

Trauma — the malignant epidemic

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Summary

Trauma is the commonest cause of death in children and young adults in the USA and the UK and the incidence of both accidental and non-accidental injury continues to increase. In the Western world more pre-retirement years of life are lost annually from trauma than malignant disease, heart disease, and AIDS combined, and by the beginning of the last decade injury deaths outnumbered deaths from all other causes combined in those under 35 years of age. In South Africa, although infectious diseases continue to exact their toll, a similar pattern is emerging. Alcohol and speed are responsible for the majority of motor vehicle accidents, while the increasing ownership of firearms directly parallels the homicide rates from these weapons. Stricter application of the legislation governing alcohol, driving and firearm control is required and a regionalised trauma care programme is desperately needed to contain this epidemic.

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In 1985 the phrase 'injuries — the neglected epidemic' was proposed by Professor Susan Baker¹ to describe the escalation in accidental and non-accidental trauma throughout the USA and the indifference of the authorities and the medical profession to the growing crisis. Although pertinent to this country, the phrase does not portray fully the extent of the national problem and the term 'malignant epidemic' is more applicable. These two words are defined medically as a widely diffused and rapidly spreading condition affecting many people in any one region at the same time and tending to become progressively worse and to result in death.²

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Although South Africa has learnt to live with violence as an everyday occurrence it is not alone, for interpersonal conflict, motor vehicle accidents (MVAs) and civilian casualties from explosive devices have become an international problem. Countries believed previously to be havens of peace are nowadays faced with this social disease. A recent retrospective report of 1000 consecutive trauma deaths in the UK awakened the authorities to the severe shortcomings of medical care by revealing that between 20% and 30% of in-hospital deaths were considered preventable.³ The majority of these fatalities arose from non-central nervous system trauma after MVAs and failure to institute correct surgical management or the use of incomplete surgical intervention were incriminated as the main causes for this disturbing statistic. The reasons are not difficult to find — no dedicated pre-hospital care organisation and few dedicated trauma care hospitals. In the USA trauma kills 6 times more children between the ages of 1 year and 14 years than the next highest cause of death and is responsible for 80% of the deaths in the 15 - 34-year age group.⁴ A white male aged 15 years has a 1:100 chance of being killed in a motor vehicle accident by the time he reaches the age of 30 years, while a black man aged 20 years has a 1:50 chance of being murdered by the time he is aged 35 years.⁵ Trauma is responsible for the deaths of 150 000 Americans each year and disables between 10 million and 17 million people annually — half a million of these permanently.⁶ It kills more young people than malignant disease, heart disease and AIDS combined.⁷

South Africa

South Africa has no cause for complacency. A report⁸ from the South African Medical Research Council in 1985 showed that 1 million years of pre-retirement life are lost annually as a result of trauma deaths. The death rate from MVAs in the RSA is in the order of 11,9/1 000 million vehicle kilometres travelled, one of the highest in the world, and the rate of MVAs in this country continues to increase. In 1984 it stood at just over 400 000 per annum and today the figure is close to half a million annually.⁹ Combined with this is an even greater increase in fatalities and those seriously injured per accident. These constitute an ever-growing burden on our health services.

Although most accidents in RSA occur in urban areas, only 7% of these prove fatal. Of accidents occurring in rural areas, 23% involve death. Injury sustained in an urban accident

carries a 1:14 chance of death, whereas injury in a rural accident carries a 1:4 chance of death. Serious injury from an urban accident carries a 1:3 risk of a fatal outcome but the chances of surviving serious injury in a rural accident are 1:1.⁹ The reasons for these grim statistics are not difficult to find in Natal. Firstly, rural collisions tend to involve higher speed. Secondly, the average response time for ambulance personnel to reach a rural accident is double that for urban collisions. Thirdly, definitive hospital care for these victims does not exist in the country areas. Multiple problems account for these increasing fatalities, included among which are alcohol abuse, speed, and a rapidly expanding urban population dependent upon inadequate and overcrowded methods of transportation.

TABLE I. INTERPERSONAL VIOLENCE TRAUMA SEEN AT KING EDWARD VIII HOSPITAL, 1983 - 1988

	1983	1988	% increase
Stab wounds			
Chest	1 628	1 717	5,5
Abdomen	534	937	75,5
Gunshot wounds			
Chest	34	118	247,1
Abdomen	59	253	328,8

Interpersonal violence

Statistics for interpersonal violence in the RSA are more difficult to obtain but are illustrated by experience at King Edward VIII Hospital in Durban. In 1983, 50% of emergency general surgical admissions were trauma-related. By 1988 this figure had risen to 60%. This in itself does not seem dramatic until the figures are analysed (Table I). In this 5-year period gunshot wounds of the torso increased by over 300%. Vascular trauma increased by 340 new cases per year. By virtue of the multiple organ systems injured in victims of gunshot wounds compared with stab wounds, the surgical manpower and hours required to manage these patients has increased enormously. Just one of these patients can involve a general surgeon, a vascular surgeon and an orthopaedic surgeon for 4-6 hours, not to mention the necessary assistants, anaesthetists, theatre staff and the theatre itself.

In 1988 almost half the admissions to the Surgical Intensive Care Unit (ICU) in King Edward VIII Hospital were victims of trauma and nearly half as many again had to be turned down because of lack of ICU beds. In addition to turning away trauma patients, the ICU has also to refuse care for those patients who require intensive monitoring after major elective surgery because of the acute trauma load. This means that either these operations must be cancelled and rescheduled, although an ICU bed can never be guaranteed, or the patient must run the risk of being managed in the general ward.

