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Clinician tasking in ambulance control improves the identification of major trauma patients and pre-hospital critical care team tasking

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ABSTRACT

Introduction: Trauma remains the fourth leading cause of death in western countries and is the leading cause of death in the first four decades of life. NICE guidance in 2016 advocated the attendance of pre-hospital critical care trauma team (PHCCT) in the pre-hospital stage of the care of patients with major trauma. Previous publications support dispatch by clinicians who are also actively involved in the delivery of the PHCCT service; however there is a lack of objective outcome measures across the current reviewed evidence base. In this study, we aimed to assess the accuracy of PHCCT clinician led dispatch, when measured by Injury Severity Score (ISS).

Methods: A retrospective cohort study over a 2 year period pre and post implementation of a PHCCT clinician led dispatch of PHCCT for potential major trauma patients, using national ambulance data combined with national trauma registry data.

Results: A total of 99,702 trauma related calls were made to SAS including 495 major trauma patients with an ISS >15, and a total of 454 dispatches of a PHCCT. Following the introduction of a PHCCT clinician staffed trauma desk, the sensitivity for major trauma was increased from 11.3% to 25.9%. The difference in sensitivity between the pre and post trauma desk group was significant at 14.6% (95% CI 7.4%–21.4%, $p < .001$).

Discussion: The results from the study support the results from other studies recommending that a PHCCT clinician should be located in ambulance control to identify major trauma patients as early as possible and co-ordinate the response.

Introduction

Trauma remains the fourth leading cause of death in western countries and is the leading cause of death in the first four decades of life [1]. Annually in Scotland there are approximately 1200 patients who are classified as major trauma patients [2]. Patients with defined major trauma have a mortality risk of 10% [3]. The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) report of 2007 included the provision of advanced airway management (including rapid sequence induction (RSI)) [1] in pre-hospital care and more recently, NICE guidance advocated the attendance of physician led trauma team in the pre-hospital stage of their care [4]. Delivery of pre-hospital care to these patients is the responsibility of the Scottish Ambulance Service (SAS).When dealing with the most critically injured patients, the SAS crews are supported by three physician led pre-hospital critical care teams (PHCCT).

In 2011 a panel, consisting of European experts in physician-based pre-hospital Critical Care, was invited to participate in a consensus process. The consensus process was based upon a four-stage modified nominal group technique (NGT) that included a consensus meeting [5–8]. The group identified five top priority areas for research of which the dispatch criteria for pre-hospital Critical Care services were included [9].

Dispatchers working in Ambulance Control Centres (ACC) are currently supported in their tasking decision making by a number of mechanisms, common to systems around the world. These can be broadly broken down into dispatch according to Medical Priority Dispatch System (MPDS) [10]; "Autolaunch" based on physiological, anatomical or mechanism based criteria [11–22]; physician presence in ACC guiding dispatch [23]; self-tasking by

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clinician remote from ACC and clinician interrogated dispatch [24–27]. These systems are not always mutually exclusive and some overlap may exist however the scarce evidence that exists indicates that the optimal system with regards to accuracy of tasking appears to advocate the use of clinician involved in the delivery of PHCC for tasking of PHCCT [23,24,28,29].

Evidence from other PHCCT [23,24] advocates the use of clinicians involved in delivery of PHCC for tasking of PHCCT to improve accuracy of tasking. Although there is positive support from these publications supporting clinician led dispatch, there is a lack of objective outcome measures across the current reviewed evidence base.

Previously in the Scottish system, the decision to dispatch a PHCCT has been led by non clinical staff (Dispatchers), with occasional input from a Clinical Advisor. The Clinical Advisors are Paramedics or Nurses working in ACC whose primary role is to re-triage 999 requests and manage clinical risk in waiting calls. However, the Clinical Advisors do not have any training specifically in the area of critical care and are not involved in the delivery of PHCC when not working in the Ambulance Control Centre (ACC).

