

Maryland

# E•M•S

## NEWSLETTER

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For All Emergency Medical Care Providers

June 1990

### Focusing on Summer Emergencies

#### **DNR Response to Boating Accidents**

Looking at a map of Maryland, one can see why water sports are so popular. Lakes, rivers, the Chesapeake Bay, and the Atlantic Ocean exert strong appeal. But the safe enjoyment of the water requires more than just enthusiasm.

There were 319 recreational boating accidents in Maryland in 1989, most of which happened in Anne Arundel, Baltimore, Calvert, and Cecil counties. Twenty-eight of those accidents resulted in fatalities last year, compared to 20 in 1988. Most fatalities occurred during July and August, on Saturday, between 4 pm and midnight. Alcohol was involved in 50 percent of the fatalities. Many lives might have been saved through the use of personal flotation devices (life jackets).

The average EMS response time on water is not equal to that on the highways. A boat with an emergency might be 2 miles away in heavy fog or 5 miles away in 10-foot seas with gale winds. It might take from 30 minutes to 2 hours to find it, even with radar and other navigational aids. At such times, helicopters cannot fly, and county small boats cannot be launched.

Most counties have limited fire and rescue capabilities on the water. The Department of Natural Resources is the principal state agency for search and rescue missions and medical emergency responses on state waterways; these activities are the responsibility of the Natural Resources Police (formerly known as the Marine Police). This

agency is empowered to enforce local, state, and federal laws as they relate to boating. Since it is usually the first agency to respond to a water emergency, Natural Resources Police, in 1978, mandated that every officer who graduates from its academy must first pass an EMT course, the first course to be given. "No other police agency has that requirement," says EMS Training Officer Sgt. John Gilmer. "On the water, we are the fire, police, and EMS departments."

There are also CRTs on the staff of the Natural Resources Police. The minimum requirement to work on the hovercraft as a medic is CRT certification. ALS providers with volunteer fire departments may take part in an exchange program to get hovercraft experience during the summer, the peak boating season.

Injuries from boating accidents are not as numerous as those caused by motor vehicle crashes, but they are very

serious. They include burns; head and chest trauma; injuries from entanglement with the shaft of the boat; and severe trauma associated with the propeller, water skiing, and collisions with piers, other boats, or floating debris. During winter weather, injuries also include hypothermia and cold-water near-drownings.

The Potomac River had a record number of fatalities in 1989, leading to a pilot program for boaters on the upper, non-tidal portion of the river, north of Little Falls at the Maryland/DC border. From March 30 to June 30, 1990, anyone traveling on that part of the river in a small boat or inner tube will have to wear a life jacket; violators will be fined \$40. Some boating enthusiasts see the requirement for life jackets as an infringement of their personal freedom, but state officials believe that saving lives is worth this

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*Last year 319 recreational boating accidents occurred in Maryland.*

## Recreational Boating Accidents

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minimal intrusion. The effectiveness of the pilot program will be reviewed for permanent approval.

"Many injuries are caused by 'people problems,'" says Cpl. Ralph Parker, spokesman for the Natural Resources Police. "People are not aware of the force of the river flow and are not cautious enough." Spring rains cause faster, higher water with debris floating in it. Although most drowning victims are from open motor boats or cabin cruisers, people also drown while walking across a dam, fishing, rafting, or in flat-bottomed boats. Most rivers are down to normal level during the summer.

Landlocked bodies of water, such as Deep Creek Lake, have a different set of problems. Cpl. Parker explains, "Folks on these bodies of water don't think of themselves as boaters, but as fishermen or skiers. They either don't know the rules or think that they don't apply to them. They should also wear life jackets and take boating safety courses."

Boats must be registered in Maryland, but no license is required for boat operators. The law requires that boat operators born after July 1, 1972 pass a Maryland boating safety course (for further information on courses, call 1-800-336-BOAT).

## Measles Outbreak; Vaccine Available

Maryland is currently experiencing its worst measles (rubeola) outbreak in 10 years. Measles in an adult can be a serious disease. A vaccine is available and has an excellent record of safety and effectiveness. If you have not had measles or have not had two shots for measles (most adults have had only one shot) you should receive the vaccine. Most people born before 1957 have had measles. If you are not sure, you should receive the vaccine.

Health care providers should suspect measles as the diagnosis in adults and children with a rash; these patients should be isolated, since measles is spread via the respiratory route.

