Medical Emergency Workload of a Regional UK HEMS Service

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Abstract

Objective: Regionalized trauma networks have been established in England to centralize specialist care at dedicated centers of excellence throughout the country. Helicopter emergency medical services (HEMS) in the West Midlands region have been redesigned to form an integrated component of such systems. The continued use of such valuable and scarce resources for medical emergencies requires evaluation.

Methods: A retrospective review of mission data for a regional Air Ambulance Service in England over a two year period.

Results: Medical emergencies continue to contribute a large proportion of the overall workload of the service. Requirement for advanced interventions at the scene was rare, with less than 10% of patients attended by HEMS teams having care needs that fall beyond the scope of standard paramedic practice.

Conclusion: Dynamic solutions are needed to ensure that HEMS support for cases of medical emergency are appropriately targeted to incidents in which clinical benefit is conferred to the patient. Intelligent tasking of appropriate resources has the potential to improve the HEMS response to medical emergencies while optimizing the availability of resources to respond to other incidents, most notably cases of major trauma.

In response to recent government-commissioned reconfiguration of trauma services in the United Kingdom, regionalized trauma networks have been established to centralize specialist care at dedicated centers of excellence throughout the country.[1,2] The development of a regionalized network for trauma in the West Midlands region of England has promoted changes to the configuration of helicopter emergency medical services (HEMS) as part of an integrated service in partnership with the West Midlands Ambulance Service National Health Service Foundation Trust (WMAS).[3]

The Midlands Air Ambulance (MAA) is a charitable organization that has been operating for over 20 years and has forged a close working relationship with WMAS. The MAA charity operates a fleet of 3 EC135 helicopters stationed at 3 bases throughout the region covered by the WMAS (population approximately 5 million) and undertakes approximately 1,400 missions per year. Two of the aircraft are staffed by WMAS paramedics, some of whom have received additional training and operate as critical care paramedics (CCPs). The remaining aircraft is staffed by an ambulance service CCP and doctors who have undergone specialist training to deliver enhanced prehospital care, including rapid sequence induction of anesthesia (RSI). Since reconfiguration of services as part of the establishment of the trauma network, the physician-led aircraft is the daytime component of the Medical Emergency Response Incident Team designed to respond to high-severity trauma cases across the entire region.

Deployment of aircraft is coordinated by a regional HEMS desk at the WMAS emergency operations center according to an agreed protocol (Fig. 1). The HEMS desk is staffed by ambulance service dispatchers who do not have a clinical background but have received additional training. Aircraft can be deployed to scenes before the arrival of land crews (primary activation) or on request by land crews once patient assessment has taken place (crew request).

The impact on service reconfiguration on the use of HEMS assets for cases of traumatic injury in the region has previously been reported.[3] In addition to their role in the response to trauma cases, HEMS assets have been shown to add clinical benefit in medical emergencies including acute myocardial infarction,[4-9] cerebrovascular accident (CVA),[10-13] and out-of-hospital cardiac arrest in specific circumstances.[14-17]

In the context of recent reconfigurations to HEMS services in the response to the development of regionalized trauma networks in the United Kingdom, the use of such valuable and scarce resources for medical emergencies requires evaluation. This study analyzes the workload due to medical emergencies of MAA services after the launch of the regional trauma network in the West Midlands region of the United Kingdom.

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Figure 1. The current HEMS dispatch protocol used by the WMAS. (Reproduced with permission from the West Midlands Ambulance Service National Health Service Foundation Trust)

