Extreme carotid sinus hypersensitivity

Introduction

Carotid sinus hypersensitivity is a recognized cause of syncope and pre-syncope in elderly. It may be responsible for approximately a third of these symptoms in patients referred to tertiary care (Kerr et al, 2006). This article presents a case of an elderly patient whose carotid sinus hypersensitivity was revealed in interesting circumstances.

Discussion

Carotid sinus hypersensitivity is an exaggerated response of baroreceptor stimulation resulting in over 3 seconds asystole and/or a fall of blood pressure of over 50 mmHg (Kumar et al, 2003). The carotid sinus plays an integral role in the neural control of haemostasis. Carotid sinus baroreceptors are innervated by the sinus nerve of Hering, a branch of the glossopharyngeal nerve which synapses in the nucleus tractus solitarius in the brainstem. Nucleus tractus solitarius indirectly modulates vagal neurons to regulate heart rate and blood pressure.

Although the first case of carotid sinus hypersensitivity was reported in 1930 (McIntosh and Kenny, 1994), its incidence in asymptomatic individuals is not clearly documented but is known to increase with age (Thomas, 1972). It has been reported in 10% of the healthy population and especially those with coronary artery disease or hypertension (Kumar et al, 2003).

The symptoms are generally precipitated by manoeuvres causing mechanical stimulation of the carotid sinus such as turning the head while wearing tight neckwear, neck pathology, straining, vagal stimuli and prolonged standing (Thomas, 1972; McIntosh et al, 1992). However, in most cases no precipitating events can be identified. Patients may present with dizziness, syncope or a combination of these symptoms.

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Carotid sinus hypersensitivity is associated with considerable morbidity; a threefold increase in fracture rate associated with falls secondary to carotid sinus hypersensitivity has been observed (McIntosh and Kenny, 1994).

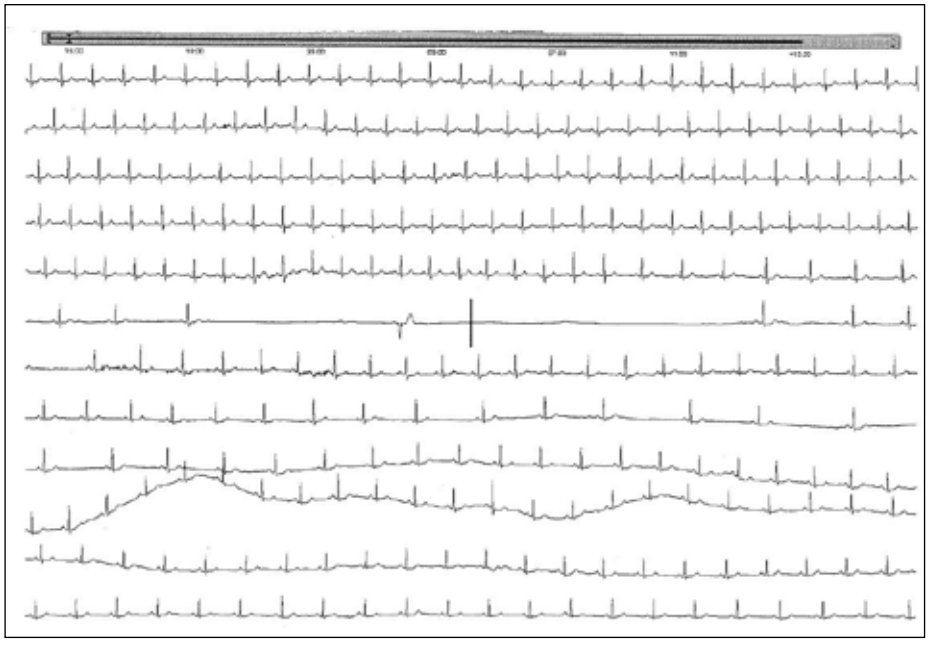
The treatment of carotid sinus hypersensitivity previously was carotid sinus denervation performed either surgically or using radiotherapy (McIntosh and Kenny, 1994). The current treatment of choice in patients with documented cardioinhibition is dual chamber cardiac pacing which can abolish syncope in more than 80% of patients (Brignole et al, 1992).

