Benefits and Risks of Living Donor Liver Transplant
Webcast
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Introduction

Andrew Schorr:
Hello, this is Andrew Schorr for UCSF Medical Center with another one of our Patient Power interviews with a leading medical expert from UCSF Medical Center. One of the areas, and there are many areas where UCSF Medical Center shines, but when it comes to organ transplant it certainly is a national if not an international leader, and the Chief of the Transplant Services is Dr. John Roberts who joins us today, and what we'd like to discuss with Dr. Roberts is one of the more exciting areas in transplantation and that is transplantation from a living donor.

One of the areas where it's certainly made it difference is with the transplantation of the liver. Dr. Roberts thinks so much for joining us.

Dr. Roberts:
I'm glad to be here today.

Andrew Schorr:
Dr. Roberts, where does it fit in? Why do we have the need for liver transplants, and where the shortfall in donations from people who've died where so many thousands of people are on the waiting list, and where living donation comes in?

Dr. Roberts:
Pretty much everybody knows there are not enough organs for all of those patients who need to get transplants, and what happens is, is that organs are actually directed in liver transplantation to those patients who are the sickest. So the patients who have the greatest chance of dying in the next three months or so are the ones who get the priority for the liver transplant.

This works well if you're fairly sick, but one of the problems is that patients who are really sick are frequently in the intensive care unit. They have deteriorated to the point where they have multiple medical problems, other organs aren't working, and to take them to the operating room makes it so that the operation becomes higher risk, and then it takes the patients much longer to recover after transplant because when you're relatively well you can walk out of the hospital say within a week after
transplant, but if you're really sick and in the intensive care unit, it may take weeks to months before you can get back to a normal life.

Living donor liver transplant is a method of providing patients who have a living donor with a liver before they get really sick. So that's kind of where I see living donor liver transplant. One of the things I tell all my patients is that if we had enough cadaver organs to go around we wouldn't do living donor liver transplants because one is we don't want to put a donor at risk, but the second is that it's a more difficult surgery for the recipient because you're getting a piece of a liver rather than a whole liver. It takes you longer to recover, and it has more complications related to where we sew together the blood vessels and the bile ducts.

**How Does Living Donor Liver Transplantation Work?**

**Andrew Schorr:**
Okay, well let's make a couple of points. First of all, you and your team, the whole multidisciplinary team at UCSF, you are really leaders in this, and I know you've done about 2100 liver transplants for adults and children since 1988, so quite a lot, and then in your Center of Excellence of course too. I believe there are about over 17,000 people on the waiting list for a liver transplant, and maybe 1700 people die every year as they're waiting. So filling this gap in where there is an available living donor can make a difference. You mentioned about the liver, taking a piece of the liver. So, many of us are not familiar with that. Is the liver the one organ that you can actually take a piece from a donor and it will regenerate into a whole liver in the recipient?

**Dr. Roberts:**
When we think about living donor transplant, what we're banking on is the ability of the liver to regenerate itself. Now, it's not the same sort of regeneration we think about with the starfish where we cut off the arm and it grows a new arm. With the liver, what happens is the remaining liver gets bigger, and your body knows the size of the liver that it needs, and when it recognizes that there is not enough liver, it sends nutrients and signals to the liver and says "get bigger."

It's a process that probably happens within normal people every day. Our liver is changing in size slightly, not enough so that you can measure it, but it probably changes a little bit in size every day. If we cut out part of a liver, and so I take out the part of a liver and transplant it into somebody else, the donor, the person who has given up part of their liver, the remaining liver hypertrophies. So it gets bigger, and the number of liver cells increases, and so it gets big enough so that everything goes back to normal in the donor.

In that piece of liver that I put in the recipient, it also gets bigger because the recipient's body is saying "not enough liver" and sends signals to the liver "get
bigger and bigger," and it grows, and both of these processes happen really fast so that if I put in piece of liver that's small in somebody, within actually a week or so that liver will have grown a lot. It probably continues to grow over a long period of time like six months to a year, but most of that growth happens within days to weeks after the surgery, and it can happen so fast that we have to during the recovery period, particularly for the donor, we have to give the donor a lot of extra nutrients to allow that liver to grow. So that's one of the things that we do.

**Diseases of the Liver**

Andrew Schorr:
Wow. Now Dr. Roberts, help us understand what sort of health conditions are the situation where a liver transplantation is needed. I know it relates to end-stage liver disease. What does that mean? What are the situations that the patients find themselves in where they really need a donor?

