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John Jones Surgical Society
NEWSLETTER
Alumni News of the Columbia Presbyterian Department of Surgery

LANDMARK REMATCH STUDY PROVES BENEFITS OF HEART PUMPS

Eric A. Rose, MD

Results of a landmark clinical research trial have shown that implanted left ventricular assist devices (LVADs) can extend life and significantly improve the quality of life of terminally ill heart failure patients. **Eric A. Rose, MD** Chairman of Surgery and Surgeon-in-Chief at Columbia Presbyterian Medical Center, NewYork-Presbyterian Hospital, and Morris and Rose Milstein/Johnson & Johnson Professor of Surgery at Columbia University College of Physicians & Surgeons, was principal investigator of the study, known as REMATCH (Randomized Evaluation of Mechanical Assistance for the Treatment of Congestive Heart Failure).

The REMATCH study was conducted at 22 academic medical centers, and involved 129 patients. These patients were either too sick or too old to be candidates for a heart transplant. Supervised by investigators at Columbia University's International Center for Health Outcomes and Innovation Research (InCHOIR), the multicenter and multi–sponsored REMATCH trial found that the use of an implanted heart pump with wearable controls more than doubled the likelihood that terminally ill heart failure patients would be alive at the end of one year.

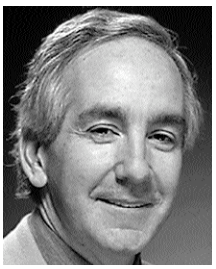
The HeartMate ™VE *left ventricular assist device was used in the landmark REMATCH trial.*

The researchers found that patients with the implanted device had a 52 percent chance of surviving a year, compared with nearly a 25 percent survival rate for patients who took drugs and were medically monitored. The likelihood of survival for two years in patients with the device was 26 percent vs. 8 percent in the other group.

The findings of the approximately $25 million trial were published in the Nov. 15 edition of the *New England Journal of Medicine*. Dr. Rose presented the results in November at the 2001 American Heart Association meetings in Anaheim, California. The report was featured in the *New York Times* and on *NBC Nightly News*, and it also appeared in the *Wall Street Journal* and on all New York–area TV news programs. In addition, on November 18, *60 Minutes* aired an in-depth piece about the heart pump used in the REMATCH study and similar devices.

"This trial transforms decades of hopeful research into the development of man-made machines to support the failing heart into a successful long-term treatment," Dr. Rose said.

Columbia University, the National Heart, Lung and Blood Institute (NHLBI), and Thoratec Corporation, the Pleasanton, CA–based manufacturer of the HeartMate™ VE device used in the trial, collaborated in developing the study's design. The design was novel because it included clinical, regulatory, and economic components and established careful data flow and analysis guidelines to prevent bias. InCHOIR is a collaboration among Columbia's Mailman School of Public Health, the College of Physicians & Surgeons, and the Department of Surgery.



Eric A. Rose, MD

The researchers say the results imply that such devices soon might be routinely employed as another choice in the medical management of terminally ill heart failure patients. This therapeutic option could benefit up to 100,000 people who are terminally ill with end-stage heart failure, for whom transplant is not possible.

Currently, the Food and Drug Administration allows the use of implanted pump devices only as a bridge to transplantation and after certain types of cardiac surgery. Approximately 4,000 people are on U.S. heart transplant lists, but only 2,733 donor hearts were available worldwide in 1999.

In the trial, 68 patients whose average age was 66 years old obtained the device, while 61 patients, whose average age was 68 years old, were assigned to the medical management arm of the trial, in which patients received drug therapy and aggressive medical monitoring.

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In Memoriam

Dr. George Hoppin Humpherys, II

Thoracic Surgery Pioneer

Dr. George H. Humphreys, a pioneer in thoracic surgery and environmental activist, died peacefully on December 18, 2001 at his home in West Dover, Vermont. He was 98 years old.

