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Watson-Jones Lecture

The organisation of trauma services in the UK

John Templeton

Department of Orthopaedic Surgery, North Staffordshire Hospital, Stoke on Trent, UK

To provide a high level of orthopaedic trauma care, education and research, across the country, trauma services in the UK require modification. Good information is necessary prior to formulating ideas and proposals. Trauma care provision must be considered comprehensively at both the national and local levels. As a first step, it is important to know just how many acute hospitals there are in the country. It is also important to know about the distribution of surgical specialities and the number of consultant orthopaedic surgeons staffing those hospitals.

Over a 3 year period, information was obtained from Health Service Directories, Trusts, *The Health Service Journal* and personal contacts. As of the spring of 1997, it had been ascertained that there were 262 acute hospitals with Accident and Emergency Departments. By the spring of 1998 this number had fallen to 258. Only 25 of these acute hospitals had neurosurgery departments on site.(Fig. 1). These include the major acute hospitals at Hull, Preston and Stoke-on-Trent. Only six acute hospitals provided the full range of surgical services.

Further research in conjunction with the British Orthopaedic Association resulted in a better understanding of the distribution of consultant orthopaedic surgeons (Fig. 2). Most of these acute hospitals are staffed by 3–5 consultants and a few do not have any consultants on staff or have orthopaedic trauma lists. Only 22 hospitals have 8 or more consultants on staff. The current configuration and distribution of all of the surgical specialities, suggests an absence of central strategy.

An incidence study of trauma in the North Staffordshire health district in 1989–1990[1] helped us to understand the speciality mix with regards to all trauma admissions to a large district general hospital and the speciality mix with regards to that sub-group of severely injured patients. This was an ideal health district to study in that it had a large local population of about 500,000 with only one acute hospital. Of about 90,000 new patient visits to the Accident and Emergency Department in the year, about 60,000 had been injured, mostly minor. Only 2506 patients were sufficiently injured to require admission to hospital. The admitted patients could be considered typical of the trauma admissions to a district general hospital. When analysed by speciality, the great majority of these trauma admissions had orthopaedic injuries requiring the services of orthopaedic surgeons. District general hospitals, if they are to deal satisfactorily with orthopaedic trauma, must have adequate numbers of consultant orthopaedic surgeons on staff. The incidence study also showed that 114 patients had severe injuries,

Correspondence to: Prof. John Templeton, Department of Orthopaedic Surgery, North Staffordshire Hospital, Thornburrow Drive, Stoke on Trent ST4 7QB, UK. Tel/Fax: +44 1782 415689

Figure 1 Location of neurosurgery in-patient services with same site accident and emergency services.

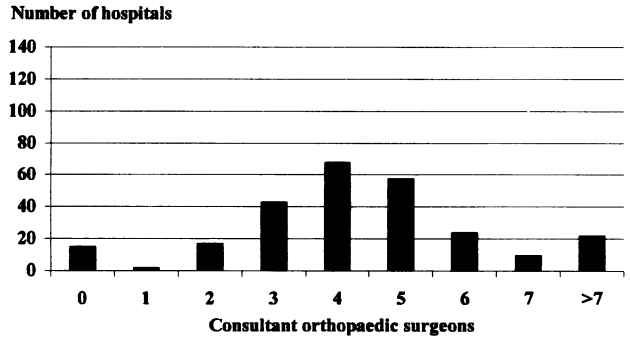

Figure 2 Number of consultant orthopaedic surgeons in the 258 acute hospitals identified in 1998

(injury severity score greater than 15). Analysis of this small group of patients revealed that the majority had suffered head injury and about one-third had suffered musculo-skeletal injury. A significant number of these patients had chest, abdominal and maxillofacial injuries. This small but important group of patients should be treated at a major acute hospital with all surgical departments on site. That is, there should be departments of, in particular, neurosurgery, orthopaedic trauma surgery including spinal surgery, thoracic surgery, general surgery, vascular surgery, maxillofacial surgery and plastic surgery. These data add support to the concept of two types of acute hospital.

