Death in a Ditch

J. D. FARRINGTON, M.D., F.A.C.S., Minocqua, Wisconsin

With spring the population of Minocqua each year increases from 2,000 to 30,000 as this town on Highway 51 metamorphoses into a resort area. As the population soars so also does the number of automobiles, trucks, buses, motorcycles and motorbikes which tear over the highways and byways of the vast wooded playground which is northern Wisconsin.

"Death in a ditch," observes J. D. Farrington, orthopedic surgeon at Lakeland Memorial Hospital, Woodruff, Wisconsin, is an immediate probability 24 hours a day, the year around, as ice, snow and wind make transportation hazardous. To cope, Minocqua and environs used a privately-owned hearse as its ambulance. Otherwise, the town had no equipment with which it could rescue the injured. Worse still, individuals who attended the injured were only sporadically trained.

Appalled, Dr. Farrington, who has been in practice in Minocqua since 1966, set about rectifying this hair-whitening situation by enlisting the help of his fellow townsfolk and instructing them in rescue techniques. Dr. Farrington is experienced as he and Sam W. Banks, of the Chicago Committee on Trauma, in association with the Chicago Fire Academy five years ago established a course, probably the first of its kind, to train those first to see the injured how to give them initial care.

"What Dr. Farrington is doing in Minocqua should be done in every community in the United States," Dr. Banks says, "regardless of how small or how large. It is the responsibility of the medical profession to give such courses on a local and continuing basis."

The photographs which illustrate Dr. Farrington’s article were taken for the Minocqua Rescue Squad by Audrey Perkins.

The road wound away into the beautiful moonlit night as John Burrows started for home. His wife, Ruth, dozed beside him as he drove along the narrow road from the country home where they had dined with friends. There was little traffic on the road and John, remembering the evening’s events, was enjoying the drive.

Suddenly a car came speeding around a corner and careened crazily toward the Burrows’ vehicle. Aroused from his dreaming, John quickly pressed on the accelerator and turned his car sharply to avoid the oncoming vehicle.

His car hit the soft shoulder of the road, caromed into a deep ditch and slammed into a telephone pole.

John was thrown against the steering wheel and corner post of the car and blacked out. How long he was out John did not know, but when he awakened, he felt a severe pain in his neck and an unusual tingling in his arms and legs.

His neck hurt when he tried to turn, but nevertheless he did turn to see what had happened to Ruth. She was crumpled against the door, half in and half out of the seat, looking at him and crying. By the light from the moon he could see blood running down her leg, and he shuddered as he saw bone protruding from the wound.

He tried to move over to his wife but a sharp pain in his neck stopped him. As John thought about what he possibly could do, a man appeared at the car window and shouted: ‘I’m going for help!’

John blacked out again and later awakened to voices.

‘Come on, fellow. We’ll take you and your wife to the hospital.’

He was pulled from the car, placed on a stretcher, and carried to the ambulance. Ruth soon was beside him on a similar rig. The door was slammed closed and the driver and his helper got into the front seat. The ambulance leaped forward with a screech from the tires and a shriek from the siren.

If this seems dramatic, it is meant to be. Unfortunately this story is too often true, for, if John survives, with the impending permanent cord damage, he will be paralyzed the rest of his life.

To protect the victim of an accident from further injury as he is removed from the
wreckage, the physician must act. He must prevent the sloppy and inefficient removal of a victim from a smashed vehicle. He must teach the rescue worker how to remove the victim properly. This is the physician’s responsibility. For example, change the last part of the accident story to what it should be:

John blacked out and awakened to the touch of a hand on his neck. A calm, reassuring voice said to him:

“Don’t move. We are trained ambulance attendants. We are here to help you and your wife.”

They then proceeded to examine Ruth and John, lift John out of the car on a spine board, and immobilize Ruth’s leg before moving her. John and Ruth were placed in the ambulance, an attendant taking his place beside them. The ambulance proceeded slowly to the hospital, obeying the speed limits and traffic signals.

This latter method of rescue and extrication of the accident victim demonstrates that certain principles should be followed, especially if the victim has severe injuries. The most frequently mishandled injuries, made worse by hasty and rough movement from a vehicle or other accident scene, are fractures of the spine and the femur.

