A Spate of Heart Transplants

After 10 years of helping each other prepare, surgeons around the world moved rapidly when they found themselves ready. A Virginian could well be next.

"We think the way is clear for trial of human heart transplantation," Dr. Norman E. Shumway said cautiously a month and a half ago (SN: 12/9/67).

Hardly had the Stanford University surgeon made his statement when an old friend and colleague in South Africa, Dr. Christiaan Barnard, performed the first human cardiac transplant on a grocer with a critically fibrosed heart. Within a shade over a month four other such operations had been performed, one by Dr. Shumway himself.

Such a spate of transplants might seem to indicate that the high barriers to cardiac transplants are down, that heart failure is close to being curable on the operating table. It isn't, yet.

Simply connecting up as complicated a piece of plumbing as the human heart is a prodigious mechanical feat. But the major problem in cardiac transplant, as with all foreign organ transplants, is not mechanical but biochemical. The body's immunologic responses are prompt, effective, and blind. They treat the life-giving organ as they do disease cells such as bacteria, rejecting it, and, if possible, killing it.

"The practical application of this operative procedure . . . is unlikely to be very wide for a number of years," Dr. Barnard said a week after the first operation. A week and a half later his 55-year-old patient, Louis Washkansky, died of pneumonia. In order to reduce his body's tendency to reject the new organ, Washkansky had been treated with radiotherapy, azathioprine, and cortisone. This treatment, however, reduced his ability to react to any foreign cells (SN: 12/16/67), so he was open to infection.

"There's no question about it," says Dr. Richard Lower of the Medical College of Virginia. "The immunological response to the transplant is the main problem. It will take a major breakthrough in immunology before the procedure will cease to be one of very high risk. When that comes, the field will be wide open for reliable transplants of all sorts of organs."

Dr. Lower, now chairman of the college's Division of Thoracic and Cardiac Surgery, has been ready for months to perform a heart transplant. So far he has lacked the right combination of donor and recipient. With Dr. Shumway, Dr. Lower in December 1959 performed the first successful heart transplant in animals, using dogs. Drs. Shumway and Lower worked together at Stanford from 1957 until 1965.

Dr. Barnard worked at the Medical College of Virginia for three and a half months last winter. Dr. Lower says the South African surgeon studied techniques of transplant surgery and the management of transplant cases post-operatively.

Such management principally is concerned with suppressing rejection, an area in which kidney surgeons have considerable experience.

Some 1,200 kidney transplant cases are walking around at the present time; while still a tremendously complex operation, in technique and management, the kidney transplant is nevertheless clinically well established.

At least one prominent kidney transplant surgeon feels that one of the difficulties encountered in the cardiac transplants has been the heart surgeons' lack of experience with kidneys. He says work with dogs has indicated that the cardiac transplants may actually be less difficult to deal with immunologically than renal transplants.

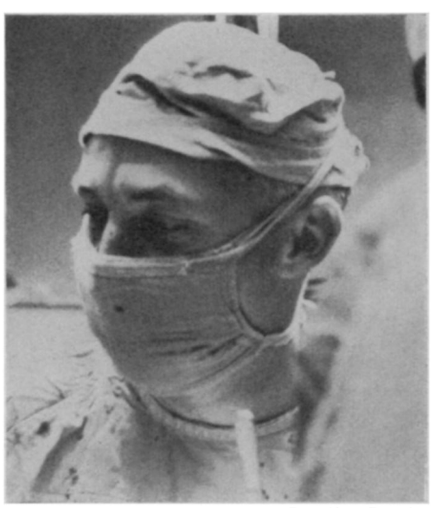
Kidney centers can be shown statistically to have a poorer record with their first patients than with succeeding ones. The cause of this, one authority says, is that experience is needed to use the immunosuppressive drugs to best advantage. He concedes that kidney surgeons are far more able to monitor the patient for slight rejection signs than are heart surgeons, whose principal tool, the electrocardiograph, which he terms relatively crude.

Immunology was not a problem with the first human to receive a new heart. In January 1964 a 68-year-old man, dying of heart failure due to hypertension, was given the heart of a chimpanzee at the University of Mississippi. Dr. James D. Hardy performed the operation as a temporary measure, to keep the patient alive on the chance that a potential donor with brain damage would die in time for a second transplant.

But the chimp's heart proved too small to keep up the blood volume of a large human, and it failed after two hours. Dr. Hardy said afterwards that enough was learned from the experience to convince surgeons there that "this operation may some day add years of

Wide World Photos

Barnard



Prentice Brooks

Shumway

Kantrowitz

life to many patients." But Dr. Hardy was beset by the problems of timing the recipient's crisis with death of a suitable donor, and he was tortured by ethical questions raised by keeping a doomed donor alive mechanically.

Time and fate cooperated a bit in Cape Town. Grocer Washkansky lay a month in Groote Schuur Hospital with no chance that his badly fibrosed heart would allow him to survive. His only hope was transplantation. Finally a young women, Denise Darvall, was brought in mortally injured after being hit by a car. Tissue typing determined that she was a good match for Washkansky. When she died surgeons were ready for the transplant. Dr. Barnard left the back wall of the two atria of the patient's heart in place, to avoid having to connect the venae cavae and pulmonary veins. After the heart was in, it was electrically shocked into beating and began to provide good, steady circulation.

