

Helicopter Emergency Medical Service presentations to an Irish emergency department

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Abstract

Aim

Helicopter Emergency Medical Services (HEMS) provide rapid aeromedical transport for critically ill or injured patients. Tallaght University Hospital (TUH) has accepted HEMS patients since 2012. This study aimed to characterise the demographics, clinical management and outcomes of patients presenting to TUH Emergency Department (ED) via HEMS.

Methods

A retrospective chart review of all adult HEMS presentations to TUH ED between January 2016 and December 2021 was conducted.

Results

A total of 192 HEMS patients presented to TUH ED from 16 counties. The mean age was 46.8 years, and 151 (78.6%) were male. Traumatic injuries in 177 patients accounted for 92% of the HEMS presentations, with road traffic accidents (63/192, 32%) the most common mechanism of injury. 152 patients (81%) required admission to TUH. Fourteen patients (7.2%) required interhospital transfer for specialist care. The average ED stay was 10.66 hours, and the mean hospital length of stay was 10 days, with longer stays observed in patients aged ≥ 65 years (12 days vs. 9.6 days, $p < 0.01$).

Discussion

TUH ED is a trauma HEMS receiving hospital for a wide geographical area. HEMS patients are typically high acuity with high admission rates and requirement for surgical interventions.

Introduction

Helicopter Emergency Medical Services (HEMS) play a vital role in the timely aeromedical transport of high-acuity patients and the implementation of the National Trauma System in Ireland.¹ Tallaght University Hospital (TUH) Emergency Department (ED) has been receiving patients via HEMS since 2012 and has been a regional trauma receiving centre since 2019.^{2,3}

HEMS in Ireland was first launched in 2012 through a collaboration between the Health Service Executive (HSE) National Ambulance Service and the Defence Forces.⁴ In an 11-year period, HEMS has received 8,392 mission requests and 3,703 patients were airlifted to hospital.⁵ The Irish Health System is currently developing the National Trauma System based on best practices from other countries. HEMS is integral to the implementation and evolution of this system. The National Aeromedical Coordination Centre (NACC), based at the National Ambulance Service's National Emergency Operations Centre, plans and manages the movement of all aeromedical missions within and from Ireland, including HEMS.

TUH ED has been designated as a Trauma Unit within the Central Trauma Network for Ireland since 2019.¹ Trauma Units are regional hospitals within each network that provide definitive care for patients with less severe injuries. The Mater Misericordiae University Hospital is the designated major trauma centre within the Central Trauma Network and is designated to manage patients with severe and multiple injuries. Currently no focused literature exists for HEMS presentation to TUH ED and current resource utilisation for a hospital perspective. Data is needed to understand future implications of HEMS service to trauma units such as TUH within the developing Irish Trauma system. The aim of this study was to establish the demographics, management, and outcomes of patients presenting to TUH ED via HEMS to inform the development of the major trauma system in Ireland.

Methods

A retrospective chart review was conducted of all adult presentations to TUH ED via HEMS between January 2016 and December 2021. Ethical approval was granted by the joint research ethics committee of St James's Hospital and Tallaght University Hospital (Project ID 4158). No funding was sought for the study.

The study setting is TUH ED. Our ED is an adult only department seeing patients aged 16 years and older and has 62,000 attendances annually. Tallaght University Hospital is a level 4 model hospital. TUH has a helipad within its hospital grounds. Patients require a short ambulance transfer from the helipad to the ED. The Tallaght University Hospital catchment area extends across southwest Dublin North Wicklow and Northeast Kildare. TUH does not have neurosurgery, cardiothoracic or maxillary facial surgical specialties on site. Cases requiring input and/or transfer to cardiothoracic and maxillary facial surgery input are discussed with

the respective specialists on call in St James's Hospital. Patients requiring neurosurgical input are discussed with our neurosurgical colleagues in Beaumont Hospital. Patient requiring time-critical inter-hospital transfers receive a high-priority ambulance response as per Protocol 37 policy operated by the national ambulance service.

Data for the study was obtained from the ED information system (Symphony) and the TUH Trauma Audit and Research Network (TARN) databases. Patients aged sixteen years and older were identified using the local emergency department information system (Symphony) and the TARN database. HEMS patients who bypassed the ED and were transferred directly to a ward or theatre were excluded from the study. Data collectors reviewed patients' clinical records and collected data on an established case report form.

Process measures included mean ED patient length of stay. This was defined as time from the patient's arrival to the time they left the ED (either discharged from the hospital or admitted to ward). Descriptive statistics were used to describe the presentations by HEMS and comparison of length of stay between age groups (< 65 vs ≥65 years) was performed. Data are expressed as mean for normally distributed continuous data and count (%) for categorical data. Independent t-test was used to compare means between the two groups, patients aged < 65 vs patients aged ≥65 years, on the same continuous dependent variable. P value <0.05 was considered significant.

