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SPINAL CORD INFARCT SECONDARY TO VAPING?: A CASE REPORT

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Background and importance

Tobacco smoking is a recognised health risk for cardiovascular events including stroke of the spinal cord. [1] There is concerted effort to reduce tobacco smoking, with measures such as higher tax rates and prohibiting the sale of to minors. [2,3] On the other hand, electronic cigarettes (e-cigarettes or vaping) are being advocated as a possible strategy to help smokers quit, [4] and are heavily marketed towards children and non-smokers, raising concerns regarding the risk of addiction to nicotine through vaping.[5, 6] According to the WHO "88 countries have no minimum age at which e-cigarettes can be bought and 74 countries have no regulations in place for these harmful products". [5] In the UK, smoking tobacco appears to be on a downward trend, whilst the vaping market has been expanding.[7] These products may lead to lung injury, effects on the brain [8] in the spine [9] and on the blood vessels. [1]

Spinal cord injury due to illicit drug misuse has been described, [10] but, to the author's knowledge, there are no reports on the medical literature of spinal cord injury directly associated with vaping.

Aim and objectives

We report the case of a young male, non-ever-cigarette smoker, heavy vaper, who sustained injury to the spinal cord as a result of infarct.

Material and methods

Retrospective review of patient's clinical case notes.

Results / Case Report

At mid morning, whilst at work, as a brick-layer, a 21-year-old male Caucasian, previously fit and healthy, felt a sharp pain to the back of his neck. He initially tried to ignore the pain but soon noticed pins and needles to his body and muscle weakness to his arms and legs. He stopped what he was doing and tried to sit down, by this time he felt clammy, sweaty and was struggling for air. At this time, he was helped by his colleagues at work and soon was taken by ambulance to the local Emergency Department where it was noted that he needed ventilatory support to maintain adequate ventilation.

Initial MRI of the whole spine revealed images consistent with spinal cord infarct at C2-C5 level, with hyperacute onset. Other investigations including MRI to the brain, viral serology, CSF analysis, blood inflammatory markers and coagulopathies studies were all normal.

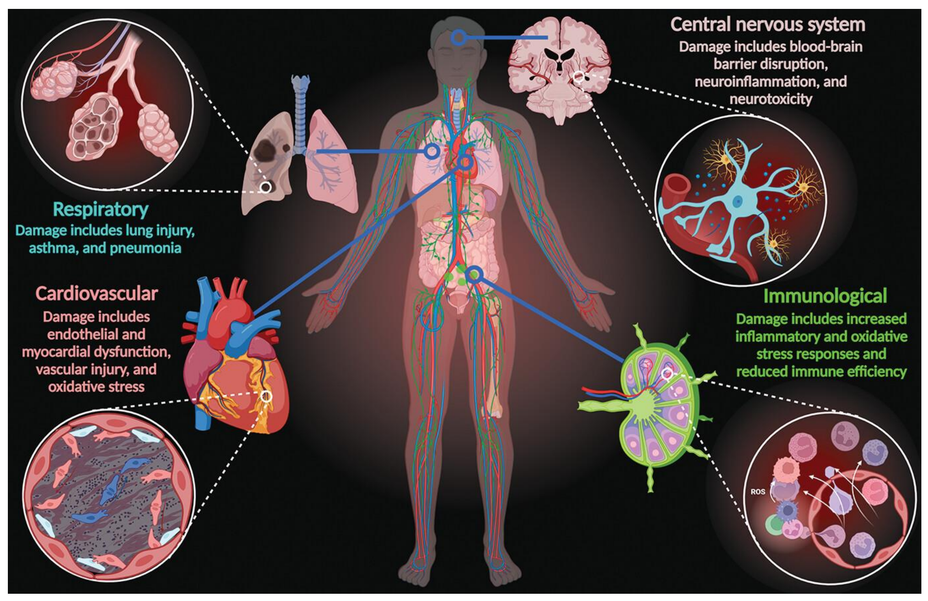

Figure 1: Vaping causes serious systemic disturbances. As suggested López-Ojeda W et al. [8]

A surgical tracheostomy was inserted to manage ventilation, and after deemed medically stable was transferred to a Spinal Rehabilitation Centre for a comprehensive rehabilitation program. At admission peripheral neurological examination revealed incomplete tetraplegia AIS D at C3 level, as per the International Standards for Neurological Classification of Spinal Cord Injury, in central cord syndrome type of injury, with no hand function.
There was no recent history of trauma, heavy exercises or lifting, non-smoker of tobacco. Had recreative illicit drugs (cocaine) more than 6 months ago.
Self reports using e-cigarettes, estimating and equivalent of 100 cigarettes per day (considering brands used - Elux® Legend, Elux ® TigerBlood, Crystal® Promax - and volumes/puffs), since he was 11 years-old.

Conclusion and relevance

Spinal cord infract is a rare ischaemic occurrence, representing only a fraction of all ischaemic strokes (1%). Its pathophysiology is not clear, but the presence of vascular risk factors such as hypertension and tobacco-smoking has been documented. [11] The impact of using e-cigarettes has not yet been fully described, and knowledge of the long-term toxicological and immunological effects remains elusive due to the short existence of vaping. [7] Vaping mechanisms of injury include enhanced release of IL 1ß and IL6, inducing oxidative stress by reducing intracellular glutathione and increased reactive oxygen species, leading to inflammation and cell death. These processes results in cytotoxicity, oxidative stress and genotoxicity. [12]

Toxicological analysis of these products (including the Elux® Legend and Tigerblood) showed great variability, with presence of not only propylene glycol, vegetable glycerine, nicotine and flavours, but also of toxic metals, including lead, cadmium, arsenic and chromium. It is known that exposure to these can cause a range ailments including cardiovascular and neurological. [12] In the UK, a refill container has up to 10mL and a maximum concentration of 20mg nicotine/mL (one e-cigarette is equivalent up to 200 cigarettes); [4] but many products are sold on the unregulated market.

Despite the first intention of aiding on quitting smoking, studies show that the increase on sales of e-cigarettes did not translate into quitting smoking or prevent relapses,[5,12] whilst other studies demonstrate that e-cigarettes use increases conventional cigarette uptake, particularly among non-smoking youth, by nearly 3 times. [5]

Although there was a history of using cocaine, the odds ratio linked to stroke is the same as if never used cocaine, if used more than 6 months ago. [13] Taking a thorough social history, including inquiry about smoking habits, might be significant for an appropriate management, particularly in the younger population. Future studies might help clarifying the whole impact of vaping in spinal cord injuries, in particular.

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