Dr. Roberts:
End-stage liver disease refers to a liver that's failing, and a very high percentage of those livers are what we call cirrhotic, or the patient's liver has become cirrhotic, and what cirrhosis is, is the scarring of the liver tissue.

There are many different causes of the scarring. Viruses are common. Hepatitis B, hepatitis C, what we call autoimmune diseases where the body attacks the liver itself such as primary biliary cirrhosis is an autoimmune disease; sclerosing cholangitis is an autoimmune disease; and so those diseases where the liver is being destroyed by either the virus or an autoimmune disease, it can only scar, and why it doesn't regenerate has to do with the fact that there is this ongoing scar tissue that blocks that regeneration.

As the liver scars down, what happens is the blood that normally passes through the liver can't get there, and so the blood backs up around the stomach and esophagus and finds another way back. It's also like putting your finger over the end of a garden hose, where when you run water through a garden hose and there's nothing blocking the end it all looks fine, but you put your finger over the end and all of a sudden you would see little holes all over the place, and that's what happens. The water that's in the blood starts leaking out and fills up the abdomen. Finally the liver is responsible for processing waste and toxins that come from your intestines. They have to be passed through the liver in order be cleansed, and when the blood can't get through the liver, then those toxins can get around to the brain and cause people to be confused and not themselves, and that's called encephalopathy.

So when a liver becomes cirrhotic, those are the common complications. We see that the patients have bleeding from their stomach and intestines. They have abdomens that become full of fluid. Their ankles swell with the same type of fluid,
and they also can become confused and not themselves. Those are kind of the main things that we see when people get end-stage liver disease and have cirrhosis.

**Differences Between Living Donor and Cadaverous Liver Transplant**

**Andrew Schorr:**
Well, nobody wants to get there of course, and so let's take a few minutes now and understand the benefits and the risks of living donor liver transplants. First of all for the patient we understand it gives them really the chance of life and a higher quality of life when otherwise, they can be so sick. Thinking about the patient, are there particular risks for them and having a transplant from a living donor that would be any different than if it were a cadaverous liver?

**Dr. Roberts:**
The first thing is for the recipient, the patient who is going to get the transplant, is that there are different risks associated with getting a living donor transplant versus a cadaver transplant, and a picture's worth a thousand words, but really what you can think of is that the blood vessels in the bile ducts enter the liver with a trunk. So they have kind of a big round part of the blood vessels and bile ducts. Then as they come into the liver they divide in branches very similar to the way a tree branches, and when we do take out part of the living donor liver, we have to leave them with the trunk of the tree and the branch to the part of the liver we leave behind because without it they couldn't survive. So we can only use a branch to say the right side of the liver. We get the branch of the bile duct and the branch of the blood vessels to that side of the liver, and as with branches in a tree, the size of the branch is always less than the trunk, so that you have a small branch versus a large trunk, and in surgery when we sew things together, it's easier to sew things together that are bigger, have a bigger diameter like the trunk of a tree, than things that are smaller in diameter like a branch.

So when we sew together the branches of the blood vessels and the bile ducts, there's a greater chance that things can go wrong. Most of those problems that occur are problems with where we sew the bile duct together because it's very thin and doesn't have a very good blood supply, and so patients who get a living donor transplant they have an advantage in that they don't have to wait until they get really sick, and they can get transplanted kind of on an elective basis, but what happens is that the risk of complications related to where we sew together the bile duct is about twice as high as if you got a cadaver liver. So that's the main difference between getting a piece of a liver and a whole liver is really that the branches that we have to work with are smaller, and there are more troubles associated with them.

Now it doesn't mean that those problems lead to the patient, the recipient, losing their new piece of liver, but it can mean more time in the hospital, more time with the radiologists as we try and take care of these problems and potentially a return
trip to the operating room, but over time all these things usually heal up, and it just means more time in the hospital and in the physicians offices until these things heal.

**Evaluation and Risks to the Donor**

Andrew Schorr:

Of course we should say, as patients and families consider this is your team is at the top tier of experience with this sort of transplant. So certainly as surgeons like to say, people can feel that they are in good hands, that you're going to do the very best that's available anywhere. What about on the donor side? What are things for someone who's considering being a living donor? What do they need to consider so they go in with their eyes open? What evaluation happens to make sure that they're right for this procedure?

