

New Firefly technology lights up more precise kidney sparing surgery

June 5 2012



Keith Kowalczyk, M.D., uses Firefly fluorescence technology with the Da Vinci Robotic System to spare healthy kidney tissue when removing cancerous kidney tumors. Credit: MedStar Georgetown University Hospital

A surgical technology called Firefly is shedding new light on kidney cancers and helping doctors at MedStar Georgetown University Hospital remove tumors more safely and more efficiently while sparing the rest of the healthy kidney.

"The addition of Firefly fluorescence during robotic surgery improves

our ability to remove [kidney tumors](#) when before we might have had to remove the whole [kidney](#)," said Keith Kowalczyk, MD, [urologist](#) and robotic surgeon. "Firefly, which essentially utilizes a dye that lights up in "firefly green" when using a specialized fluoroscopic camera, can show us the difference between cancerous and healthy tissue and helps us see the blood supply to the tumor. It lights up parts of the kidney and its blood supply we couldn't see this well before."

This new innovation uses the minimally-invasive precision of the da Vinci Surgical System, and adds the second component of Firefly fluorescence imaging. MedStar Georgetown is one of the first hospitals in the DC region to use this new technology.

When Eugene Carter of Washington, D.C. was diagnosed with [kidney cancer](#), the decision to have [robotic surgery](#) by Dr. Kowalczyk while utilizing fluorescence imaging seemed the obvious choice.

"I'm 70, and with advanced age the hazards of surgery can increase, so I wanted the least [invasive surgery](#) possible," explained Mr. Carter. "The robotics provide more steadiness and precision, and I wanted my surgeon to be as steady and as precise as possible. It seems to me this is just a much wiser system."

How does it work? The Firefly technology uses near-infrared imaging to detect an injected tracer dye of indocyanine green (ICG) in the blood.

During surgery, urologists use the Firefly system at three different stages of the procedure. The first injection of the dye into the IV by the [anesthesiologist](#) gives a detailed picture of the blood supply to the kidney.

"Up to 25-percent of patients might have extra renal arteries that are not always obvious on a CT scan or MRI, so the Firefly can help us see these

arteries. This helps us ensure that all of the blood supply to the kidney is accounted for and controlled prior to the removal of the tumor, and can therefore decrease blood loss," explained Dr. Kowalczyk.

The second injection of dye helps the surgeon differentiate between the cancerous tissue and the normal kidney tissue, which can allow for better tumor removal and potentially a lower risk of leaving any cancer behind. Finally, after the tumor has been removed and the kidney has been repaired, the dye can again be injected again to ensure that the [blood supply](#) to the kidney has been properly restored.

Besides the known benefits of robotic minimally-invasive surgery—including smaller incisions, less blood loss, less postoperative pain, shorter hospital stays, and earlier returns to work—the addition of the Firefly system can improve patient outcomes even further.

"Additionally, the ability to better distinguish between tumor tissue and normal kidney tissue may lead to a lower risk of leaving any tumor behind, and therefore better long-term cancer control," said Dr. Kowalczyk.

According to the American Cancer Society, kidney cancer is among the 10 most common cancers among both men and women. The ACS estimates that about 64,770 new cases of kidney cancer will occur in 2012, and about 13,570 people will die from the disease.

"I'm so glad I was able to keep my kidney," said Mr. Carter. "Without this new system, my kidney might not have been able to be saved."

Provided by MedStar Georgetown University Hospital

Citation: New Firefly technology lights up more precise kidney sparing surgery (2012, June 5)

retrieved 4 May 2024 from

<https://medicalxpress.com/news/2012-06-firefly-technology-precise-kidney-surgery.html>

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