



Dr. John P. Gallagher

**GOLD LEAF PATCH**—The gold leaf adhering to the aorta of a rabbit in this greatly magnified photograph is shown 60 days after it was applied to the blood vessel, using the new electrical charging technique pioneered by Drs. John P. Gallagher and Charles Geschickter of Georgetown University Hospital, Washington, D. C.

SURGERY

## Gold Prevents Adhesions

Electrically charged leaves of gold, the most malleable metal, have been used successfully to prevent post-operative adhesions and to patch blood vessels—By Faye Marley

► **ELECTRICALLY CHARGED** gold leaves used for the first time on humans and animals in a Washington, D. C., hospital, have prevented troublesome adhesions and helped to patch blood vessels.

Adhesions sometimes give trouble after surgery because abnormal fibers or "bands" stick together. They occur most often after operations on the appendix and on the female pelvic organs, but they may also occur after operation on the brain, between the tough membranes covering the brain. In about ten percent of patients suffering adhesions, "strangulation" occurs and another operation is necessary to separate the adhering parts.

Dr. John P. Gallagher of the department of neurosurgery, Georgetown University Hospital, reported his work with Dr. Charles F. Geschickter of the department of research pathology in the *Journal of the American Medical Association*, 189:928, 1964. Dr. Gallagher told *SCIENCE SERVICE* that although no previous work had been reported with electrically charged gold leaves, he "had a hunch" his experiments would be successful.

"Gold is truly a noble metal," he said. "Nothing becomes adherent to gold in the body. It is free from all adverse tissue reaction, such as silk sutures can cause, and in some cases it can replace these sutures as well as form a protective layer over surgical suture lines."

One reference to gold leaves in the medi-

cal literature was made by a notorious medical quack named Digby, who in 1668 had one idea that was sound—the application of gold leaves, not charged electrically, to the pustules of smallpox to prevent scarring.

In 1947, Dr. M. Unger reported the use of gold foil, still not electrically charged, for the healing and closing of perforations of the eardrum in chronic otitis, or bone inflammation.

In 1950, Dr. L. Imbert and P. Moiroud reported that perforated gold plate used to cover a large defect in the cranium was still in place after 40 years, with no sign of adverse tissue reaction.

Drs. F. R. Robinson and M. T. Johnson in 1961 reported severe tissue reactions in cats when metals such as silver and tin were implanted in the animals' brains, but found that gold produced scarcely any reaction.

After reviewing the medical literature, Dr. Gallagher said that references to the use of gold salts in the treatment of disease, especially arthritis, are abundant, but that he found no references to the use of electrostatically charged leaves or foil in surgery or medicine.

Dr. Gallagher and his co-worker first performed animal experiments, using 21 rabbits. The abdominal aorta and the inferior vena cava, which is the vein from the abdominal organs and lower extremities, were the sites for operation after anesthesia.

After making each wound in the blood vessel, the researchers covered it with a charged gold leaf about one centimeter square. With weak hemorrhages, two or three leaves were necessary to stop bleeding, and when strong blood spurts from blood vessels took place, five or six pieces of gold leaf laid one on top of the other were required. Even the first leaf caused a marked reduction in the arterial bleeding, however.

Only one or two pieces of charged gold leaf were necessary to stop hemorrhaging from the inferior vena cava promptly.

Ten humans underwent treatment. The first was a nine-year-old boy admitted to Georgetown after sustaining a compound depressed fracture of the frontal bone of his head.

The dura mater, or toughest membrane of the brain, was exposed and cerebrospinal fluid was welling up in the wound. After cleaning the wound, the largest tear was sutured and a charged gold leaf laid over the suture line to seal it. Additional pieces of gold leaf were placed over several small holes and against cut edges of bone.

An electrostatic charge is conferred on a gold leaf merely by stroking a camel-hair brush against a rubber comb and then touching the leaf with the charged brush. Accepting its electrical charge and sticking to the brush, the gold leaf can then be placed directly on the site of the hemorrhage, or on any surgical target, Dr. Gallagher explained.

When the charged leaf is touched to the tissue surface, it is released immediately from the brush and clings tightly to the exposed structure.

Gold is the most malleable of all metals, so it will bend conveniently into depressions and irregular surfaces easily without losing its strength. For example, when gold leaf is electrically charged and then laid on the naked fingertip, it sticks so closely to the skin that the fingerprint shows through clearly.

For ideal use in the operating room, gold leaf should be two or three times as thick as the commercial leaf now available.

• *Science News Letter*, 86:211 Oct. 3, 1964

PHYSIOLOGY

## New Method Promises Aid to Stroke Victims

► **MEASURING BLOOD FLOW** in the brain by taking the skin temperature of a person's head may help stroke victims.

The new method permits detection of closed blood vessels in the brain, reported Drs. Ernest H. Wood and Richard P. Hill, neuroradiologists from Chapel Hill, N.C.

A scanning device is used to measure the heat, in the form of infrared radiation, given off by the blood flowing through the brain.

This process is unsatisfactory for persons with fever, the researchers said. Also, the test is useless for persons who are in a coma or have other neutral or systemic disorders.

The researchers reported this method at the VII Symposium Neuroradiologicum, an international meeting in New York.

• *Science News Letter*, 86:211 Oct. 3, 1964