The Cost of Living

Some Kidney Patients Die For Lack of Funds For Machine Treatment

Artificial Organ Works Well, But Use Is Costly; Federal Grants, Donations Dwindle Insurance Doesn't Meet Bills

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The effort to treat sufferers from chronic kidney disease by machine, which once promised to save thousands of lives a year, is floundering for lack of financial support.

High costs have plagued the so-called artificial kidney program from the outset. Hospital bills for the twice-weekly machine blood "washings" that take over the kidney's vital function of removing blood wastes and adjusting body chemistry now run from $10,000 to $20,000 annually per patient. That's the main reason only about 1,700 Americans currently receive the treatments, while an estimated 8,000 people will die this year for lack of them.

But even this far from adequate situation is deteriorating. Federal grants have been running out at the 14 hospitals designated by the U.S. Public Health Service about three years ago as demonstration centers for the process; without Government help, some of them have had to reduce the number of cases they handle.

Some private hospitals have been forced into similar cutbacks because of difficulties in attracting donations to support patients who can't pay the cost themselves. Indeed, private support of any kind has been slow in coming.

Coming Out Second Best

"The cost per capita of the treatment is an overwhelming drawback when we approach organizations for help," says Dr. Frederic B. Westervelt, director of the kidney care demonstration center at the University of Virginia School of Medicine in Charlottesville. "They say, 'Look what we can do for $10,000 a year—we can give 20 people an artificial leg.' When they measure what they think is the greatest good for the greatest number, we come out second best."

As a result of this lack of funds, hospital committees that once spent weeks agonizing over which artificial kidney candidates would receive the life-giving treatments, called hemodialysis or simply dialysis, now find that the decision has been taken out of their hands. "Who gets the care here now is determined purely by ability to pay—we don't like it, but that's the way it is," says Dr. Daniel Leb of the Louisville (Ky.) General Hospital's kidney center, run by the University of Louisville School of Medicine.

Physicians' chagrin over the financial obstacles to the treatment is heightened by the highly advanced state of artificial kidney technology. The prototype of the present artificial kidney machine, which resembles a squat old-fashioned washing machine, was developed in 1943 in Holland by Dr. William J. Kolff, who now is a resident of the U.S. The patient is connected to the machine, and his blood is pumped through a series of tubes, coils and filters.

The key element of the device is a thin cellophane membrane immersed in a saline solution. Through the process of osmosis, wastes in the blood that otherwise would accumulate and cause death pass through the membrane into the solution. At the same time, vital chemicals normally added to the blood by healthy kidneys pass from the solution into the blood. The "cleansed" blood then is returned to the body.

A Surgical Breakthrough

For a number of years, the machine could be used only when a few treatments would suffice—such as in cases of acute infections—because the surgery required to connect the patient with the machine was difficult and dangerous. In 1960, however, a team of specialists from the University of Washington devised a system that made the artificial kidney available to individuals who had suffered irreparable kidney damage and needed frequent blood washings. In minor surgery, they permanently inserted small plastic tubes in an artery and vein in a patient's arm or leg. During dialysis, the machine is easily connected to the body through those tubes; when the treatment is finished, the tubes are plugged and covered with a small bandage.

Recently, some doctors have improved on this method. By increasing the flow of blood through an artery and a vein, they enlarge them to the point where they can be easily punctured with large needles for connection to the kidney machine. This makes the

mechanics of dialysis about as simple as giving blood.

Dialysis is time consuming; the twice-weekly treatments take from six to 13 hours each, depending on the patient and model of machine used. But it is painless, and patients undergoing the life-long treatment can lead a nearly normal life. Clyde Shields of Seattle, who nine years ago received vein and artery implants from the University of Washington team and became the first person to start regular dialysis by machine, still is regularly employed as a mechanic. He is 49 years old.

The Role of Transplants

Treatment by kidney machine isn't the only alternative open to victims of kidney failure. Kidney transplant operations have been performed since 1954 with a high and growing rate of success. Up to last year, three-fourths of the transplant patients who received a kidney from a blood relative had survived for at least one year after the operation (people have two kidneys but can live with just one). The one-year survival rate for a person who received a kidney from a cadaver was 45%.

The utility of this operation is limited, however. Many kidney patients might not survive a transplant operation because of poor general physical condition, and not nearly enough suitable organs are available for those who could benefit. Only about 2,000 kidney transplants have been made in the past 14 years, an average of less than 150 a year.

Moreover, transplant candidates often require dialysis. They usually must undergo the treatment while awaiting an organ, and they must fall back on the machine if the operation fails.

Amid the general gloom over the outlook for artificial kidney treatment, some see a hopeful sign in the recent trend for more patients to receive machine dialysis at home instead of in a hospital. The savings from such a move can be substantial. The first-year bill for home dialysis, including $3,000 to $4,000 to purchase the artificial kidney machine itself and fees for training a family member to run it, usually total about $10,000. After that, it costs $3,000 to $5,000 a year to maintain the machine and buy the various components and chemicals that must be changed after every use.

About 200 of the 1,700 Americans on machine dialysis currently are treated at home, and some kidney specialists say they have high hopes that the number will rise sharply in the next few years. In 1967, the U.S. Public Health Service moved to accelerate the trend by setting up 12 home treatment training centers around the country and promising them $4 million over a five-year period.

But many experts in the field strongly doubt that home care will assume the majority of the treatment burden in the near future. They point out that some patients don't have a relative who can assume the job of operating the complex artificial kidney, others don't have homes where the treatments can be safely carried out and still more have strong fears about entrusting themselves to the care of a family member when a mistake could prove fatal. Moreover, even patients who intend to purchase their own artificial kidney must receive hospital dialysis for several months while a relative is being trained to run the machine.

