

SURGERY

Heart Transplants Years in Future

Kidneys are transplanted from baboons and chimps to ailing humans with short-term success, but drugs necessary for organ transfers open the way to death-dealing infections.

By FAYE MARLEY

► YOU CANNOT HOPE to have a permanent new heart or kidney replacement taken from a baboon, chimp, cadaver or even from your nearest relative any time soon.

Perhaps your grandchildren will benefit from such transplants, but it is going to take years for medical science to achieve safe and sure success. Scientists must come up with better ways of fooling nature.

"Over-optimistic writers as well as over-enthusiastic surgeons are deluding themselves and the public if they promise replacement of worn-out and diseased parts for the human body just now," an eminent authority on blood diseases told SCIENCE SERVICE.

"It is criminal to raise the hopes of desperately ill people," he said in an interview at the meeting of the Federation of American Societies for Experimental Biology in Chicago, Ill.

An example of how desperate people can get was the recent case of a little Danish girl with a fatally abnormal heart. Her parents asked the Russian surgeon Vladimir Petrovich Demikhov in Moscow to transplant the heart of an accident donor or of someone else newly dead into the child's chest.

Two Heads on One Dog

Although Dr. Demikhov has transplanted hearts in animals with some degree of success, and has even gone so far as to attach two heads to one dog, he would not attempt the human surgery that would have meant death to the child.

"I would have to operate on at least ten monkeys," Dr. Demikhov explained to Mr. and Mrs. Hegelund Jensen of Copenhagen, "before I could think of operating on a human being."

The joining of nerves and the fine suturing of blood vessels, as well as rejection caused by immunity to foreign tissue, are enormous problems. Matching of blood types and other similarities in donor and recipient of transplants are believed necessary for lasting success. The reason corneal transplants are successful is that there is no blood vessel problem.

Dr. Seldon Bernstein of the Jackson Laboratory, Bar Harbor, Maine, told SCIENCE SERVICE that experiments in that laboratory had not been able to get liver transplants to "take" even in a mouse's own tissue.

A surgeon uses the most promising drug, Imuran, to overcome the immunity problem in human transplants, he said, but even this does not prevent later infection.

The importance of the transplant controversy is seen in the fact that 18 papers on

the subject of transplantation were given at the convention of the American Medical Association in San Francisco.

One speaker was Dr. Thomas E. Starzl, whose team at the University of Colorado and the Veterans Administration Hospital in Denver, Colo., has given up trying to transplant baboon kidneys to humans after the last two patients in a series of six died.

Dr. Starzl said that no more such transplants will be done until a way to overcome the immunity problem is found.

The Denver transplants followed a successful chimpanzee kidney transplant in New Orleans, La., on Jefferson Davis, a 44-year-old Negro dock worker who later died of pneumonia.

Dr. Keith Reemtsma of Tulane University, who headed a team of 12 physicians and surgeons operating on Mr. Davis, planned to continue animal-to-man transplants, called heterografts, because one of his patients had survived three months after such surgery.

An evaluation of 244 transplants done since 1955 shows discouraging facts on survival of patients who have had the most promising grafts from identical twins or

near relatives. Many scientists believe that heterografts are ridiculous in view of the lack of fundamental biological laws on transplants from man to man.

Here are some of the discouraging facts: Seven of 28 identical twins who received transplants are now dead.

Only five of 91 patients who got transplants from other near relatives are alive after more than one year.

Only one of 120 persons who had transplants from living unrelated donors and cadavers lived longer than a year.

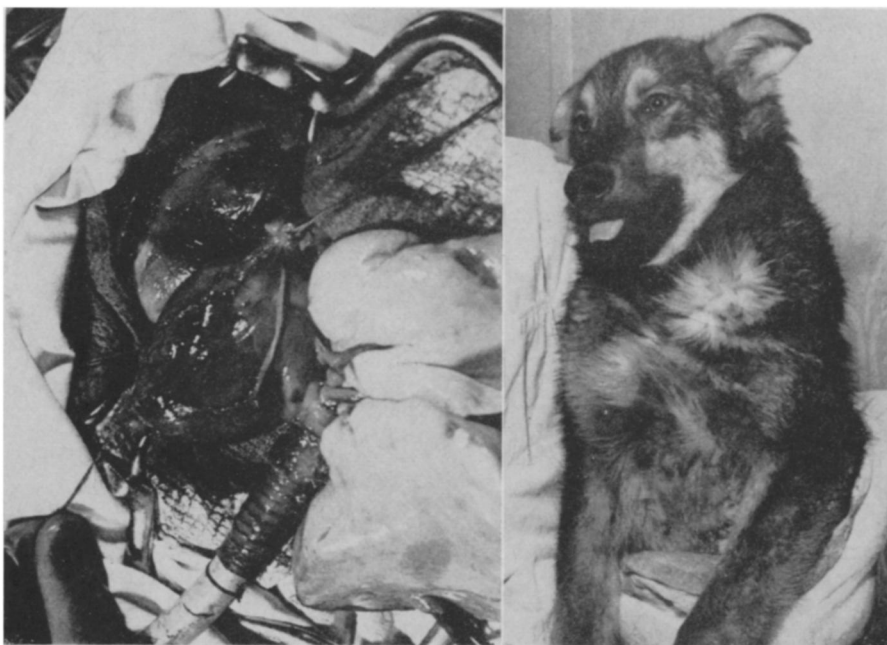
Kidney transplants have been most successful but heart, lung, liver, spleen and other internal organ transplants have been attempted.