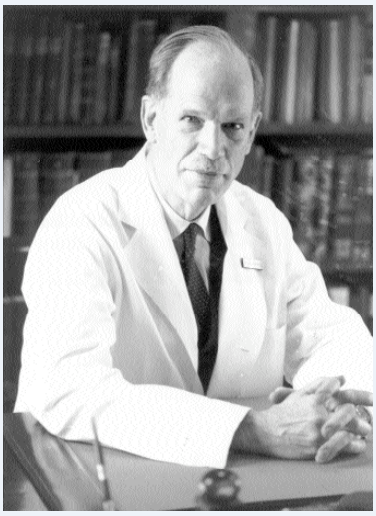
In his more than 40 years of active professional life — 23 as Valentine Mott Professor of Surgery and Chairman of the Department of Surgery at Columbia Presbyterian Medical Center (1946 – 1969) — he pioneered the emerging specialty of thoracic surgery. He was the first surgeon in New York to operate successfully for congenital heart disease in 1938, and in 1941 for congenital anomalies of the esophagus. Over a period of 50 years he published more than 80 papers on surgical subjects, but will be remembered by the many doctors and department chairs, whom he taught, more for his humor, ingenuity, and sense of drama. Former students invariably recall his "Christmas Tree" chart depicting upcoming rotations, exemplifying his gift of practical whimsy. More important for his patients, now reaching old age, were the newly devised surgical "miracles" that kept them from dying in infancy.

Dr. Humphreys provided leadership to a number of societies, including the American Board of Thoracic Surgery (which he founded in 1948); the New York Society for Cardiovascular Surgery (founded in 1950); the New York Society for Thoracic Surgery; the New York Cancer Society; the New York Heart Association; the New York Surgical Society; and the American Bureau for Medical Advancement in China/ABMAC (1974 – 1979).

Always interested in the advancement of thoracic surgery globally, he visited, taught, and consulted in Colombia (1948); Taiwan (1951, 1960, 1969); Lebanon, Syria, and Iraq (1954); the Philippines, Hong Kong, Singapore, China, India and Iran (1960). Once medical consultant to Madame Chiang Kai-shek, he was decorated in 1979 by the Republic of China in recognition of the services of ABMAC in Taiwan.

Following the death of his wife Edith in 1980, Dr. Humphreys moved to his beloved "Littlebrook" in West Dover, Vermont, where he continued his early love of the natural environment. Raising sheep, playing chess, and operating a small sugaring operation left time for other activities, including organizing square dances and "shabi-shabi"s, and providing leadership to the Dover Historical Society, Mountain View Cemetery and Handle Road Associates. He also served on the Dover planning Commission 1981 – 1988, a crucial time in developing and moving through a town plan and zoning ordinance for the first time in Dover.

Dr. Humphreys was also deeply involved with environmental issues. "Reluctant Activist" was a term used by the Vermont Natural Resources Council when giving him their "Grass Roots Award" in 1996 for his leadership in reclassifying a section of Cold Brook. He co-founded Tannery Wildlife Refuge in Dover and was noted for his faithful production of detailed maps for town meetings whenever required.



He is remembered by his many friends, family and colleagues as a man of courage, generosity, encyclopedic mind, reflective wisdom, and mischievous wit. His cartooning skills enlivened work and family gatherings alike. At the slightest provocation, he could launch into a recitation of the *Rhyme of the Ancient Mariner*, a discourse on the sex-life of butterflies, the rivers of Iraq, the discovery of Chichenitza, or relatives caught by Barbary pirates off the coast of Africa. He spent over ten years authoring his extensive autobiography *Eight Rabbits*. "I am a rabbit by the Chinese calendar, which organizes life in more natural 12-year cycles", Dr. Humphreys wrote. He added, "I stopped at 8 rabbits as 96 years is enough. Nothing more of interest happens… I have become an old barnacle, but a reasonably comfortable one." As voiced by a caregiver upon thinking of his life, "He was an incredible storehouse of knowledge, and also had a heart of gold. All of us loved him and will miss him terribly."

Dr. Humphreys was born on November 22, 1903 in New York City, son of John S. Humphreys and Maria M. Champney. From 1911 until his return to Manhattan in 1930 he lived in Cambridge, Massachusetts, where he graduated from Harvard College in 1925 and Harvard Medical School in 1929. His surgical training occurred at the newly opened Columbia Presbyterian Medical Center, beginning in 1930.