A review of the available evidence to optimise identification of major trauma cases in ACC was followed by a recommendation in "Trauma Care Scotland" [30], which led to the Scottish Ambulance Service introducing a "trauma desk" in the ACC on 1st October 2012. This was staffed by either a Helicopter Emergency Medical Service (HEMS) paramedic or retrieval practitioner experienced in the delivery of PHCC, with the aim of using their clinical knowledge and gestalt to identify patients who would benefit from a pre-hospital trauma critical care team across Scotland. Retrieval practitioners are staff from either a nursing or paramedic background with an extended clinical skillset who undertake their clinical work with a PHCCT. The effective tasking of the finite and expensive resource of a PHCCT to a small group of traumatically injured patients can be complex, with the early identification of these patients being the key component to begin their access to clinical care commensurate with their clinical needs.As well as information collected by call handlers and displayed on the ACC computer system, PHCCT clinicians working on the trauma desk gather additional information on trauma related calls using two methods.In silent listening, the PHCCT clinician will listen in to the call handler receiving the call in real time to gather further information. Interrogated dispatch can occur after silent listening or as a primary intervention. During interrogated dispatch, the PHCCT clinician will phone back the reporter (the person making the emergency call) and gather further information. This may include asking specific questions about mechanism and injuries but also "listening to the scene" where background information may prove useful in making the decision about PHCCT dispatch.

The aim of this study is to investigate the accuracy of the trauma desk tasking system to defined major trauma patients and compare to the previous tasking model.

Methodology

This study uses a quantitative approach, utilising retrospective comparative study methodology. A consecutive sample of data was collected over a 24-month period and divided into pre and post desk samples. The pre-introduction sample was taken from dates 1st October 2011 to 30th September 2012 and post-introduction sample from 1st October 2012 to 30th September 2013. The method of call handling and dispatch of PHCCT during these two periods is shown in Fig. 1.

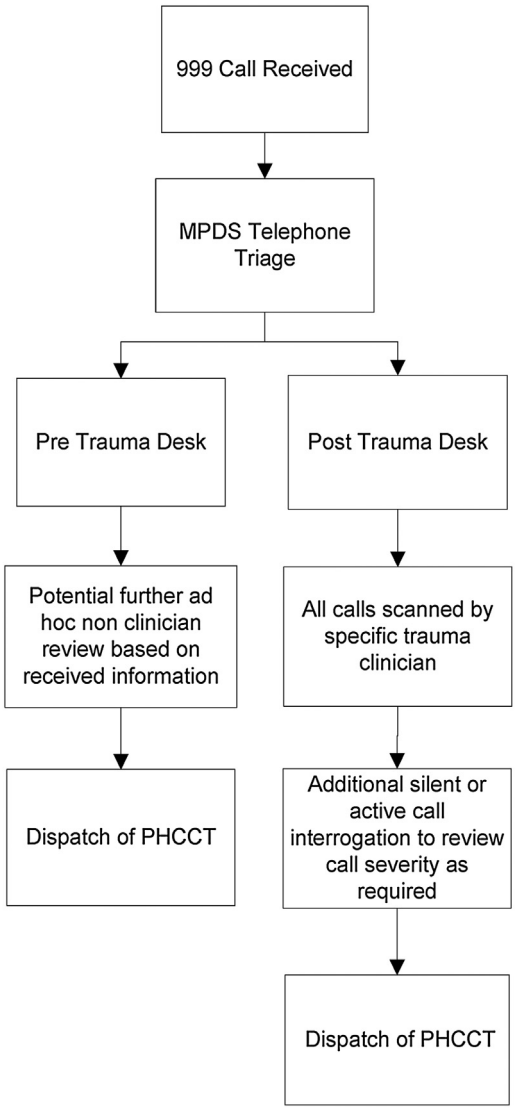

Fig. 1. Call handling diagram.

Data collection

Data was requested and collected from two national databases, from SAS and Scottish Trauma Audit Group (STAG). STAG is a national trauma registry covering >90% of all hospitalised trauma in Scotland. Inclusion and exclusion for STAG are listed in Appendix A. Arrangements in place in Scotland allow the use of anonymised patient data from the Scottish Trauma Audit Group to be used without ethical approval when the data is handled according to agreed guidelines. Approval for access to these data bases and use for this study was requested and received from SAS Medical Director and STAG research committee. Data was compiled and stored in Microsoft Excel computer programme documents. All patient identifiable information was removed and patients were identified by their unique SAS incident number. Data was matched using a number of demographic variables. Where insufficient data was available, matching was declared incomplete and the patient was excluded from the study. As well as data matching errors, there are a small number of major trauma patients that arrive without input from the Scottish Ambulance Service (self presentation or via Search and Rescue aircraft). These patients were also unable to be matched and were excluded.