MEDICINE

Shock Can Damage Bone

Permanent, serious tissue and bone damage may result from electrical shock but does not always become evident immediately

➤ A PERSON suffering electrical shock may survive without apparent harm, although its intense heat has actually caused permanent tissue and bone damage.

A patient who had received a 2,500-volt shock for about 20 seconds when he picked up "hot" metallic objects in each hand seemed to suffer no ill effects other than a swelling of the shoulders and upper arms. But 18 months later, after he had noticed movement limited in his shoulders, X-rays revealed deformed upper arms, a shortened right arm and fractures in the arm bones.

Drs. Louis B. Brinn and John E. Moseley of Mount Sinai Hospital, New York, discovered in this patient a thinning of bone covering and a widening of the marrow cavity—conditions apparently never reported before from electrical injuries.

Little has been published in U.S. medical literature on such injuries, which have been kept to a minimum in the United States because of industrial safety measures. In Germany, Russia and Italy, however, the occurrence is much more common.

The effect of an electric current on the body depends on many factors such as type of current, voltage, duration of contact, path taken by the current in the body and resistance at the point of contact.

Tissue temperature within the body during electrical shock can reach several thousand degrees C., which can cause heat necrosis, or pathologic death, of the bone. Tissue death can occur with coagulation of protein and liquefaction of fat. The intense heat can vaporize water in the tissues, thus carbonizing organic matter.

Death from low voltage, especially below 220 volts, is usually due to abnormal heart rhythm, while above 1,000 volts it is caused by inhibition of the breathing control center in the brain.

Cell death or altered cell activity may occur either temporarily or permanently. The conductivity of nerve trunks may be damaged by high current, and blood vessel damage and weakness may also result.

Bone changes may occur mechanically when the intense jerk of the muscles causes fractures, or physiologically when the intense heat disintegrates bone or chars it.

The findings are reported in the American Journal of Roentgenology, Radium Therapy and Nuclear Medicine, July 1966.

IBM

KNEE MOTION—A device that records the joint motion of the human knee and then transmits information to a remote computer for processing is being studied by Dr. Richard Lipson of the University of Vermont College of Medicine, one of the institutions participating in technical assistance projects sponsored by International Business Machines Corporation. Here he adjusts prototype of an electromechanical device on a model of a knee.

MEDICINE

New Kidney to Be Smaller

➤ THOUSANDS of kidney patients are expected to benefit from a proposed artificial kidney that will be cheaper and 50 times lighter in weight than the type presently in use.

Artificial kidneys now in use for cleansing impurities from the blood cost each patient from $8,000 to $12,000 a year. The lifesaving treatment usually requires hospital visits twice a week. Artificial kidneys that can be used at home also are complex and costly.

Arrangements have been made with cooperating medical groups in the New York area to test a model of the new disposable artificial cartridge-type kidney on animals. Future human trials will depend on these tests.

The main structural elements in the new artificial kidney will be die-cut pieces of waterproof cardboard, which will be easily joined and inexpensive. The entire unit will weigh only about four pounds.

Patients who undergo regular blood cleansing by machine usually have a permanent set of short tubes implanted in one forearm. The blood is pumped through one of these tubes to the machine by the patient's heart or in some cases by an external pump. One tube carries arterial blood to the machine and the other brings the purified blood back from the machine to a vein in the forearm. The basic process by which an artificial kidney cleanses the circulating stream of blood is called dialysis.

In the artificial kidney device the blood comes in contact with cellophane or another kind of semipermeable membrane through which the metabolic waste products pass into a fluid known as dialyzing solution.

Dr. Edward F. Leonard, chairman of the committee on bioengineering and applied biology of Columbia University's school of engineering and applied science, has been directing preliminary research on the device for two years. He anticipates that it can be used in the home.

Dr. Leonard says his research indicates that though the new kidney already "achieves an intimate and effective contact of blood with the dialyzing solution," laboratory experiments and computer modeling are still being used to improve the design.

MEDICINE

New Heart Drug Reported By Russian Scientists

➤ A NEW DRUG for dilating heart vessels has been developed at the Institute of Pharmacology and Chemotherapy of the USSR Academy of Medical Sciences, Moscow.

Called chloracisine, it was obtained by changing the structure of the phenothiazine molecule.

Within two or three minutes chloracisine reportedly stopped spasms of coronary vessels and sharply intensified blood supply to the heart almost without effect on the blood pressure. The drug's effects last for several hours, and appear to normalize the heart rhythm as well as dilate the blood vessels.

It is recommended for cardiac deficiency and serious forms of angina pectoris that develop as a result of clogged arteries.