Dr. Humphreys is survived by two daughters, Cornelia Rea of Concord, MA and Edith Mas of West Dover, VT; his half brother Dr. David H. Humphreys of Asheville, NC, seven grandchildren and two great-grandchildren. He was predeceased by his wife Edith Sturgis of almost 50 years, his sister Elizabeth Humphreys and his son John S. Humphreys.

A memorial celebration was held in West Dover, VT, July 5, 2002.

In lieu of flowers, contributions in his memory may be made to the Dover Historical Society, Tannery Wildlife Refuge, Vermont Natural Resources Council, or Vermont Land Trust, c/o Covey and Allen, P.O. Box 215, Wilmington, VT 05363.

John N. Schullinger, MD

The Memorial Service for Dr. George H. Humphreys, II

Story-telling, folk-singing and square dancing; these were Dr. Humphreys' requests of his family, not a funeral, for a memorial service. This was accomplished in a warm, memorable way on July 5, 2002 in the Town Hall of West Dover, Vermont. Led by his two daughters, who were the first to speak, it was held in a meeting-house style, with chairs arranged in a circle. About 100 people of all ages attended at various times (including Dr. Humphreys' dog) and participants who were so moved were asked to share stories and anecdotes about Dr. Humphreys, followed by a moment of silence.

CPMC representatives included Drs. Eric Rose, Fred Herter, Fred Jaretski, Baba Bhonsley, John Schullinger, Henry Spotnitz and David Kinne. Fred Herter spoke about Dr. Humphreys' warm, caring nature, of never having heard him speak ill of anyone and of his peculiar tendencies. No one could understand how Dr. Humphreys, seated in the front row of Grand Rounds, could seemingly fall asleep but wake up at the end of a presentation and ask the most penetrating question. Or, in a one-on-one meeting in his office to address a most

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Dr. Carl Robert Feind
(1917 – 2002)

Dr. Carl Robert Feind died in Oradell, N.J. on February 21, 2002, following a stroke. He was 85 years old.

Carl always made whatever he was doing seem easy and I can't picture him not smiling. He was a superb clinician as well as an outstanding surgeon. He was revered by the house-staff for his teaching, and passed his cloak admirably on to the next generation of surgeons. He quietly and unobtrusively was an important member of the Department for the entire 52 years of his association. He was also a very active and devoted P&S Alumnus and received the Alumni Federation Medal.

Carl was born in Newark, New Jersey on Jan. 28, 1917. He was a skilled swimmer training for the 1936 Olympics in the breaststroke. He received a BA from Victoria Junior College in Victoria, Texas, an AB from the University of Texas in 1940 and then entered the Military Service. He served in WW II from 1940 to 1946, became a major in the Air Corps, and trained fighter pilots. He entered P&S after the war, graduating in 1950. He took his internship and residency on the Presbyterian Hospital Surgical Service from 1950 to 1956, and subsequently worked at Presbyterian, Delafield, Harlem and Bellevue Hospitals. He became an Attending Surgeon at Presbyterian Hospital and Professor of Clinical Surgery at the College of P&S.

Carl's major professional interest was head & neck, and thyroid surgery. During his residency he did seminal work in defining the lymphatic anatomy of the neck and subsequently became internationally known in the field of thyroid surgery. He was a consummate clinician, worked closely with the thyroid and parathyroid specialists in the Department of Medicine, and was active in the development of parathyroid transplantation and needle aspiration of the thyroid to avoid surgery.

In the operating room, he made the definition of the anatomy, finding the parathyroid glands, and preservation of the recurrent laryngeal nerves, look easy. His reputation and skill attracted influential patients from all over the world and through these contacts he developed an important Research Fund. He also never lost his interest, knowledge,

and skill in abdominal surgery nor in the care of every day medical p roblems. In spite of Carl's surgical concentration, reputation and ability in the neck, a senior general surgeon asked Carl to remove his gallbladder; and on occasion he performed other difficult abdominal surgery as well.

