A fall in isolation: reflection on a complex case

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A Fall in Isolation: A Case Study

Abstract

Falls are the leading cause of injury-related mortality in the UK and represent the second leading cause of accidental death worldwide (NICE 2013). This case review focuses on a male patient who had fallen and was found to be profoundly hypothermic, with an altered level of consciousness and evidence of seizure activity. With multiple time critical features this clinical presentation was then made particularly challenging by the presence of several human factors. A reflective model that included consideration of associated human factors was then used in light of this and the fact that the incident occurred during the current COVID-19 pandemic (WHO 2020: 1). Reflecting on this incident has revealed how some 'sub-conscious' (intuitive) thinking led to some unconscious bias compounded by availability heuristics and the human factors present. This meant the author encountered difficulty when trying to obtain peripheral vascular access, and although several alternative interventions were found the majority of these were unavailable to the author at the time of the incident and in some instances would require a change to standard clinical practice for many paramedics. The only intervention that could have been utilized earlier in the management of this patient was the use of rectal diazepam, but the need for this intervention was then removed by the patient's seizure activity self-terminating. Given the increasing prevalence of falls, social isolation, mental health, alcohol, and substance misuse amongst society this type of call is unlikely to be an isolated event, and the presence of the COVID-19 pandemic

increases this possibility still further strengthening the argument for the range of clinical interventions available to paramedics to be increased (Panchal *et al.* 2021).

Key Words

● Falls ● Hypothermia ● Human Factors ● Vascular Access ● Seizure ● Diazepam

Introduction

"Clinical decision-making and reflection are essential skills for any healthcare professional to possess in that they underpin and enhance practice by providing a robust framework for structuring one's thinking and subsequent actions" (Hibberd *et al.* 2014: 232). With this in mind the author intends to review a recent clinical encounter in order to determine whether the standard of care provided could be improved and to then augment their future practice with the learning points derived from this reflective case study. The incident in question relates to a male patient who was found in a life-threatening condition following a fall that had occurred several days before the request for emergency medical services was received. A concerned neighbour had raised the alarm after noticing food parcels had remained undisturbed on the patient's doorstep for a number of days.

For the purposes of this case review the author has decided to use one of the reflective models proposed by Willis (2010) for prehospital professionals. He

introduced three alternative reflective paradigms specifically designed for those who work within the prehospital arena; one with an ethical focus, one that examines the human factors pertaining to an incident and another that encourages the practitioner to consider any appropriate care pathways that may exist. Given the time critical nature of the incident under scrutiny and the numerous environmental factors encountered it was felt that the second model incorporating an exploration of the human factors affecting patient care would be the most appropriate (Figure 1).

