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Hepatic Resection and Transplantation

### HEPATIC RESECTION AND TRANSPLANTATION.

As we extend the bounds of surgical resection for hepatic malignancies, we overcome previously held limitations of our efforts against the disease. How do our techniques in theories on hepatic resection also relate back hepatic transplantation?

You are listening to ReachMD XM 157, the channel for medical professionals. Welcome to the clinicians roundtable. I am your host, Dr. Mark Nolan Hill, Professor of Surgery and practicing general surgeon. Our guest today is Dr. Alan Hemming, Professor of Surgery and Chief of Transplantation and hepatobiliary surgery at the University of Florida College of Medicine.

**DR. MARK NOLAN HILL:**

Welcome Dr. Hemming.

**DR. ALAN HEMMING:**

Thanks for having me here Mark.

**DR. MARK NOLAN HILL:**

We are discussing hepatic resection and transplantation. Dr. Hemming it has always been that you are either trained as a hepatobiliary surgeon or a transplant surgeon. How are you doing both and what is going on now in the training of young surgeons in terms of both hepatic resection and transplantation.

**DR. ALAN HEMMING:**

Traditionally, in United States, we are trained as someone who resects the liver or takes part of the liver out or transplanter who does liver transplantation and kidney transplantation, etc., that has not been true in countries other than the US. In Europe and in Canada, the training has been geared towards disease process, so that if you are a liver surgeon, you did liver resectional surgery and transplantation. I think what has changed in the US a little bit over the last few years is the introduction of living-related donor transplantation where the transplanters all of a sudden got involved in resecting part of the liver or use as a donor graft. The necessary

techniques for that were sort of transported from resectional surgery once the transplant has gotten involved in that there was some crossover between the two of sharing of information and ideas to lead to, I think, a hybrid type of surgery and everybody realizing that there was a benefit to combine training.

**DR. MARK NOLAN HILL:**

So, it will not be in the future that some who called themselves clearly either just a transplant surgeon or a resectional surgeon?

**DR. ALAN HEMMING:**

Although, there are still surgeons who would be doing only liver resectional work, I think you are going to see more and more of the very high-end surgery being done by people who can do both liver transplantation and resection work.

**DR. MARK NOLAN HILL:**

Which is technically more demanding?

**DR. ALAN HEMMING:**

Both transplantation and resection at the high end have equally demanding components, in fact, many of the components are the same.

**DR. MARK NOLAN HILL:**

In your practice what are the most reasons that you do transplantation for?

**DR. ALAN HEMMING:**

Where I am, we do both pediatric and adult liver transplantation and the most common reason I would perform a liver transplant right now is for end-stage liver disease secondary to hepatitis C and a very close part of that currently in the United States is hepatocellular carcinoma, usually from hepatitis C, but primary liver cancers also have become a very big indication for transplantation.

**DR. MARK NOLAN HILL:**

Do you ever transplant for alcoholic cirrhosis?

**DR. ALAN HEMMING:**

We do, in our particular area approximately 10% of the patients; probably have alcoholic cirrhosis that undergo transplantation. To be

clear, those are the patients that damage their liver with alcoholic cirrhosis, but are no longer drinking and have undergone at least a 6-month period of sobriety with counseling and psychotherapy.

**DR. MARK NOLAN HILL:**

Are there any ethical issues with that?

**DR. ALAN HEMMING:**

I think they are always ethical issues when it comes to liver transplantation. The bottom line is we have scarce resource. We have more patients on our waiting list at any given time than we will have livers. Approximately, 10% to 15% of the patients on the waiting list will die while awaiting a liver. So, when you start making judgments about who does and does not get a liver, there are always ethics involved. The decision about whether to transplant someone who has alcoholic liver disease is really one that is made almost by society rather than any particular transplant program. It is a standard across United States to transplant folks who have developed alcoholic liver disease. It is a relative standard to transplant only people who have demonstrated that they had stopped for a prolonged period of time.

**DR. MARK NOLAN HILL:**

In your research you have demonstrated preoperative portal vein embolization. Why do you do this and what does it do?