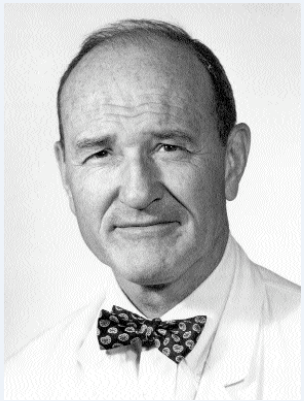
In addition to his wife and children, his love outside the hospital was sailing. He was vice commodore and fleet surgeon of the Devon Yatch Club and was known for his ardent fleet racing and the popular overnight teenager sailing trips on Gardiner's Bay. Over the years he had many boats, recently always called Pied-de-Mer, or Petite Pied-de-Mer depending on their size, and he spent as much time on the Sound or in the British Virgin Islands as his professional duties allowed. His guiding star was Herb Hild whom he lunched and sailed with regularly. Carl, Herb and I, and other close friends with Carl as navigator, had a memorable race from Miami to Nassau and in Nassau. And he sailed as he operated, making it look easy, looking casual, but always on target.

As his close friends knew, he loved to play taps on his bugle, not brilliantly, but with style. Accordingly, it was extremely touching that his Memorial Service closed with taps. Carl was an excellent doctor and surgeon, a good friend, and was loved and respected by his family, his colleagues, his residents, his patients, and the entire Hospital staff. He will be greatly missed by all of us.

The family has suggested that memorial contributions be sent to the Carl R. Feind Research Fund, Columbia University, Department of Surgery, 177 Fort Washington Avenue, New York, NY, 10032.

Alfred Jaretzki III, MD

Dr. Charles W. Findlay, II
(1917 – 2002)



Dr. Charles W. Findlay, II, a valued former member of the surgical staff at CPMC, died of a stroke on February 11, 2002. He was in his 84th year.

A graduate of Yale in 1939, and P&S in 1943, Charlie took his general and thoracic training in Boston (MGH and Children's Hospital) and New York (St. Luke's and Presbyterian), and was appointed to the surgical faculty at Columbia in 1950. Throughout his professional life (aside from two years in the military, 1953-54, during the Korean War), he was continuously active at the Medical Center, teaching and practicing general and thoracic surgery (mostly the latter), both at Presbyterian and Francis Delafield Hospitals. At the time of his retirement, he had the title of Associate Clinical Professor of Surgery.

Although an able surgeon and fine teacher, Charlie Findlay will be best remembered for his enthusiastic, even passionate involvement in a number of non-surgical activities, chief of which was horticulture. In the small shaded backyard of his Bronxville home, he planted innumerable varieties of flowers, plants, shrubs, even trees, some of which began as cuttings he had collected from his many travels to other lands. He was totally happy immersed in this green jungle, and he was as assiduous in the cultivation of his seedlings as he was in the care of his patients. At one point, he inveigled me to join him in starting a vineyard…I was to provide the space in my Dobbs Ferry yard and he would see to the health of my 21 hybrid grape plants. It was a magnificent failure: our fist harvest and pressing (in an ancient cider mill) resulted in pure "mother" vinegar! But on retirement in 1982, he happily left Bronxville for open spaces in Little Compton, Rhode island, where he established and operated the Shortleaf Nursery and was active in a number of horticultural societies and ventures. And if this was not enough to keep him occupied, he became interested in and collected hand-woven Middle Eastern textiles, and developed an expertise in early American history. He even became a docent at the New Bedford Museum of Whaling.

It would be hard to find a more humorous or interesting conversationalist, or a happier man in retirement. His life, moreover, was greatly complimented by an equally fascinating wife, Peggy, and three fine children.

If I have overlooked Charlie Findlay's earlier career as a surgeon, as a teacher, or as a clinical investigator (between 1947 and 1958 he published 15 papers ranging from antibiotic therapy to wound healing), it is only because I sense that his preeminent fulfillment and joy in life derived from his love of growing things. In any case, he was a remarkable person and a good friend, and I am to be envied for my continuing relationship with the Findlay family—my grandson and Charlie's granddaughter became close friends this past summer during a canoeing trip to the wilds of Canada, and it was this fortuitous connection that led me to get hold of Charlie two weeks before he died. We had a wonderful exchange; this after a lapse of ten years or so—he was the same Charlie as ever, and we laughed together about what the future held. Would that he could be there to revel in it.

Frederic P. Herter, MD

Dr. Edward B. Self
(1911 – 2002)

Dr. Edward B. Self died quietly at home in Edgartown, Massachusetts on January 18, 2002 from complications of leukemia and malignant melanoma. He was 91 years old.