◆ Ellis S. Caplan, MD  
Chief, Infectious Disease  
Shock Trauma Center, MIEMSS

Preventive measures recommended for boating safety include taking a boating safety course and wearing a life jacket (whether or not they are required by law); being informed about conditions that make the water safe or dangerous; and being aware that drunk boating is against the law and every bit as lethal as drunk driving.

Boaters may contact Natural Resources Police about boating accidents, assistance for search and rescue, etc., by calling 9-1-1; using the onboard VHF radio; or calling the new hotline number, 1-800-628-9944.

## Eye Injuries Increase In Summer Months

Eye injuries increase in the summer months when people are involved with active outdoor sports, gardening, boating, car maintenance, fireworks, etc. "Anyone is at risk for eye injuries in an environment where things are turning, hitting, splashing, or flying through the air," says Leonard M. Parver, MD, co-director of the Maryland Eye Trauma System (METS) from the Center for Sight at Georgetown University. "Shop workers, hobbyists, athletes, gas station attendants, people mowing lawns, and children may sustain devastating blunt or penetrating eye injuries that can cause blindness. Racquetball and squash injuries are particularly dangerous; a squash ball fits the size of the eye socket and can cause severe injury, including injury to the optic nerve."

According to a METS/MIEMSS study of 8 years of data, there are 2.4 million eye injuries in the US every year; more than 61,000 people sustain eye injuries severe enough to be admitted to hospitals. According to an estimate from the National Society for the Prevention of Blindness, 90 percent of these eye injuries are preventable.

"It is absolutely necessary that people whose activities put their eyes at risk wear appropriate safety glasses capable of stopping a high-speed projectile," Dr. Parver emphasizes. "The key element is that the lenses be made of POLYCARBONATE, the same material as bullet-proof glass."

Polycarbonate lenses, which can be ground to prescription, feel like regular plastic lenses and are possibly even a bit lighter in weight. Their only

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In 1988 the Natural Resources Police established the Sober Skipper program to make drunk boating as socially unacceptable as drunk driving. Drinking alcohol can increase risk-taking and cause daredevil behavior. Alcohol in the bloodstream can intensify a boater's fatigue, resulting in diminished vision, judgment, decision-making ability, balance, and reaction time. The consequences can be fatal.

Ocean City was the original target area for the Sober Skipper program; it is now promoted throughout the Chesapeake Bay area and at state parks. Program Director Jack Nash explains, "Safe boating requires a clear head, an observant eye, and a steady hand." Research shows that a blood alcohol level of .035, much lower than the standard for motor vehicle drivers, impairs the boater's ability to operate a boat. Effects vary with individuals according to weight, food consumption, drinking history, chemical makeup, and how fast the alcohol is consumed. Additional stressors while boating, such as boat and engine noise, vibrations, sun, glare, wind, and temperature, affect the reaction times of even boaters who have not been drinking and will magnify the effects of alcohol in those who have. Alcohol consumption should wait until the cruise is over and the boat is anchored for the night.

The message that alcohol and water are a deadly combination is delivered through radio and TV public service announcements; posters in store windows, restaurants, and taverns; and electronic signs. "In Ocean City we have our messages placed so that regardless of which route you come in on, you will see the message at least 20 times," Mr. Nash says. Bumper stickers, educational material, labels, and buttons, are available at boat shows and other appropriate activities.

For further information contact Jack Nash, the Sober Skipper, 69 Prince George Street, Annapolis, MD 21401, or call 301-974-2040.

# ATV Safety Courses Offered to Train Drivers

Concern over the high rate of accidents caused by ATVs (all-terrain vehicles) has resulted in a national effort to educate the public to the possible dangers involved. According to Robert M. Shirley, 4-H extension agent of the University of Maryland Cooperative Extension Service, only two states in the nation have not had ATV fatalities.

Carroll County, which has a unique 4-H Club/Maryland State Police (MSP) awareness and training program for ATV drivers, recently hosted one of four regional meetings held as part of a national educational program. The workshops are funded by grants to the states from the National 4-H Council, which received a large grant from Honda, one of the ATV manufacturers. The emphasis is on safety education for young people who already have ATVs. "We are not promoting ATVs or condemning them; we are concerned about the accidents," Mr. Shirley says. The 4-H Club involvement with the MSP came about after a 15-year-old boy was seriously injured and in a coma from an ATV accident. Five years later, his condition has not changed.