**DR. ALAN HEMMING:**

Preoperative portal vein embolization refers to prior to doing the liver surgery and removing say three-quarters of the liver or more, we would go in with our interventional radiologists, have them put a needle into the portal vein, and the portal vein is the main vein that comes from the gut that brings blood flow into liver and initially branches into a right and a left inside the liver. If we were going to leave just a small portion of the left side of the liver, we would have our interventional radiologist place needle into the right portal vein, block it and that diverts all of the portal flow into the left side of the liver that causes the left side of the liver to grow before the surgery. So, we may increase the volume of the left lobe of the liver by 30% to 40% which gives us a much greater margin of safety, so that if we then were resecting say all of the right side of the liver and half of the left, instead of leaving only 20% or 25% of the liver we may now be leaving 30% or 35% of the liver which would give us much less risk of liver failure.

If you have just joined us, you are listening to the clinicians roundtable on ReachMD XM 157. I am your host, Dr. Mark Nolan Hill, and our guest today is Dr. Alan Hemming, Professor of Surgery and Chief of Transplantation and Hepatobiliary Surgery at the University of Florida College of Medicine. We are discussing hepatic resection and transplantation.

**DR. MARK NOLAN HILL:**

Dr. Hemming, is hepatic resection ever done for nonmalignant disease?

**DR. ALAN HEMMING:**

Oh certainly! There are a variety of tumors in the liver, tumor just meaning something that occupies some space, I guess, that are benign, that would include things like adenomas, which are something that have some malignant potential, but have bigger potential to bleed and we would resect those. There are certain cysts or cystadenomas that we have resected are benign. There are varieties of other things that we might do.

**DR. MARK NOLAN HILL:**

And what about benign conditions that require aggressive extended hepatic resection?

**DR. ALAN HEMMING:**

If we are referring to the surgery, then we probably should include vascular reconstruction and variety of very large operations. It would be rare that we would perform that for, in fact, I cannot think a reason that we would do it, do it for a benign condition. The majority of the time that we are doing these extensive resections include vascular reconstruction or taking out very large amounts of liver. It is to get a margin on a malignant condition. So, in other words, get rid of all of the cancer cells. For a lot of the benign conditions, we would not need that sort of clearance and is very unlikely that we would need to go at those great lengths.

**DR. MARK NOLAN HILL:**

How do you coordinate these extended resections with the adjuvant therapy such as chemotherapy or radiation type treatments?

**DR. ALAN HEMMING:**

It really very much depends on the type of disease we are resecting, but for instances for colorectal metastasis to the liver. We would generally these days give preoperative chemotherapy that would include agents like Avastin that have to stopped about 6 to 8 weeks prior to the surgery due to some complications they can cause, so we would time the chemotherapy. They usually get about 6 cycles of chemotherapy, we would wait 6 to 8 weeks then do their surgery after that and then usually about 6 weeks after that they will restart their chemotherapy.

**DR. MARK NOLAN HILL:**

I know that there are researchers working specifically to study how to protect the liver during the surgical procedure. Can you tell us briefly about that?

**DR. ALAN HEMMING:**

Sure! There are a variety of different ways of doing this. One of the things we during liver surgery or we may do is interrupt blood supply to the liver, so that there is no bleeding as we come through the liver. That obviously gives an ischemic injury to that liver. There is no blood flow to it. One of the ways is to protect the liver. For that you can cool the liver and that is one of the things we do in some of the very large resections that we do. We can use something called ischemic preconditioning, means we temporarily interrupt the blood flow to the liver, not while we are coming through it, but just to give it a small, I guess, taste of the things to come. What that does is it primes the biochemistry of the hepatocytes or the liver cells to sustain a greater injury later on, so it will tolerate cessation of blood flow for

longer period of time, so what we will do is put the clamps on the inflow to the liver for about 5 minutes, then we will release it for 15, and then the next time we put the clamp on, we can leave it on for up to an hour and the liver will tolerate that injury much better. There are also a variety of different drugs that people are working on for inducing the same mechanism to improve the liver function after we finish the surgery.