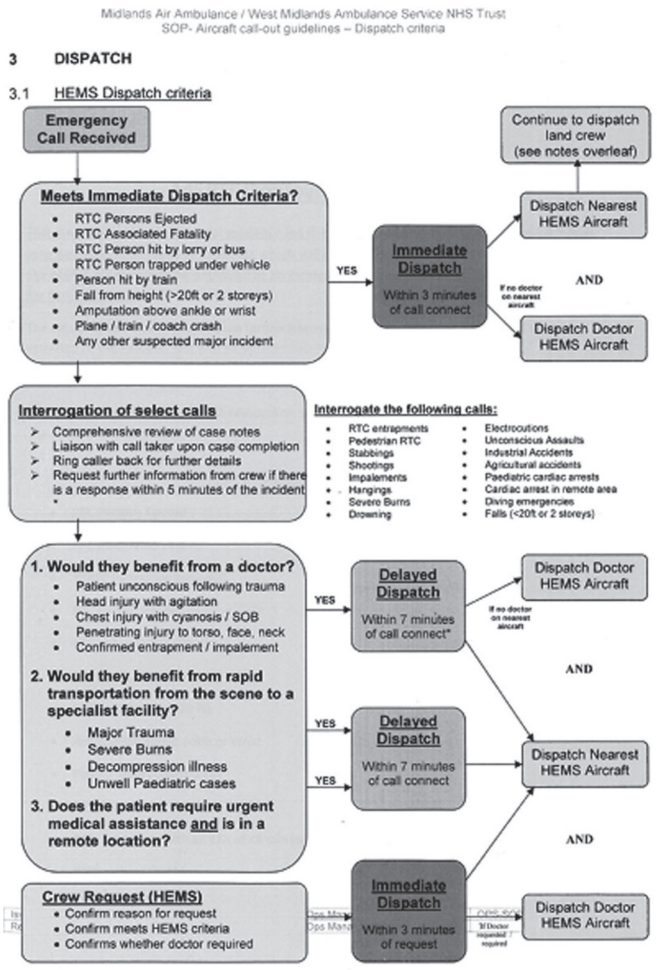

Table 1. Breakdown of the Conditions Within the "Other–Medical" Category

Condition	Number of cases
Seizure	44
Sepsis	14
Syncope/cardiac dysrhythmia	18
Severe allergic reaction	13
Psychiatric	8
Back pain	5
Headache	3
Choking	1

Methods

A retrospective case review of all missions conducted by the MAA over the 2-year period after the launch of the regional trauma network (March 26, 2012-March 26, 2014) was conducted. All missions were reviewed, and those categories recorded as nontrauma at the initial dispatch were selected. Inclusion criteria were all cases in which MAA resources were activated with a nontraumatic etiology. Exclusion criteria included activations to cases with traumatic etiology and interfacility transfers. The secure, confidential MAA mission database was used to extract data from each case relating to the category of medical emergency, mode of activation (primary/crew request), mission outcome (cancellation/conveyed by helicopter), and on-scene intervention by the HEMS crew. Statistical analysis was performed using the SPSS software package (SPSS v.17.0 for Windows; SPSS Inc, Chicago, IL). Statistical significance was defined as $P < .05$. This study fulfilled the criteria of a service evaluation and therefore did not require ethical approval.

Results

Activations

During the 2-year period, the MAA was activated 2,802 times. Of these, 2,116 (76%) were cases of traumatic etiology, and 53 (2%) involved interfacility transfer. The remaining 633 (22%) cases were categorized as "medical." During the study period, 5 HEMS missions for medical cases were aborted because of inclement weather and were excluded from further analysis. In 325 (52%) of the cases, resources were activated after a request from land crews already in attendance at the scene with the remaining 303 (48%) activated by HEMS dispatchers in the ambulance emergency operations center. The physician-led aircraft was activated to a third of medical cases.

Case Mix

Resources were activated to 199 (32%) cases of cardiac arrest, 163 (26%) cases of chest pain, 95 (15%) of collapse, and 65 (10%) for CVA. One hundred six (17%) cases were categorized as "other–medical." A breakdown of the conditions categorized as "other–medical" is shown in Table 1. Crew request for HEMS assistance was the most common mode of activation in all categories other than cardiac arrest (Table 2).

Mission Cancellation

A total of 108 (17%) of activations resulted in cancellation by land crews before teams reached the scene because the initial clinical assessment indicated that HEMS was not required. A significantly greater proportion of primary activations (80/305) than crew requests (27/323) resulted in cancellation (26% vs. 8%, $P < .0001$).

The proportion of activations resulting in mission cancellation was consistent across all case categories apart for cases of chest pain in which it was only 8% (Table 3). Significantly greater proportions of primary activations than crew requests resulted in mission cancellation for cases of cardiac arrest, chest pain, and "other–medical" (Table 4).

Interventions at the Scene and Patient Conveyance

Cardiac Arrest

Of the 162 cases attended by HEMS during the study period, 40 (25%) had return of spontaneous circulation