He was a graduate of Yale in 1932 and P & S in 1936. After completing his surgical training at Columbia, he remained on the faculty until his retirement in 1977, as Associate Professor of Surgery. In World War II, he served in the Army Medical Corps as Chief of Surgery of the 160th Station Hospital in Bath, England, and Amiens, France. Then he served as Chief of Surgery of the 229th, a 1,000 bed hospital in Nagoya, Japan.

His love of Martha's Vineyard began in 1920 when his father rented him a rowboat in Edgartown in which he explored the harbor. After he married in 1941, he and his wife Beatrice bought property at Cape Pogue, where they summered with their family. Upon retirement in 1977, the couple moved permanently to Chappaquiddick, where Dr. Self became active in Island affairs.

He served as President of the Chappaquiddick Island Association and the Chappaquiddick Beach Club. In addition, he was a Trustee and President of the Vineyard Conservation Society, and also served as Director of the Sheriff's Meadow Foundation and later as Honorary Director and Member of the Edgartown Board of Health.

His hobbies included medicine and bicycling. He would often combine the two by bicycling with friends to and from South Beach, and afterward check their blood pressures.

Donations in his honor should be sent to the Vineyard Conservation Society, the Hospice at Martha's Vineyard or a charity of one's choice.

David W. Kinne, MD

LOOK FOR YOUR INVITATION

to the

John Jones Surgical Society and
P&S Alumni Association Reception at the
88th American College of Surgeons Clinical Congress
Hilton San Francisco Hotel
Rooms 5 & 6

San Francisco, California
Tuesday, October 8 2002
Time: 6:00pm – 8:00pm

SAVE THE DATE
at the American College of Surgeons Clinical Congress

SOON TO BE PUBLISHED

History of the Department of Surgery Columbia Presbyterian Medical Center

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Minimal Access Surgery: Past, Present, Future

Dennis L. Fowler, MD

Dennis L. Fowler, MD

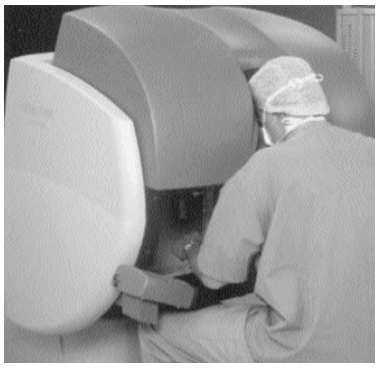
Minimal access surgery is here to stay. The public has embraced it, primary care physicians and other referring physicians have requested it, and nonsurgeon interventialists (radiologists, cardiologists, etc.) have expanded their practice of it. Slowly, surgeons are increasing the use of this approach for more and more difficult cases. At the present time, laparoscopic and thoracoscopic p rocedures have been widely accepted for the easier and more commonly performed procedures such as diagnostic laparoscopy, cholecystectomy, or lung biopsy. Despite the fact that the feasibility and safety of more difficult procedures such as colectomy, solid organ removal, or lung resection have been demonstrated, most surgeons do not yet use laparoscopic or thoracoscopic approaches for these procedures.

Although laparoscopy has been possible for 100 years, and good laparoscopic equipment has been available since the 1960's, diagnostic procedures and tubal ligation were the only realistic uses for laparoscopy prior to the development of the CCD chip video camera in 1986. Before that, the surgeon put his/her eye down to the laparoscope to look into the abdomen. Within 5 years of that invention, surgeons reported successful completion of laparoscopic procedures for cholecystectomy, appendectomy, colectomy, fundoplication, hernia repair, splenectomy, adrenalectomy, and common bile duct exploration, as well as others. Most of these reports were isolated cases or small series of highly selected patients. And so it was appropriate to wait for more studies before generally adopting the technique.

