

The tragedy of trauma

Seven trauma research centers are conducting clinical research on a major American killer

by Jeanne Bockel

Trauma is the leading cause of death among persons between the ages of 1 and 37; it is the fourth leading cause of death at all ages and the primary cause of disability. The tragedy of trauma is that it kills thousands who would otherwise live long, productive lives; debilitating diseases like cancer and heart disease and other chronic conditions, by contrast, occur late in life.

The treatment of traumatic injuries, brought on by a fall, a blow or an animal's jaws, is probably the most ancient focus of the practice of medicine.

Nevertheless, no traumatic injury is as simple as it seems; the complications that accompany it are often more critical, and less attended to, than the injury itself. These complications are a focus of increasing concern among doctors who treat accident victims. But the knowledge with which they have to work appears still to be inadequate.

Addressing a recent international symposium on trauma, in Washington, D. C., Dr. Simon Sevitt, consultant pathologist of Birmingham Accident Hospital in England, contended that it is these complications that account for the deaths of the great majority of injured and burned subjects who reach the hospital alive but do not survive treatment.

Whether a badly injured person lives or dies is often decided within a matter of hours. But until recently, little research has been carried out on what actually happens to severe trauma victims—or even, of those who died, on what caused their deaths. Scattered autopsies show that the cause of death is often a situation other than the one that received the emergency treatment.

For example, a survey of 950 reports of autopsies performed on accident victims revealed that in 38 percent of cases in which the death of

accident victims followed hip fractures, the primary cause of death was pulmonary embolism. Other instances are burn victims dying of kidney failure, the deterioration of stomach lining following a wound elsewhere, or young patients succumbing to injuries that an older, less athletic victim survives.

When a person is hit by trauma, says Dr. Lars-Erik Gelin of Gothenburg, Sweden, reactions are induced which can affect any tissue and any function within his body. These, in turn, induce interacting forces which cannot be predicted in the normal person because they depend on the nature and extent of injury and how the individual responds to it. This in turn can depend on age, nutritional status and preinjury diseases of the patient.

Probably the first reaction to trauma, he says, is shock, caused by the redistribution of blood volume and an overactivity of catecholamine levels. Research on this phase is by far the most important in saving lives because if the trauma is too extensive and the patient responds too weakly, a dangerous lack of oxygen in the tissues can result.

Another obvious focus for trauma research is burns, because complications are both more common and more serious; burn victims frequently die of infection. Dr. Wesley Alexander of Cincinnati General Hospital has found within the last six months that neutrophils, the first cells to arrive at the site of an inflammation, function poorly in burn patients. Doctors at the Trauma Center at the University of Cincinnati Medical Center believe this might be why burn patients are exceptionally infection-prone. An outcome of this research might be to predict the neutrophil function so that treatment involving risk of infection could be correctly

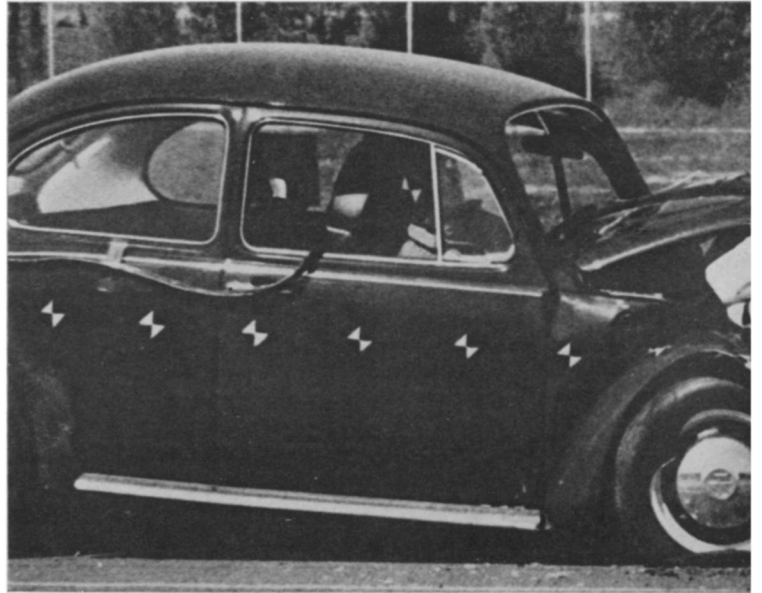
timed with the neutrophil cycle.