Results

A total of 192 cases were identified as having presented to TUH ED via HEMS. The mean age was 46.8 years (SD 17.579), ranging from 16 to 91 years. There were 41 females and 151 males. Patients were transferred from 16 Irish counties to TUH ED.

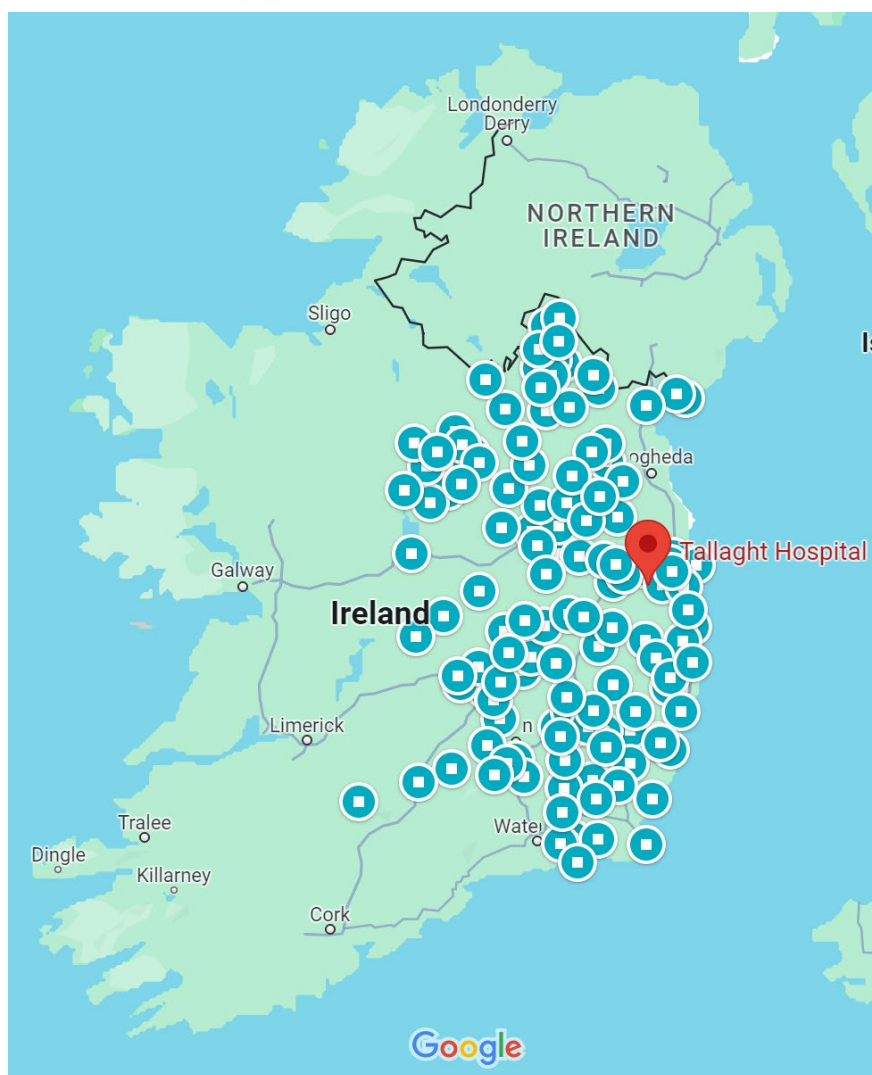


Figure 1: Pick up locations of patients transferred by HEMS to Tallaght University Hospital Emergency Department

177 (92%) of the patients presenting by HEMS patients had traumatic presentations and the remainder were medical presentations. The most common presenting complaint was road traffic accident (62/192, 32%), followed by fall from height (54/192, 28%). Most patients (81%, 152/192) were admitted to TUH. A third of patients required operative intervention (33%, 65/192). Thirty-seven patients (19%) required admission to intensive care. The mean time length of stay in the emergency department was 10.66 hours (standard deviation 7.41).