Immunosuppressive drugs and radiation therapy were used to ward off rejection. Despite Washkansky's diabetes, he seemed to progress well. But his undefended body acquired pneumonia in both lungs, and despite continuing good operation of his new heart, with no sign of rejection, he died. Barnard said afterward that the immunosuppressive therapy given may have been too strenuous.

Three days after Washkansky's operation Dr. Adrian Kantrowitz of Maimonides Hospital in Brooklyn transplanted the heart of a dead malformed infant into a two-and-a-half-week-old boy with malformation of the right ventricle. A shunting operation had been tried and had been unsuccessful in developing sufficient circulation in the boy's lungs to keep him alive for later open heart surgery (Dr. Lower believes the only effective operation for conditions like this boy's will be found to be transplant.) For several hours after the transplant the boy's breathing and blood pressure were normal. Then the new heart stopped, far too soon for there to have been rejection.

Dr. Kantrowitz termed the attempted transplant a "failure pure and simple." Colleagues at Maimonides said one of the difficulties in the case was the fact that a heart-lung machine could not be used on the baby. Instead hypothermia was used, the baby being immersed in ice water before surgery to slow down its bodily processes.

On Jan. 2 Dr. Barnard tried again. He gave retired dentist Philip Blaiberg, 58, the heart of Clive Haupt, 24, who died of a brain hemorrhage. Blaiberg had more luck. He does not suffer the disadvantage of diabetes.

Dr. Barnard, learning from his first experience, has been more sparing in the use of immunosuppressive measures. However, last week Blaiberg was entering the time of maximum risk of rejection.

The next transplant was done at Stanford by Dr. Shumway. Mike Kasperak, 54, dying because of heart damage caused by a viral infection 10 years ago, received the heart of Mrs. Virginia White, who died of a massive cerebral hemorrhage Jan. 7. Kasperak last week was on the critical list due to failure of liver and kidney function. He was bleeding into the gastrointestinal tract. The liver and kidney troubles pre-date the transplant.

At midweek, however, peritoneal dialysis (flushing the abdominal cavity) and transfusions of fresh blood were meeting the crisis. Dr. Shumway said the complications were "severe but soluble" as long as heart function remains good. Cardiac output was fairly normal.

Kasperak, like Washkansky, presented the additional problem of having a heart cavity much larger than the organ it contains. This extra space filled with blood, confusing efforts to monitor the heart for rejection signs.

Dr. Kantrowitz performed his second transplant last Tuesday. Louis Block received the heart of Miss Helen Krouch in a nine-hour operation. The donated heart was too small to handle Block's circulation and Block died hours after surgery.

Despite the five operations in quick succession, and the anxiousness of Dr. Lower and others to perform cardiac transplants, there is still much hesitation and doubt on the part of many cardiac surgeons. They feel that the surgery is experimental (Dr. Shumway himself has termed it so.) and are reluctant to get into such a high-risk area. Some feel that experimentation should not be carried so far in the operating room. Others are not confident that results with animals are easily extended to apply to humans, that at some point experimental surgery must be tried.

Most agree, however, that cardiac transplant will remain an unusual, high-risk operation for last-ditch application. Part of the risk is that while kidney transplants can be done over if there is rejection, heart transplants are one-shot efforts. If there is rejection the patient dies.

Better tissue typing would help, Dr. Lower says. He terms this technique still in its infancy. There is no real evidence, he believes, that tissue typing, as done today, contributes significantly.

He says it has been found in kidney transplants that sometimes a bad match will take while a good match will be rejected. He suggests that current typing methods miss important factors.

A much-needed breakthrough is in immunosuppressive drugs. If drugs could be found that suppressed only the relevant part of the immune reaction, leaving the rest of the body's defenses intact, they could be used energetically with less fear of infections.

At present transplant recipients face extended immunosuppressive therapy, possibly lifetime therapy.

Studies are in progress to learn the mechanism of adaptation, by which the body ceases to fight the transplant. It is possible, Dr. Lower thinks, that in some cases repair of the foreign organ is done by the body, using host cells rather than cells derived from the transplant. In such cases the organ eventually would be composed, at least in part, of tissue identical to that of the host. He stresses that this is simply a theory.

There is, apparently, a lot of theory, and as yet too little fact, surrounding the fundamental biological processes involved in transplant surgery.

THE PILL

No Moral Revolution Discovered, Yet

By the 1880's both men and women had mechanical devices that together would provide virtually 100 percent contraceptive safety. Thus for almost a century young people willing to experiment with sex have had a means of avoiding pregnancy.

Nevertheless, this fact seems to have been obscured in a floodtide of publicity over oral contraception and its moral impact. Suddenly, the late-arriving pill is supposedly forcing a change in sexual mores.

Authorities on sexual behavior, however, remain unimpressed with the power of the pill. Not only has contraception long been available, they point out, but young people don't generally base their decisions about sexual behavior on contraception.

The pill isn't a major force affecting social mores, says Dr. Ira Reiss, University of Iowa sociologist and author of the recent work, "The Social Context of Premarital Sexual Permissiveness."

Perhaps one or two percent of premarital sex incidents are due to the pill, he says. The other 98 percent would stem from basic values, emotional involvement and the courtship system that has evolved in the United States since the last century—a system that leaves the marriage choice up to young people.

Dr. Ernst Prelinger, clinical psychologist at Yale University, agrees. "Women