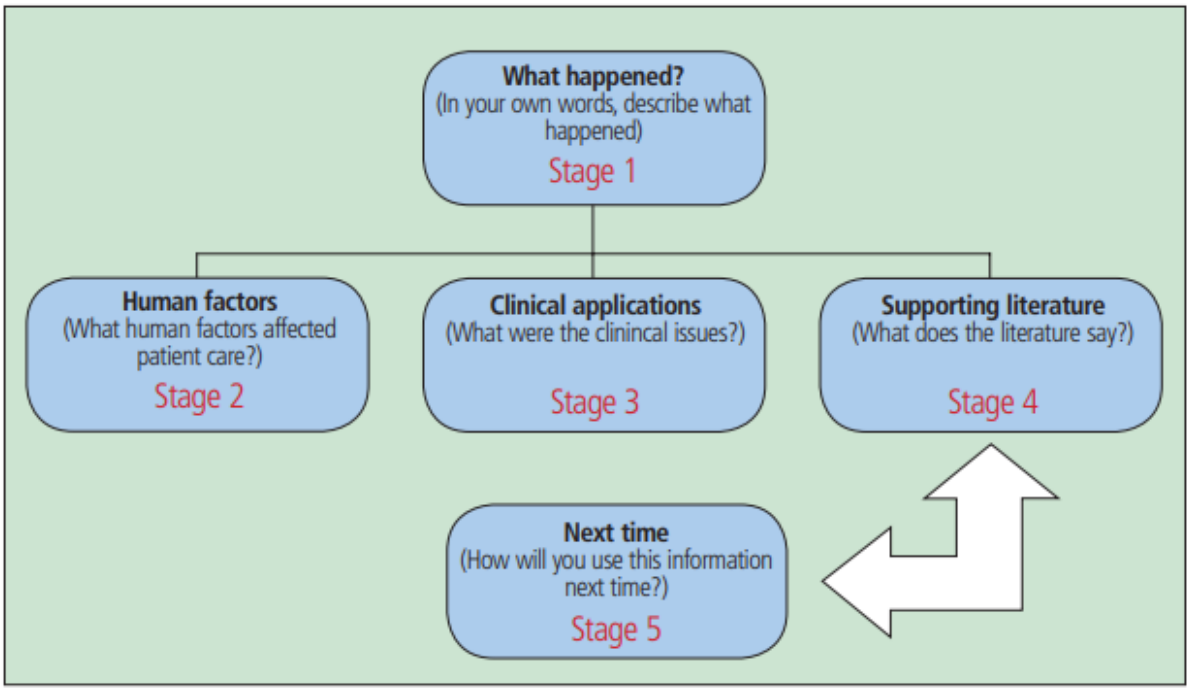

Figure 1 – Model 2 for Reflection by Willis (2010: 214)

Stage 1 – What happened?

While working as part of an operational ambulance crew, the author was tasked to a call for a 40-year-old male patient who had not been seen by neighbours in several days. It was questionable whether there was available access to the property, so the Police were also requested. Fortunately, the crew were able to gain access to the

patient's apartment, which was situated on the ground floor, without causing any damage via an open window. The crew entered the property wearing Level 2 personal protective equipment (PPE), which was standard practice at the time for incidents that were unlikely to involve aerosol generating procedures (AGPs) (Public Health England (PHE) 2021). However, upon entering it quickly became apparent that a greater level of PPE would be required as the patient was lying in the middle of the floor, partially clothed, doubly incontinent and surrounded by human faeces, beer cans, vodka bottles, fast food cartons and with the interior being in a general state of disarray.

Although PPE was required the first priority was to perform a primary survey to assess for and manage any life-threatening conditions. Kirk (2020: 37) maintains that during this phase of the patient assessment first impressions can be very valuable. Factors such as general impression, patient position and colour can provide vital clues regarding the patient's overall condition. In this particular case there were several signs that the patient was in a life-threatening condition; he was lying in a foetal position on his left side, had a reduced level of consciousness, his face appeared pale but there was also some peripheral cyanosis to his fingernails, he felt cold to the touch with no peripheral pulses and had evidence of seizure activity. Consequently, the patient had several time critical features under the <C>ABCD (Catastrophic haemorrhage, Airway, Breathing, Circulation and Disability) approach advocated in current clinical practice within the UK (Brown *et al.* 2019: 130).

Given that the patient was peripherally cyanosed and potentially in an active seizure he was commenced on high-concentration oxygen as no satisfactory pulse oximetry measurement could be obtained (O'Driscoll *et al.* 2017: i7). Although there was bloody residue around the patient's mouth suggesting previous tongue biting, the patient had a patent airway and his conscious level was not low enough to tolerate even a nasopharyngeal airway, which are typically better tolerated in semiconscious patients (Tawfik, Al Nobani and Tageldin 2020). With oxygen commenced the crew then decided to don a higher level of PPE based on the quantity of bodily fluids present and because it was felt that there was a significant risk of the patient's condition deteriorating such that aerosol generating procedures (AGP) would be required. This was done on a staggered basis, so that one of the crew members remained with the patient at all times to provide ongoing care, and this also facilitated the retrieval of all the equipment necessary for peripheral vascular access and drug administration to resolve the seizure. Meanwhile the patient assessment process continued and during the physical examination it became apparent that the patient had developed a pressure sore on their left hip, which appeared to fall within the suspected deep tissue injury category of the European Pressure Ulcer Advisory Panel (EPUAP) Pressure Ulcer Classification Tool (McCoulough 2018). The patient's observations were further confirmation of their critical condition; hypothermic with a tympanic temperature measurement of 25°C, an unrecordable blood pressure and a bradycardic electrocardiogram (ECG) with a rate of 32bpm and artifact due to the seizure activity. Tympanic temperature measurement was used as it more accurately reflects the patient's core body temperature compared to the value provided by surface scan devices which can be influenced by environmental factors and sweat or moisture (Harris, DiCorpo and Merlin 2017).