ATVs are small 3- or 4-wheel, balloon-tired vehicles used extensively



*TFC Scott Wimmer explains the proper method of driving an ATV to a student. (Photo courtesy of TFC Warfield)*

for recreational riding, although they were originally meant to be an alternative to horses or tractors on farms. ATVs are classed as off-road vehicles and are unstable on paved surfaces. Federal law now prohibits the manufacture of 3-wheel ATVs due to their instability, but some that were sold before the ban are still in use.

The 4-H/MSP training program, which began in 1987 with a grant of an ATV, five qualified volunteer instructors,

and \$1,200 from the Carroll County Commissioners to the Westminster MSP Barrack, has grown to about a dozen training sites with courses given almost weekly throughout the state. The four major ATV manufacturers (Honda, Yamaha, Kawasaki, and Suzuki), in accordance with the 1988 federal consent decree, formed the ATV Safety Institute which gives funds for course materials, supplies, and reimbursement to course instructors, many of whom are off-duty state troopers. The MSP is officially involved only in Carroll County.

Statistics show that most ATV accidents happen during the first 2-3 weeks of ownership, making it obvious that new drivers need training. TFC Ronald "Buck" Warfield, who developed the program with Mr. Shirley, aggressively targets new ATV drivers. Either TFC Warfield or his wife Ida call each new owner during the first week after purchase to persuade him/her to take a training course. Response has been overwhelming — about 75 percent take the course.

Results are impressive. Crediting the combination of the ban on the sale of unstable 3-wheel vehicles, the new public awareness of the dangers involved, and the training program, TFC Warfield says that the accident rate has plummeted 40 percent since the program began.

For further information about ATV safety courses, either contact the Carroll County 4-H Club Office at 301-848-4611 or TFC Warfield at 301-489-4078.

## Summer Brings Risks of Eye Injury

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drawbacks are that they scratch easily (a hard nonscratch coating may be applied) and they are more expensive than regular lenses. But they do afford a great deal of protection.

Proper eye safety gear for athletes is polycarbonate lenses in a heavy-duty nylon frame, secured by an elastic safety band that goes around the head. "You can't use your regular glasses. Not only are they not helpful, but they are probably worse than wearing nothing at all. When the ball hits, it will shatter even a plastic lens." Most sporting-goods stores and opticians sell polycarbonate lenses.

Fireworks accidents are totally preventable, Dr. Parver says. "You wouldn't give your children a 22-caliber gun to play with; this is the same amount of black powder, so why would you permit them to have it?" Fireworks displays should be set up following established safety standards:

spectators should be kept at a safe distance and there should be adequate planning for first aid and fire prevention.

Dr. Parver makes the following suggestions to prehospital care providers and emergency department personnel:

- Be alert to the possibility of eye injury. It may not be obvious. Half of all eye injuries are combined with multiple injuries.

- In the emergency department if you detect laceration of the eyeball or other indications of injury, protect the eye with a metal shield and keep the patient without food (NPO) because chances are that surgical repair will be required.

- Transport the patient to one of the two MIEMSS specialty referral centers that are Maryland eye trauma centers: Wilmer Eye Clinic at Johns Hopkins Hospital in Baltimore or the Center for Sight at Georgetown University in Washington, DC.

# Raccoons and Ticks Can Transmit Diseases

People spend more time outside during the warm-weather months—May, June, July, and August; consequently, there is an increase in vector-borne diseases. Although rabies affects animals year round, humans are more likely to be at risk for it during those months. Lyme disease, which is carried by a tick, is also most prevalent in the summertime.

## Rabies

The current epidemic of rabies began in Maryland in 1981 in Allegany County and has moved eastward at the rate of 25 miles per year. Rabies is now found in every county west of the Chesapeake Bay as well as Cecil, Kent, and Queen Anne's counties; it is expected to move down the Delmarva Peninsula at the same rate. There have been no human deaths in this epidemic so far, but 1989 was the first year since 1984 that there was an increase in animal cases. The mid-Atlantic outbreak of rabies is distinct from the southeastern outbreak; the two outbreaks are moving south to Virginia and north to North Carolina, respectively, but have not met yet. The mid-Atlantic outbreak of rabies has reached north to New Jersey and Delaware and is about to enter New York State.

Rabies is maintained primarily in the raccoon population. Of the 389 rabid animals in Maryland in 1989 (a 15 percent increase over 1988), 85 percent were raccoons. Other animals are "spillovers," says Jack K. Grigor, DVM, MPH, public health veterinarian for the Department of Health and Mental Hygiene Division of Epidemiology and Disease Control. "In Maryland, rabid foxes, skunks, dogs, cats, or other species are a result of exposure to rabid raccoons, not to one another. There are not enough of the other animals involved to have a role in the epidemic." The situation is different in other parts of the country; it is not understood whether that is due to something unique in the carrier animal or the virus.

