

Postural hypotension in the mechanism of transient ischaemic attacks

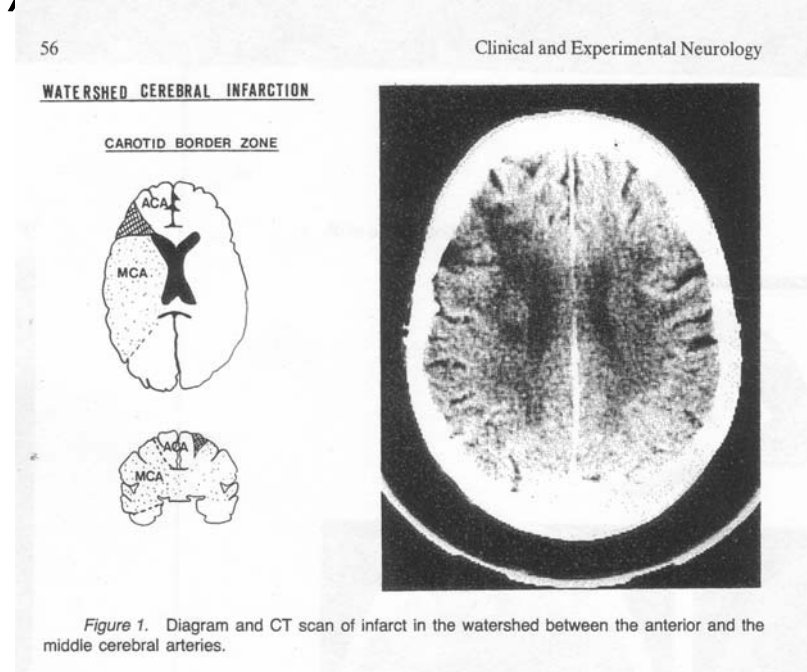
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Introduction

- Systemic hypotension is generally accepted as a mechanism for boundary zone (or watershed) stroke



Introduction

- **BUT it is not considered to be important in the pathophysiology of transient ischaemic attacks (TIAs)**

Introduction

- Physiologists have long known that transient hypotension may cause **impairment of collateral flow distal to a significant stenosis**, resulting in focal ischaemia

Introduction

- Current teaching is that nearly all TIAs are secondary to **emboli** from arterial or cardiac sources
- **And**
- That spontaneous or provoked **systemic hypotension** usually produces symptoms of **global cerebral ischaemia** rather than focal neurological deficits

Introduction

- **BUT is this really true?**

Pilot Study

- **Jardine et al** recently published a case series
- 8 elderly patients with postural hypotension who presented with TIAs
- All were on hypotensive drugs
- 6 underwent head up tilt testing
- TIAs reproduced in 3
- All improved following a decrease in medication
- 3 other small case series (50 patients)

Questions

- 1) What is the **incidence of posturally induced TIAs** in elderly patients?
- 2) Can we **safely** reproduce them on the tilt table?
- 3) What is the **incidence of postural hypotension** in this group of patients?

Postural hypotension (PH)

- Is **COMMON** in the elderly and is frequently secondary to **medication**
- Particularly during initiation of treatment
- **Worst offenders:**
 - Doxazosin (alpha blocker)
 - Labetolol (alpha, beta blocker)
 - ACE inhibitors, beta blockers

Method

- Patients 65 years and over were **recruited** from the emergency department, medical wards and neurology clinics
- Inclusion criteria:
- Anterior circulation TIA
- Sinus Rhythm
- Well enough to sign consent and undergo tilt

Method

- After consenting a **questionnaire** which included recent neurological symptoms, postural symptoms and medication was completed
- Assessed whether lying and standing BP was recorded by medical staff

Method

- Patients underwent 70 deg head **up tilt testing** with continuous systolic BP (SBP) monitoring using photoplethysmography
- A precursory neurological examination was performed

Method

- If patients were not hypotensive after 15 min of tilt sublingual nitroglycerine (GTN) spray was administered to induce hypotension
- Patients carefully observed for focal neurological symptoms and signs

Method

- Patients were returned rapidly to the horizontal position in the event of **focal neurological changes** or **impending syncope**
- Neurological examination was repeated while hypotensive