Mechanism of injury/ presenting complaint	n/N, %
Road traffic accident	63/192, 32.8%
Fall	54/192, 28.1%
Crush injury	9/192, 4.7%
Blunt trauma	20/192, 10.4%
Horse related injuries	21/192, 10.9%
Occupational injuries	4/192, 2.1%
Penetrating injury	4/192, 2.1%
Drowning	2/192, 1%
Medical emergencies (including cardiac arrest, seizure, chest pain, stroke, syncope/collapse, sepsis)	15/192, 7.8%

Table 1: Mechanism of injury/ presenting complaint

Most patients (81%, 152/192) required admission to TUH. Fourteen (7.2%) patients required transfer to a secondary hospital to receive further specialised care, as TUH does not have Plastics, Neurosurgical, and Cardiothoracic specialties on site. The mean hospital LOS of 10.1 days. The mean length of hospital stay was shorter in patients under 65 years of age compared with patients 65 years and older (9.6 days versus 12 days, $p < 0.01$).

Discussion

This study provides an overview of HEMS presentations to TUH ED over a six-year period. This single-centre study illustrates the critical role HEMS plays in the evolving landscape of trauma care in Ireland and offers insights to inform the development of the National Trauma System.

The prevalence of traumatic presentations (92%) among HEMS patients conveyed to TUH differs to the predominance medical aetiologies (50.3%) of overall HEMS patients in Ireland.⁴ The higher proportion of traumatic transfers to Tallaght University Hospital is perhaps unsurprising. Tallaght University Hospital is already a local regional centre for receiving trauma patients since the implementation of the Orthopaedic Trauma Bypass Protocol by the Dublin Midlands Hospital Group and the National Ambulance Service in May 2019. The high conveyance rate of traumatic injuries by helicopter reflects the high-acuity nature of this transport modality, consistent with international evidence supporting HEMS use in severe trauma cases requiring time-sensitive, specialist interventions.⁶⁻⁷ Road traffic accidents and falls from height, accounting for 60% of all HEMS transfers, remain among the most common

mechanisms of injury in trauma systems worldwide and are frequent causes of polytrauma necessitating rapid retrieval and care.⁸⁻⁹

The demographic profile of the cohort—predominantly male (78.6%) with a mean age of 46.8 years—is also in line with previous trauma literature, which consistently identifies working-age men as being at highest risk for major trauma.¹⁰ These findings further validate the role of HEMS in targeting a high-yield patient population who benefit most from expedited transport to a trauma-capable facility.

Importantly, over 80% of patients presenting via HEMS required hospital admission, one-third underwent surgical intervention, and nearly one-fifth required critical care. These figures highlight the high acuity of this cohort and support the utility of HEMS in prehospital triage to trauma units such as TUH.

The mean ED length of stay (LOS) in the study cohort was 10.66 hours. This indicates that a significant proportion of the patients did not meet the Irish Health Service Executive's designated target of 70% of Emergency Department (ED) patients being admitted to hospital within six hours of registration. The prolonged ED LOS is of concern as it has been showed to be associated with increased short-term mortality.¹¹⁻¹² Our study was not designed to identify the cause for the prolonged ED length of stay. In a national review, performance of the ED LOS key performance indicator has consistently fallen short of the HSE target, with a reported 88% of hospitals being below the target in March 2023.¹³

The mean hospital LOS of 10.04 days underscores the resource intensity and prolonged recovery associated with traumatic injuries. Older patients had significantly longer stays (12 vs. 9.6 days, $p < 0.01$), consistent with prior studies showing that age is an independent predictor of prolonged hospitalization and poorer trauma outcomes.¹⁴

One notable operational challenge is that 7.2% of HEMS patients required transfer from TUH to other hospitals for specialty services such as neurosurgery, cardiothoracic surgery, or plastic surgery—specialties not available on site in Tallaght. This finding highlights the importance of strategic trauma network design to ensure optimal initial destination decisions and minimize inter-facility transfers, which can delay definitive care and negatively impact outcomes.¹⁵ It also reinforces the need for continued system investment in clear triage protocols and robust inter-hospital transfer pathways within the National Trauma System.

This study also affirms the role of TUH as a key regional trauma unit, receiving patients from 17 counties nationwide. TUH's helipad within hospital grounds offers a major operational advantage, reducing transfer times—a factor shown to correlate with improved survival in trauma patients.¹⁶

The retrospective nature of this study is subject to inherent limitations of chart review and secondary data analysis, including incomplete documentation and potential selection bias.

The study did not include clinical outcomes such as mortality or functional status at discharge, which would provide more complete insight into the impact of HEMS on patient recovery. Future prospective research with larger datasets and inclusion of outcome metrics will be essential to fully evaluate HEMS effectiveness in the Irish trauma system.

During the study period, Tallaght University Hospital Emergency Department was a trauma HEMS receiving hospital for a wide geographical area. HEMS patients presenting to TUH are associated with high acuity, high admission rates and requirement for surgical interventions placing a significant resource burden on the receiving hospital.

Declarations of Conflicts of Interest:

None declared.

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