Any warm-blooded animal can get or transmit rabies, which is transmitted through the saliva, not the blood or tissue. Abnormal behavior in the animal is the primary manifestation of the disease.

"Prehospital care providers tend to be compassionate and want to help,

but unless they know what they are doing they may expose themselves to disease and not help anybody," says Dr. Grigor. "Don't get involved with a sick-looking or stray animal. It should be treated as cautiously as dangling electric wires—protect yourself first."

Stray kittens are appealing and there is a temptation to pick them up. Cuddling a kitten or rubbing it around your face might introduce rabid saliva into your nose, mouth, or open wounds. The kitten has probably licked its paws, which then have saliva on them. After the kitten is picked up it might become frightened, scratch you, and then run off and disappear. If the kitten cannot be recovered, it must be assumed that it was rabid, given the dire consequences of ignoring rabies. Just touching fur does not expose you to the disease.

Cats are not vaccinated as frequently as dogs and they are allowed to run freely, often frequenting the same places as raccoons at night. Maryland has had 85 rabid cats and only 8 rabid dogs since the epidemic began. Only about half of the cats exposed people, but each one exposed nine individuals that needed treatment.

Early detection is useless when dealing with rabies, Dr. Grigor says. "If you contract the disease, you die. Prevention by evaluation of exposure and prompt prophylaxis is the answer. You don't want to be bitten by the animal, but if you are inadvertently exposed to saliva, immediate, thorough washing with great volumes of soap and water is indicated."

Each case of exposure, or possible exposure, should be evaluated individually by the physician or local health department. A dog, cat, or farm animal can be observed for 10 days to see if it is rabid, but the wild animal, if available, should be killed immediately to test its brain. The test is very reliable and is arranged through the local health department. If the animal was rabid, it may be necessary to give the victim rabies shots. There are only five in the series now, an improvement over past years when there were more than 20. The shots are also less painful now.

The key to avoiding rabies is to avoid unfamiliar dogs, cats, and all wildlife. In addition, remember the following:

- Beware of abnormal behavior. Although people like to think that they have attracted an animal that comes up to them, such behavior is abnormal for a wild animal. Changes in disposition are also signs—a normally shy animal becoming aggressive (or vice-versa), agitated, unpredictable, refusing to be chased away, or attacking another animal.

- An animal with paralysis might look as though it is suffering from road injury, but actually have rabies encephalitis.

- Avoid all unfamiliar animals and even familiar ones if they are acting abnormally.

- If exposure occurs, contact your physician and your local health department.

- Call animal control experts, if available, to catch the animal for conclusive rabies testing.

## Lyme Disease

The first case of Lyme disease in Maryland was found in 1979. It is NOT carried by the wood tick, the so-called dog tick. Most cases are transmitted by the deer tick in its nymph stage; it is reddish and as tiny as the period at the end of this sentence. Cases occur every month of the year; adult deer ticks may transmit the disease during the cooler months. Deer ticks are found in brush and wooded areas in every county in the state, especially around the Chesapeake Bay and the lower eastern shore. They are not as plentiful in western Maryland. If you are in an area likely to have ticks from May through August, it must be assumed that the ticks were present and you are at risk. They are not typically found in open fields.

Transmission of the disease requires a tick bite and several hours of attachment. Therefore, the best advice for avoiding Lyme disease is as follows:

- Avoid ticks.
- Dress appropriately (long sleeves that are buttoned, long pants, preferably tucked into socks).
- Use tick repellents as directed.
- Remove ticks at regular intervals.

It takes several hours for the tick to transmit the disease, so prompt removal makes a difference.

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# Water Sports Can Cause Spinal Injuries

The months May through August are the "busy season" for the MIEMSS Neurotrauma Center, according to Daniela Kantor, program analyst. Most head and spinal cord (or spinal column) injuries are due to motorcycle or automobile accidents, but a significant number are caused by injuries from water sports, such as body surfing or diving.

The pattern of water-related injuries treated at MIEMSS over the past three years has been: 1987—14; 1988—28; and 1989—15. It is hoped that preventive MIEMSS programs, such as the High Risk Adolescent Trauma Prevention Program and the Feet First, First Time Program, may have accounted for some of the drop in injuries from 1988 to 1989.