Transplants Simple, Hazardous

Kidney transplantation looks deceptively easy, says Dr. Francis D. Moore, surgeon-in-chief, Peter Bent Brigham Hospital, Boston, Mass., which is a pioneer kidney-transplant center. The simplicity of the surgery should not blind one to its hazards, however.

"The responsibility of surgeons and of organized medicine is very grave indeed," Dr. Moore says. "Any surgeon who wishes to transplant kidneys in people should take at least a year off from his ordinary activities to set up a laboratory enterprise."

Repeated experiments with animals under accurate biochemical control should be done by a four-man team spending several



Novosti Press Agency, E. Tikhonov, photographer

SECOND HEART—Two hearts are beating in the chest of this happy-looking Russian dog. The transplant was accomplished by Dr. Vladimir Petrovich Demikhov, chief of the organ-transplanting laboratory of the Soviet Academy of Medical Sciences, Moscow. The other photograph shows the last stage of the operation. Both hearts are switched into one blood circulation system.

months together. Yet transplant beginners expect to learn techniques in a few days from visits to laboratories that have spent 20 years on the problems, the surgeon reveals.

"Dozens of hospitals and laboratories in this country and abroad are preparing to enter this field," Dr. Moore wrote in *Science*, 144:388, 1964. He warned that although this widespread interest must be encouraged, because transplantation offers hope of life in fatal illnesses, an appreciation of the difficulties to be overcome is necessary.

Just how difficult the task ahead is can be seen in this illustration given by British Nobelist Peter B. Medawar, famed for his work in acquired immunological tolerance.

Dr. Medawar was explaining some of the immunity problems of organ transplantation for humans to a convention of the American College of Physicians in Atlantic City, N. J.

He asked the doctors to suppose that he, Medawar, needed a kidney and had four friends to choose from as donors. Knowing that an effective way to suppress immunity was yet to be found, he would naturally try to get a graft from a donor who was most compatible immunologically.

Injection to Spot Best Donor

The way he has worked out the problem with laboratory animals, which he believes will work with humans, is to draw 20 cubic centimeters of blood and remove the lymphocytes (white blood cells having a single rounded nucleus, or cell center).

Into the skin of each prospective kidney donor he would inject five million of these white blood cells. The injections would raise little red spots that would be reactions of Dr. Medawar's lymphocytes against theirs, and the friend with the smallest spots, showing the least reaction, would be the most compatible donor.

Some surgeons hold out greater hope for success with artificial rather than with human or animal transplants.

Dr. Willem J. Kolff and his co-workers at the Cleveland Clinic, Cleveland, Ohio, recently developed a sac-type of artificial heart after working for the past six years on several types intended for replacement of the natural heart.

Pumps and Ventricle Bypass

Dr. Bert K. Kusserow, newly elected president of the American Society for Artificial Internal Organs, told *SCIENCE SERVICE* in an interview that he was "cautiously optimistic" about his work with a heart pump in dogs. Dr. Kusserow is now at the University of Vermont, Burlington, but did his original partial heart implant in animals while he was at Yale University, New Haven, Conn., in 1958.

Dr. Domingo Liotta, who began work in Cordoba, Argentina, four years ago in implanting artificial hearts in dogs, told this reporter that his present "bypass" work at Baylor University, Houston, Texas, is preferable to total heart replacement.

Bypass of both heart ventricles has been done by Dr. Liotta, working with Drs. Denton A. Cooley and Michael E. DeBakey, all of Baylor's Cora and Webb Mading department of surgery.

• *Science News Letter*, 86:170 Sept. 12, 1964

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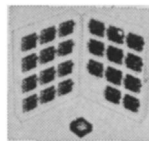


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