

# Helicopter Winchmen's Experiences with Pain Management in Challenging Environments

## **Abstract:**

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We conducted a survey of Irish Coast Guard Search and Rescue Helicopter winchmen to establish if their pain management scope of practice was adequate for their working environment. We surveyed 17 SAR personnel. 88% of winchmen have experienced scenarios where they were unable to reduce pain scores below 6/10. In seeking solutions within current Irish Prehospital Clinical Practice Guidelines, repeated descriptions of operations in extreme weather and sea conditions were given which were entirely incompatible with the dexterity required to break a glass ampoule and draw up solution, let alone site an intravenous (IV) line or administer a drug via intramuscular (IM) injection. Irish Coast Guard Search and Rescue Helicopter winchmen encounter polytrauma patients in extreme pain in uniquely challenging environments. Novel solutions to pain management within this tightly governed system are urgently required.

## **Introduction**

The Irish Coast Guard (IRCG) Search and Rescue (SAR) helicopters respond to emergencies up to 200 miles into the Atlantic Ocean, inland waterways, offshore islands, and the mountains of Ireland. They operate from four bases and are on call 24 hours a day, throughout the year. As of 2011, 86% of the country's 32 winchmen have up-skilled to paramedic level. Current Prehospital Emergency Care Council (PHECC) guidelines equip SAR paramedics with a range of drug options including Entonox, oxygen, ibuprofen, aspirin, paracetamol, naloxone and GTN. The aim of this study is to establish if current pain management strategies available are adequate for the environment in which these winchmen work.

## **Methods**

Permission to conduct the study was obtained from the Director of the IRCG, with agreement locally from CHC Helicopters. Ethical approval was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospitals. A 38-item questionnaire, containing both open and closed questions, was designed to allow the crews to give their personal opinions and experiences alongside quantifiable answers, whilst minimising interviewer bias and ensuring reproducibility. We interviewed 17 SAR personnel, 2 EMTs and 15 paramedics. This is a purposive sample of a small size. Thus, the views expressed are not representative of the general population or even the wider paramedic community. However, given we interviewed more than half of the total IRCG SAR winchmen population in Ireland (32); they give an insight to the working environment and views of this specific cohort. All subjects signed a consent form, in full knowledge that participation was voluntary and anonymous. Only verbal responses were recorded, interviews were not video or audio recorded and no other data was noted covertly, such as body language. The single interviewer was in no way associated with their employer, CHC Helicopters, nor the IRCG. The data was analysed according to its qualitative or quantitative nature. The qualitative data was coded and thematic content analysis used to extract themes. Quantitative data were expressed as frequency and percentage (%).

Figure 1

## **Results**

A winchman will encounter patients in severe pain (Pain score >6/10) on average 15 times in a year. 94% of those interviewed had encountered patients in excruciating pain (pain score >9/10). Trauma was the greatest source of excruciating pain (94%). Injuries included pelvic, long bone, vertebral and rib fractures with 35% having encountered partial or full amputations. 69% of these patients had multiple severe injuries.

### *Time managing patients in pain*

Winchmen have spent anything up to 7 hours with patients (longest average time 131min), often alone, in extremely challenging conditions. Distance, stabilising the patient and the nature of patient injuries were consistently cited as principal contributing factors to prolonging rescue, with weather and sea conditions protracting call-out times. 35 minutes was the average time spent with a patient on a typical call-out. Time on target (time helicopter on scene) was on average 22 minutes, but varied according to weather conditions, fuel levels, location of the rescue, sea conditions and presence of obstructions to winching. Access to patients was a significant factor in prolonging rescues. Crew may have to hike across mountainous terrain to patients in areas inaccessible to the helicopter and carry the patient back. Additional time is also needed on small fishing vessels, where winchmen may have to splint, immobilise a patient, in limited space, and negotiate a stretcher through narrow stairwells with lay assistance. Two examples were given of a fishing crane being used to raise a patient to deck via the fishing hatch.

### *Rescue priorities over pain*

Winchmen have to prioritise safe rescue over patient comfort on average 10 times per year. 65% of those interviewed were able to give examples where injured patients were rapidly winched to safety without the ability to administer pain relief. 30% of scenarios given included descriptions where rescue from an unsafe environment was prioritised over spinal immobilisation.

### Communication barriers

Noise from the aircraft presents a significant communication barrier. Personnel have to shout at patients and resort to hand signals, or ask the helicopter to leave the scene. Patients who are not immobilised can use the on-board headset. Winchmen encounter an average of 9 language barriers a year. Spanish, French and Polish predominate. A multi-lingual medical phrase book is also available.

### Severe pain

Four separate examples were given of patients' screams audible over the noise of the rotor blades, despite helmets with ear protection being worn. One such example was of a 14-year-old boy's cries audible to the pilot 15 feet below the helicopter on the winch. 94% of winchmen have treated patients with non-traumatic sources of pain, with cardiac chest pain being the principal cause, followed by gastrointestinal pain and headaches. 88% of them have experienced scenarios where they were unable to reduce pain score below 6/10 within their current scope of practice. Trauma was again the predominant derivation of injury (80%). 66% of patients with irreducible pain had fractures. In 25% of such patients, Entonox was contraindicated.

### Patient assessment

94% of winchmen have experienced difficulties assessing patients' vital signs owing to aircraft noise and vibration. They rely predominantly on visual cues (94%) as the cold, wet and vibration frequently interfere with automated monitoring equipment.