**DR. MARK NOLAN HILL:**

Why is it so important to protect the liver?

**DR. ALAN HEMMING:**

There are 2 things that we do as we resect; obviously we are taking out a percentage of the liver function. There is a certain volume of liver there, if we take more than about 80% of that volume, we risk the patient going into liver failure. One of the ways of preserving some of the immediate function is to protect it from the ischemia that we give it. So, let us we had a liver that was going to have 20% of its function if we did not give it an ischemic injury, but we give it an ischemic injury and that throws it down to 10% where that person can go into liver failure. So, if we protect it and keep it at that full 20% of what we leave that patient will survive and go on for possible cure.

**DR. MARK NOLAN HILL:**

Now, I am talking about transplantation. You mention that a reasonable percentage of the patients will die waiting for their transplant. What is the average time that someone who waits until they get a transplant?

**DR. ALAN HEMMING:**

That very much depends on how sick they are and what region of the country they are in. The way that the livers are allocated in United States goes by something called a MELD score, which is an assessment of how sick they are, how much liver dysfunction they have, so that the sicker you are, the more likely you are to get a liver transplant. Now there is some regional disparity in terms of at what point you are getting transplant and with what MELD scores. For instance, in Florida we tend to transplant a relatively lower MELD score, in other words less sick patients, then might be the case in the New York or Chicago area, just because of demand in that area for livers. For instance if you have a liver tumor that fits within certain criteria, then your MELD score may be bumped up in order to transplant you sooner, and if your MELD score is very low, then you may wait for very, very long time before you get transplant, more than a year. On average, I would say 50% of the patients that are on our list in Florida are transplanted within 6 months.

**DR. MARK NOLAN HILL:**

Now, I am a great Mickey Mantle fan, but you might recall many years ago Mickey Mantle in the medical community there were some concerns he needed a transplant and it seemed that he got his transplant very, very rapidly. Any comments on this?

**DR. ALAN HEMMING:**

Well, there were lot of comments about when he got his transplant he was inappropriately put to the top of the list, I can assure you that really was not true. There is a very strict selection criteria that is different now than it was then, but the bottom line is there was always a list, it is not something that you can pick and choose over, and there actually was an investigation into the whole Mickey Mantle issues and there was never shown to be any favoritism or jumping of queues or anything like that.

**DR. MARK NOLAN HILL:**

Finally, we always talk about minimally invasive surgery and laparoscopic approaches. Does this have any role, even in the future, into extended hepatic resection or transplantation?

**DR. ALAN HEMMING:**

Well, even now, we use laparoscopic surgery for some liver resections. There are few people that have done some extended operations; extended liver resection or what we call extended liver operations, none of them that would include vascular resection. I would never say never, techniques advance all the time and it may well be at some point that we can those techniques in the future. One of the limitations obviously is you have to get things in and out of somebody, so if you are taking a very large piece of something out, you have to have a hole to get it out, similarly with liver transplantation, you have to get a liver out and a liver in and there are certain size, so you need a certain size hole to get it in. We certainly do right and left lobectomies which is half a liver. We will perform those laparoscopically. People have used laparoscopic liver surgery to do the living donor operations to minimize the amount of discomfort that someone who is willing to donate part of the liver will have. So, I think that as the technology improves then I think for sure there is a role for more laparoscopic surgery in both liver transplantation and resection.

**DR. MARK NOLAN HILL:**

I want to thank our guest, Dr. Alan Hemming. We have been discussing hepatic resection and transplantation. I am Dr. Mark Nolan Hill and you have been listening to the clinicians' roundtable on ReachMD XM 157, the channel for medical professionals. Be sure to visit our website at [ReachMD.com](https://ReachMD.com) between on demand podcast of our entire library. For comments and questions, please call us toll free at 888 MD XM 157 and thank you for listening.

This is Leah Binder, Chief Executive Officer of the Leapfrog Group, and you have been listening to ReachMD XM 157, the channel for medical professionals.