

For release Tuesday, March 6, 2001

POTENTIAL LIVING LIVER DONOR CANDIDATES CAN HAVE SIMPLE NEW SCREENING TESTS

AT A GLANCE

- ✍ New protocol involving two magnetic resonance (MR) imaging tests may make it easier to quickly screen potential living liver donors.
- ✍ Current donor screening tests are invasive and require an overnight stay in the hospital.
- ✍ Less than a third of the 15,000-plus people in need receive cadaveric liver transplants annually; 1,000 die while waiting.

SAN ANTONIO — A simple new imaging protocol may quickly and painlessly help determine whether a person is a good candidate to be a living liver donor for a child or adult in need of a transplant. The new method is an alternative to the current protocol that involves a hospital stay and invasive tests.

With the new protocol, a candidate for liver donation has several blood tests and a single magnetic resonance (MR) imaging study that can be completed in a half-hour session, according to

research being presented here today at the 26th Annual Scientific Meeting of the Society of Cardiovascular & Interventional Radiology (SCVIR).

“Every year, less than a third of the people on the waiting list receive a cadaveric donor liver, so living donors are an important option for people who can’t wait,” said James C. Carr, M.D., fellow in cardiovascular and interventional radiology, Northwestern Memorial Hospital and Northwestern University Medical School, Chicago. “About half the time the first potential living liver donor will be ruled out, so offering noninvasive screening is definitely preferable.”

Since the first living liver donor transplant was performed in the United States in 1989, more than 800 have been done; about half of the recipients were children. More than 17,000 people currently await a liver, and only about 5,000 transplants typically are performed annually due to a

shortage in cadaveric livers, according to the United Network for Organ Sharing (UNOS). About 1,000 people die every year while waiting for a liver.

Because the liver regenerates, living donors can give part of their livers and the liver will grow to the appropriate size in both donor and recipient.

A number of factors can rule out a potential living liver donor, including variances in anatomy and blood vessels that can make donation riskier. The traditional screening method involves an overnight hospital stay and several tests, including a computed tomography (CT) scan; a liver biopsy, which involves inserting a needle into the liver to remove a tissue sample; an X-ray angiogram, in which a contrast dye is injected into the arteries to make them more visible; and, sometimes, a cholangiogram, a special liver X-ray in which contrast dye is injected into the bile ducts either by inserting a needle directly into the liver or using an endoscope.

“Obviously a relative or friend who wants to donate is willing to potentially have major surgery to remove part of his or her liver, and would be willing to have the more invasive screening tests,” said Dr. Carr. “But now we can usually gather the same information with a single MR study using these two new techniques, which are much simpler and less expensive than the standard screening protocol.”

The two MR techniques are magnetic resonance angiography (MRA) and TrueFISP (which stands for fast imaging with steady state precession). Both use radio waves and a magnetic field rather than radiation to capture images. The two are implemented using a recently developed high magnetic field strength MR system that has ultrafast imaging capabilities and can be performed in the same session.

The potential donor lies on a horizontal table that is moved through the magnet, which looks like a large tube. TrueFISP rapidly takes “slice” pictures of the abdomen in multiple planes and clearly

demonstrates the anatomy of the feeding and draining veins. It depicts the internal structure of the liver and its relation to other organs. In addition, the volume of liver to be donated can be accurately measured from these images to determine if it is of satisfactory size. When that test is finished, the patient receives contrast fluid intravenously and then MRA is performed, providing three-dimensional images of the blood vessels leading to and away from the liver. Both of these techniques can be combined with additional imaging to illustrate the bile ducts and assess the amount of fat in the liver. The entire MR study lasts 30 minutes and provides a comprehensive assessment of a potential living donor in a completely non-invasive manner.

In the study, 47 potential living donors ranging from 20 to 57 years old were screened with the two MR methods. After the screening, 16 had surgery to donate their livers. Recipients included 6 adults and 10 children. There were no serious complications among the donors. Two adult recipients died due to complications from the surgery. The adult transplants were performed at Northwestern Memorial Hospital and the pediatric transplants were performed at Children's Memorial Hospital, both in Chicago.

When the recipient is a child (often suffering from a fatal childhood liver disease called biliary atresia), typically a portion of the left lobe is surgically removed from the living donor's liver and transplanted. Adult-to-adult transplantation is riskier and often involves transplanting the right lobe of the liver. Adults most often need transplants due to cirrhosis caused by hepatitis C.

The first living liver donor transplant — a mother donating to her 21-month old daughter — was performed in 1989. The first adult-to-adult living liver donation was performed in 1997. Survival rates for children receiving living donor livers vs. cadaveric livers are comparable, with about three-quarters surviving

after five years, according to studies. Because adult-to-adult living liver donor transplantation is a newer technique, long-term survival rates haven't been determined.

More than 1,000 people worldwide have donated portions of their livers. The surgery entails a 5 percent to 10 percent risk of complications for the donor, including infection, blood clots and narrowing of the bile ducts, which eventually are resolved. Three donors died as a result of the surgery. Because of the risks, cadaveric donation is preferred. Living donor livers do have several advantages for the recipient. Living donor livers are outside the body for a very short time, and are therefore in better condition. Also, the surgery can be performed while the patient is in stable, rather than critical condition. Typically the most critical patients are those who get priority to receive cadaveric livers, since there are not enough for everyone on the waiting list.

Co-authors of a paper on the topic being presented at SCVIR by Dr. Carr are: A. Nemcek, M.D.; A. Blei, M.D.; J. Abecassis, M.D.; J. Fryer, M.D.; and J. Finn, M.D.

An estimated 5,000 people are attending the SCVIR Annual Scientific Meeting. The Society, based in Fairfax, Va., is the professional association for physicians who specialize in minimally invasive interventional radiology procedures.

An interventional radiologist is a physician who has special training to diagnose and treat conditions using miniature tools and imaging guidance. Typically, the interventional radiologist

performs procedures through a very small nick in the skin, about the size of a pencil tip. Interventional radiology treatments are generally easier for the patient than surgery because most involve no surgical incisions, less pain and shorter hospital stays.

#

Copies of 2001 SCVIR news releases are available online at www.pcipr.com beginning Monday, March 5.

Editor's note: Study numbers are current as of February 19, and may change upon presentation at the SCVIR annual meeting.

General consumer information on interventional radiology is available online at www.scvir.org.