The responsibility for improving ambulance and rescue service rests with physicians. For too long apathy and a “leave-it-to-others” attitude have prevailed.

While the Red Cross, International Rescue and the Bureau of Mines do a creditable job, training of both rescue workers and ambulance attendants must go further. Although large courses in first aid are excellent, they often do not reach the individuals in need of more advanced training.

Only when the entire problem is approached on a community basis, with medical authorities taking the lead, can the ideal be attained.

Because vehicular accidents cause some 25 per cent of the accidental injuries and 50 per cent of the accidental deaths in the United States, this article will deal with extrication of victims of automobile accidents, although the principles outlined apply to all types of accidents.

There is, in general, a set pattern for rescue—actual extrication—of the injured, regardless of the circumstances. Order should be the basic principle in care and extrication, for the haste arising out of disorder causes more harm than good and usually is unnecessary.

Only when the lives of the victim and the rescuer are threatened by the circumstances of the accident is haste acceptable. Fire, leaking gas, spilled gasoline, possible explosion or collapse of a structure, necessitate immediate removal, but these do not occur often.

As a rule, rescue and ambulance services should not be combined. In most instances, rescue tools kept in an ambulance mean less space for transport and care of the injured.

Ideally, there should be a rescue service and an ambulance service.

Rescue units are of three types—light, medium, and heavy, depending on the needs of a given community. Equipment varies from jacks capable of raising a passenger car to those for raising a freight car. A light rescue unit will have the basic equipment listed on page 129, column 1. Each community must ascertain what it might need.

Survey (Fig. 1) of the situation and the victims should be the initial step. Rescuers must gain enough access to the vehicle to examine the injured and to provide lifesaving care before extricating them. Usually there is no problem, but many times the damage to the vehicle and the position of it and the victims will tax the ingenuity of all concerned.

At the accident scene, the doors, unless jammed shut, may be forced back against the body of the vehicle to make the full width of the opening available. Glass in front, side and rear windows also can be removed. The windshield in many cars will pop out as a unit. The front seat may be moved forward or backward, the rear seat removed.

Attendants must identify themselves and reassure the victims and—strangely enough—the onlookers. To prevent interference from the curious the area must be secured. At times help from onlookers must be obtained but it must be directed and must be orderly. Flares and barricades must be set up to prevent further damage, especially when the accident occurs on a busy highway.

Communication must be established immediately with medical facilities to apprise them of the occurrence and the number of victims.
Lifesaving measures must be instituted before the victim is moved. Of these, correction of airway defects, breathing and bleeding problems is the most pressing. Merely positioning the head of the unconscious patient and clearing his mouth of debris are often all that is
needed to allow spontaneous breathing. Accessible bleeding of any magnitude should be cared for, and fractures immobilized temporarily to prevent further damage when the victim is removed. The arm can be fastened to the trunk, the leg to its mate, until definitive care can be given.

Spine boards (Fig. 2) are of great value in extricating all types of injured, particularly the most frequently mishandled injury, fracture of the spine with actual or impending damage to the cord.

The spine board is ideal for the victim with such an injury, but, once again, preparation of this patient so that he can be removed is a step-by-step procedure.

A sitting victim with cervical injury, for example, is secured to the short spine board described in the March-April 1967 Bulletin and then removed. The collar (Fig. 3) is applied first. This is fashioned easily from two or more universal dressings,* folded lengthwise and held in place by safety pins or soft roller dressings. The short board then is slid behind the patient on an angle and positioned (Fig. 4). As the board is waxed, it slides easily. The victim’s head then is secured (Fig. 5) to the board by using the headband and chin strap. A neck roll may be necessary in some cases to allow fixation in the optimum position.

(Continued)

*All-purpose dressing unfolds to either 10 by 18 inches or 10 by 36 inches, affording adequate coverage for any wound. When two are folded lengthwise, they form an efficient cervical collar. It may also be used as padding for splints.
Next the victim is secured to the board. Two eight-foot long straps are passed through the upper handholds, behind the board, out the lower handholds and around the thigh from outside to inside, and finally under and over the thigh to the chest buckle, staying as high as possible in the groin. The injured and the board are now a unit (Fig. 6).