To date, the financial squeeze has been hardest on the hospitals picked by the Federal Government in 1965 and 1966 to demonstrate the feasibility of the widespread use of artificial kidneys. The Federal grants—which totaled $2.5 million—paid the operational costs of the kidney centers and permitted them to admit patients who couldn't pay for their own treatments. Federal funds for medical projects go only for research or treatment-demonstration purposes, not for daily general patient care, so the centers knew the funds might not be renewed when the grants expired. But many of them felt that the Government wouldn't cut them off after having made a commitment.

Since it became clear that the grants would stop in the wake of the Government economy drive caused by the war in Vietnam, the centers have moved to pare their rolls. None have summarily cut off any patients, but when a patient receives a transplant or moves to home care, he isn't replaced.

The center at Cleveland's Mt. Sinai Hospital, for instance, now has only 17 patients on dialysis, down from 30 in 1967; its Federal grant expired Dec. 31. The unit at the University of Alabama Medical Center in Birmingham now only accepts patients likely to receive transplants fairly quickly; if new funds can't be obtained, it plans to phase out its artificial kidney program as soon as other facilities can be found for its 15 present patients.

The center at Hennepin County General Hospital in Minneapolis, whose Federal grant expired Dec. 31, now requires some prospective patients to put $12,000—funds for at least one year's care—in an escrow account before they can begin dialysis. "A couple of people have felt they'd rather die than spend the amount of money involved," says one doctor at the hospital.

A bill now pending in Congress would commit new Federal money for artificial kidney programs, but its prospects for passage aren't clear now. A similar bill made little headway last year.

The outlook for developing other sources of funds is even less bright. Only a half dozen states support dialysis patients, and few others show signs of following. New York has the largest state program; according to Dr Ira Griefer, medical director for the National Kidney Foundation, Medicaid in New York helps pay dialysis bills for more than half of the state's 400 dialysis patients and the state has set up a Kidney Disease Institute to coordinate the various public and private kidney treatment projects. But state officials say that about 900 New Yorkers a year need the treatments, and their efforts help only a fraction of those who need financial help.

Ordinary types of health insurance often pay some costs of dialysis but typically fall far short of meeting the actual expenses. The average maximum major medical policy benefit of $10,000 "just about covers the preliminary steps to start a patient on dialysis," says L. A. Orsini, an official of the Health Insurance Association, a New York-based trade group.

A few companies now offer kidney treatment policies. Western States Life Insurance Co. in Sacramento, Calif., for instance, sells a $50,000 maximum benefit group policy for an organ transplant or dialysis. However, mos

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drying circuit, collects the water sublimated from the valve. The valve is left in the vacuum drying system for a period of 24 hours. After this length of drying time the micro-moisture content for each valve is 1.7%. At the completion of this final stage the drying tube is cut down from the vacuum system. This is achieved by heating the fine glass tube connecting the drying tube to the system. At a maximum temperature this tube collapses under the heat sealing the valves under vacuum.

The valves in their sealed tubes are stored in a rack at room temperature and may be kept indefinitely. Each tube is labeled with a reference number and size of the valve therein. A filing system is kept which records all details of stored valves.

Reconstitution

When a valve is required a selection of valve sizes is made available in the operating room. When the required valve size is determined, the appropriate donor valve is reconstituted by removing the valve from its storage tube and immersing the valve in sterile water at 37° C. Reconstitution takes approximately 10 to 15 minutes.

Conclusion

Methods of aortic valve preservation and sterilization have been discussed. The techniques involved are 4% formaldehyde and freeze drying together with ethylene-oxide sterilization. It is the authors' experience that these techniques have to be carried out with precision. Failure to do so will render the valve unusable when it has been reconstituted and ready for implantation.

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private insurers have been reluctant to enter the field.

Persons covered by the Federal Medicare program for the elderly receive little aid for dialysis. Medicaid, the Federally assisted program adopted by some states to help low-income people pay medical expenses, provides more aid—$25 for each in-hospital dialysis treatment—but still leaves substantial bills.

What's left for some kidney disease sufferers, then, is charity. While organized support for kidney care has been slow in coming, instances abound of local largess in individual cases. Last Christmas, for example, residents of Whitesville, Ky., a town of fewer than 1,000, raised $26,000 in four days for Roscoe French, a 33-year-old carpenter for whom machine dialysis represented the only chance at life.

Even well-off victims may end up needing charity. "If you aren't indigent when you start dialysis, you soon will be," says one physician.

CAUSE AND EFFECT

The cardiac monitor unit had been given only superficial cleaning for some time which irked the house cardiologist no small amount. In an effort to put an end to such conditions, he phoned the administrative assistant in charge at his home one evening. The conversation went something like this:

"Mr. Jones, a puddle of scrub water was allowed to remain on the floor in the cardiac unit for a rather extended period this evening. During that time, the patient pulled loose a monitoring electrode, setting off the alarm. In her dash to answer the alarm, the nurse slipped on the wet floor, knocked against the ceiling-mounted I.V. standard, and smashed the bottle of solution against the electronic monitor."

"The contents of the bottle flooded the monitor causing an immediate short circuit. Since the patient was receiving oxygen, the shorted monitor erupted into flames. This fire caused a flash-back through the oxygen lines, exploding the oxygen storage bottles outside."

"Because of the magnitude of the explosion and the amount of high-flying debris, Air Force observers monitored the blast as an invasion and fired all of the retaliatory ICBM rockets! And all because of your darn scrub water!"