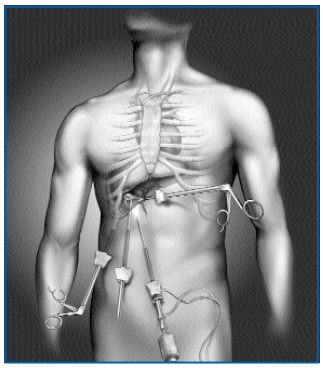
Although questions remain about the use of laparoscopy for curative procedures for cancer, many data are now available that document the benefits of the laparoscopic approach for many types of abdominal surgery. These benefits include less pain, quicker recovery, less blood loss, less embarrassment of pulmonary function, fewer wound infections, fewer incisional hernias, less stress response, less suppression of the immune system, and a better cosmetic result. Additionally, many studies now document that the overall care of patients with laparoscopic surgery costs less. Despite that, it is estimated that only 1% of all colon resections in the United States each year are completed laparoscopically. And the same could be said for many other types of abdominal surgery as well. Why is that?

The surgical robot da Vinci *(Intuitive Surgical, Mt. View, CA) is the currently available technology that addresses several of the problems associated with minimal access surgery. It has 3 arms that control the camera and two surgical instruments that have articulating tips. Despite these advances, most surgeons do not feel that this device will become widely used for general surgical applications.*

There are probably several reasons for slow adoption of advanced laparoscopic techniques by surgeons. The most important reason is that the procedures are technically much more difficult to learn. For general surgeons and chest surgeons, minimal access surgery usually involves the use of a telescope for visualization. The resultant 2-dimensional image is foreign to most surgeons. Additionally, the necessity to use very long, straight instruments that are limited in motion by the presence of a fulcrum point, makes completion of surgery with these tools very difficult. Other factors include the added operating time during the learning process, difficult and costly acquisition of the equipment, and the need for extra training of operating room personnel.



The surgeon's console for da Vinci *provides a comfortable position for the surgeon.*



This is an example of current minimal access surgery and illustrates some of the problems with current techniques and technology: 2D imaging, long straight instruments with a fulcrum point that limits motion, and an uncomfortable position for the surgeon.

With the establishment of the Minimal Access Surgery Center at NewYork-Presbyterian Hospital, we are trying to address some of those issues. We have two initiatives specifically aimed at these issues: training and research. Although a major focus of training is resident education, postgraduate education in the form of hands-on courses is offered for many types of minimal access surgical procedures each year. Research aimed at these issues is focused on the development of technology that will enable surgeons to perform minimal access surgery in an easier and safer way. Additionally, research is focused on the development of technology with which to learn minimal access surgery (simulators).

Although the best methods for learning laparoscopy are yet to be defined, we have learned much about adult education in surgery during the past few years. To capitalize on that we have implemented a laparoscopic training curriculum within the general surgical residency at Columbia. This curriculum includes specific didactic sessions about the instruments, techniques, and physiologic changes associated with laparoscopic surgery. Each didactic session is followed by a hands-on laboratory session. The goal is for the resident to acquire some laparoscopic skills outside the operating room. We believe this will make it better for the resident, patient, and attending surgeon. The hands-on sessions sometimes use inanimate models, sometimes use animal models, and sometimes use computer-based virtual simulators. Although we hope that these virtual reality simulators will eventually allow us to teach and learn surgical procedures using them, current simulators are limited by inadequate computational speed, inadequate graphics, and inadequate haptic feedback. However, current simulators do have value as "part task trainers." Residents (and surgeons, too) can learn motor skills using the simulators, and this should allow residents to learn surgical procedures in the operating room, rather than motor skills.

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Family and friends of Dr. Humphreys square dancing at his memorial service.

difficult question, he would fumble with his pipe, fill it with tobacco, light it after using several matches, and then pronounce the most clear analysis and solution of the problem.

Fred Jaretski recalled his superb technical skills, his sharp memory when he and Fred Herter questioned him a few years ago about the history of the Department for material included in the book on this subject soon to be published. Baba Bhonsley spoke of Dr. Humphreys' promise to train this young surgeon from India, so junior on the house staff, and how he kept this promise.

Several family members (including all seven grandchildren) recalled very individual ways Dr. Humphreys interacted with and influenced them. Many sides of his personality emerged: his love of science, nature, gardening, of learning and teaching, cooking, as well as his sense of humor, love of practical jokes and games (especially intricate variations of charades) and how adept he was at many activities with his hands.