### Pain management options

Non-pharmacological pain management options most frequently availed of were splinting, reassurance and positioning. 88% of crew were able to recall difficulty splinting, with the nature of patients' injuries being the chief obstacle (60%). Pain (47%) and patient access (42%) were notable barriers to successful splinting. 25% experienced patients trapped on rocks, or on narrow cliff ledges that needed spinal immobilisation.

### Paediatric pain management

Winchman will treat on average 3 children annually. 65% had faced challenging scenarios with children. Recurrent themes were personal emotional difficulties managing children (41%), their medical conditions (18%), experiences of children dying (18%) and the injuries sustained (18%). One winchman recalled an explosion in which 6 children died and 6 received multiple severe injuries including amputation.

### Drug administration

Repeated descriptions of operations in extreme weather and sea conditions were given which were entirely non-compatible with the dexterity required to break a glass ampoule and draw up solution, let alone site an IV line or administer a drug via IM injection. Deterrents cited were location (82%), sea conditions (71%), movement (65%), extreme cold or heavy rain (59%) and poor visibility (24%). 76% of winchmen see a benefit in up-skilling to IV cannulation. Warm fluid administration in hypothermia was felt to be the principal benefit, together with the ability to administer drugs with tele-medical support. Whilst universally responders had concerns with the ability to gain IV access during rescue, once aboard the aircraft conditions are considerably more stable. They envisaged training, skill maintenance and regular offsite practice as additional challenges. Intra-osseous (IO) access was then presented as an alternative to IV access. All but one responder felt this could be viable once in the aircraft, or another stable environment. The rapidity and ease of both access and skill maintenance, was perceived to be of benefit, particularly in hypothermia.

### Ideal agent

Properties of an ideal analgesic agent from winchmen's perspectives were robust packaging (35%), easy storage (35%), easy administration (24%), easily carried (24%), and long shelf life (24%). Their preferred route of administration was Oral (47%) or IV (47%), followed by IM (41%) or IO (41%) with 24% describing the Oral Transmucosal route by referring to Fentanyl Lollipops.

### Opinions

Interviews concluded with a series of entirely open questions asking for winchmen's opinions on improving analgesia provision within their service. Improvements most keenly sought were stronger, faster-acting medications (59%), additional routes of administration (41%), upskilling (18%), ease of drug administration (18%), and improved monitoring equipment (18%). When asked to expand on further training, winchmen were interested in more offsite exposure (65%) as well as augmented medical training which focused on maintenance of their core skills (53%). Missing data did not exceed 1%.

### Discussion

Traditional EMS systems are focused on the "transport" or rescue elements of patient care. Set up primarily as a SAR (as opposed to emergency medical) service, the structure of IRCG helicopter operations is no exception. A belief that the standards of pain management in austere environments can be compromised simply because the situation is an emergency, has hampered development of clinical thinking and standards worldwide. Paradoxically, the majority of prehospital care is highly predictable, easy to train for and ideally suited for the same standards of governance that exist in hospital. The general European consensus that even with the addition of prehospital physicians or paramedic administration of opiates, there is considerable work to do to improve this aspect of patient care with only Entonox, ibuprofen, paracetamol and GTN at their disposal, winchmen frequently experience scenarios where they are unable to control pain. Pain relief is no longer seen as solely humanitarian, but intrinsic to neuroendocrine control of catecholamine surges, and associated detrimental effects. Given the nature of injuries encountered, the time and distance from definitive care at which rescues can occur, alternative pain management strategies are urgently required for this unique working environment.

<sup>2</sup>. Unsurprisingly,

The Third Edition of the PHECC Clinical Practice Guidelines introduces a mechanism where, under registered medical practitioner's instructions (URMPIO), a suitably up-skilled PHECC registered paramedic may administer IM Morphine. To date, this option has yet to be invoked as its introduction poses significant logistical and training investment. Given their views on the impracticalities of needles and ampoules in their working environment, this decision appears logical. A solution might lay in existing novel needle-free Fentanyl delivery methods such as transdermal, intranasal or oral transmucosal. The possibility of introducing patient controlled analgesia via these novel routes has been described.

Considering the lack of patient exposure in comparison to road-based peers, increasing winchmen's scope of practice may seem unwarranted. However, one needs to consider that ship captains have very little medical training, yet are routinely authorised to carry and administer a variety of medications through MEDICO networks worldwide. These paramedics all have live access to consultant lead tele-medical support via MEDICO Cork and are all skilled in airway management, oxygen and naloxone administration. Some winchmen felt that Advanced Paramedic (AP) bags should be carried on board the helicopter, such that if an AP was on scene, they could be winched up onto the craft without losing time winching the equipment. This change in practice could introduce the possibility for winchmen to carry out procedures and administer drugs URMPIO via MEDICO Cork.

<sup>5</sup>. These

On average, Winchmen train 3 hours per 24-hour shift to maintain currency in their in-flight and winching skills. They are high-skilled individuals, accustomed to executing directives and following the well-drilled, complex protocols demanded by the aviation industry. It is entirely plausible to advocate enhancements to their skills matrix, provided fears voiced by crews surrounding clinical practice development are addressed. Such a skills matrix must be mindful of the working environment and the limitations of the crew's clinical practice, striking a balance between adequate pain management and patient safety. Irish Coast Guard Search and Rescue Helicopter winchmen encounter polytrauma patients in extreme pain in uniquely challenging environments. Traditional analgesic solutions from hospital or road based practice appear impractical. Novel solutions to pain management within this tightly governed system are required.

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