

Clinical Paper

Helicopter Emergency Medical Service (HEMS) in Northern Ireland: An Analysis of the First 100 Cases

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Abstract:

Introduction: Northern Ireland (N.I) is the most recent region within the UK to establish a helicopter emergency medical service (HEMS) which became operational in July 2017.¹ We present descriptive data and discussion about the first 100 cases managed by this new trauma service. Some call-outs involved multiple cases. The data covers a period of 130 days from late July 2018 to late November 2018.

Methods: Information from all HEMS cases was captured manually and records retained for governance purposes. For the purpose of this paper we conducted a hand trawl of records relating to the first 100 cases managed by the HEMS team. Data was entered into a database for the purpose of analysis. Measured data included: location of incident, mode of dispatch, patient demographics, mechanism of injury, interventions provided, destination (hospital) and outcome at 24hours.

Results: Patients were treated in all counties of N.I., most frequently in Co. Antrim. 83% of patients were male. Age range was between 3 years old and 97 years old. The most common mechanism of injury was road traffic collision; others included fall from height, animal attacks, electrocution, drowning and burns. All cases were assessed by a consultant and paramedic. Interventions included: pre hospital anaesthesia using rapid sequence intubation (RSI), thoracostomies, enhanced drug therapy (EDT) for pain management, procedural sedation or fracture reduction (FR) and administration of hypertonic saline (HTS). Thirteen patients were declared deceased on scene. Five required no further transportation (medically or self-discharged). Of the remainder, 90% were alive at 24 hours.

Discussion: There has been considerable learning in the early stages and analysis of this data has indicated:

Since starting the service we have provided critical interventions to a wide variety of age groups throughout NI. Gender profile, mechanism of injury, vulnerable road users (defined as motorcyclists, pedal cyclists and pedestrians) and RSI rates are comparable to data published in the UK.^{2,3,4,5} The Royal Victoria Hospital (RVH) emergency department (ED) was the receiving unit for most patients attended by HEMS. 90% of all patients transferred to hospital were alive at 24 hours.

INTRODUCTION

Northern Ireland is the most recent region within the UK to establish a Helicopter Emergency Medical Service. The service became operational in July 2017 and is a partnership between the Northern Ireland Ambulance Service (NIAS) and Air Ambulance Northern Ireland charity (AANI). Currently, the service responds only to trauma cases throughout the region. The daily operational crew consists of a pilot, one paramedic and one consultant grade doctor (Figure 1). Medical staff were recruited from emergency medicine, anaesthesia and intensive care medicine.

The purpose of this paper is to present an analysis of activity, patient demographics and clinical interventions relating to the first 100 cases – some call-outs involved multiple cases. We intended to assess the level of enhanced interventions provided uniquely by the team for example RSI, EDT.



Fig 1. Northern Ireland Air Ambulance crew respond to a Road Traffic Collision.

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There was also a need to explore patterns in demand/activity that would provide opportunities to develop operational aspects of the service.

METHODS

All HEMS cases were captured manually and records retained for governance purposes. For the purpose of this paper we conducted a hand trawl of records relating to the first 100 cases managed by the HEMS team. Data was entered into a database for the purpose of analysis. Measured data included: location of incident, dispatch mode, patient demographics, mechanism of injury, treatment provided, destination and outcome at 24 hours. As there were 100 patients in the study, numbers and percentages quoted are equivalent.

RESULTS

Geography and Dispatch

The largest number of cases were in Co. Antrim, 36% with the smallest number of cases in Co. Fermanagh, 4% (Figure 2).

The helicopter was used as the primary dispatch mode in 75% of missions. The dedicated rapid response car was the primary mode of dispatch in just under a quarter of missions (24%). On one occasion, a road ambulance was dispatched for operational reasons.