Several attempts were made to cannulate the patient in order to administer intravenous (IV) diazepam and a bolus of warm intravenous fluids, however all proved unsuccessful. The difficulty encountered during cannulation could be attributed to the peripheral shutdown that normally occurs during hypothermia. This natural compensatory mechanism is triggered during this condition to avoid further heat loss through peripheral vessels where most of the cooling and heat loss from the body occurs, and this is coordinated by the release of sympathetic hormones that stimulate vasoconstriction through selective α-adrenergic receptors (Beker 2018: 3). Another contributory factor could be severe dehydration which is an important component of Acute Alcohol Withdrawal Syndrome (AAWS), something that would have been triggered by the patient's immobility post fall (Sachdeva, Choudhary and Chandra 2015: 3). Indeed, the patient presentation had all the hallmarks of AAWS or even the most severe form of alcohol withdrawal, Delirium Tremens (DTs), which is associated with an altered mental status (global confusion), sympathetic overdrive (autonomic hyperactivity) and can lead to cardiovascular collapse; a state similar to that observed with this patient. This condition could also have been responsible for the seizure activity witnessed during the patient encounter (Trevisan *et al.* 1998).

Stage 2 – Human Factors

Further to the complexity of the patient's physical condition their management was made more challenging by their surrounding environment and appearance. Their chaotic home environment, unkempt appearance, social standing, and double incontinence hypothetically created implicit bias in the approach taken by the crew in

the management of this patient. Implicit bias was found to be a common influence on the quality of care provided by healthcare professionals within the systematic review conducted by FitzGerald and Hurst (2017). They found that socioeconomic status (SES) could be one of the factors contributing to this together with other characteristics such as race/ethnicity, gender, age, mental illness, weight, having AIDS, intravenous drug users, disability, and social circumstances.

The author attempted to remain cognisant of the potential influence that bias could have on clinical judgement and wished to ensure this patient was afforded an equitable amount of care. Based on the unsanitary condition of the apartment and the patient's time critical condition the author concluded that there would be no time to effectively clean the patient in this instance and decided that transport to definite care was indicated to have this done in a controlled environment. Previous negative experiences presumably contributed to this decision, and this could be considered as a form of availability heuristics, where memories of other patient encounters influenced the decision and introduced bias rather than allowing the process to remain objective (Allen 2019: 12). Unfortunately, this compromised the thoroughness of the physical examination performed on the patient in this case, which could have had a detrimental effect on the clinical outcome for the patient (Asif *et al*. 2017).

The rationale for such clinical decisions can be explained when viewed against the findings of the literature review conducted by Perona, Rahman and O'Meara (2019: 7). They found that paramedics often utilize both sub-conscious (intuitive) and

conscious (analytical) thought processes as part of their patient assessment and management. These forms of thinking are often referred to a Type 1 and Type 2 thinking respectively and could be likened to the 'reflection in practice' seen above, which tends to be more spur of the moment and the 'reflection on practice' which occurs after the incident, of which this reflection is a part. With Type 1 thinking or 'reflection in practice' the clinician is reliant on memories of previous similar incidents to guide their decisions and therefore is susceptible to errors which can lead to misdiagnosis on the part of the clinician particularly when under time pressure. Whereas Type 2 thinking lends itself more to post incident dissection when the clinician has the benefit of more time and hindsight. To mitigate against the risks of Type 1 thinking Perona, Rahman and O'Meara (2019: 7) suggest that the technique of verbalisation or explicit reasoning should be used as a means by which to navigate an ambiguous or challenging patient presentations. This method could have been used in this instance to facilitate reciprocal problem solving and mutual performance monitoring, thus reducing the risk of unconscious bias.

Perona, Rahman and O'Meara (2019: 8) also propose that the use of guidelines and clinical evidence can offer decision-making support, but they further recognize that the decision-making process is not linear and extended deliberation can lead to delays in the provision of care; essentially paralysis by analysis. Such in-depth analytical thinking is better placed within a 'reflection on practice' enabling the acquisition of a broader repository of knowledge and understanding and facilitating the transition from Type 2 thinking to Type 1 thought processes in future complex situations. To this end a more detailed evaluation will be made of the interventions that were or could have been used.

