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Limiting blood flow interruption during kidney surgery avoids chronic kidney disease

ROCHESTER, Minn. -- Interrupting the blood flow for more than 20 to 25 minutes during kidney cancer (<http://www.mayoclinic.org/kidney-cancer/research.html>) surgery leads to a greater risk for patients developing chronic kidney disease, a Mayo Clinic and Cleveland Clinic collaborative research team has found. The study was published today in the journal, *European Urology*.

For the retrospective study, researchers analyzed outcomes of 362 patients with only one kidney who underwent surgery for renal cortical tumors at Mayo Clinic and Cleveland Clinic between 1990 and 2008. Using a technique called warm ischemia, surgeons kept the patient's kidneys at body temperature during the partial nephrectomy. Ischemia involves cutting off the blood supply to the kidney with clamps in order to control bleeding and to keep blood from obscuring the surgeon's view of the kidney. It also allows for precise closure of the urine collecting system and the surgical opening. The median ischemia time was 21 minutes in the study and the median age of patients was 62 years.

Ischemia can cause tissue damage from a lack of oxygen and nutrients. Researchers found that each additional minute of warm ischemia is associated with a 5 to 6 percent increase in the odds of developing acute renal failure or reduced kidney functioning and is associated with a 6 percent increased risk of new onset Stage IV chronic kidney disease during long-term follow-up.

"This is the largest evaluation of warm ischemia time in patients with a single kidney who are undergoing a partial nephrectomy, combining the experiences of the Mayo Clinic and Cleveland Clinic, both leaders in the field of kidney cancer," says R. Houston Thompson, M.D.,

(<http://www.mayoclinic.org/bio/13623818.html>) Mayo Clinic urologist and the study's primary investigator. "These results suggest that every minute counts when the renal arteries and veins are

clamped. When planning for the surgery, surgeons should make efforts to minimize ischemia time, especially in situations where a person only has one kidney."

"Historically, 30 minutes was considered the maximum safe duration of warm ischemia during partial nephrectomy, and other retrospective clinical studies have suggested that warm ischemia for 40 to 55 minutes is safe," says Dr. Thompson. "However, these studies included patients with two kidneys, which could mask the true effects of ischemia on renal function.

"Because each additional minute of warm ischemia invites the risk for chronic kidney problems, if longer ischemic times are unavoidable, techniques such as ice slush (cold ischemia) should be considered."

The researchers stress that the study's results do not have implications for patients treated with cold ischemia.

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Collaboration

Collaborators include Brian Lane, M.D.; Amr Fergany, M.D. and Steven Campbell, M.D. with the Glickman Urological Institute, Cleveland Clinic Foundation; Christine Lohse, Bradley Leibovich, M.D., (<http://www.mayoclinic.org/bio/12144681.html>); Igor Frank, M.D., (<http://www.mayoclinic.org/bio/12529231.html>) and Michael Blute, M.D., all of Mayo Clinic; and Inderbir Gill, M.D., Keck School of Medicine, University of Southern California.

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VIDEO ALERT: A video interview with Dr. R. Houston Thompson describing the research is available on the News Blog

(<http://newsblog.mayoclinic.org/2010/06/11/limiting-blood-flow-interruption-during-kidney-surgery-help-s-avoid-chronic-kidney-disease/>).

