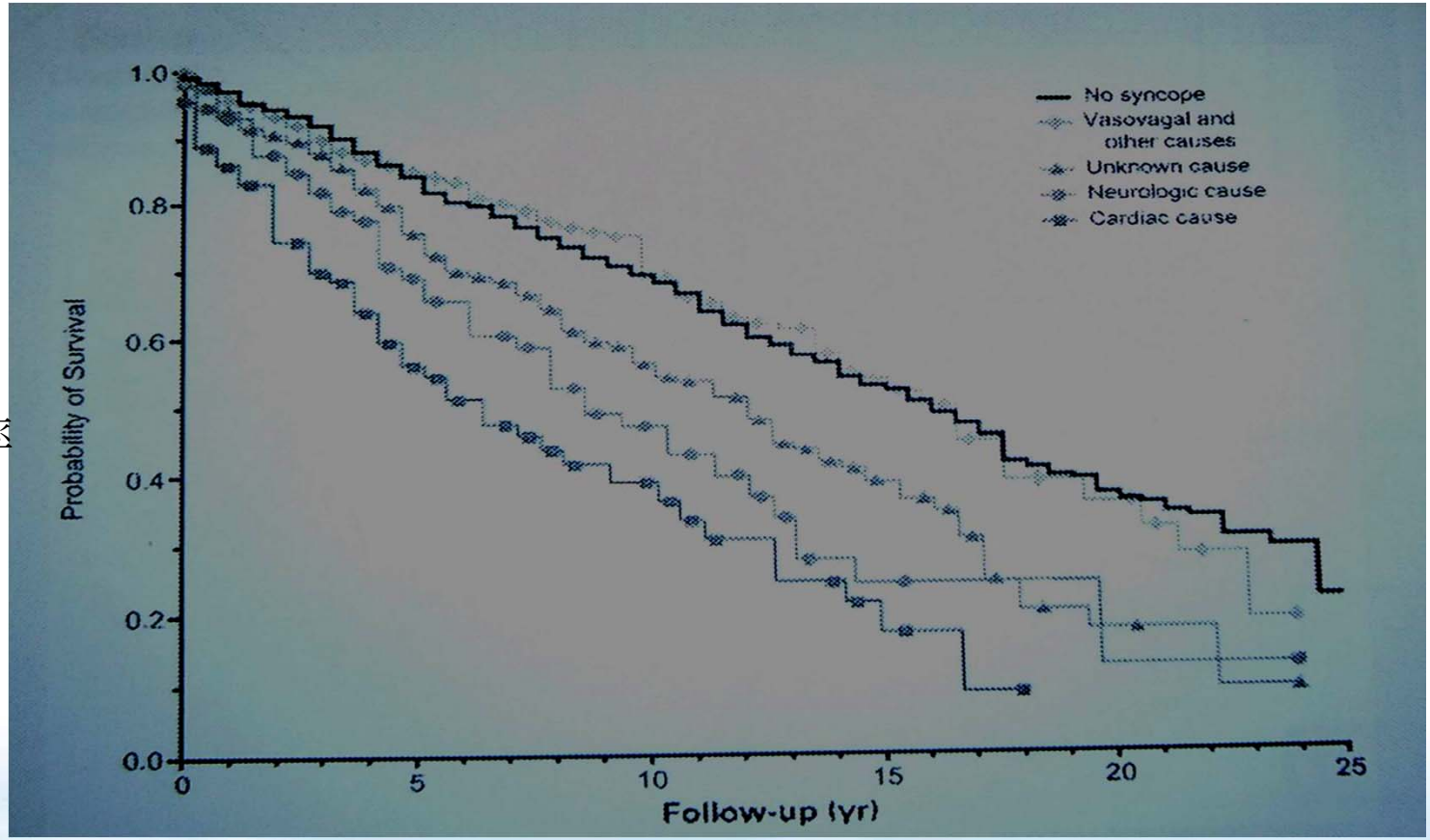
Treatment	Level of evidence
Non-pharmacological	
Water and salt supplementation	III
Exercise	Ib
Elastic support hosiery	IV
Pharmacological	
Fludrocortisone	III
Midodrine	IIb
Beta-blockers	III
Central sympatholytic agents	III
Pyridostigmine	IIb
Ivabradine	III
Octreotide	III
Erythropoeitin	III
ddAVP/desmopressin	IV
Selective serotonin reuptake inhibitors	IV
Methylphenidate	IV

Europace (2009) 11, 18–25

昏厥症預後

危險度:心臟方面>神經方面>迷走神經昏厥

存活率



NEJM 2002;347;878-885

敬請指教!