Dr. Roberts:

Well, the first thing we do with the living donor is to 1) send them what we call a health history questionnaire. It's a questionnaire that asks them about general health issues, and what we want to do is make sure that the patient is healthy. They have to be between the ages of 18 and 55, and then they have to have a blood type that's compatible with the recipient. So that means that if the recipient is type O, they have to be type O. If the recipient is type A, they could be type O or type A. So there are some rules in regard to blood type to make sure that they're compatible.

At that point, what we do is if they're compatible and it doesn't look like they have medical problems, we have a number of things that happen. One is that they seek what we call the Independent Donor Advocate, and in our institution this is a social worker whose real responsibility is to make sure that the donor gets through the process with a good understanding of the issues regarding donation of a piece of liver in general and then issues regarding their specific case. They see an internist who looks at them for their general health. They see two surgeons, myself and Dr. Asher who does the donor surgery, to discuss their particular case. We do a lot of blood tests, and we then do a number of x-rays. One set of x-rays is to look at the blood vessels to the liver to make sure we can safely cut out the right or left lobe of the liver, and then another set looks at the bile duct so we can make sure that the bile duct has the right anatomy to be able to donate a piece of liver. Not everybody has an anatomy that allows them to donate a piece of liver. That doesn't mean that their liver will ever cause them trouble. It just means that there is no way we can cut that piece of liver and safely give it to somebody else.

There is a risk of death associated with donating a piece of liver. It's about one in 500 we think for the risk of death. The risk of death of donating a kidney is about one in 3000, so this is a riskier operation than donating a kidney. The stakes are usually higher for the recipient of the transplant because unlike kidney failure,
where you have a dialysis machine, in liver failure we don't have that kind of machine that allows a patient to survive until they can get a cadaver organ.

So there's a risk of death, there is a risk of complications associated with any surgery, and there are complications associated with this surgery. There's going to be pain related to having an incision, and people really need to think that they're going to have to take some time out of their life until they get back to feeling normal. We have surveyed our donors and have asked them how long did it take you to feel 100% again? When the donors responded, about half of them said that within six weeks they felt back to 100%. Three quarters of the people felt they were back 100% by three months, and the last quarter took six months before they felt that they'd recovered back to 100%. Now when people talk about being 100% that's a psychological feeling of, you know; I feel well, I'm doing everything I want to do; because people are going to be changed because they now have a scar across their abdomen that they didn't have before. So those are the kinds of things that I think the donor needs to understand about as they're going forward with this surgery.

Andrew Schorr:
Dr. Roberts, I know your team has really immense experience comparatively in doing this, and since January of 2000 you've done over a hundred of these living donor liver transplants. You must feel that the donors really have given an incredible gift and have been very courageous as they've done this.

Dr. Roberts:
Yes, I think we are always in awe of what the donors have done in terms of providing of themselves to the recipients. It really is a heroic act because people take on themselves not only a risk of death but also pain-and-suffering in order for their loved one to get the benefit of the liver transplant.

You know, the donors have always impressed us in terms of their selflessness in doing that. We try to make sure that we protect the donor from injury and risk that's outside of the other risks that we know of for this operation. That's why we have an Independent Donor Advocate that really helps to make sure that the donor understands the issues involved with donation and that there are not issues related to say their personal life at work or finances that would suffer after they've donated. So we really think the donors have done a lot, and we try to help the donors in whatever way we can to make this a positive experience.

Andrew Schorr:
Well, Dr. Roberts, I want to congratulate you on the program you have at UCSF Medical Center. I know it's certainly exemplary, and I know you'd agree with me that we all wish there were more donor organs available from people who die who choose to make arrangements so that organs can be donated, but since there is that gap it's really wonderful what you and then the donors are able to do to fill
that in a way that gives people continued life. Dr. John Roberts, Chief of the Transplant Service at UC San Francisco Medical Center, thank you so much for being with us. I really appreciate your time and your devotion to patients.

Dr. Roberts:
Well, thank you for having me on, and I have to say that here at UCSF taking care of both the donor and the recipient is really a team effort, and I'm only a part of that, and it's the nurses and the doctors and the other healthcare workers that really allow us to do well with taking care of these patients.

Andrew Schorr:
Right. Thank you sir. Well, for more information about the physicians and services, please call our physician referral service at 1-888-689-UCSF (1-888-689-8273). I'm Andrew Schorr, and you've been listing to Patient Power brought to you by UCSF Medical Center.

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