# Case Studies

# Case Study - Example 1

**Introduction –**

Female, 29 years old, fell from horse during steeplechase race. Fall involved both speed (approx. 35kph) and height (approx. 1.75m). Witnessed loss of consciousness <1min.

CPG's considered;

| | |
|---|---|
| 4/5/6.2.2 | Primary Survey Trauma – Adult |
| 4.2.5 | Secondary Survey Trauma – Adult |
| 4/5/6.2.6 | Pain Management – Adult |
| 4.4.14 | Altered Level of Consciousness – Adult |
| 4.6.5 | Head Injury – Adult |
| 4/5/6.6.7 | Limb Injury – Adult |
| 4.6.9 | Spinal Injury Management |

**Case details –**

A – not indicated
c - Mechanism of Injury indicated need for spinal motion restriction
B – 14 per minute
C – 90bpm, regular, CAP refill <2, SpO2 96%, skin pale, temp 36.6°C, BP 120/P
D – V on AVPU scale, witnesses reported that patient was unresponsive for a short period of time (<1 minute) after the fall.
E – Head to Toe examination revealed no further obvious issues. (In line with Turf Club protocol, the riding helmet was examined and no significant damage was noted.)

**Working diagnosis –**

Head injury with altered level of consciousness

Video review of the fall on scene indicated hyperflexion of the neck as the head impacted the ground first.

The patient would not tolerate a cervical collar and became agitated and combative as practitioners attempted to apply both collar and O2. The decision was made on scene to use passive spinal motion restriction in a vacuum mattress.

**Pre – Hospital Management –**

Collar and NRB refused
SAM Pelvic splint – standard for all jockeys with query c-spine and/or head injuries
Combi Board lift
Spinal motion restriction in vacuum mattress
Transferred to ED

**Key learning outcomes –**

Worldwide, traumatic brain injury (TBI) is one of the leading causes of death and permanent disability particularly in young adults. After the initial injury, many patients suffer secondary brain injuries because of hypoxia, hypercapnea and hypotension. The secondary brain injuries can result in increased mortality and disability (Pakkanen et al, 2016).

Prehospital care providers are sometimes confronted with combative, violent, and uncooperative trauma patients (Melamed et al, 2007). The prehospital management of the agitated, combative patient suffering from major trauma can be difficult. This can delay treatment thus causing further deterioration, especially when agitation prevents a necessary procedure from being performed. In this case the patient's combative behaviour presented challenges to the practitioners on scene, particularly as the use of the cervical collar is drilled into EMTs working at National hunt race meetings.

The cervical collar has been routinely used for trauma patients for more than 30 years and is a hallmark of state-of-the-art prehospital trauma care The use of collars is regarded as so important that it is highlighted in the well-known ABC's of major trauma as a first measure, together with establishment of a free airway. (Sundstrom et al, 2014). It can be argued that some practitioners are "paralysed" by the collar and its use and may not focus on other key interventions such as airway management. Recommendations 5 (adult) and 19 (paediatric) of the PHECC position paper on Pre-hospital spinal injury management states that uncooperative patients shall not be forced into active spinal motion restriction as this is a greater risk to the patient (PHECC, 2016).

Likewise, the resistance towards the oxygen mask is problematic as any single episode of hypoxia can double the mortality chance of a head-injured patient. It is recommended that the SpO2 of head injured patients be maintained as close to 100% as possible through early application of O2, even if SpO2 is above 90% (Duckworth, 2018).

**References –**

Duckworth, R. (2018), EPIC - An EMS-centered approach to head injuries, online https://www.ems1.com/ems-training/articles/epic-an-ems-centeredapproach-to-head-injuries-vd25t6wgkt1254OM/

Melamed E., Oron Y., Ben-Avraham R., Blumenfeld A. and Lin G. (2007), The combative multi-trauma patient: a protocol for prehospital management, European Journal of Emergency Medicine, 14:265-268.

Pakkanen T. (2016), Pre-hospital severe traumatic brain injury – comparison of outcome in paramedic versus physician staffed emergency medical services. Scandanavian Journal of Trauma, Resuscitation and Emergency Medicine, Vol. 24, article number 62.

Pre-Hospital Emergency Care Council, (2016). Pre-hospital spinal injury management – PHECC position paper, online www.phecit.ie.

Sundstrøm T., Asbjørnsen H., Habiba S., Arne Sunde G., and Wester K., (2014), Prehospital Use of Cervical Collars in Trauma Patients: A Critical Review. Journal of Neurotrauma, 31:531-540.

# Case Study – Example 2

**Introduction –**

Male 57 years old, complaining of feeling generally unwell following time spent in a crowded environment in warm weather.

CPG's considered;
4/5/6.2.1 Primary Survey Medical – Adult
4.2.4 Secondary Survey Medical – Adult
4/5/6.6.6 Heat related Emergency – Adult

**Case details –**

A – not indicated
C – not indicated
B – 16 per minute
C – 98bpm, regular, CAP refill <2, SpO2 99%, skin clammy, Temp 37.8°C, BP 100/70, Blood Glucose 7.5mmol/L.
D – A on AVPU scale.
E – Head to Toe examination revealed no further obvious issues.

S – Patient was diaphoretic and complained of headache and dizziness, appeared stressed and uncomfortable.
A – n/a
M – Cipramil (antidepressant)
P – Ongoing treatment for depression
L – Lunch 40 minutes prior to feeling unwell
E – Spent several hours in crowded environment, ambient temperature >20°C.

**Working diagnosis –**

Heat exhaustion

Patient presented with the classic symptoms of heat exhaustion (heavy sweating, headache, dizziness, clammy skin and rapid pulse) and was quickly diagnosed.

