Carotid artery dissection following minimal postural trauma in a firefighter

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Abstract
Carotid artery dissections (CAD) are uncommon, but not rare, and are increasingly recognized as a cause of morbidity. A case of CAD following minimal sustained postural trauma is described. The causes and outcomes of CAD are discussed, with particular reference to risks that might be found in the workplace.

Key words
Carotid artery dissection; firefighting; vascular injury.

Introduction
Carotid artery dissections (CAD) are uncommon but not rare. Incidence studies indicate between 2.5 and 3 cases per 100,000 population for all age groups, mean age of onset in the early 40s [1,2]. Carotid artery intimal tears leading to dissection usually occur ~2 cm distal to the carotid bulb, at the level of C2–3, and the dissection usually extends distally until the carotid artery enters the foramen lacerum. Dependent upon their size, they may result in minor luminal narrowing, haemodynamically significant stenosis or even, as in the present case, complete occlusion. Complications include cranial nerve compromise, Horner’s syndrome and (as in the reported case) symptoms of ischaemia in vascular territories distal to the lesion, including retinal artery occlusion, optic neuropathy, transient ischaemic attack or completed stroke. Treatment is generally conservative, using anticoagulants, until there is evidence of resolution of the arterial wall abnormalities, with surgery being reserved for those who have progressive aneurysms or continuous ischaemic symptoms. Surgical treatment can include aneurismal resection with arterial reconstruction, carotid ligations, or cervical to intracranial bypass in those with occlusive aneurysms. Outcomes following surgery are generally good.

Case report
A previously fit, 43-year-old firefighter presented to the Accident and Emergency Department of his local hospital with a severe right-sided headache, slurred speech, unsteadiness on his feet and ‘drooping’ of the right side of his face. He gave a history that, the previous day, he had spent some time operating the controls of a turntable ladder and had spent a period of some 10–15 min looking up above his head without a break. Following this, he experienced a right-sided headache, which worsened after playing volleyball in the afternoon. He then went home feeling unwell, went to bed and woke the following morning with the symptoms described above.

In the Accident and Emergency Department, a diagnosis of transient ischaemic attack was made and aspirin prescribed. The symptoms resolved initially, but returned later that day. Further investigation revealed an infarction of the right cerebral hemisphere secondary to right carotid artery dissection with complete occlusion. He had no predisposing factors for arteriopathy, except for a very slightly raised total cholesterol. He was treated with an anticoagulant and Atorvastatin, and his symptoms resolved over the subsequent few days. It is expected that he will make a complete recovery from his illness. However, it was decided that his problem was incompatible with firefighting, so he was retired from the service.

Discussion
The cause of CAD is usually some form of trauma, possibly superimposed upon a predisposing condition such as fibromuscular dysplasia [3], or one of the collagen disorders such as Marfan’s syndrome, Ehlers–Danlos
syndrome or α1 antitrypsin deficiency. Anatomical variants of the carotid artery may also predispose to dissection. It is suspected but unproven that atherosclerosis is a predisposing factor [1]. However, whether spontaneous dissection can occur is doubtful [2]. The trauma which is often the immediate cause may be major or minor. Traumatic events which have been reported to precede CAD include sporting injuries, road traffic accidents (including deceleration trauma from airbags [3,4]), violent vomiting, coughing and nose blowing, prolonged phone calls, rapid ascent from depth while scuba diving [1,5] and roller-coaster rides. Reported iatrogenic dissections include those due to operations in which the neck is held in forced extension, e.g. maxillofacial surgery and bronchoscopy, chiropractic manipulation [2] (although doubt has been cast on this association [6]), the Heimlich manoeuvre [7] and even Shiatsu massage [8]. The diagnosis should be suspected in any individual who presents with transient unilateral weakness or transient unilateral blurred vision that occurs after direct trauma to or hyperextension of the neck [9], especially if this is associated with Horner’s syndrome.

Workplace activities that might give rise to a risk of CAD can be roughly divided into two: those that involve acute traumatic events (such as sudden external forces) and delayed trauma (such as remaining in a forced position of the neck). Most acute traumatic events have a sudden and unexpected character—a quick blow to the neck or an abrupt turning of the head with lateral flexion of the neck may be enough to compress the internal carotid artery against the transverse process of one of the upper cervical vertebrae, causing the initial intimal tear in an otherwise healthy vessel. Perhaps of more relevance in the workplace are the manifold situations in daily life that involve forced neck positions that might lead to CAD. Reports of CAD from workplace activities involving this sort of postural risk include prolonged telephone calls [10], strenuous effort assisting the delivery of a calf [11] and, indeed, the present case. It is easy to imagine other workplace tasks involving similar postural activities.

With regard to the longer-term workplace consequences of CAD, this has not been extensively studied. Series studies indicate that ~4% of patients with a first CAD will experience a second event [1]. Occupations such as firefighting demand a very high standard of physical fitness and it is probable that an individual such as that described in the case report will not satisfy this standard. UK drivers are allowed to drive Group 1 vehicles (car or light van) 1 month following a cerebrovascular event due to occlusive vascular disease with satisfactory recovery, or must wait 1 year if wishing to drive Group 2 vehicles (truck or bus) [12]. One case report [13] describes a pilot who presented with Horner’s syndrome but not cerebral ischaemia who was re-certified fit to fly 1 year after his CAD.

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References