![Fig. 6. Proper placement of two eight-foot straps to secure patient to board is demonstrated. Straps must be as high as possible in the groin.](image)

The victim then is turned in the seat so that he faces the side of the car, and his feet and legs are outside. If his leg is fractured, the legs are tied together with triangular bandages before the victim is turned. Three ties are sufficient—a figure eight about the foot and ankle and ties below and above the knee.

Once the victim is turned, his legs will be accessible, allowing definitive splinting with blanket rolls, padded boards or inflatable splints.

If the victim is small so that two average men can lift him, he then is lifted (Fig. 7) out of the car. Each attendant uses the upper handhold on the board and passes his forearm under the buttocks of the victim and grasps the other attendant’s hand. They place the victim, his thighs still flexed in the straps, on a litter or stretcher. The straps then are released and used to secure the victim, still on the short board, to the litter or stretcher.

The victim is taken to the hospital on the board, which should be removed only by a physician.

(The hospital gives duplicate items of equipment to the ambulance attendants so that they have neither to wait nor return to pick up the ones in use.)

If the victim is too large to be lifted out, then he may be removed (Figs. 8 and 9) as a unit on the long board. First, he is secured to the short board, turned, placed flat on the seat, and under him and the short board is pushed the long board. The victim then can be lifted out on the long board, and he should remain on it secured by straps. Straps are passed easily through the handholds or strap holes as the board has one-inch half rounds on its underside (Fig. 10).

Removal of many victims even though they may have no evidence of spine injury is easier with the long board, instead of pulling, tugging and lifting them out. This patient may be turned and slid onto the board, or the board may be pushed under him.
Fig. 8. This 270-pound man is too large to be lifted. After being secured to short board, he is removed as unit on the long board.

Fig. 9. After victim is turned and placed flat on seat, long board is pushed beneath him and the short board.

Fig. 10. Victim's legs are released from the two long straps, which are now used to secure him to long board.

Fig. 11. To remove victim thrown to floor between seats long board can be pushed in from either side.

Fig. 12. Six-foot sling of one-inch rope is helpful in extricating a victim trapped under a vehicle. Figures continue on following page.
One of the most difficult to remove is the victim who has been thrown on the floor between the front and rear seats (Fig. 11). Here again the long board is valuable. Being beveled and waxed, the board can be pushed under the injured by attendants at both sides of vehicle (Figs. 9 and 10).

For the occasional hard-to-handle victim, a recently developed rope sling (Fig. 12) is valuable. This is a six-foot loop of one-inch rope to which two 1¼-inch rings are affixed before the rope is spliced. The rings are fastened together by a malleable chain link.

The first step toward removal of such a victim is to obtain more space by lifting out the back seat (Fig. 13). The victim is then examined and given whatever care is necessary at this point.

The sling is placed across the victim's chest (Fig. 14) and under his arms, the ring slide pushed firmly under his back. This slide keeps the rope from spreading when tension is applied. The long board then is positioned under the victim's shoulders and head, and, guided from foot end, he is pulled onto the board as the attendants pull steadily on the rope (Fig. 15).

Being large in diameter, the rope does not cut into the chest; and with the ring holding the loop together under the patient's back, local pressure in either axilla is surprisingly little. Pressure is uniform and the possibility of harm is less than if the rescuers were to pull on a fractured shoulder girdle or arm.

An ejected victim suspected of having spinal injuries traditionally is lifted by blanket lift, by three-, four- or six-man lift (Fig. 16), and placed on litter, face up or face down. It is common practice that after such a patient is hospitalized he is turned on his side if necessary for examination.

