Injury, Int. J. Care Injured (2005) **36**, 1306—1310

ELSEVIER

INJURY
INTERNATIONAL JOURNAL OF THE CARE OF THE INJURED

www.elsevier.com/locate/injury

Operating out of hours in acute orthopaedics: Variations amongst surgeons and regions in the United Kingdom

C.P. Charalambous*, M. Tryfonidis, C. Paschalides, I. Lamprianou, R. Samarji, P. Hirst

Department of Orthopaedics, Manchester Royal Infirmary, Flat 204, 159 Hathersage Road, Manchester M13 0HX, UK

Accepted 17 May 2005

KEYWORDS
Out of hours;
Operating;
Orthopaedics

Summary It is recommended that out of hours, surgery should be confined to emergency cases. What constitutes an emergency in orthopaedic surgery is not well defined. This study presents the results of a postal survey sent to orthopaedic surgeons practicing in the United Kingdom, asking them what is the time frame they would recommend operating upon, and whether they would operate out of hours for common acute orthopaedic presentations. Our results demonstrate variability both amongst individual surgeons as well as amongst different regions in the United Kingdom.

Introduction

It is recommended that out of hours, surgery should be confined to emergency cases which cannot wait until the following day.[1—3] This is because, out of hours, medical and nursing staff are not at their best either physically or mentally, and unexpected surgical complications can always occur. In some specialities, such as general and vascular surgery, what constitutes an emergency is fairly well defined, with conditions that immediately threaten a patient's life. However, what constitutes an emergency in orthopaedic surgery may be less clear. In orthopaedic surgery the term 'emergency' is often used to describe not only those conditions which are limb or life threatening but also those that may be associated with increased risk of infection, impairment of bony union, development of avascular necrosis or irreversible neurological damage in the long term. Thus, it is recommended that open fractures should be treated within 6 h of injury to decrease the risk of infection,[10] that displaced hip and talar fractures should be operated early to decrease the risk of avascular necrosis and non-union,[4,5,7] joint dislocations should be reduced early to reduce the risk of avascular necrosis[11] and neurological damage.

* Corresponding author. Tel.: +44 7712192409.
E-mail address: bcharalambos@hotmail.com (C.P. Charalambous).

0020-1383/$ — see front matter © 2005 Published by Elsevier Ltd.
doi:10.1016/j.injury.2005.05.020

Unfortunately, such recommendations are often not based on strong clinical or scientific evidence, with some reports suggesting that reasonable delays for surgery may be acceptable.[6,9]

The aim of this study was to examine opinions throughout the United Kingdom with regards to operating out of hours for orthopaedic surgery. This may help in implementing national guidelines on the timing of operating on orthopaedic emergencies and could be a valuable tool in dealing with medico-legal cases.

Methods

A postal questionnaire was initially sent in mid 2002—1447 surgeons identified through the Directory of Operating Theatres and Departments of Surgery, 2001. The surgeons were asked how many years they had been practicing as orthopaedic consultants and whether they covered paediatric or adult trauma when on call. They were given a series of clinical scenarios for each of which they were asked to state what is the time frame they would recommend operating from time of injury, and whether they would operate for that scenario out of hours (23:00—08:00) when on call. They were told to assume that no other injuries were present. They were asked to return the questionnaire in a self-addressed envelope. For those surgeons who failed to respond a second reminder was sent. The UK was divided into different regions according to the Directory of Operating Theatres and Departments of Surgery 2001, and the region in which each particular respondent was practicing was determined. A numerical code on the questionnaire was used to identify the identity of each respondent and thus the region of practice.

Statistical analysis

For each of the clinical scenarios the percentage of surgeons who would operate in each particular time frame as well as operating out of hours was calculated. One of the clinical scenarios was repeated twice in the questionnaire, and only the responses to its first sitting were considered.

To allow comparisons between different groups of surgeons, the attitude of each respondent to out of hours operating was estimated using the Rasch model.[12] This is a probabilistic model, widely used in psychometrics to build and evaluate attitude scales. In the context of this study, the Rasch model estimates a single attitude measure for each one of the surgeons using their responses to the questionnaire. The Rasch model has very desirable psychometric properties. The estimation of the attitude measure for each of the persons is question-free, that is any failure of the respondent to answer all questions in the questionnaire does not affect the comparability of the estimated attitude measures. We decided to use the Rasch model rather than raw scores or percentages of positive responses as the latter are not directly comparable if the subjects responded to different questions. The Rasch model also provides a series of 'fit statistics' which are tools that allow the identification of inconsistent respondents whose responses may intervene in the measurement process and introduce 'noise' in the data. The attitude estimates, as determined by the Rasch model, may theoretically range from minus infinite to plus infinite. Larger positive estimates indicate more positive attitude towards operating out of hours. Smaller estimates (or negative) indicate more negative attitude to out-of-hours operating. The relationship between years of working as a consultant and attitude towards out of hours operating was assessed with Pearson correlation test. Comparisons between groups of surgeons and regions were performed using univariate and multivariate ANOVA. Variability of individual surgeon's responses (considering all scenarios together) was assessed using Chi-Square test. In addition a comparison of the responses in the eight scenarios for which national guidelines exist (open fractures) versus all scenarios for which there are no national guidelines, was performed using one-sample *t*-test. Statistical significance was established at $P = 0.05$ level.

Results

Nine hundred and seventeen replies were obtained (62% response rate). Of these 185 stated that they had been retired or were not involved in trauma work and thus did not feel that the questionnaire applied to them. One surgeon was on sick leave and seven stated that they did not want to answer the questionnaire. The remaining 724 returned a completed questionnaire. The response for individual clinical scenarios ranged from 671 to 724. Of the respondents, 60 practiced only adult trauma, 20 only paediatric and 540 both, with the remaining not answering the relevant question. In 679 of the respondents the region of practice could be determined. The median consultant experience for the respondents was 8 years (ranging from <1 to 35 years). The percentage of surgeons that would operate at each particular time frame as well as operating out of hours for each of the clinical scenarios is shown in Table 1.