Stage 3 – Clinical Applications

According to Kattimani and Bharadwaj (2013) all patients experiencing seizures or suffering from DTs should have intravenous access established immediately for the administration of anticonvulsants and fluid resuscitation. However, the PPE required by the circumstances of this call greatly hampered the author's dexterity and this meant that significant difficulty was encountered with cannulation. Therefore, this aspect of the treatment plan was not easy to implement, but thankfully the seizure activity appeared to self-terminate removing the need for immediate drug intervention. As an alternative the author did consider the use of rectal diazepam as a means of administering an anticonvulsant. Although Hua (2019) reports that pathological conditions including colorectal diseases such as inflammatory bowel disease (IBD), irritable bowel syndrome (IBS), haemorrhoids, anal fissures, bowel incontinence, and acute gastrointestinal infections can influence the effectiveness of rectally administered drugs. They can all affect retention, mucosal interaction, and the time available for drug absorption. Aside from these problems, the faecal incontinence also made this drug route a less desirable option. In addition, the patient was profoundly hypotensive and hypothermic, and despite the fact that neither of these two conditions are listed as contra-indications for the administration of diazepam (Brown *et al.* 2019: 565), hypotension and respiratory depression are recorded as potential side effects. In addition, caution is advised where alcohol may have been taken as side effects are more likely to occur. Therefore, administration of any form of diazepam would have potentially required supplementary fluid resuscitation, which would not have been immediately feasible in the absence of peripheral vascular access.

Where intravenous access cannot be obtained, or if the time required to place an intravenous line would compromise patient care, Fowler *et al.* (2007: 64) recommends that the intraosseous (IO) route should be considered. It is also an acceptable route for the administration of diazepam (Brown *et al.* 2019: 567), so could provide a viable solution to some of the issues discussed previously. Bewick (2017) suggests that the use of intraosseous access should be considered early in patients who have had several failed intravenous cannulation attempts, or who are recreational drug abusers, but as Sumera (2018: 217) points out pain needs to be considered in some circumstances if the patient is alert. This is on the basis that the procedure is associated with a higher degree of pain than other methods of obtaining peripheral vascular access during insertion but primarily during infusion under pressure; a finding supported by Bradburn, Gill and Doane (2015). Nevertheless, in the studies conducted by Davidoff *et al.* (2005) and Gillum and Kovar (2005) the average pain was rated at 5 on a 1-10 severity scale and 1.2 on a five-point scale, respectively, with 1 being the lowest and 5 being the highest in the later. These pain scores are known to be considerably reduced with administration of 2% lidocaine prior to starting an infusion (Bradburn, Gill and Doane 2015: 6). However, lidocaine did not form part of the author's drug formulary at the time of this clinical incident. Consequently, this treatment strategy remained outside of the author's scope of practice.

Stage 4 – Supporting Literature

It therefore seemed prudent to review further literature to ascertain whether any alternative or contemporary techniques are available to manage similar patient presentations in the future. In the comparative evaluation by Gridley and Perry (2016) of diazepam and lorazepam other routes of administration were considered such as buccal, nasal, oral/sublingual and intramuscular (IM). Although in doing so they recognized the fact that IM administration of benzodiazepines is linked with a delay until plasma concentrations reach a level capable of producing a therapeutic effect. Whilst this may be undesirable in normal circumstances, its use may be justified in situations where the patient is continuing to exhibit seizure activity and the clinician has no other available route by which to administer an anti-convulsant. However, the studies conducted by Greenblatt *et al.* (1982) and Wermeling *et al.* (2001) upon which some of these findings were based were primarily investigating the use of alternative drug routes for lorazepam administration and not diazepam specifically. It therefore may not be possible to extrapolate the same conclusions for diazepam as it has a different pharmacokinetic process of absorption. Due to its high lipid solubility diazepam tends to rapidly redistribute into adipose tissue leading to a reduced duration of action in comparison with lorazepam, which could further impair the suitability of diazepam for this drug route.

Various other studies also investigated the use of intranasal (IN) administration of benzodiazepines, but the majority of these involved the use of other medications and most found that a relatively large drug volume was required to achieve therapeutic effect and the resultant leakage decreased the amount of agent absorbed (Burstein *et al.*1997; Knoester *et al.* 2002; Riss, Kriel and Croyd, 2006). One benzodiazepine that is worth consideration though is midazolam. It has been shown in a number of

studies to provide more effective and superior seizure control than rectal or intravenous diazepam when administered via the buccal drug routes, however McTague, Martland and Appleton (2018) also found no evidence to support the use of intranasal midazolam or lorazepam as alternatives to buccal midazolam or rectal diazepam. Despite this the use of midazolam is not universally available to all paramedics across the UK as was the case here, with a Patient Group Directive being required unless a patient has their own supply (AACE 2019: 587), and the author's clinical competency did not extend to external jugular vein cannulation (EJVC).

