# Over Half Of Liver Transplant Patients Develop Metabolic Syndrome

Researchers from Israel have determined that more than half of liver transplant recipients develop post-transplantation metabolic syndrome (PTMS), placing them at greater risk for cardiovascular disease. Prior to transplantation only 5% of the patients were diagnosed with metabolic syndrome, but rates of obesity, hypertriglyceridemia, hypertension, and diabetes were significantly higher post transplantation. Full details of this retrospective-prevalence study are available in the January 2011 issue of *Liver Transplantation*, a journal published by Wiley-Blackwell on behalf of the American Association for the Study of Liver Diseases.

Metabolic syndrome, which is comprised of obesity, hypertension, hyperglycemia, and dyslipidemia, is commonly seen in patients following liver transplantation and is double the rate reported for the general population. Prior studies have found that immunosuppressive medications including calcineurin inhibitors and corticosteroids; modifiable lifestyle choices such as food intake, which can contribute to weight gain and insulin resistance; and the underlying liver disease itself (chronic hepatitis C virus infection and nonalcoholic fatty liver disease), all play a significant role in the development of metabolic syndrome.

In order to determine the prevalence and risk factors associated with PTMS, Professor Ziv Ben Ari and colleagues from the Liver Transplant Unit at Rabin Medical Center—the largest such unit in Israel—reviewed the files of 252 patients who received a liver transplant between 1985 and 2007. Researchers analyzed pre- and post-transplant clinical and laboratory data, including height, weight, waist circumference, presence of diabetes, hypertension, or hyperlipidemia, and prescribed medications (immunosuppressive, anti-hypertensive, hypoglycemic, and lipid-lowering drugs).

Researchers diagnosed PTMS when at least three of the following criteria were met: increased waist circumference, elevated fasting serum triglycerides, elevated blood pressure, abnormally high fasting serum glucose, high BMI and low high-density lipoprotein-cholesterol. Major vascular events were defined as transient ischemic attack, cerebrovascular accident, acute coronary syndrome, and myocardial infarction. Coronary events were identified by coronary angiography or coronary revascularization.

"We found significantly higher rates of obesity, hypertriglyceridemia, hypertension, diabetes and low HDL cholesterol, in patients following liver transplantation," said Professor Ben Ari. Researchers determined that PTMS patients were older and heavier than those in the non-PTMS group, and had a higher rate of pre-transplant chronic hepatitis C virus infection.

Further analysis showed significant independent predictors of PTMS were age, pre-transplant nonalcoholic fatty liver disease, BMI, diabetes, and triglycerides. Patients with PTMS also experienced more major vascular and cardiac events following their transplants than those without PTMS (15% versus 5%). "PTMS is associated with cardiovascular morbidity but not mortality, and it may be predicted by pre-transplantation conditions," concluded Professor Ben Ari.

In an editorial also published this month in Liver Transplantation, Michael Charlton, MD, FRCP, from the Mayo Clinic Transplant Center commented, "Professor Ben Ari and colleagues provide new evidence of the increasingly high prevalence and important associated outcomes of PTMS. Well designed, prospective studies are needed to validate these new observations and to establish optimal strategies for the diagnosis, prevention and management of post-transplant metabolic syndrome."

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