**Pre – Hospital Management –**

Allowed to rest in cool environment away from busy area of medical centre

Rehydrated with 2 litres of water over 30 minutes orally

Vital signs monitored at 10 minute intervals

**Key learning outcomes –**

Heat illnesses range in severity from mild (heat rash, heat syncope and cramps) to severe (heat exhaustion, heat injury and heat stroke). Although heat illness can occur in anyone, an increased risk is associated with a variety of environmental factors, personal characteristics, health conditions and medications (Carter et al, 2006). Heat exhaustion is usually caused by physical exertion in a hot environment and often presents with flu-like symptoms that may include headache, nausea, vomiting, malaise, muscle cramps, and dizziness (Waters, 2001). The temperature is typically normal but can be elevated; it is usually less than 41˚C if elevated. Clinical signs and symptoms of dehydration are almost always present in the form of tachycardia, hypotension, and diaphoresis.

In this case, the ambient temperature on the day (20.5°C) was above normal for the time of year (three year mean 13.2°C) but not abnormally high. Heat exhaustion and heatstroke usually only happen in Ireland during unusually hot weather such as a heatwave (HSE, 2018). A heatwave refers to prolonged periods of abnormally hot weather which may be accompanied by high humidity. While there is no generally accepted definition of a heatwave, in Ireland it's classified by Met Eireann as 5 consecutive days with a maximum temperature in excess of 25°C.

While in the medical centre symptoms of the patient's primary complaint gradually dissipated but he remained agitated and was visibly upset. It is important to develop a rapport with the patient, a non-confrontational empathetic approach will help the EMT gather more information regarding the patient's chief complaint (Dooley, 2015). Patients with mental health issues are especially likely to be suspicious and fearful. When the patient eventually relaxed, he expressed concern that he was unable to function properly in the crowded environment and that his anxiety was made worse by having the responsibility of looking after his daughter, aged 12, and her two friends for the day. The patient's working diagnosis of heat exhaustion was unusual given the weather conditions. Research suggests that certain drugs including antidepressants may induce or worsen heat-related illnesses by inhibition of sweating and reduction of

heat elimination (Kwok, 2005). Patients using these drugs are therefore more vulnerable to heat stress (Lohmus, 2018).

In summary, while the patient presented with heat exhaustion it is likely that his medications may have exacerbated the issue and it was vital that a thorough secondary survey (especially regarding previous medical history) was completed by attending EMTs. Comorbidity should also be considered.

The patient spent several hours in the medical centre and was then discharged to home.

**References –**


Carter, R., Cheuvront, S., and Sawka, M. (2006), Heat related illnesses, Sports Science Exchange, Vol. 19, No. 3.

Dooley S., (2015), Dual Diagnosis, Presentation by National Forensic Mental Health Services.

HSE (2018), Heat Waves, Health Impacts, online at https://www.hse.ie/eng/services/list/5/publichealth/publichealthdepts/extreme/heatwaves.html

Kwok, JS., Chan, TY, (2005), Recurrent heat-related illnesses during antipsychotic treatment. Annals of Pharmacotherapy, Nov;39(11):1940-2

Lohmus, M., (2018), Possible Biological Mechanisms Linking Mental Health and Heat—A Contemplative Review, International Journal of Environmental Research and Public Health, 15(7):1515

Waters, T., (2001), Heat Illness – tips for recognition and treatment. Cleveland Clinic Journal of Medicine, Vol. 68, No. 8.

| EMT CPC Case Study Marking Rubric – Version 2 – November 2019 | | | |
|---|---|---|---|
| | Exemplary | Good | Poor |
| **Introduction** | EMT clearly outlines why they choose this particular case study | EMT makes reference to why they choose this particular case but does not go into detail. | No reference made to the reasoning why this case was chosen. |
| **Case Details** Important scene details and Vital signs | Clearly outlines the situation presented to them including correct differential diagnosis thought process on route, the scene presented to them, vital signs and the condition of the patient. | Omits vital signs or important scene details relevant for the incident.<br><br>Expected vital signs for presented condition not included. | Poor or no outline of patient's vital signs.<br>Poor or no outline of important scene details.<br>No differential diagnosis (where one is expected) |
| **Working Diagnosis** explained in reference to specific condition presented | EMT should clearly explain how the signs and symptoms relate to their patient and how they came to decide on their working diagnosis.<br><br>EMT should present a detailed review of the condition through research | EMT does not relate signs and symptoms correctly for the presented condition.<br><br>Review of condition missing some key details. Research not fully completed | Shows no understanding of the relationship between S&S and the condition.<br>No research of condition completed. No explanation of thought process. |
| **Pre Hospital Management** By you and any ALS provider | Clearly outlines treatment given by practitioner and their rational for providing such treatment in line with CPGs | Omits some rational for providing such treatment to patient.<br>Appears to give inaccurate details on treatment or rational | Omits any detail on pre hospital treatment.<br><br>Omits rational for treatment. |
| **Key Learning outcomes** What the EMT has learned | Key learning points clearly outlined and benefit to EMTs competence has been explained | Some key learning points given. Assessor able to identify key learning points that should have been listed.<br>Minimal benefit to competence shown. | No key learning points given.<br>No benefit to practitioners competence shown. |
| **References** | References used and are appropriate for the case. | References used but some omitted | No references used. |
| **Score per box** | **6 marks** | **3 marks** | **1 Mark** |

| | |
|---|---|
| **Exemplary total** | |
| **Good total** | |
| **Poor total** | |
| | |
| **Overall result** | **/36** |