

# Management of severe trauma in an austere environment with limited kit on Pacific Partnership 2010 Deployment

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## Abstract

**Background:** Management of trauma is a challenging process which can be made worse in the austere environment. Austere medicine is essentially the provision of medical care without access to modern investigations or technology. This case review will discuss the management of a 38 yr old female involved in a motor vehicle accident (MVA), car vs tree during monsoonal rain conditions in a remote location in Cambodia during the Pacific Partnership 2010 mission.

## Introduction

Whilst conducting humanitarian health operations with the United States military at a medical site in Cambodia, a request for assistance was made to the site commander to send staff to assess a patient from a MVA who had allegedly suffered a minor injury. The communication was relayed that the patient had suffered only a minor injury and could be assessed and retrieved back to the Medical site. The author was asked to respond to this request as the victim was a member of the US embassy staff. The accident was supposed to have happened approx 30 mins north of the current Medical site position. The time of the accident was unknown. The author and two members of the US Navy medical service were driven north to assess the patient in extreme weather conditions with severe electrical storms causing reduced visibility down to 3-4 feet ahead. The team made its way north in search of the hospital where the victim was to be located.

After driving around 40mins to the location, no hospital was seen, but a small market area was noted, with a local waving the team over. On the left was a small clinic into which the team was summoned. The clinic was small containing patients with different conditions scattered on the floor. The team was taken through to a back room which had half a roof and with the rain pouring in. The team found a woman on a stretcher lying on the floor which was covered in water. She had noticeable head trauma, she was having decerebrate posturing and she was vomiting blood.

## History & Examination: Primary Survey

The history was that this female was driving along the road to the port when the car lost control in the wet and hit a tree. The female was pulled out of the car by local Cambodians.

Using the advanced trauma life support process<sup>1</sup> the ABCDE (Airway with C-spine protection, Breathing, Circulation, Disability, and Exposure) approach was used by the author and team who ensured the C-spine was aligned and protected.

**Airway:** was assessed, suctioned and an oropharyngeal (OPA) airway was inserted. Oxygen was applied via a nasal cannula attached to the OPA, as there was no NRB (Non Re-breathe Masks), available. The author cut the end of the nasal cannula and placed this inside the OPA and set the oxygen to high flow. After managing the airway with this limited kit (no ETT available), breathing was assessed.

**Breathing:** bilateral air entry was heard with scattered faint ronchi. There was rapid rise and fall of the chest and her respiratory rate was 35. No tension pneumothorax, haemothorax or life threatening chest injury was identified during the primary survey.

**Circulation** was assessed, a radial pulse was present and IV access in both ACF was obtained with small yellow 24 Gauge cannulas as this was the only equipment available. The author successfully sited two 24 Gauge side by side in one ACF (anti cubital fossa) to increase the flow rate. IV N/saline was commenced. Minor external bleeding due to lacerations was noted on both arms and was controlled with dressings. The pelvis was unstable and a sheet was used to tie the pelvis in.

## Case Study

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**Disability:** An assessment of disability found the patient unconscious and not responding to stimuli, AVPU score (alert, pain, voice unresponsive) = U, pupils size 2 and sluggish. She was having decerebrate posturing.

**Exposure:** The left leg was rotated with a suspected fracture of the femur, the pelvis was unstable and no external haemorrhage was seen. Minor ooze was noted from a lower leg laceration. Facial swelling and bruising was present with minor scalp lacerations. The left humerus appeared broken and bruising was evident midshaft.

On evaluation the author and the team had provided stabilisation within the golden hour period. The golden hour defines that period in which critically injured patients who are able to obtain haemorrhage control and resuscitation within the hour, have a chance of survival which is greatly improved<sup>2</sup>.

Evaluation of the primary survey had concluded the following 1. Airway - patent with oxygen applied, 2. Breathing - adequate rise and fall of the chest and no tension or haemothorax identified 3. Circulation - any haemorrhage was controlled and IV access obtained and IV fluids infusing, 4. Disability - the patient was U on the AVPU score, 5. Exposure - the patient was exposed and assessed for other injuries and external haemorrhage then blankets applied to maintain warmth.

### Clinical Findings

This was where the team focused on splinting fractures and dressing the minor lacerations. The patient was log rolled and no injury was found on the back and no external haemorrhage seen.

As the weather conditions were deteriorating the immediate issues were continuing stabilisation and evacuation. A call was placed via mobile phone to the medical supervisor on the USN Mercy to request immediate rotary wing evacuation because the patient would not survive a road retrieval. Her injuries were too severe and she needed intubation.

The team tied her pelvis, splinted her left leg, maintained her airway and kept her warm with the available blankets and continuously assessed and reassessed her ABCDE. The seizures became progressively worse and the team continued to suction her airway and provide C-spine immobilisation and prepare her for intubation when the helicopter arrived with the anaesthetist.

A number of issues presented the team at the clinic. No one spoke English, the clinic had limited equipment with just basic dressings, small IV cannulas and no IV drugs and due to this the team could not provide

definitive care beyond the available basic equipment. There were no ETT's, No NRB's (Non Re-breathe Masks), no IV drugs and oxygen was supplied via two C size cylinders at 8L per minute. Her condition was deteriorating and the team did what they could without definitive airway support.

The patient was maintained for 1hr 20mins until the anaesthetist arrived on the helicopter. The patient was subsequently intubated on the ground in the back of the clinic and flown back the USN Mercy in horrendous weather conditions.

The US pilots displayed heroic actions flying at 300 feet with poor visibility but following the road from the port where the USN Mercy was anchored in our location.



*FLTLT O'Neill loading the patient in to the H-60 Nighthawk which landed on a road in austere conditions (2010)*

### Discussion

The fact that the team was able to provide care within the golden hour, that being the time period lasting from a few minutes to several hours following traumatic injury being sustained, during which there is the highest likelihood that prompt medical treatment will prevent death<sup>1</sup>. It is well established that the victim's chances of survival are greatest if they receive care within a short period of time after a severe injury<sup>3</sup>. This was achieved by maintenance of a good airway, obtaining IV access, splinting fractures and controlling any external bleeding which probably contributed to her survival. On board the USN Mercy she was definitively treated for her injuries which included a fractured pelvis, femur and a head CT confirmed DAI (diffuse axonal injury). She was transferred from the operating room (O.R) to the ICU intubated, ventilated on the USN Mercy for 12 hrs prior to being transferred to a neuro ICU unit in Singapore.

The current progress of the patient is that she is doing well, is up and walking but has some memory loss. She continues to improve.

The key primary objectives of this trauma management case were rapid and accurate assessment of the patient's condition, resuscitation and stabilisation, and organising rotary wing aero medical evacuation.

This short paper describes the management of a severely injured trauma patient in an austere environment with limited equipment. Having an experienced team leader qualified in ATLS/TNCC (Advanced Trauma Life Support/Trauma Nurse Core Course) enabled the stabilisation of the patient and ensured the maximum level of care in a cold

wet environment. It also shows adaptability of ADF health staff having interoperability with US forces and that well trained staff are able to adapt to clinical challenges in the austere environment. The lessons learnt were that limited kit, even though not ideal, can be adapted to maximise patient care. Regular training and clinical currency is imperative for ADF staff deploying on operations and that no matter what communication/intelligence is given always expect the worst and prepare for it.

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