The Center for Liver Disease and Transplantation at NewYork-Presbyterian Hospital

Advances in medical care come about as a result of research aimed at improving the understanding, diagnosis, and treatment of disease. The findings of clinical trials can change the standard of care and enhance clinical practice in ways that benefit patients and their families.

Academic medical centers not only lead and participate in such clinical research, but also conduct basic science investigations with the potential to improve clinical care. At NewYork-Presbyterian Hospital, investigators are performing translational research that starts in the laboratory and is transferred to the clinic to help patients. Moreover, clinical observations frequently extend back to the lab to inform new avenues of study. Here are some examples of those types of inquiry at NewYork-Presbyterian/Columbia University Medical Center.

### Withdrawing Immunosuppressive Therapy in Pediatric Liver Transplant Recipients: A Reality?

NewYork-Presbyterian/Columbia was the only center in New York to participate in a multicenter study, published in the *Journal of the American Medical Association* (2012;307:283-293), demonstrating the feasibility of withdrawing immunosuppressive therapy in pediatric living donor liver transplant recipients. In this pilot study, 60 percent of pediatric recipients of parental living donor liver transplants remained off immunosuppression therapy for at least one year with normal graft function and stable allograft histology. The remaining children were placed back on medication after their livers showed signs of rejection.

Physicians would like to avoid long-term use of immunosuppressants because they may lead to complications such as cancer, diabetes, hypertension, and kidney failure. If validated in larger studies, these findings have the potential to improve the lives of children who receive liver transplants at a young age.

### Study Shows Feasibility of *Ex Vivo* Transplantation

Surgeons at NewYork-Presbyterian/Columbia published a study in the *American Journal of Transplantation* (2012;12:1323-1328) reporting successful outcomes among three patients who had multivisceral *ex vivo* surgery for tumors involving the celiac and superior mesenteric arteries. Abdominal tumors involving both roots of these arteries are deemed unresectable by conventional surgical methods. Our surgeons performed three cases of multivisceral *ex vivo* surgery involving temporary removal of the entire abdominal viscera followed by vascular reconstruction, *ex vivo* tumor resection, and autotransplantation of excised organs. They achieved a complete tumor resection with negative margins in all cases. All patients have survived, with no tumor recurrence to date at 17, 27, and 38 months of follow-up.

The findings indicate that multivisceral *ex vivo* surgery applying the techniques of deceased donor multivisceral transplantation is feasible for achieving local control of otherwise unresectable abdominal tumors.

### Using Bone Marrow Transplantation to Prevent Organ Rejection

NewYork-Presbyterian/Columbia researchers are assessing the combined use of bone marrow transplantation and liver transplantation to induce tolerance in recipients of liver tissue from living donors. The rationale: the transplantation of bone marrow from the same person donating the liver tissue may alter the recipient’s immune system to make it more receptive to the donor organ. If this approach is validated, its clinical use could obviate the need for chronic immunosuppressive therapy. Prior studies have indicated this may be possible with kidney transplantation, and it is now being explored for liver transplantation.

This line of inquiry is at the stage of preclinical research. Investigators...
Basic science and clinical research have the potential to improve liver transplantation outcomes in the future.

benefit from the strong history of collaboration between surgeons, medical doctors, and laboratory investigators at NewYork-Presbyterian/Columbia. They hope they can apply the results of their studies to induce specific tolerance in recipients of liver tissue from living donors.

**The Benefits of Machine Preservation**

Preserving organs on ice prior to transplantation, an approach known as cold storage, has been the standard practice in liver transplantation for 20 years. Now there is new evidence that a technique called hypothermic machine perfusion (HMP) may improve organ preservation. HMP has been used to enhance graft function and survival in kidney transplant recipients. NewYork-Presbyterian/Columbia physicians were the first to compare conventional cold storage with HMP in liver transplant recipients.

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What Influences Living Donor Liver Transplant Outcomes?

NewYork-Presbyterian/Columbia is the only institution in New York City participating in the national multicenter NIH-funded Adult to Adult Living Donor Liver Transplant Cohort Study (A2ALL), which is focusing on the factors influencing the outcomes of living donor liver transplants for both donors and recipients. Researchers are comparing outcomes of this procedure with those for patients who receive livers from deceased donors.

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