Young victims

The above statistics are tragic but what makes them even worse is that trauma victims are young. They belong to that section of society that is economically viable, upon whom the country depends for its existence. This grim picture does not end here — the economics of trauma must also be considered. In the USA trauma care costs \$75-100 billion annually.^{1,4,6} This refers only to the cost of treatment, the total cost extends far beyond this. In 1984, the cost of 1 death in 1 MVA was \$300 000.¹⁰ In South Africa it was R111 000.⁹ That was over 5 years ago and could have doubled by now. Other losses must also be considered — loss of potential earnings, loss of a

breadwinner, loss of productivity, expenses of rehabilitation and care of the permanently disabled; these costs are incalculable.

Phasic pattern

So what can be done and what is being done? In order to ascertain the needs, the nature of the beast must be understood. Trauma deaths follow a distinct phasic pattern and each phase requires a different approach to solve its problems.

Phase 1

Fifty per cent of trauma deaths occur immediately or within a short period after injury and are, in the main, due to major central nervous system injury, major thoracic injury or major vascular injury. Little, if anything, can be done medically to help these patients and there can be few more relevant areas for the adage 'prevention is better than cure'. In order to achieve this, there must be adequate research. But what is happening? The answer is very little. In the USA the annual federal budget for trauma research is 5% of that allocated to research for heart disease despite the fact that more than twice the number of pre-retirement years of life are lost from trauma.¹ The same situation pertains for cancer research. Millions of dollars are being poured into research for malignant and cardiac disease when the youth of society is dying from neglect. At this moment a frantic search for the cure for AIDS continues while the young are being killed in their thousands on the streets by a disease for which the cure is already known.

The commonest causes of death in MVAs throughout the world are alcohol and speed. Research in this country has shown that many serious injuries are alcohol-related.¹¹ South Africa records a death rate of 11,9/1 000 million vehicle kilometres travelled, and has one of the highest speed limits. When travelling at 100 km/h the average person does not weigh 70 kg, but has a relative weight of 6 300 kg.⁷ When one considers the formula for kinetic energy the body ceases to exist at this speed — it becomes a high-velocity missile, which fragments on impact with the dashboard. Reducing speed reduces this effect dramatically, and therefore reduces the mortality rate. Despite a recent report to this effect by the South African National Institute for Transport and Road Research, no changes have been implemented.

Seat-belt legislation has had a major effect in reducing mortality and virtually all countries report a 25% reduction with the proper use of seat belts.¹²⁻¹⁶ The same holds true for safety helmets for motorcycle riders.¹⁷ However, in this country the penalties for non-compliance are too lax and are not a sufficient deterrent.

With regard to inter-personal violence the present crisis in the RSA parallels the increase in ownership of firearms, as the figures from King Edward VIII Hospital amply demonstrate. A clear-cut association has been demonstrated in the USA between firearm availability and homicide rates.¹⁸ In the UK inter-personal violence from firearms is uncommon due, in the main, to strict legislation governing ownership. In this country much stricter control is required.

Phase 2

Thirty per cent of trauma deaths occur within 4 hours of injury. The thrust of assistance must change from prevention (reducing phase 1 trauma deaths) to cure — phase 2 — which is the provision of adequate medical care. This must be in two forms: (i) pre-hospital; and (ii) hospital.

There is a phenomenon in trauma known as the 'golden hour'; this occurs immediately after injury. Aid during this period has been shown to reduce mortality rates dramatically and to this end a well-trained paramedical service is invaluable.

The effect of adequate pre-hospital care and early hospital admission is reflected by the vastly reduced mortality rates seen in the various military conflicts of this century. Mortality rates in the Vietnam War of 1967-1973, where resuscitation and stabilisation on scene were combined with rapid, efficient casualty evacuation, were one-tenth of that during World War II and half that in the Korean War.¹⁹

After efficient pre-hospital care there must be an adequate receiving hospital and this cannot be over-emphasised. This requires a dedicated trauma team available and ready 24 hours a day coupled with adequate resuscitation and diagnostic facilities. The team should consist of a leader of consultant status whose sole interest is care of the trauma victim. He should be reinforced by specialists in trauma anaesthesia, neurosurgery, thoracic surgery, orthopaedic surgery and vascular surgery. He should, in addition, be fully trained in intensive care medicine. Allied to this team must be nursing staff and an adequate number of junior medical staff. This team must work in an environment where resuscitation and diagnosis may proceed without restriction or hindrance and where immediate theatre access is available at all times. This system was introduced in the late 1960s in the state of Maryland. The mortality rate for major trauma fell from 70% to 16% within 1 year of its inception.⁵ Similar centres were created throughout the USA and not one has failed to demonstrate a reduction in mortality rates following the creation of such trauma service.^{4,5,19-23}

Phase 3

The remaining trauma deaths (20%) are caused predominantly by sepsis and multiple organ failure and occur at variable times after admission to hospital. Trauma intensive care facilities are essential if this figure is to be reduced.

Dedicated trauma care on an international scale is at present a fairy-tale. This specialty is the Cinderella of the medical profession treating the Humpty Dumpties of the world. Until the vision and foresight of Professor A. E. Wilkinson,²⁴ who established Johannesburg Hospital's Accident Service and Trauma Unit, are implemented on a nationwide basis, trauma

care shall remain as helpless as 'all the king's horses and all the king's men' and the present epidemic will never be contained.

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