Of the 354 patients with spinal column or spinal cord injury (SCI) treated at MIEMSS last year, more than half had major deficits. "SCI injuries are so devastating to patients and families physically, emotionally, and financially,

that if these preventive programs can keep even one person from being hurt they are worth it," says Ms. Kantor. The average age of MIEMSS SCI patients is 27 years old.

Public awareness is growing regarding entering water feet first before diving and the dangers of body surfing; educational efforts are underway in 41 states, the District of Columbia, and Canada. Warning signs are beginning to be seen on beaches in



*This national SCI prevention program originated in Florida.*

Ocean City, MD, and elsewhere. Messages emphasize that carefully wading into the water prior to diving or jumping can avoid injuries from water of inadequate depth or encountering objects below the surface of the water.

The national prevention program has been sponsored by the American Association of Neurological Surgeons and the Congress of Neurological Surgeons since 1986, based upon programs begun in Florida and Missouri.

## New Drug Used for Spinal Cord Injuries

Based on a National Institutes of Health Clinical Alert sent in April, a new treatment is being used in an effort to reduce disability in patients with acute spinal cord injury (SCI). "It has become the 'Gold Standard' for early neurological treatment and has been instituted at MIEMSS Shock Trauma Center and other Maryland trauma centers," says Walker L. Robinson, MD, acting director of the Neurotrauma Center.

According to the alert, when the infusion of very-high-dose methylprednisolone is begun within 8 hours of injury and used in the specified doses and treatment schedule, patients can show improvement in their motor function and in their pin-and-touch sensation. The double-blind, randomized, controlled clinical trial was reported by the National Acute SCI Study by Principal Investigator Dr. Michael B. Bracken, professor of epidemiology at Yale University. Results were tabulated at 6 weeks and 6 months after injury by the 10 medical centers participating in the study. An article on the study was published in May in the *New England Journal of Medicine*.

According to Dr. Robinson, "We will be evaluating all of our patients for efficacy of the procedure because the original study was very restricted and does not reflect our normal patient population." Dr. Robinson presented a discussion of the new treatment at the Maryland Trauma Center Network meeting on May 16.

## Raccoon- and Tick-Borne Diseases

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Lyme disease is caused by a spirochete. Not every tick bite results in disease, but within 30 days after exposure, from 60 to 80 percent of people who get Lyme disease will have a round, red rash at the site and may have other lesions elsewhere. The rashes are not itchy. Other late symptoms include central nervous system involvement, such as palsy in the face and upper body. From 3 to 6 weeks after exposure, arthritis with painful swelling in the large joints may come and go, one joint at a time, rotating around the body. This differs from the usual arthritis, which is equilateral (on both sides of the body). Lyme disease also affects the heart in 10 percent of the cases. Contrary to publicity in the media, the disease is seldom fatal.

Dr. Grigor emphasizes that even neglected, unrecognized cases of Lyme disease are treatable at any stage; ideally, prompt treatment should be given when symptoms appear. The tick bite does not have to be documented; knowing that you were in an area likely to have ticks is enough. Readily available antibiotics are used to

combat the infection.

### Rocky Mountain Spotted Fever

Rocky Mountain Spotted Fever is another vector-borne disease, carried by wood ticks (dog ticks). There is equal risk throughout Maryland for this infection. Wood ticks are usually found in brushy fields, rather than in woods, and are much larger and easily seen. The tick must be removed within 4 hours; when engorged it will become as large as a navy bean.

To remove a tick, place a pair of long-nosed tweezers on each side of its mouth parts and lift the tick straight off. The wounds are not deep—dab the site with alcohol and treat the site as if a splinter had been removed. Alternative methods, such as burning or smothering with olive oil, are ineffective.

"Because different kinds of ticks are not easily identified, avoid them all, remove them as soon as possible, and don't worry about knowing which is which," Dr. Grigor says. "Using an insect repellent not only helps to avoid ticks, it also helps to avoid mosquitoes found in lowlands with standing water, which in rare instances might carry encephalitis."

# Prehospital Response to Heat Emergencies

Although heat emergencies are primarily thought of as a summer problem, they can occur in any season to any age victim. Examples are a child left alone in a sunlit, unventilated car in warm weather, or a senior citizen who has not adjusted to the arrival of 70-degree weather and is still dressing in four layers of clothing, including a heavy parka.