Next, two folk singers (playing a guitar and an Appalachian dulcimer) sang a few of Dr. Humphreys' favorite old folk songs, and family members played and sang other favorites, joined by the crowd. After a pot-luck supper, guests were invited to view photographs of him with family at various times of life, portraits of him painted by his daughter, and peruse a copy of his recently published memoirs, *Eight Rabbits, A Century of Memories, 1903–1999*. There was also on display a large cartoon presented to Dr. Humphreys at his retirement, showing photos of faculty members in the Department of Surgery in various surgical activities, surrounding Dr. Humphreys.

Then, as shown in the photo above, there was square dancing by family and friends, helped by a band and professional caller. Many commented on how pleased Dr. Humphreys would have been with this service.

David W. Kinne, MD

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The left ventricular assist device works by assisting the function of the heart's left ventricle, which becomes weakened in congestive heart failure. The implanted device's pumping mechanism ensures circulation of the blood from the left ventricle to the aorta, the artery that supplies oxygen–rich blood to the brain and the rest of the body.

Besides increasing the life span of the patients, the pump device enhanced quality of life. These patients felt better, were less depressed, and were more mobile. These psychological and physical findings were statistically significant for patients with the device one year after implantation.

Based on the results, the FDA has allowed Thoratec to offer the HeartMate™ VE to six surviving patients in the medical management arm of the trial. To date, three of these patients have chosen to have the device implanted. The agency also has allowed the company to include an additional 30 patients in the trial.

"The REMATCH data proved to be so significant that Thoratec has submitted it to the FDA to seek approval to make the HeartMate™ VE available as soon as possible to congestive heart patients who are not eligible for cardiac transplantation," says D. Keith Grossman, president and CEO of Thoratec. "Thoratec is very appreciative of the collaboration among NHLBI, Columbia University, Dr. Rose and each of the investigators that has resulted in the realization of a goal the entire circulatory support industry has been striving toward for decades."

The researchers chose HeartMate™ VE because it has a textured surface that lowers the probability of clot formation even in the absence of anticoagulant, or clot–preventing, drugs. Thoratec, which provided the devices at no cost and paid for some medical care for the patients, also was willing to put its device through a rigorous randomized trial.

The investigators acknowledge that more research needs to be done to overcome some serious problems with the therapy, including infection and device failure. "Heart failure affects an estimated 4.7 million Americans, with 550,000 new cases diagnosed each year," says Dr. Claude Lenfant, NHLBI director. "This compelling study shows that even with a high rate of complications, a left ventricular assistance device can provide a significantly longer and better quality of life in extremely ill heart failure patients for whom no other meaningful therapy is available." With the data from the trial, the investigators are now comparing the cost of implanting the device with the cost of maintaining patients with drugs and medical management. This information could help Medicare and private insurers determine reimbursement policies, if the FDA approves its use.

Continued from Minimal Access Surgery, page 5

The second initiative is technology development. Clearly current instrumentation has major limitations. These limitations apply to the two necessities for completing an intervention. We are limited by the 2-dimensional image on the display, and we are limited by the use of very primitive, difficult instruments. In the Minimal Access Surgery Center we are establishing a collaboration between clinical surgeons and engineers at Columbia for the development of enabling technologies. The goal of developing these technologies is to make the performance of minimal access surgery easier and safer.

Although no one knows exactly how we will be doing surgery 10, 15, or 25 years into the future, there are three concepts that are likely to play prominently in future therapy. There will be more image guided therapy (CT, MRI, ultrasound) and less intervention using a visual image (open or laparoscopic surgery). There will be more endoluminal therapy, delivered with instruments passed through existing orifices when possible. And there will be a trend toward ablative therapy rather than resective therapy. To reach those capabilities, it is likely that computers will play an increasingly important role in therapy. At a very basic level, the computer will make the instruments smart, so they can guide the surgeon, advise the surgeon if something is not right, and eventually autonomously complete some tasks. Even now, investigators have made prototypes of robotic devices to autonomously place needles in places such as the retinal vein or spine, to complete a carotid Doppler exam, and to function as a surgical scrub technician. These developments are only the beginning of the integration of computers and advanced technology into the care of patients. The goal is to reduce the invasiveness of the procedures used to treat patients. At the same time, the technology must enhance the safety for the patient and be easy for the surgeon to learn and use. The end result will be a method of treatment that is better for everyone: the patient, the resident, the surgeon, and the system.