Conclusions

Pressure on the carotid body during a duplex scan helped to unmask underlying carotid sinus hypersensitivity in this patient with precipitation of symptomatic prolonged asystole. While carotid sinus hypersensitivity is a recognized entity precipitated by pressure on the carotid body there is no report in the literature of its occurrence during carotid duplex examination.

Therefore, it is important to avoid excessive prolonged pressure during such an examination and there is potentially a role for electrocardiogram monitoring during carotid scan duplex, especially in

Figure 1. Holter electrocardiogram recording showing 10 seconds of asystole during carotid ultrasound recording.



Case Report

A 75-year-old hypertensive woman presented with an episode of slurred speech. Over the last 3 years she had had several blackouts with occasional dizzy episodes, on one occasion associated with jerking of the legs. Previous computed tomography scans and electroencephalography were normal. No firm diagnosis was reached but she had received treatment for suspected epilepsy. On this presentation the working diagnosis was transient ischaemic attack. Echocardiogram and 12-lead electrocardiogram were normal. While undergoing carotid ultrasound she blacked out. An ongoing Holter electrocardiogram recorded 10 seconds of asystole corresponding to the event (*Figure 1*). There was only minor stenosis of the left and right carotid arteries with normal vertebral flow. Extreme carotid sinus hypersensitivity was diagnosed and she received a permanent pacemaker. It remains uncertain if her previous episodes were a result of similar cardiac events, but no further events occurred during 6 months follow up suggesting that the previous episodes were likely to be the result of carotid sinus hypersensitivity which has now been cured by permanent pacing.

elderly patients, to allow early recognition of any potentially serious bradyarrhythmias which may develop during the examination (Kapoor, 2009). BJHM

Brignole M, Menozzi C, Lolli G, Bottoni N, Gaggioli G (1992) Long term outcome of paced and non-paced patients with severe carotid sinus syndrome. *Am J Cardiol* **69:** 1039–43

Kapoor JR (2009) Carotid Sinus Hypersensitivity: A Diagnostic Pearl. *J Am Coll Cardiol* **54:** 1633

Kerr SRJ, Pearce MS, Brayne C, Richard J, Davis RJ, Kenny RA (2006) Carotid sinus hypersensitivity in asymptomatic older persons implications for diagnosis of syncope and falls. *Arch Intern Med* **166:** 515–20

Kumar NP, Thomas P, Mudd P, Morris OR, Masud T (2003) The usefulness of carotid sinus massage in different patient groups. *Age Ageing* **32:** 666–9

McIntosh SJ, Kenny RA (1994) Carotid sinus syndrome in the elderly. *J Roy Soc Med* **87:** 798–800

McIntosh SJ, Lawson J, Kenny RA (1992) Clinical characteristics of vasodepressor, cardioinhibitory and mixed carotid sinus syndrome in the elderly. *Am J Med* **95:** 203–8

Thomas JE (1972) Diseases of the carotid sinus - syncope. In: Vinken PJ, Bruyn GW, eds. *Handbook of Clinical Neurology*. North Holland Publishing, Amsterdam: 532–51

LEARNING POINTS

- Carotid sinus hypersensitivity is a recognized cause of syncope and pre-syncope in elderly.
- It may be responsible for approximately a third of these symptoms in patients referred to tertiary care.
- Carotid sinus hypersensitivity is responsible for considerable morbidity.
- It is important to avoid excessive prolonged pressure on carotid arteries during work-up for carotid sinus hypersensitivity such as a carotid scan.
- There is a potential role for electrocardiogram monitoring during carotid scan duplex, especially in elderly patients, for early recognition of any potentially serious bradyarrhythmias.