There are three stages of heat emergencies: heat cramps, heat exhaustion, and heat stroke. A person with mild symptoms might rapidly advance to the more serious levels; the prehospital care provider must be alert to changes in condition. As with all patients, the ABCs must be monitored; all levels will benefit from removal of the patient from the source of heat to an air-conditioned or well-ventilated ambulance and prompt transport to an emergency department.

## Heat Cramps (mild)

A person having heat cramps might complain of feeling warm and the skin will be moist from perspiration. Starting an IV will have a generalized cooling effect and replace fluids lost by the body's normal compensation mechanism. The patient should get oxygen as a prophylactic measure and vital signs should be monitored. A patient with heat cramps may deteriorate to a more severe condition of heat emergency.

## Heat Exhaustion (moderate)

Heat exhaustion is characterized by the loss of water and/or salt usually resulting from prolonged strenuous exercise or exposure to extremes of temperature.

Symptoms can include muscle cramps, weakness, headache, lightheadedness, and nausea. Although patients with heat exhaustion may show signs of irritability or poor judgment, their mental status should be essentially intact. Since they have not yet lost their normal thermal regulation, patients suffering from heat exhaustion will usually be sweating.

Make sure that the patient with heat exhaustion is receiving oxygen. Cool the patient by removing some clothing or fanning him/her. Initiate an IV of Ringer's lactate and monitor the blood pressure. Monitor cardiac rhythm; the heart rate might be faster as the cardiovascular system

compensates for vasodilation. Judgment must be used in evaluating the heart rate; if the patient has just been running or exercising, the heart rate may be higher. But if the patient has been lying down for a few minutes the heart rate should begin to come down. Watch for potential problems, such as fainting. Transport the patient in a comfortable position, using air-conditioning if available.

## Heat Stroke (severe)

In this condition, the patient has lost the ability to maintain normal body temperature. The patient will usually have skin that is dry and feels hot to the touch and may have a body temperature of 105 degrees or greater. The patient may be confused or even comatose and could progress to have generalized seizures.

The patient's pupils may be dilated, and respirations are likely to be fast and shallow. He/she may have a rapid heart beat and blood pressure that drops when going from a sitting or standing position to lying down.

Treatment for this condition begins the same way as for the less serious conditions: Monitor vital signs, administer oxygen, and start an IV of Ringer's lactate. Titrate the IV in accordance with the patient's blood pressure; if the pressure is low, administer more fluid to bring the blood pressure up. Remove the patient's clothing; although the patient's modesty is important, this is a

true medical emergency. If necessary, have two people hold a sheet in front of the patient or put him/her in the back of the ambulance to ensure privacy. Put a wet sheet over the patient as soon as possible. On top of the sheet, put ice packs in the armpits, against the neck, and at the groin. Large blood vessels are close to the skin at those points; ice packs will cool the blood as it passes by. Raise the patient's head and transport him/her in the semi-Fowler's position, unless the patient's blood pressure indicates that he/she needs to be treated for shock.

Because of potential blood pressure, cardiac, and central nervous system problems, this is a high priority patient who needs to be moved to a medical facility as quickly as possible.

The prehospital care provider should be alert to the fact that some people—for example, the elderly and those on certain medications such as antidepressants, antihistamines, antispasmodics, and antipsychotics—may be predisposed to problems of temperature regulation and be at high risk for heat stroke.

"The most important thing to remember about patients with heat emergencies is how closely they need watching," says Dia Gainor, associate director of ALS for the MIEMSS office of training and certification. "They can quickly progress in the severity of their symptoms."

## June Is 'Drive to Survive' Month

The Maryland Department of Transportation (MDOT) has designated June as "Drive to Survive Month." This is part of a 3-year ongoing campaign to improve driving attitudes and practices, including awareness of driving complexities and driving with care and consideration for others.

The main elements of the campaign, targeted for drivers, passengers, motorcyclists, and pedestrians, are as follows:

- General highway safety
- Encouraging the use of seat belts and child safety restraints
- Combating drinking and driving, with special efforts to reach youthful drivers

- Motor carrier safety, with emphasis on autos and trucks sharing the road. Specific suggestions are made about truck blind spots, braking distances, and equipment defects.

- Capital Beltway safety, in cooperation with the Virginia DOT. Emphasis will be on curbing aggressive driving behavior and encouraging trucks and cars to share the road safely.

The Drive to Survive message is being spread through displays at schools and other public and private facilities; TV and radio programs; an awards luncheon; bumper stickers on buses; and the distribution of brochures about driving while intoxicated.