In 1988, The Royal College of Surgeons of England produced a report on the management of patients with

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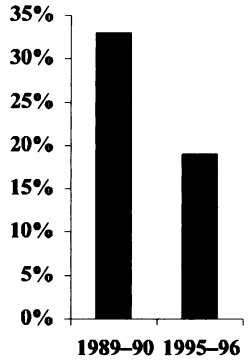

Figure 3 Death rate following severe injury at the North Staffordshire Hospital

Table 1 Severely injured patients (ISS > 15) admitted to North Staffordshire Hospital Trauma Centre

1989–1990	114
1995–1996	219

major injuries.[2] This report made a number of recommendations, one of which was that there should be one designated district general hospital per health district and one Trauma Centre for each 2 million of the population. There is a need for both types of hospital acting in a complementary fashion. A system of trauma care has been developing in the North West Midlands for many years. This is a mainly agricultural area with a population of about 1.75 million. It has a number of good sized district general hospitals in the surrounding area and a major acute hospital with all surgical services on site at Stoke-on-Trent. All hospitals have consultant orthopaedic surgeons on staff. Most of the hospitals have CT scanners linked to the Neurosurgery Department at Stoke-on-Trent for image transfer. The area is served by three emergency ambulance services and good rehabilitation services are available. In the year 1989–1990, 114 severely injured patients were admitted to the North Staffordshire Hospital (NSH) at Stoke-on-Trent. The number of severely injured patients admitted to the NSH had almost doubled by 1996 (Table 1). The crude death rate over the same period for these severely injured patients admitted to the North Staffordshire Hospital had almost halfed (Fig. 3).

A comparative study was carried out over the two calendar years 1995 and 1996 between the NSH at Stoke-on-Trent and the Oregon Health Science University (OHSU), a Level 1 Trauma Centre, at Portland, Oregon (Table 2). There are two Level 1 Trauma Centres in the Oregon area serving a population of 3 million. There is one Major Acute Hospital at Stoke-on-Trent serving a population of about 1.75 million. In addition to the two

Table 2 Portland/Stoke-on-Trent comparative study, January 1995–December 1996

	OHSU Level 1 Trauma Centre	NSH
Trauma admissions	3100	5167
Mortality rate	5%	1.9%
Severely injured patients	796	390
Mortality rate	11.4%	17.4%
% GNP spent on health	14% (USA)	7% (UK)

OHSU, Oregon Health Science University; NSH, North Staffordshire Hospital.

Level 1 Trauma Centres there are 45 community hospitals in the Oregon area,[3] dealing with trauma and in the North West Midlands there are 6 such hospitals. The crude mortality rate of all trauma patients admitted to the OHSU at Portland was 5% as compared to 1.9% for all trauma patients admitted to the NSH at Stoke-on-Trent. Of course this is an unfair comparison as we know that the case mix for trauma admissions at both of these major hospitals is very different. When only severely injured patients, that is, those with an injury severity score of greater than 15, were analysed, it was found that twice as many such patients were admitted to the OHSU at Portland as compared to the NSH at Stoke-on-Trent over the 2 years. The crude mortality rate in this group of severely injured patients at the OHSU was 11.4% as compared to 17.4% at NSH. In the subsequent year, 1997–1998, the crude mortality rate at the NSH had dropped further to 13% – approaching that at the OHSU. It is interesting to note, however, that the US currently spends twice as much on health as we do in Britain (Table 2).

Proposal

Based on the preceding information, knowledge of implementation of regional trauma systems in the US[4–6] and experience with an evolving trauma system in the Northwest Midlands, a comprehensive trauma system for each natural geographical area is suggested in order to provide a high level of trauma care for the future. There are probably about 30 such areas in the UK. Each system should serve up to about three million population – and be made up of three well-integrated parts: pre-hospital care, hospital care and rehabilitation with a strategy for injury prevention. There should be only one emergency ambulance service per trauma system. Injured patients should be taken directly from the scene of the injury to the most appropriate hospital rather than to the closest hospital. Each trauma system should be made up of several well-resourced district