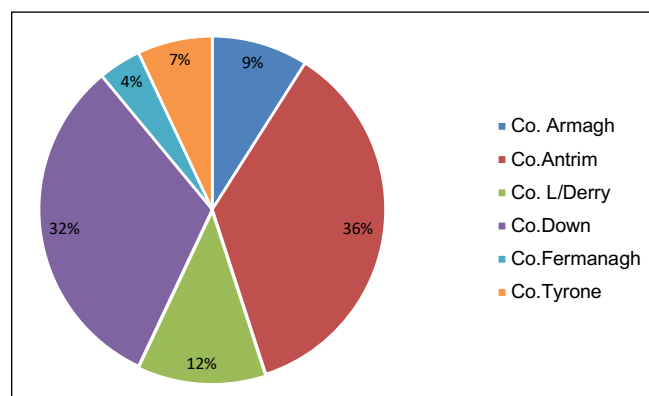


Fig 2. Location of call-out by county

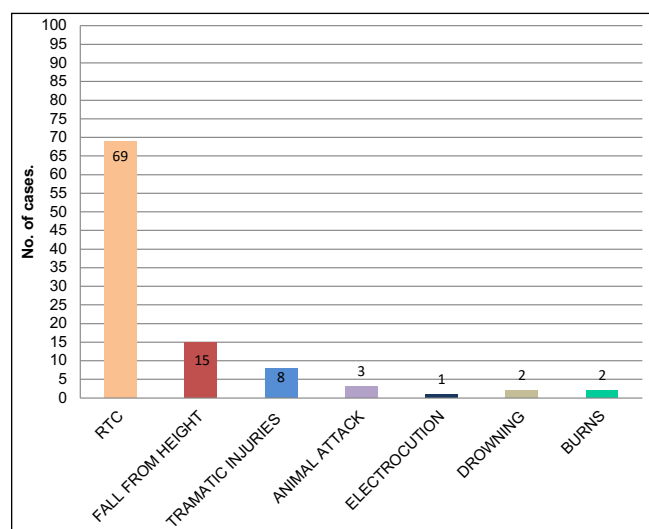


Fig 3. Mechanism of Injury

Patient demographics

Most patients (83%) were male. The disparity between genders in this sample of 100 cases is larger than in UK wide audit reports¹ but follows the trend that males are more likely to be a victim of major trauma.^{1,4}

The youngest patient was 3 years old and the oldest patient was 97. The mean population age was 45 years with a median of 43.5 and mode of 25.

Mechanism of Injury

RTC was the most common mechanism of injury at 69% (Figure 3).

Within the RTC category (Figure 4), motor vehicles included car, van or lorry. This group comprised 66% (44/69) of RTCs. Two-wheeled vehicles (motorcyclists and pedal cyclists) represented 22% (15/69) of those injured in a RTC.

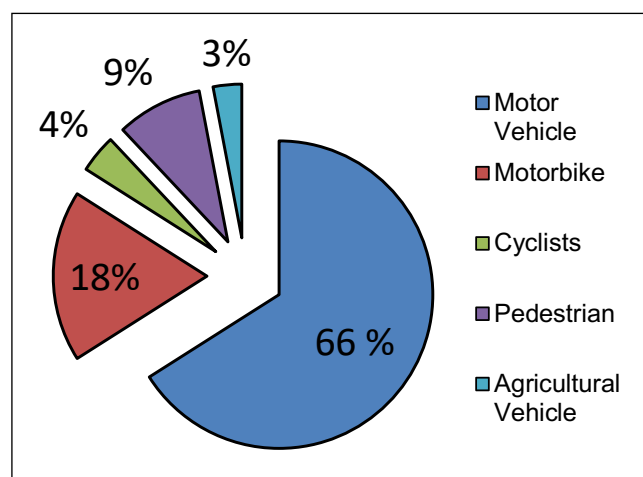


Fig 4. Types of road traffic involved in collision

Fall from height was the second largest percentage of mechanism causing injury, totalling 15. Ten of the 15 cases involved a fall ≥ 2 m (high energy transfer – high risk) with the remaining 5 cases involving a fall ≤ 2 m. Fall from height of ≤ 2 m, or low-energy fall, has been steadily increasing in published UK data since 1990 and has overtaken RTC as the most common mechanism of injury in major trauma.³

Interventions

In addition to the advanced skills and enhanced drug therapy

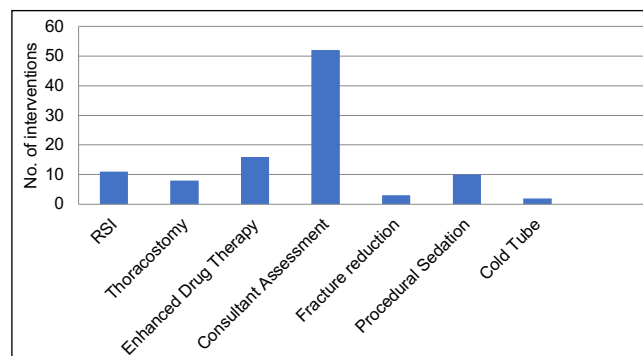


Fig 5. Advanced skills provided by the Air Ambulance

provided by the HEMS team (Figure 5 and Text Boxes 1-4) other outcomes were noted; which included the ability to redirect patients to the most appropriate receiving unit regardless of Trust boundaries.

BOX 1

RSI

- In total 11 RSIs were performed in the first 100 cases.
- Included in the 11 RSIs were:
 - 2 RSI including thoracostomy
 - 1 RSI including HTS
 - 1 RSI including fracture reduction

BOX 2

Intubation without drugs referred to as 'Cold Tube'

- In total 2 cold tubes were performed.
- 1 x cold tube in conjunction with a thoracostomy.
- 1 x cold tube followed with HTS.

BOX 3

Thoracostomy

- In total 8 x thoracostomies were performed.
- In 5, airway was established by road crew prior to HEMS arrival.
- The remaining 3 thoracostomies were in conjunction with HEMS RSI or cold tube procedure (see box 1 and 2).

BOX 4

Enhanced Drug therapy

- The use of EDT was recorded on 28 occasions within the first 100 cases.
- EDT includes medications not carried or administered by a road paramedic for example (but not limited to): Ketamine, midazolam, fentanyl.
- EDT was recorded in conjunction with 3 fracture reductions, 9 procedural sedations and 16 times for other reasons which included pain management.