## Recognizing, Treating Scuba Diving Injuries

Some prehospital care providers may assume that they will never see a sport scuba diving injury because they are not located near the ocean. However, scuba diving injuries, such as arterial gas embolisms, can occur even in 4-6 feet of water in a swimming pool.

"When a scuba diving injury is suspected, I can say without reservation that the victim should be placed on 100 percent oxygen by non-rebreather face mask or by endotracheal tube if indicated," states Roy A.M. Myers, MD, director of the MIEMSS hyperbaric medicine department. "It is the initial treatment for gas embolism, decompression sickness, pulmonary barotrauma, or collapsed lung. You can't go wrong."

Prehospital care providers should check the ABCs, perform appropriate stabilizing maneuvers, and quickly transport the patient to the closest emergency department (ED). Diver injuries are not necessarily life threatening. Pulmonary barotrauma may need only a chest tube, which can be inserted in the ED. Hyperbaric oxygen therapy might be necessary, but the prehospital care provider should NOT take the patient directly to the nearest chamber—it might be closed for repairs or unstaffed at that time. EMS consultation should be utilized.

Gas embolism and decompression sickness are potentially life-threatening conditions. Patients with these conditions urgently need care.

Gas embolism can occur if a diver breathes compressed air and holds his breath or if air becomes trapped in his lungs while he is ascending to the surface. The pressure of this expanding air may rupture lung air sacs. Bubbles enter the bloodstream from the damaged lung and obstruct the blood flow to the brain, heart, or other organs. The diver may be unconscious when he surfaces, or come to the surface, look around wildly, faint, and sink to the bottom. He may have neurologic deficits and chest pains. He needs immediate 100 percent oxygen by non-rebreather face mask or endotracheal tube; he should be stabilized and transported immediately.

Decompression sickness is the

syndrome of joint pains, numbness, and paralysis, also known as "the Bends," that is due to excess quantities of nitrogen in the tissues. As one dives to deeper depths, breathing air has the same volume but contains more molecules of nitrogen. After a time at the deeper depth, the nitrogen molecules are absorbed in the tissue until the body is saturated with nitrogen. When the diver ascends to a shallower depth, the nitrogen tries to get out by either becoming bubbles that can block veins or arteries or escaping into tissues and decreasing blood flow to the spinal cord and the brain by increasing tissue pressure. Symptoms of decompression sickness are divided into three types:

*Type I.* Niggles, pain: "Niggles" refers to a creepy feeling on the skin; pain anywhere, especially around the joints; fatigue; or possible rash at the site of tight clothing. Although this is a mild condition, this patient possibly needs hyperbaric oxygen therapy because the condition might worsen.

*Type II.* Neurological/pulmonary/cardiovascular components: Shortness of breath, coughing, or spasms; neurologic symptoms (including strange sensations; paralysis; dizziness; staggering; band-like abdominal pain; unconsciousness).

*Type III.* Super saturation: Looks like a cross between decompression sickness and gas embolism. People with certain heart defects are particularly vulnerable.

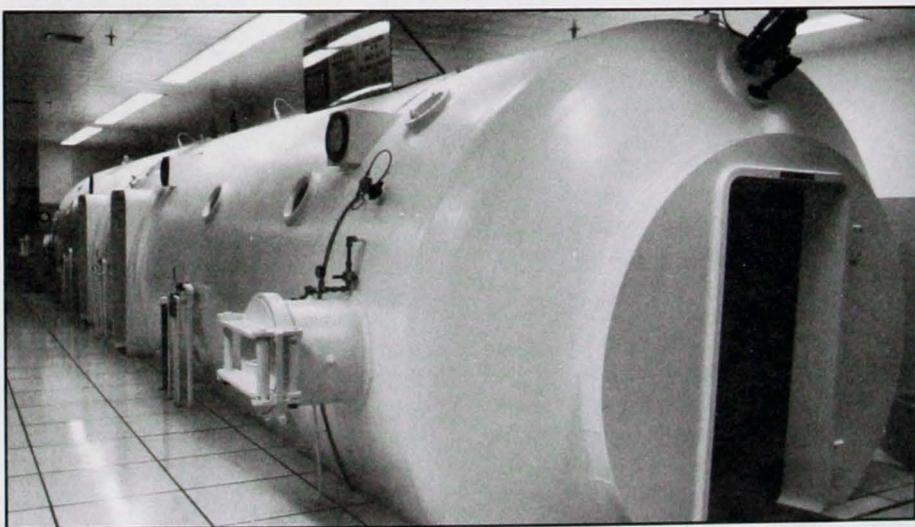
Symptoms of gas embolism

almost invariably occur during ascents or within 5 minutes of surfacing from a dive; symptoms of decompression sickness usually occur within 12 hours, but may occur up to 36 hours of a dive, or within 48 hours if one has flown following a dive. Divers should not fly for a minimum of 24 hours after their dive was completed.

