

Cool Blood for Brains

A new instrument that cools blood flowing through the brain may enable neurosurgery to last up to an hour or more

➤ A NEW BLOOD cooler promises to make a major contribution to brain surgery by permitting the surgeon to operate on the brain for a time span of an hour or more, without blood flowing through the brain.

During some neurosurgery blood circulation through the brain must be stopped entirely, but under normal conditions the brain cannot withstand circulatory arrest for more than a few minutes.

The new blood cooler or heat exchanger used experimentally on animals was developed by a neurosurgeon, Dr. Eric W. Peterson, and a team of scientists of the National Research Council of Canada.

Since the brain consumes large amounts of oxygen when the body is at normal temperature, circulatory arrest to the brain poses problems. The need for oxygen can be reduced however, by cooling the brain tissues, which can be accomplished by covering the patient with a cooling blanket or bathing him in ice.

Either of these two methods makes it possible for a brain operation to last about 10 minutes. Longer periods are possible if the blood is cooled by a heart-lung machine, but this involves a major operation before the brain can be touched.

The new heat exchange lowers the temperature only of the blood flowing through the brain, while the blood temperature throughout the rest of the body remains substantially normal.

The cold blood passing through the brain reduces the temperature of the brain tissue from its normal 98.6 degrees F. to about 41 degrees. This makes it possible for the surgeon to cut off the supply of blood to the brain for an hour or more.

The equipment is expected to be of particular value in operations for brain artery aneurysms or ballooning blood vessels, a particularly dangerous condition since bursting of such a vessel in the brain causes immediate death. The cooler is also expected to be effective in operations to remove big vessel tumors, cancerous brain tumors and inoperable invasive tumors at the base of the skull, and in treating head and neck blood vessel diseases.

In experiments with animals, a plastic tube was connected to the femoral artery in the thigh. Blood flowed from the body to the heat exchanger where it was cooled. The cooled blood was returned to the body through a tube attached to the carotid

artery, which supplies blood to the brain.

Once the brain has been cooled, the surgeon clamps the tubing to stop the flow of blood to the brain. He also ties a tourniquet around the neck muscles to stop blood entering the brain through vessels leading from the head and neck muscles.

The vertebral arteries are clamped to prevent warm blood reaching the brain via this route.

According to the scientists, one of the major advantages of the cooler is that no equipment is needed to pump blood through the heat exchanger. Resistance along the flow path is almost negligible, requiring less than five percent of pressure developed by the heart.

The system also has a built-in safety factor which prevents freezing of the blood by the heat exchanger. The water which is pumped through the exchanger is cooled by passing it over crushed ice.

As the water is always slightly above the freezing point, there is no possibility of the blood freezing.

• *Science News*, 90:37 July 16, 1966

MEDICINE

Smallpox Vaccination Blamed for Stillbirth

➤ A WARNING against giving smallpox vaccinations to pregnant women has been sounded at Queen's College of the University of St. Andrews in Dundee.

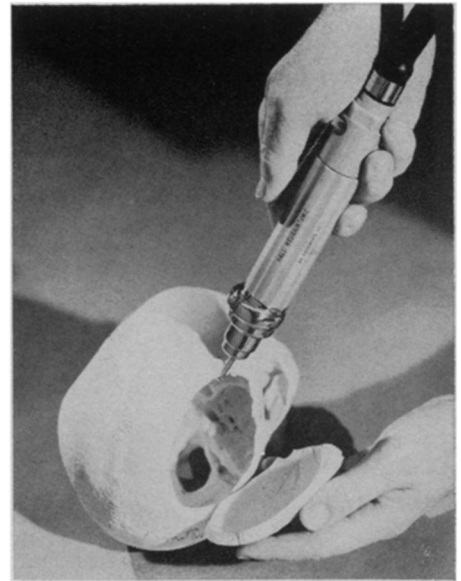
It came from Dr. D. M. Green, a lecturer in bacteriology, S. M. Reid and K. Rhaney, who reported in *Lancet*, 1:129, 1966, two cases of stillborn fetuses resulting from smallpox vaccinations in mothers. The fetuses showed a condition known as fetal vaccinia. They had skin lesions and were infected internally with the vaccine virus.

Since the first report of fetal vaccinia in 1932, 13 such cases have been found. The English report adds two.

Dr. Green and his colleagues noted that previous cases arose from a smallpox scare and massive vaccination. Theirs, however, came from routine vaccinations given to the mothers in preparation for emigration.

"In view of the large numbers of people who travel," observed the researchers, "it seems desirable that the risk of this apparently rare but serious complication of vaccination should be made widely known."

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Air Instruments

SKULL OPENER—Surgeons can remove the top of a skull in one simple, quick, circular motion, reducing what was once an hour-long procedure to less than two minutes. The Hall Neurairtome, designed by Dr. Robert M. Hall of Pittsburgh and manufactured by Air Instruments, Inc., also of Pittsburgh, is air-driven and weighs less than one pound.

DENTISTRY

Dentists' Offices Go To Viet Nam in Suitcases

➤ ALL JAMES BOND could get into his suitcase were a rifle, some knives and a tear gas bomb. The Air Force has gone 007 one better—and more peacefully, too—by packing a whole dentist's office into a pair of cases only two feet long and 18 inches wide.

Frustrated military dentists in Viet Nam, who had been grinding along with equipment designed during World War I, cheered so loudly when 10 test models were sent over from stateside that all the ones left in the United States were quickly uprooted and hustled along.

Everything but the patient's chair and the pretty receptionist is included in the unit, which was developed at the USAF School of Aerospace Medicine at Brooks AFB, Texas. At the "business end" is a high-speed, air-driven, air-bearing handpiece, equipped with the usual variety of precision-made, but evil-looking, cutters, grinders and polishers.

Since there were not nearly enough prototypes to go around in Viet Nam, 75 more were rush-ordered and an additional 50 are in the red-tape-and-requisition stage.

Designed to work from a portable power supply, the unit is now being improved by AF scientists to run on anything from Asian house current to jeep batteries.

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