Case report
Cough syncope whilst driving – An unusual yet serious presentation
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A B S T R A C T
Cough is a common symptom of cardiorespiratory pathology, yet its vasomotor effects are underappreciated. We report a case of a 45-year-old male who had a Cough Syncope event resulting in a road traffic collision. Although he was unhurt and fully recovered, we believe there is need for greater understanding of this unusual sequence of events.

1. Introduction
A cough is a reflex action to clear your airways of mucus and irritants such as dust or smoke. It is regulated by the Medulla which receives sensory input via afferent Vagal nerves primarily from the: respiratory tract, pericardium, oesophagus, diaphragm and stomach. C fibres, nociceptive A-d fibres and stretch receptors in these areas respond to mechanical and chemical stimulation. An impulse is then relayed to the ‘Respiratory Pattern Generator’ which then modifies the activity of inspiratory and expiratory motor neurones leading to a paroxysmal cough.

Loss of consciousness (syncope) following a cough episode was first described in 1876 by Charcot who named the condition as ‘laryngeal vertigo’ [1]. The name evolved into ‘cough syncope’ over the years and this remains the preferred term in the literature today. A typical patient is usually, but not restricted to, being: male, overweight and smoker with obstructive lung disease [2]. There are several studies which elude to the cardiorespiratory and cerebrovascular effects of coughing and potential role in cough syncope [3]. We describe a unique case of cough syncope and discuss the implications of this diagnosis for the patient.

2. Case report
A 45-Year-old male presented to the Emergency Department following a syncopal episode whilst being at the wheel of a vehicle involved in a road traffic collision. He was driving and accompanied with his partner in the passenger seat, when suddenly started to violently cough after inhaling cigarette smoke. He subsequently lost consciousness at speeds of 30mph causing the vehicle to skid into metal railings. He and his partner escaped from the incident unhurt. Although a long-term smoker with no history of a chronic cough, this was his first episode of paroxysmal violent coughing after inhaling cigarette smoke.

His medical history includes many years of wheezing and persistent breathlessness which was investigated and diagnosed six years ago by his General Practitioner as Chronic Obstructive Pulmonary Disease. He admits that he has been non-compliant with his prescribed inhaler therapy. Clinically he remained well and there was no evidence of head, neck, hard or soft tissue injuries. His observations, laboratory investigations and Electrocardiogram (ECG) were all within normal limits. The implications of this event on his day to day life became apparent when he was informed of the Driving Vehicle Licensing Agency (DVLA) requirements to notify the incident together with a driving ban for 6 months.

3. Discussion
The pathophysiological process involved in cough syncope originates with the generation of very high intrathoracic pressures [4]. The haemodynamic theory seems to be the most established in explaining this, where an increase of intrathoracic pressure (up to 300 mm Hg) during a cough acutely lowers the venous return and therefore cardiac output. The resulting reduction in cerebral perfusion then leads to a loss of consciousness [5]. This has been demonstrated by Mattile et al. who used Transcranial Doppler Sonography (TCD) to monitor middle cerebral artery flow velocities during a cough syncopal event and documented consistent decrease in cerebral blood flow [6]. The role of Baroreflex

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activation in cough syncope with resulting vasodilation and bradycardia seems inconsistent from patient to patient. Cardiac conduction abnormalities such as Asystole and complete Atrioventricular block have been reported in some during a cough syncopal event which is largely related to an exaggerated vagal response [7].

4. Conclusion

According to the latest DVLA guidance even a single cough syncopal event identifies an individual as being in a higher risk group for experiencing a recurrence whenever they cough, regardless of the cause. Car and motorcycle users must inform the DVLA and not drive for six months following a single episode and twelve months following multiple episodes over five years [8].

The haemodynamic consequences of coughing are complex and variable. On one hand they allow for the expulsion of irritants from the respiratory tract and in some individuals cause a syncopal event. The primary mechanism involved in the latter is likely a combination of reduced cerebral perfusion and vagal modulation related to high intrathoracic pressures. It is therefore evident that a large, male subject with obstructive airway disease would be at highest risk for this. The social impact on individuals is clear from the DVLA guidance outlined.

Declaration of competing interest

I can confirm we have no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rmcr.2020.101155.

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