DAN, a nonprofit network established by the Undersea Medical Society in 1981, assists in the treatment of underwater diving accidents by providing 24-hour telephone emergency help in coordinating the patient's care. There are seven DAN regions covering the United States and the Caribbean; regional coordinators maintain current information about chamber status and diving medical services. MIEMSS is the regional center for the northeast US, and Dr. Myers is the regional coordinator.

DAN also collects and analyzes data on diving accidents to understand their causes and develop better treatment methods. National DAN headquarters are located at Duke University Medical Center. For information or non-emergency calls, the DAN office may be reached at 919-684-2948 from 9 am to 5 pm, Monday through Friday.

To use the 24-hour emergency network, call Duke University and ask for the DAN physician on call. Collect calls are accepted in an actual emergency. The emergency number is 919-684-8111.



Scuba diving injuries are often treated in a hyperbaric chamber, such as the one at MIEMSS.



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## DATED MATERIAL

# Dealing with Patients Struck by Lightning

Lightning injuries are full of contradictions. Although they are estimated to be between 10,000 and 200,000 amps of current, lightning strikes may leave only a pinpoint burn wound. Immersion in water is dangerous during an electrical storm because water is such an excellent conductor of electricity; however, perspiration on the skin conducts lightning around the surface of the body, often minimizing injury. And "dead" lightning victims who receive maximum resuscitation may return to normal cardiac rhythm.

"Even people who have complete asystole from being struck by lightning, if given immediate CPR (within 3-4 minutes), do very well and may achieve complete recovery," says Andrew M. Munster, MD, director of the Baltimore Regional Burn Center, one of the MIEMSS specialty referral centers.

Lightning injury occurs by:

- A direct strike, associated with high mortality because it is frequently to the head.
- Lightning jumping from the highest point in the area, such as a tree, which is not very conductive, to the lower resistance of the human body seeking shelter under the tree; or being conducted around the surface of a body that is wet from rain or perspiration.
- Ground current, forming a circuit between a standing person's legs and

the ground.

About 150-300 people in the United States die each year from lightning injuries, but about twice that number recover from their injuries. Extent of injury is determined by three factors: duration of exposure; voltage/amperage; and resistance. People survive being struck because the duration of exposure to lightning is shorter than for other electrical injuries.

"Prompt resuscitation with CPR and ALS is crucial to give the patient a shot at survival," says Lana Parsons, MS, ANP-C, of the Burn Center. "Not everyone will be resuscitatable, but a maximum effort is needed."

A lightning victim may experience the following: cardiac arrest; minor or extensive burns; momentary dazing, numbness, brief amnesia; neurological symptoms ranging from dizziness to deep coma; retrograde amnesia; paralysis; paresthesias of the extremities, which is usually temporary; confusion; loss of consciousness; hearing loss; cataracts; and mental changes, such as disorientation, dullness, a sense of oppression; slow reaction time; withdrawal; and negativism. There may be fractures from the contraction of the muscles, but these are not usual.

Skin lesions vary; there might be wounds similar to other electrical wounds, or pinpoint burn wounds, or

"feathering or inverted Christmas tree" patterns. There may also be extensive burns from clothing that caught on fire.

"Time is of the essence when dealing with these patients; it is preferable to bring them to the Burn Center, but if they are far away take them to the closest appropriate medical facility," Ms. Parsons says. "There are limitations to what can be done in the field; the patient needs more advanced stabilization, drugs, etc."

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During electrical storms:

- Stay indoors, but do not use electrical appliances or phones. Stay away from open doors and windows; metal pipes, stoves, and sinks.
  - Being in a closed automobile offers good protection against lightning.
  - Avoid being the highest object in an area. If you are caught out in the open with no cover, it is safer to curl up on the ground with your limbs close together than to seek shelter under a tree.
  - Metal objects, such as fishing rods or golf clubs, and golf shoes with metal cleats, will conduct electricity.
  - Get out of the water and off small boats.
  - Drop to the ground immediately if you feel your hair stand on end or your skin tingle. It may mean you are about to be hit by lightning.
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