

## Expert opinion of the risk factors for morbidity and mortality in blunt chest wall trauma: Results of a national postal questionnaire survey of Emergency Departments in the United Kingdom

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### ABSTRACT

**Objective:** Blunt chest wall trauma is a common injury treated in the Emergency Departments and has a high reported morbidity and mortality. No national guidelines exist for the management of this patient group unless the patient has severe immediate life-threatening injuries. The aim of this study was to investigate current management of blunt chest wall trauma patients in the UK and to gather expert opinion of the risk factors for morbidity and mortality.

**Methodology:** A sample of 100 physicians working in Emergency Departments in the UK were purposively selected and sent a postal questionnaire to complete. Non-responder analysis was undertaken in order to assess bias. The completed questionnaires were analysed with descriptive statistics.

**Results:** A response rate of 90% was achieved. The different type of hospital providing emergency care was well represented in the results. The general surgical team was the most frequently used ward-based team when the patient required admission to hospital (51%). Inconsistencies exist regarding the use of guidelines for the management of the blunt chest wall patient. The risk factors for morbidity and mortality suggested by the sample concurred with current literature including patient age, pre-existing conditions and number of ribs fractured and areas for further research were highlighted.

**Conclusion:** Variation exists in the management of blunt chest wall trauma patients in the UK. This study provides the expert opinion of a sample of 90 physicians working in Emergency Departments in the UK regarding the risk factors for morbidity and mortality in blunt chest wall trauma patients.

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### Introduction

There has been a dramatic increase in the number of people attending Emergency Departments (ED) with the total number of attendances at all Emergency Departments in England increasing from 14,293,307 in 2000–2001 to 20,511,908 in 2009–2010.<sup>1</sup> The Trauma Audit and Research Network (2011) have highlighted that blunt chest wall trauma accounts for over 15% of all trauma cases in the UK.<sup>2</sup> Reported mortality in blunt chest wall trauma ranges between 4 and 20 percent and as a result proves a substantial cost to the healthcare provider.<sup>3,4</sup> Currently however, no national guidelines or care pathway exist to assist the Emergency Physician in the management of these patients, unless the patient has immediate life-threatening injuries requiring surgical or intensive care intervention.<sup>5</sup> If the Emergency Physician could accurately risk stratify patients presenting with blunt chest wall trauma on

the basis of whether they should be admitted to hospital, discharged home, or be admitted to the ward or the intensive care unit (ICU) then this could potentially improve this population's morbidity and mortality.<sup>5–7</sup> In order to risk stratify the blunt chest wall trauma patient, the risk factors for these outcomes need to be identified.

The aim of this study therefore was to collect information regarding the current practice for the management of blunt chest wall trauma patients and the Emergency Physicians' expert opinion regarding the risk factors for morbidity and mortality in the United Kingdom. Blunt chest wall trauma was defined as blunt chest injury resulting in chest wall contusion or rib fractures, with or without non-immediate life-threatening lung injury.<sup>7</sup> 'Emergency Physician' is used to describe a consultant working in the field of Emergency Medicine.

### Methods

This study was designed following available guidelines in questionnaire research and the guidelines published in a series of papers in the British Medical Journal.<sup>8–11</sup> A questionnaire was

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designed that addressed current practice in the management of blunt chest wall trauma patients and Emergency Physicians' opinion of the risk factors for morbidity and mortality in this patient group. The first three questions were closed-ended questions with a set choice of responses. The final question was open-ended in design, in which the respondent was asked to list all the risk factors they believed contributed to morbidity and mortality when assessing the blunt chest wall trauma patient. This question was open in design in order not to lead the respondent into providing specific responses and to reduce the risk of introducing response bias. The questionnaire was piloted on a sample of physicians working in Emergency Medicine in Morriston Hospital, a large regional trauma centre in South Wales and appropriate changes were made to the questionnaire and covering letter based on feedback received in the pilot study.

As the aim of the study was to gather expert opinion regarding the risk factors for morbidity and mortality in blunt chest wall trauma patients presenting to the Emergency Department, a purposive key informant sample was used. A total of 100 major Emergency Departments out of a total of 203 in England and Wales were selected for inclusion in this study in order to generate conclusions that were generalisable nationally from the data.<sup>12</sup> The hospitals were selected to provide a range of district hospitals, teaching hospitals and regional trauma centres and also small, medium and large in size. The size of the hospitals were categorised by number of beds; small (<400), medium (400–599) and large (600 or more).<sup>13</sup> The hospitals were selected in order to provide a sample with an even distribution geographically. Walk in Centres or Minor Injury Units were not included as a large number of these are run by a nurse or general practitioner and the study was focussed on physicians working in the Emergency Departments. Only physicians (consultants) were targeted in this study as the purpose of the study was to gain expert opinion. It was considered that only using physicians (consultants) was the most appropriate way of ensuring that the person completing the questionnaire had sufficient knowledge and experience to be regarded as an expert in Emergency Medicine due to the level of training and expertise required to become an Emergency Physician.

