Kidney Stone Theory

What causes kidney stones is still a mystery. The most accepted theory says that kidney stones form where calcium oxalate crystals attach to injured cells in the kidney. However, research published in the Journal of Clinical Investigation (1 March 2003) disproves this theory. Andrew P. Evan, PhD, of Indiana University led a study that confirms a theory postulated by Alexander Randall, MD, in 1940. Dr. Randall believed that kidney stones develop from calcium phosphate crystals in the tip of the renal papilla.

Using infrared analysis and other technology that were unavailable to Dr. Randall, researchers from Indiana University School of Medicine, Clarion Health Partners, and the University of Chicago studied tissue from three types of kidney patients: those with calcium oxalate stones (the most common type of kidney stone), those likely to develop kidney stones after having intestinal bypass surgery; and a control group who had malignant tumors in their ureters. The researchers also took kidney biopsies. They discovered that each group followed a different progression. Calcium oxalate stones initially form from calcium phosphate crystals in the interstitial tissue within the papilla, just as Dr. Randall proposed. However, stones found in the bypass group begin forming in the lining of very small tubules on their way to the ureter. No stones formed in the control group during this study, but ongoing research indicates that the crystals begin forming stones in yet another location. Dr. Evans says that the difference in location may stem from the physiology and diet that are unique to each group.

Current Theory on Cause of Kidney Stones Refutes. www.sciencedaily.com 4 March 2003

Kidney Transplants

Finding a compatible kidney donor may become a bit easier within the next few years for thousands of people waiting for transplants in the US. To increase the likelihood of a successful transplant, donor and recipient must have the same blood type and match a high number of HLA factors. HLA refers to human leukocyte antigen, which is an inherited immune-system protein found on the surface of white blood cells. In addition, the recipient's blood should not show an antibody reaction to the donor's blood. Finding a healthy person who meets these specifications and who is willing to donate a kidney is difficult. About 40% of the 11,000 kidney transplants performed each year use organs from living donors. The rest come from people who donated their organs upon death. The number of kidneys from living donors may increase with the help of a new program that is scheduled to become nationwide by 2007. The new kidney 'swap shop' will allow a transplant patient who has a willing but incompatible donor to switch donors with another patient in the same predicament so that each has a better donor match.

The problem of antibody incompatibility has been the subject of experimental research by surgeons at Johns Hopkins University and at Mayo Clinic. They have successfully filtered antibodies from a kidney patient's blood using plasmapheresis. In this technique, a centrifuge separates red blood cells from the fluid that contains antibodies. The red blood cells are returned to the body via a saline solution, and the fluid with antibodies is discarded. At Johns Hopkins, patients also receive new antibodies, collected from many donors, to provide some immune protection. The process is repeated over several days until the cross-matching test shows no reaction to the kidney donor. Then, the patient undergoes transplant with the regular course of immunosuppressive drugs.

According to The Merck Manual, "About 90% of kidneys obtained from living donors are functioning one year after transplantation; 3 to 5% of these kidneys stop functioning during each year that follows. About 70 to 90% of kidneys from someone who has just died are functioning after one year; 5 to 8% stop functioning during each year that follows. Transplanted kidneys sometimes function for more than 30 years."

Kidney 'swap shop' offers patients hope www.newscientist.com 8 July 2005