While this would not initially aid the trauma patient with an unknown cycle, subsequent therapy and rehabilitation could depend on it.

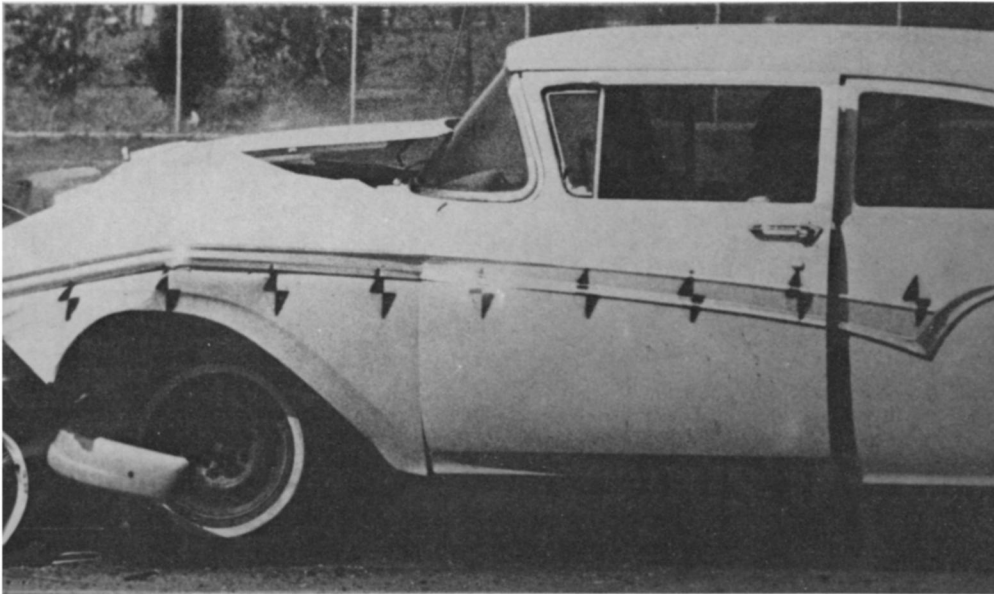
According to the National Institute of General Medical Sciences, Bethesda, Md., studies must be done on persons who are healthy at the moment trauma is imposed to determine accurately the physiological changes produced by trauma alone. Fundamental studies acutely needed are on wound healing and wound infection. Additional areas of needed research include hemodynamic, metabolic, cardiac, and respiratory changes following trauma, and the effects elsewhere in the body, of injuries to the head, spinal cord and nerves.

In the past three years, the institute has established seven trauma research centers to conduct clinical research on trauma. These include Columbia Presbyterian Medical Center, New York, where studies are being conducted on human energy exchange in body metabolism following severe trauma; Parkland Memorial Hospital in Dallas, where baseline studies on the traumatized patient are being done; the Hospital of the University of Pennsylvania in Philadelphia, with special focus on shock at the cellular level; Albany Medical Center in Albany, N.Y., studying the problems in evaluating and monitoring critically injured patients; Cincinnati General Hospital in Ohio, studying bacterial infections in injured and burned patients; University of Maryland Hospital in Baltimore; where types of injuries are being classified, and E. J. Meyer Memorial Hospital in Buffalo, where the alterations of regional metabolism and organ failure in surgical stress are being studied.

The centers are models for quality emergency care for the severely injured



A variety of medical complications that accompany traumatic



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The accident victim: Trauma is a disease of the nights and weekends.

and, in addition, have demonstrated certain key elements in caring for the injured: availability of skilled trauma teams around the clock; advanced monitoring equipment for detecting changes in vital organs, and fast laboratory test service.

"Trauma," says Dr. Oscar P. Hampton Jr. of Washington University in St. Louis, "is a disease of nights and weekends." These are times, he says, at which without the development of specific centers, neither laboratory facilities nor technicians are available in most hospitals to help a physician determine what is happening to his emergency patient. As a result, he says, people are dying who need not.

Or, if they survive their burns, smashed limbs or stab wounds, they suffer permanent handicaps that might have been prevented were the facilities at even the best equipped hospitals available when they are needed. □



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