Consideration then moved to non-pharmacological interventions. As the patient was also effectively in a state of peri-arrest precipitated by a case of accidental hypothermia the author reviewed the latest European Resuscitation Council Guidelines (Lott *et al.* 2021) for any changes or advances in practice. They suggest that prehospital insulation, triage, fast transfer to a hospital and rewarming are the key interventions to be performed in circumstances such as this, which is in keeping with current prehospital guidelines (Brown *et al.* 2019: 264) of preventing further heat loss and time critical transfer to a facility capable of providing extracorporeal life support (ECLS) where possible. Furthermore, both of these guidelines highlighted the need for practitioners to be ready to resuscitate, reinforcing the need for IV or IO access to be established and defibrillator pads to be applied, as any rough handling could be sufficient to precipitate a cardiac arrhythmia and in turn cardiac arrest; something which the author remained aware of throughout the call.

Stage 5 – Next Time

The inability to establish peripheral vascular access and correct some of the symptoms observed in this patient filled the author with feelings of helplessness and frustration at being unable to intervene. Though having reviewed the literature surrounding this case it would seem that a number of alternative solutions exist within current practice. These include earlier consideration of rectal diazepam, the use of alternative benzodiazepines like midazolam and other routes of drug administration like IN, EJVC and IO supplemented by 2% lidocaine for conscious patients, although a number of these may require a change in clinical practice for many clinicians. The author made two attempts at cannulation before initiating transportation to hospital, which corresponds with the standard procedure to be followed in cases of failed attempts (Armstrong 2018: 441). Considering this from an ethical viewpoint, subsequent attempts to gain vascular access are typically associated with even lower chances of success (Nadler *et al.* 2015) and remaining on scene to making such attempts would sit contrary to the ethical principle of nonmaleficence (to do no harm) by delaying the patient's transfer to definitive care for a potentially futile purpose.

Conclusions

The author chose to review this particular incident because of the extreme nature of the clinical presentation and the challenges encountered during the patient management. What initially appeared to be an isolated fall, proved to be a much more complex and demanding case, which can be so true of many of the falls attended to on an annual basis by the ambulance service, highlighting the need for

thorough assessment to enable appropriate management. The reflective model devised by Willis (2010) used to analyse the incident management encouraged a much broader consideration of the factors affecting patient care; issues which although frequently present in the prehospital environment invariably get overlooked during call evaluations. Although the author found several alternative interventions to help deal with the clinical dilemma in this case, the majority of these were unavailable to the author at the time of the incident and in some instances would require a change to standard clinical practice for paramedics. The only intervention that could have been utilized earlier in the management of this patient was the use of rectal diazepam, but the need for this intervention was then removed by the patient's seizure activity self-terminating. Analysis of this incident also revealed a certain degree of unconscious bias which could be mitigated through the use of verbalisation, explicit reasoning and reflective practice. The use of these clinical interventions would be appropriate during similar incidents in the future and the unfortunate fact is that this was probably not an isolated incident as the knock-on effects of COVID-19 in terms of social isolation, mental health, alcohol, and substance misuse all increase the likelihood of this type of incident becoming commonplace for the ambulance service (Panchal *et al.* 2021).

<u>Key Points</u>

- Call evaluations should take account of the broader issues impacting upon patient care including human factors and ethical concerns.
- Implicit or unconscious bias can potentially affect patient assessment and management.

- Guidelines regarding an intervention should be regarded as simply that, and an alternative approach may be justifiable if it is in the patient's best interests and not going to compromise patient outcomes.
- Falls with associated complications are potentially more likely as a result of the COVID-19 pandemic.

CPD Reflective Questions

- Have human factors impacted upon patient management in a patient encounter that you were involved in and how did you mitigate against these?
- Do you feel implicit bias has affected your clinical judgement in the past and how will you prevent this in the future?
- Has this case review changed your perspective on falls?

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