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Improvement in initial survival of spinal injuries: a 10-year audit

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Summary A 10-year retrospective study of all spinal injuries presenting to the Leeds Teaching Hospitals between 1991 and 2001.The hospitals provide secondary care to a population of 750,000 and tertiary care to a population of 2—3 million.

In total 1119 spinal injuries were studied. The overall survival rate was 89%. The commonest age group for presentation was 25—29 years with a secondary peak in the seventh decade, a mean overall of 43 years. 66% of injuries occurred in males. The commonest cause was a fall from a height (44%), with road traffic accidents (RTA) causing 43%. Pedestrians were most at risk within the road traffic group, making up 63% of cases. Isolated cervical spine injuries made up 37% of all cases. Cervical fractures were most associated with neurological injury (50%).

Immediate survival has increased over the decade from 83% in 1991 to 93% in 2001. The probability of survival was significant at $P = 0.006$ and actual survival at $P = 0.012$ (Pearson correlation). The causal analysis has not been carried out but it is thought likely that improved quality of care is responsible.

Introduction

There were 14.3 million attendances in accident and emergency units throughout England from 1 April 2000 to 31 March 2001,[5] which was made up of trauma and non-trauma patients. Trauma patients present with injuries ranging from simple isolated distal soft tissue injuries and fractures to complex poly-trauma. In that same period, there were 2005 cervical spinal fractures (ICD10 code S12) and 607 neurological injuries at all levels (ICD10 codes S14, S24 and S34).[5] These presentations have varying sequelae from complete recovery through permanent paralysis to death, with devastating consequences to the individuals and their community. It is recognised that trauma is the leading cause of death in the first four decades of life.[14]

In the United States, an estimated 10,000 new cases of spinal injuries are reported each year.[2] Paediatric spinal fractures represent between 2%

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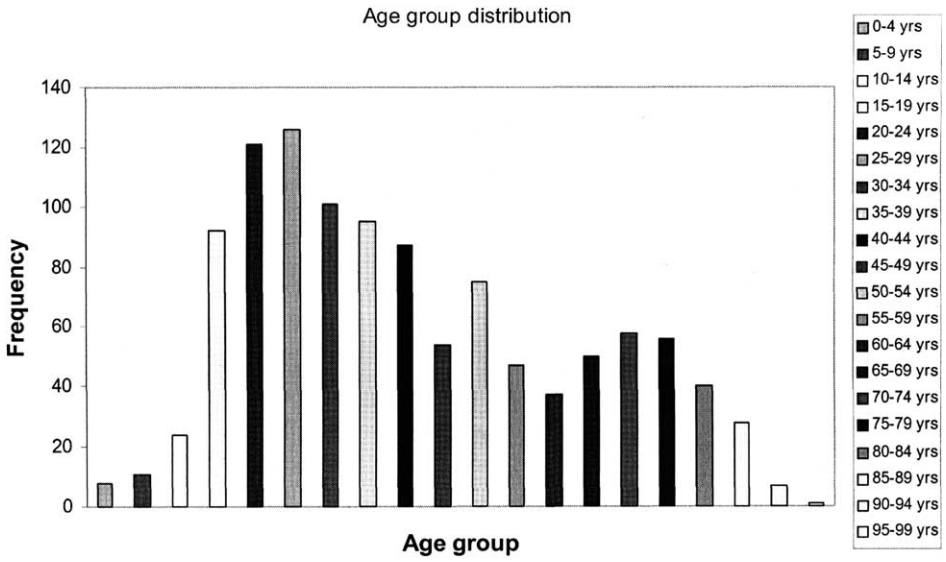

Figure 1 Age group distribution.

and 5% of all acute spinal injuries.[4] About 1—2% of all paediatric patients requiring hospital admission for traumatic injuries will have injuries to the cervical spine.[1] Vertebral fractures in the elderly, despite being the most common type of osteoporotic fracture are under-diagnosed with a reported 30% clinical diagnosis rate.[10]

There have been various publications looking at trauma to specific levels of the spine and with specific groups.[1,4,7,9,10,11,13] We could not find any publications looking at survival of spinal injury patients presenting to a unit/trust/hospital as a whole. The aim of this paper is to restrospectively analyse survival from all spinal injuries presenting to our unit over a 10-year period and to determine if changes have occurred.

The two main hospitals (Leeds General Infirmary and St James's University Hospital) provide secondary care to a population of 750,000, but tertiary care to a population of 2—3 million.

Material and methods

All patients with spinal injuries presenting to the Leeds Teaching Hospital between 1991 and 2001 were identified using data from a computerised database.* These data include demographic details of patients, method of injury, details of spinal injury, injury severity score (ISS), therapeutic interventions, ward stay and outcome. The TARN inclusion criteria are strictly adhered to, ensuring that patient selection is consistent:

1. a patient must be admitted to an HDU/ ICU bed following a traumatic method of injury; or
2. a patient must remain an inpatient for 72 h or more, because of one or more injuries; or
3. a patient has died in hospital following one or more injuries (this includes patients who died in the resuscitation room following serious injury).

There are some special cases in addition to this. Isolated, single and simple fractures that are treated conservatively are ignored and so too are elderly patients that have suffered a femoral fracture. However, tertiary referrals that fulfil one or more of the above criteria are included.

The term "Spinal injuries" potentially includes minor soft-tissue strains at one extreme, to fatal proximal-cord injuries at the other. Patients included in the database fulfil the criteria for inclusion in the TARN database.

Statistical advice was obtained and survival was calculated as average probability of survival and actual survival.

Results

A total of 1119 patients were studied. There were 734 (66%) males and 385 (34%) females. The mean age was 43 years with 40% of patients in the 20—40 years age group. Twenty five percent of patients were older than 60 years (Fig. 1).

The commonest cause of spinal injury was a fall from height with 490 cases (44%) with the majority having fallen over 2 m (>60%). This was followed by road traffic accidents (RTA) with 481 cases (43%). Sporting injuries contributed to 60 cases (5%),

* The Trauma Audit & Research Network (TARN) database.