Using the long board, the same method of turning is valuable at the accident scene, and the victim will not sag. By grasping the victim's clothing (Fig. 17), attendants can turn...
Equipment for Rescue Vehicle

THE LIGHT RESCUE VEHICLE used in Minoqua, Wisconsin, is a four-wheel-drive panel truck with power take-off winch, heavy-duty springs and tires. To extricate the victim of an accident and provide emergency care, the truck carries this equipment:

- Siren
- Rotating lamp with red light, on top of truck
- Two spot lights
- Portable gas-powered generator with two 300-watt lights with 100-foot extension cords
- Stand-up flash lights
- Chain saw, gas powered
- Rescue saw, gas powered, with blades for metal and concrete
- Bolt cutter
- Ten-ton, push-pull jack with spreader unit
- Crowbars
- Sledge hammer
- Two ten-foot wooden pike poles
- One hundred feet of 1/2 inch rope
- Twenty-five feet of heavy-duty chain
- Six four-by-four-by-six-inch blocks
- Ten-pound BC fire extinguisher
- Asbestos blanket
- Fourteen-foot aluminum extension ladder
- E oxygen tank with regulator, hose and mask
- Four wool blankets
- One traction splint with ankle hitch
- Padded-board splints for leg and arm
- Inflatable splints
- Triangular and soft roller bandages
- Universal dressings
- Airways for infant, child and adult
- Two pillows
- Bag-mask resuscitation unit
- Six-foot (circle) one-inch rope sling with ring slide
- Short and long spine boards with eight- and nine-foot straps
- Hard helmets and coveralls

Fig. 15. Guided from foot end, injured is pulled by attendants onto spine board. As ring-slide under patient's back holds sling firm, pressure in either axilla is "surprisingly little," says Dr. Farrington, who also points out that traction must be at board level. Figures continue on next page.

him part way, place the long board alongside of him, and turn him back on the board. The straps are passed across the victim, fastened, and he is (Fig. 18) ready for transport.

Usually the ejected victim is out in the open, but on occasion he is found under the vehicle (Fig. 19). With the rope sling and long board, he can be extricated with relative ease (Fig. 20).

Just as emergency care — resuscitation, splinting and bandaging — must be practiced to attain perfection so must rescue techniques be practiced. The actual scene of the accident is no place for practice.

Extrication can be practiced on pseudo victims in cars salvaged from wrecks and placed in any position necessary. Such exercises should be part of any training program and should be done on a continuing basis.

Use of the long and short spine boards definitely lessens the potential damage to the victim, especially one with an injured spine, and makes difficult tasks relatively easy.
Rescue From Death in a Ditch—continued

Fig. 16. Three attendants demonstrate lift of ejected victim suspected of having injuries of spine.

Fig. 17. Grasping ejected victim’s clothing, rescuers turn him part way, position board, turn him back on it.

Fig. 18. After straps carried in every rescue vehicle assure patient’s security, he is ready for journey to hospital.

Fig. 19. To extricate victim from under auto rescuers use rope sling, rather than pull on clothing or extremities.

Fig. 20. Minocquans demonstrate second step in “snake” injured out of tight spot. Traction should be at board level.
Standards for Emergency Ambulance Services

These Standards, developed by the Committee on Trauma, include requirements for appraisal and immediate care at the site of injury or illness, followed by safe and comfortable transportation to a hospital as should be done by any organization operating an emergency ambulance service. All such services should be under continuing supervision.

The Committee believes that lives can be saved if ambulance personnel is well trained; ambulance vehicles are equipped adequately and operated safely; and all communities and operators insist upon meeting and maintaining high standards for the organization and operation of emergency ambulance services.

These Standards are desirable. If some are impractical for a given community, they should remain as ideals to be approached as nearly as possible.

The Standards were approved by the American College of Surgeons' Board of Regents in February, 1967.

Organization and operation

In each community the health department or other governmental agency should obtain the authority to regulate all public and private ambulance services. (If enabling legislation is required for such authority, the local government should request it from the state legislature immediately.)

A state, county or municipal agency should be responsible for determining the need for public and private ambulance services, licensing each service and enforcing these standards.

The operator of an ambulance service should be legally and morally responsible for the conduct of the organization and operation.

A manual of ambulance service policies and standards should be available for use by all personnel.

Liaison between the staff of an ambulance service and the law enforcement authorities, the medical profession, hospital administrators, and the public is important. A periodic review of ambulance reports, correspondence, complaints and violations is an excellent means of promoting rapport among all interested parties.