Physicians were identified from the selected hospitals using the staff directories on the hospital websites or by contacting the Emergency Department directly. Once a suitable contact had been identified, the questionnaires were addressed to the named physician working in each of the Emergency Departments. The covering letter and a stamp-addressed envelope was included (with return address) for return of the questionnaire. A second set of questionnaires were sent out to non-responders after two months.

The questionnaire responses were entered onto a Microsoft Excel spreadsheet. Any questionnaires with missing demographic data were included in the study and the remaining responses included in the analysis. The questionnaires in which the respondent failed to suggest any risk factors for morbidity and mortality in blunt chest wall trauma patients were excluded. As the final question concerning possible risk factors was open-ended, all the variables suggested by the respondents were listed for inclusion in the data analysis.

Response rates were fully recorded and non-responder analysis was completed to compare the characteristics of the non-responders and the responders. Results were presented descriptively using numbers and percentages. Data analysis was completed using the Microsoft Excel software. A letter explaining the purpose and design of the study was sent to the Chairman of the South West Wales Research Ethics Committee. It was confirmed by the chairman that no ethical approval was required for this study.

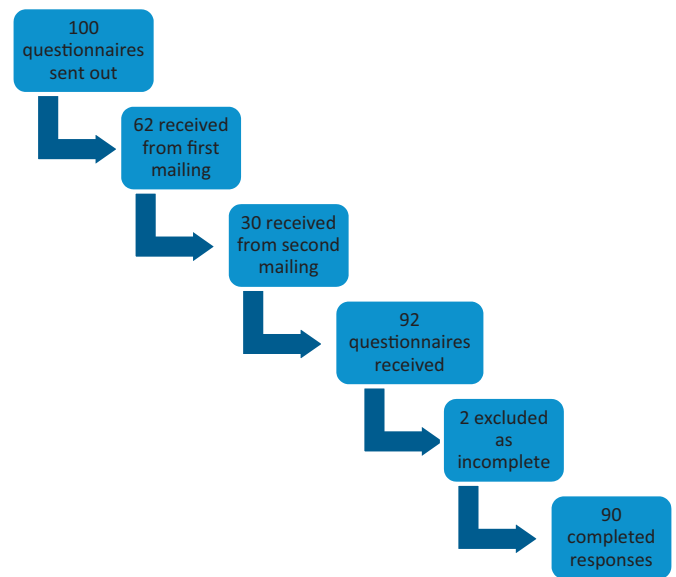


Fig. 1. Diagram illustrating sample response rate.

## Results

A total of 90 out of the 100 physicians who were sampled completed the questionnaires appropriately after three months giving a response rate of 90%. The flow diagram in Fig. 1 illustrates the number of respondents at each stage. The total number of attendances at all of the 90 emergency departments included in the sample was 7,914,000 per year.

The non-responder analysis indicated no differences in demographics between the responders and non-responders in terms of location and type of hospital. Table 1 highlights the responses to the first three questions. The first section of the table illustrates the type of hospital in which the respondents worked as an Emergency Physician, with 50% of respondents working in a District General Hospital. The team to which the BCWT patient was referred if they

Table 1

Indicating type of hospital ( $n$  = number of responses to each question) in which the respondent works as an Emergency Physician.

Type of hospital	$n$	%
District General hospital	45	50
Teaching hospital	33	36.7
Regional trauma centre	11	12.2
Field hospital	1	1.1
Team to which patient referred		
General surgical team	46	51.1
Cardiothoracic team	17	18.9
Emergency medicine team	16	17.8
Orthopaedic team	10	11.1
Thoracic team	5	5.6
General medical team	4	4.4
Guidelines used		
Local	43	47.8
None	26	28.9
ATLS	18	20
Regional	4	4.4
Consultant experience	2	2.2
CEM guidelines	1	1.1
Oxford Handbook of EM	1	1.1
Trainee induction lecture	1	1.1

ATLS: advanced trauma life support; CEM: College of Emergency Medicine; EM: emergency medicine; NB: percentages were calculated by dividing the number of responses to a particular response option by the total number of respondents ( $n=90$ ).

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