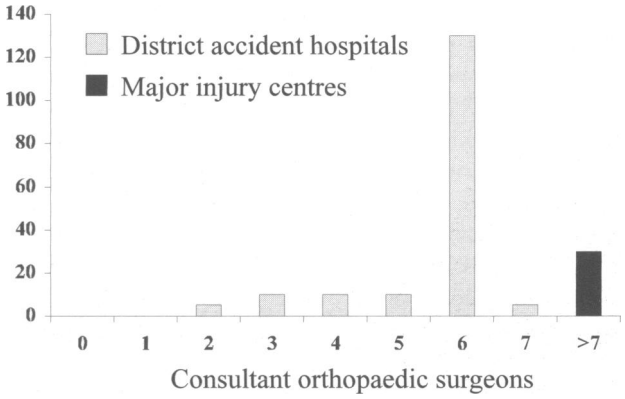

Figure 4 The future – ?200 designated Trauma Hospitals

general hospitals designated as District Accident Hospitals and one major acute hospital designated as a Major Injury Centre. All of these hospitals should complement each other and be configured according to a hub and spoke model.[7]

The District Accident Hospital should, generally speaking, serve a larger population than at present. This is in keeping with The Royal College of Surgeons' report published in 1997,[8] which indicated that the ideal size of such hospitals would need to be larger than at present. Probably about 170 of the present district general hospitals should be designated as District Accident Hospitals. Whereas the recent British Orthopaedic Association report[9] on the severely injured, states that there should be 4–5 consultant orthopaedic surgeons at each of these hospitals, there probably should be at least six consultant orthopaedic surgeons on staff at these hospitals. Again this is in keeping with the consultation document on the *Provision of Acute General Hospital Services*.[10] Dedicated orthopaedic trauma lists must be available and orthopaedic trauma should be given adequate resources so as to deal with musculo-skeletal injuries from the local area, but generally excluding complex bony injuries and those orthopaedic injuries suffered by multiply injured patients. In each Trauma System, the acute general hospital designated as a Major Injury Centre must have all major surgical specialties on site, including orthopaedic trauma and neurosurgery.

Whereas a District Accident Hospital would have a standard Accident and Emergency Department, a Major Injury Centre should have an Enhanced Accident and Emergency Department with resuscitative trauma teams. Patients with, or suspected of having, major injury should be resuscitated and/or assessed by a resuscitative trauma team in the Enhanced Accident and Emergency Department. There should be at least

six resuscitative trauma team leaders, and one of them should be available 24 h a day. These resuscitative trauma team leaders should be either consultant anaesthetists or consultants in accident and emergency medicine. District Accident Hospitals at some distance from the Major Injury Centre would also require such teams. Whereas the District Accident Hospital would have a standard Intensive Care Unit, the Major Injury Centre should have an Intensive Care Unit with dedicated trauma beds. Whereas a District Accident Hospital would have a Department of Trauma and Orthopaedics staffed by at least six consultant orthopaedic surgeons, the Major Injury Centre should have a separate Department of Orthopaedic Trauma staffed by up to eight full-time equivalent orthopaedic trauma surgeons depending on the size of the population served. The department of orthopaedic trauma at the Major Injury Centre, in addition to caring for all the musculo-skeletal injuries from its local area, would also look after the complex bony injuries and those severely, multiply injured patients requiring orthopaedic attention from the entire trauma system.

It is probable that in the future, fewer acute hospitals, appropriately staffed, will deal with trauma (Fig. 4). Whereas the District Accident Hospital would have a department of general surgery, the Major Injury Centre should have departments of general surgery and vascular surgery. The Major Injury Centre, in addition, would have on-site neurosurgery, maxillofacial surgery, plastic surgery and thoracic surgery departments.

Minor Injuries Units will continue to be important adjuncts to the District Accident Hospital and Major Injury Centre. They should be the responsibility of the primary care sector and they should be staffed by primary care physicians and/or practice nurses.

Provision of good rehabilitation facilities will be essential in order to optimise trauma care. It is interesting to reflect that an Accident Services Review Committee provided an interim report in 1961 on how trauma services should be organised.[11] Its membership was very comprehensive and included representatives from the Royal Colleges, the British Orthopaedic Association, the British Medical Association, the College of General Practitioners and many other important bodies. The Committee made a very clear recommendation, which was ignored, that there should be a three-tier scheme for each accident service area: that is, one central accident unit, several accident units and peripheral casualty units. This is exactly what is being suggested again almost 40 years later.

Acknowledgement

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