The privately-owned company should be financially responsible, and it should carry adequate public liability insurance. Reasonable charges, predicated on services provided and on operating costs, should be posted with, and approved by, the licensing authority.

Twenty-four hour, year-round coverage should be available.

All ambulance personnel should respect local fire, building, health and traffic regulations, including disaster plans.

The Committee on Trauma recommends that the model ordinance regulating ambulance service (page 132, column two) distributed by the National Safety Council be used as a guide by local authorities for any necessary legal action.

Standby ambulance service should be established with other operators in adjacent areas.

A record of all violations of the law should be kept by the operator of the ambulance service. He also should keep a record of any accidents in which his vehicles are involved.

Personnel

At least two trained persons, a driver and an attendant, or two driver-attendants, should man each ambulance dispatched.

The driver's ability to drive and the attendant's competence in emergency care should be certified by the licensing authority. The employer should be accountable for the character and moral conduct of those whom he employs.

Before an applicant—driver or attendant—is certified, the licensing authority should determine that he 1) is not addicted to alcohol or drugs, and 2) has not been convicted of a felony.

The applicant should be examined by a physician. The applicant should have a sound body, eyesight of at least 20/40 in the better eye, and no physical defects which might impair his ability to drive or attend an ambulance. Provisions for periodic examination should be made. He should speak, read and write English. He should hold a current certificate of
completion of an advanced first-aid course given by the Red Cross, the U.S. Bureau of Mines, St. John Ambulance Association or the equivalent; and he should be certified as proficient in external cardiac compression and in handling emergency childbirth and persons with acute mental conditions.

The ambulance attendant should record all calls, describing them in detail.

An advisor who is a doctor of medicine is recommended to provide continuing refresher training.

Vehicles

The casualty-carrying vehicle should provide easy loading, privacy and comfortable riding. There should be adequate space for the attendant to continue care while the patient is in transit. Driver’s and patient’s compartments should be separate. Good illumination and temperature control of the patient area are required.

The vehicle should start and stop slowly and smoothly, and travel at a safe speed. Jostling and speed may be harmful and dangerous to the patient.

An ambulance should be equipped with warning devices, according to state or local statute.

An ambulance should be kept clean, and supplied with fresh linen for each call. After it has transported a patient with a contagious disease the vehicle must be cleansed thoroughly before it is used for another call.

Equipment

Minimal equipment for the ambulance is listed in the March-April 1967 BULLETIN.

The vehicle and equipment should be inspected at least annually for safety and good mechanical condition. Attendants also should be tested annually to assure that they are using the equipment correctly.

Communications

All vehicles should be equipped with a two-way radio capable of clear transmission and reception over not less than 20 miles.

A dispatching office with an adequate communications system, a time-recording device and adequate space for records should be set up. On all shifts the dispatcher should have at least as much training as the ambulance personnel so that he can receive and transmit reliable information as to the injury or illness.

Other factors

Many other items need to be standardized. In some instances there is no general agreement as yet; in others there is not enough experience with what seems to be good suggestions. In still other instances, local conditions influence the base lines.

For example, consideration should be given to: The relation of ambulance services to rescue operations; the wearing of uniforms, name plates or arm bands; the exact content of ambulance records and to whom copies should be made available; the detailed requirements for a casualty-carrying vehicle; an easy interchange of equipment between ambulances and hospitals; the possible need of sirens; and closer communications between ambulances and hospital emergency departments.

For these, the Committee on Trauma is not yet ready to establish standards.

Model Ambulance Ordinance

The model ambulance ordinance developed by the American College of Surgeons, the American Association for the Surgery of Trauma, and the National Safety Council working in concert under their Joint Action Program, may be obtained from the:


The model ambulance ordinance was published in full in the September-October 1963 number of AID, the journal of the Ambulance Association of America.

The Council of State Governments calls attention to regulation of ambulance service in its 1964 edition of Program of Suggested State Legislation.

This book is available for $2.00 from the Council of State Governments, 1313 East Sixtieth Street, Chicago 60637.