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Case study

The Hijacked Ambulance: Activation of the amygdala in paramedic care - a case study

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1. Introduction

Paramedics work autonomously and often in uncontrolled environments. As part of their role, paramedics are frequently expected to respond to, and manage complex cases, that vary for a variety of reasons. The scene findings may be clinically complex, operationally complex, personally complex, or a mixture of these and paramedics must demonstrate critical thinking, clinical reasoning, and good communication skills to ensure good scene management occurs. However, as robust as paramedicine standardisation and benchmarked education are, each paramedic will experience a range of personal emotional responses at each scene.

This case study will review the amygdala hijack. A neurological phenomenon that impacts critical thinking amongst other things, and what happens when this phenomenon occurs in paramedic care, and how this can affect operational paramedics when they are inadvertently dispatched to complex, or personal scenes. As described in this case study, the amygdala hijack can add to the existing complexity of the emergency response that the paramedics have been sent to manage.

2. The Case

An experienced paramedic team have been partnered together for several months. They have managed multi-vehicle car crashes, house fires, cardiac arrests, and critical respiratory cases together. This morning on shift is no different and they have already responded several times. Following a patient handover, they are returning to their ambulance station when the dispatcher advises them over the radio that a single car has impacted a tree not far from their location. The crew respond and carefully navigate the streets to the scene. On arrival at the scene the crew can see that a single car has impacted a tree at moderate speed. There is extensive damage to the front driver's side of the vehicle, and they can see an unconscious driver entrapped. From the windscreen vantage point, the driver appears to be in critical condition, and one crew member turn to discuss the plan with their partner. But they notice that their

partner is ashen grey in the face. Their partner is staring at the wreck in a trance like state. Several attempts to get their partners attention fail to achieve the goal until their partner looks at them and utters "I know that person in the driver's seat".

In that split second, the first crew member realises that their partner is suddenly, without warning more of a liability than an asset; but this is not their fault. The activation of a small part of the responder's brain has just been triggered, stunting their rational and cognitive bandwidth; and very little can be done to mitigate this. A standard ambulance response has just become more complex through a phenomenon that is somewhat absent in the ambulance literature, the amygdala hijack.

3 What is the amygdala?

The amygdala is a small part of the central nervous system classified as a component of the limbic system. It is situated deep within the brain, inferior to the cerebral cortex and anterior to the hippocampus¹. Broadly speaking, the limbic system is involved in emotional and behavioural processing and responses, particularly those necessary for survival, such as feeding, reproduction and fight or flight responses.⁽¹⁾ The amygdala is of particular interest due to its capability of processing and storing emotionally related stimuli, completely independently of the rest of our memory.⁽²⁾ Memories that have a strong emotional connotation tend to endure, hence, the amygdala has a strong influence in determining how robustly these memories are stored¹.

The amygdala's sheer complexity lies within its autonomy, and ability to trigger certain emotions, either pleasant or unpleasant, in response to specific stimuli that may have been forgotten by the person, however, imprinted within the amygdala.⁽²⁾ The amygdala is most efficient at storing fearful memories, hence, when it is stimulated by sensory information, if the amygdala senses danger, or an emotive memory it can initiate the flight or fight response.⁽³⁾ The sudden nature of this cascade by-passes the neocortex's suppression responses which results in the release of cortisol and adrenaline.⁽³⁾ This initiates a biological defense mechanism which causes a sudden increase

in heart rate, blood pressure and overall sympathetic hyperstimulation.(3,4)

4 What is a hijack?

This autonomic response, although evolved to improve the chances of survival when faced with physical threats, is also triggered by psychological threats derived from personal pressure and stress.(3) From this, the term “amygdala hijack” was coined by psychologist Daniel Goleman in his 1995 book “Emotional Intelligence: Why It Can Matter More Than IQ”. In this, he referred to an intense and immediate emotional overreaction to a seemingly normal situation, first introducing the phenomenon of “amygdala hijack”.(3)

As a result of the release of cortisol and adrenaline, the common signs and symptoms expected from a hijack can include increasing heart rate, increasing respiratory rate, sweating, palpitations, tremors, and goose bumps. (5,6) Whilst these are generic fight or flight presentations, the opposing aspect that sets the amygdala hijack apart specifies a sudden onset of a strong and uncontrolled emotional reaction, and a sudden loss of critical thinking. Consequently, self-identification can be difficult.(5,6)

5 Discussion

Whilst a car crash to a lay person would not be considered “normal”, the nature of ambulance work and paramedic care would see this type of scene historically classified as a “normal part of the job”. That said, the personal experiences each paramedic has would no doubt exacerbate any already stressful situation encountered, heightening the effects of the amygdala. For example, if the patient is known to the paramedic or the paramedic has had previous traumatic exposure to a similar situation.

The stressful circumstances in which paramedics are often exposed to are inclusive of traumatic events, high acuity callouts, paediatrics, multi-casualty incidents or particularly aggressive or combative patients. These situations amplify the already emotionally demanding environment in which paramedics work and, hence, may trigger the amygdala hijack. This warrants more research into how this phenomenon impacts para-

medics in practice, and begs the questions, does this impact patient safety or can this impact the paramedic’s ability to provide the highest quality of care? Although there is limited research surrounding this topic in paramedic care specifically, a common trend suggested that first responders exposed to acutely stressful situations, demonstrated impaired concentration and impaired cognitive bandwidth in time-pressured situations, when compared to controlled environments.(7-11)

Similarly, the quality of patient documentation appeared to be compromised in studies conducted by LeBlanc et al. (2012), indicative of impaired concentration and judgement, potentially hindering patient treatment. This trend in findings was further reinforced with Pasquale et al. (2017) research in discovering that less clinical judgement errors were made within controlled environments, when compared to high stress situations.(12)

6 How can this be managed in paramedic care?

Whilst we cannot suppress our emotional response, paramedics can ultimately prepare for them by actively reinterpreting a negative stimulus as a neutral stimulus. This supports the maintenance of the prefrontal cortex processing during the negative experience however this needs to encompass a deliberate approach to counteract the brains rapid and impulsive reaction. Management and mitigation of this issue within paramedicine comes with some of its own complexities. Primarily due to the intricacies involved in the physiology of amygdala hijack and the lack of research into the specific clinical implications yielded by the amygdala hijack in paramedics. That said, the employment of active cognitive reappraisal discussed above or the development of coping mechanisms, such as, task-orientated or problem-focused coping styles, or breathing techniques could assist in the mitigation of ineffective or inappropriate treatment caused by amygdala hijack.(13-16)

7 Conclusion

Whilst the amygdala hijack and the associated sympathetic hyperstimulation has been found to compro-

mise a person's ability to think critically, perform fine motor skills and maintain cognitive bandwidth when in stressful situations, steps can be taken to mitigate the impact of this phenomenon in paramedics. However, there is a noted paucity in literature encompassing this phenomenon, that warrants further research. That said, creating awareness of this phenomenon now within the paramedicine professional will hopefully better equip paramedics in recognising and responding appropriately to on scene amygdala hijack.

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