Cardiology

Method

- Changes were made to hypotensive medication if symptomatic hypotension was demonstrated
- Patients were followed up at an outpatient clinic approximately 3 months after tilt

Results (whole group)

- **69 patients (39M/30F)**
- **Average age: 76 years (65-92)**
- **57 patients (83%) were on hypotensive drugs**
- **Prior lying and standing BP was documented in only 26 (38%)**

Tilt results (whole group)

- **Mean supine systolic BP (SBP)
141mmHg (94-208)**
- **Mean BP at 5min of tilt 140mmHg
(59-230)**
- **Mean SBP nadir 74mmHg (30-159)**

Tilt results

- TIA symptoms reproduced in 8/69 patients (12%)
- 5/8 history of documented postural hypotension pre tilt
- All were on hypotensive drugs
- Previous cerebrovascular disease in 6
- Focal neurology: mostly limb symptoms (4 leg weakness, 1 arm weakness, 1 arm altered sensation, 1 expressive dysphasia and 1 diplopia)
- Duration of symptoms: 90 seconds to 15 minutes
- At F/U 1/8 patients had another event

Comparing Tilt negative (61 patients) vs. Tilt positive group (8 patients)

- Tilt + group were older – 80 yrs vs. 76 yrs
- No statistical significance in difference in supine SBP, SBP at 5 mins or nadir SBP during tilt
- 49 of Tilt – group were on hypotensive drugs
- Tilt + group were on 2.4 hypotensive drugs vs. 1.7

Conclusion

- 1) We were **safely** able to reproduce TIAs in 12% of patients by tilt induced hypotension
- 2) This is consistent with our hypothesis that TIAs may occur **secondary to low flow** rather than by **embolic mechanism**

Conclusion

- 3) PH not routinely assessed and not commonly seen during early tilt
- 4) Tilt testing is useful to confirm the diagnosis but we are not sure how sensitive it is

Conclusion

- 5) Postural hypotension may be an under-recognised treatable cause of TIAs in the elderly

Recommendations

- 1) Postural hypotension should be routinely assessed
- 2) If shown to have postural hypotension their medication should be reviewed

Acknowledgements

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Is OH a risk factor for stroke?

- A study done on 11707 middle aged people followed up for 7.9 years (Atherosclerotic risk in Communities Study, 1987 - 1996) provides evidence that orthostatic hypotension (OH) is a risk factor for stroke

Sensitivity and specificity of HUT

- **Sensitivity depends on your selected population:**
- **50 – 60% in neurocardiogenic syncope**
- **>75% in autonomic impairment**
- **Almost 100% in POTS**
- **Specificity 92% in first group**

Reproducibility of HUT

- **Positive test 50 – 80%**
- **Negative test 95%**

Postural hypotension

- **Tilt positive group: 5/8 (62.5%)**
- **Tilt negative group: 7/61 (11.5%)**
- **But not routinely assessed**

Significant carotid stenosis

- **Tilt positive group: none**
- **Tilt negative group:**
- **>70% stenosis --- 2 patients ---- 1 proceeded to stenting**
- **60 – 69% stenosis --- 4 patients --- 1 proceeded to endarterectomy and 1 to stenting**

Questionnaire

- **Questions:**

- .What Ethnic group do you see yourself part of? _____
- .How many of the attacks that brought you into hospital have you had?

- .Is there any particular time of the day/activity during which these attacks occur?

- .And over what period of time have you experienced them? _____
- .Have you ever fainted? YES / NO . If you have fainted, how frequently does it happen?

- . Do you get light headed when you stand up from a sitting position? YES / NO
- . Do you fall over for no reason? YES / NO .
- .Have you had a stroke? YES / NO.
- .Are you on treatment for high blood pressure? YES / NO .
- .Do you have prostatism (an enlarged prostate)? YES / NO.
- What medication are you taking and what doses?

Questionnaire

- .Have there been any changes to your medication over the last month? YES / NO.

- .What tests have you had done?

- Blood sugar YES / NO.
- Cholesterol YES / NO.
- ECG YES / NO.
- CT head scan YES / NO.

- . If so, what changes have been made?

- _____.
- MRI head scan YES / NO.
- Carotid ultrasound YES / NO.

Other references

- Heart 2000; 83: 564-569
- Arch Intern Med. 1995; 155: 930-935
- Circulation. 1998; 98: 2290-2295