Transport and Destination

Most patients were transferred to the RVH ED, however most other acute hospitals were utilised (Figure 6). A significant majority (67%) of patients were transported by road ambulance to the receiving hospital (Figure 7). Eighteen patients did not require further active transportation (13 deceased and 5 medically or self-discharged).

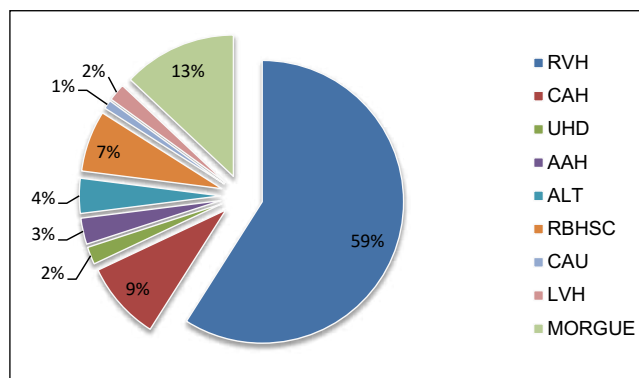


Fig 6. Destination Emergency Department

KEY

- RVH: Royal Victoria Hospital
 CAH: Craigavon Area Hospital
 UHD: Ulster Hospital, Dundonald
 AAH: Antrim Area Hospital
 ALT: Altnagelvin Area Hospital
 RBHSC: Royal Belfast Hospital for Sick Children
 CAU: Causeway Area Hospital
 LVH: Lagan Valley Hospital

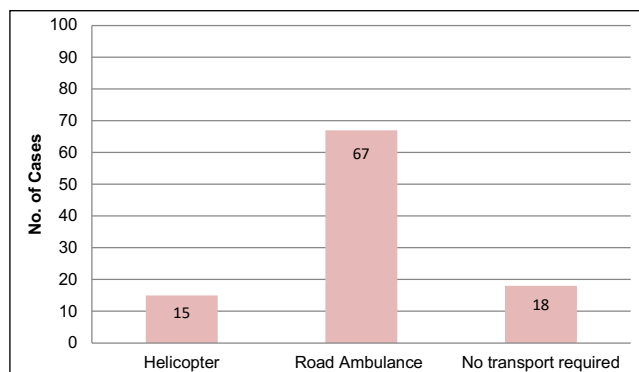


Fig 7. Mode of transport to receiving unit

Outcome at 24hours

90% of the 82 of patients transported to hospital were alive at 24 hours. 9% (n=8) of patients had died at 24 hours.

DISCUSSION

We have presented descriptive data relating to the first 100 cases treated by HEMS in N.I. Males are more likely to suffer major trauma in N.I in line with other published studies in the UK.¹ However, the percentage gap between male and female is larger in the first 100 cases; this may be due to the small sample size or for multiple, complex factors that would require in-depth analysis beyond the remit of this paper.

The mean age of patients in the first 100 cases was 45 years which is younger than UK figures collected in 2013.¹ Generally, the mean age of major trauma patients has been steadily increasing since 1990, according to Kehoe et al.¹ The most significant change in age profile percentage was in the over 75 years category; this tripled from 1990-2013.¹ In recent data collected by the Trauma Audit and Research Network (TARN) for England and Wales, patients aged 60 years and



over made up 53% of severely injuries registered on their database.⁶ In addition, the most common mechanism of injury in this age group is a fall <2m. Falls were the second most common mechanism of injury in our population (15%), but falls from a significant height (>2m) were the most prevalent in our data. It is to be expected that a small sample size of 100 cases may not reflect every demographic or mechanism of injury national trend relating to trauma incidents.

We note a number of interesting findings:

Two-wheeled vehicles (motorcyclists and cyclists) made up 22% of those injured in a RTC in this sample. In terms of injury prevention, we feel that this area may warrant further study.

Based on the data from the first 100 cases, the rate of prehospital RSI is 11% (n=11) which is comparable to data published from Australia, England, Finland, Hungary, Norway and Switzerland.²

In the first 100 cases, we took a relatively low number of patients to hospital via helicopter. Some call-outs involved multiple patients – the helicopter can only carry one casualty. The lack of an operational helipad at the RVH means additional time is required to transfer a patient from the helicopter (landing at an alternative helipad i.e. Musgrave Park, Belfast) to a road ambulance for subsequent transport to the RVH by road. This factor, amongst others e.g. safety, weather, patient condition, interventions en route etc are considered at scene by the HEMS team when agreeing on the most suitable mode of transport. However, with the establishment of the helipad at the RVH we anticipate that this pattern will change in the future and more patients will be transported by helicopter.

In terms of destination hospital, although a majority of patients were brought to the de facto major trauma centre at

the RVH, there was still a broad use of other acute hospitals within the province. With the establishment of a regional trauma network, it is possible that this pattern may also change.

In terms of outcomes we have only looked at the very binary measure of alive/dead at 24 hours.

At time of writing (early October 2018) we have attended 380 patients in 15 months and as our service is contributing to TARN, further detailed analysis will become available in due course. -

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