


Treating Bladder Cancer Bladder Removal Surgery

Part 1: radical cystectomy options
With Dr. Alexander Kutikov, MD, FACS
from Fox Chase Cancer Center



BCAN
Bladder Cancer Advocacy Network

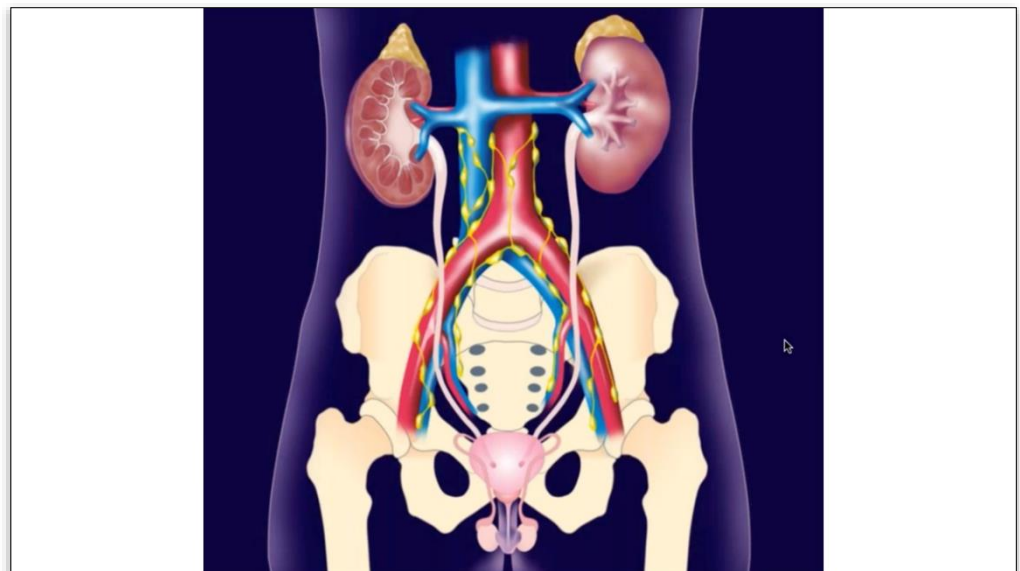
The Basics of A Radical Cystectomy and Ileal Conduits

Dr. Alexander Kutikov:

But we're here to really talk about cystectomy, and let's talk a little bit about anatomy. This is what's called the retroperitoneum, which is a fancy word for the organs that live behind the bowel sack. This is kind of the anatomy that we're used to seeing, and this lives behind it. These are the kidneys. These are the ureters, the tubes that go from the kidneys to the bladder. This is the bladder, and this is the prostate in the male. We'll talk about female urological anatomy in a minute. The inner lining of the bladder is the same as the inner lining of the ureters and the same as the inner lining of the kidneys.

When we talk about urothelial carcinoma, which is basically the main type of cancer that bladder cancer patients have, that is the same lining that lines the ureters and the kidneys. So patients with bladder cancer are at risk of developing tumors along their ureters and inside of the kidney. It's very important for those people that are being

monitored for bladder cancer, whether they had or didn't have a cystectomy, is to have routine imaging of their upper tract. The upper tract, we basically call the kidneys and the ureters. These blue and red pipes are the great vessels. This is the aorta that brings blood away from the heart and goes down to the legs. The blue are the veins. This is the iliac veins and the vena cava. These yellow nodes and little yellow channels is the lymphatic system. What the lymphatic system does in the healthy state, is that it traffics



the immune system to appropriate areas of the body. Just like if you have a sore throat, you get a lymph node that's enlarged in your neck.

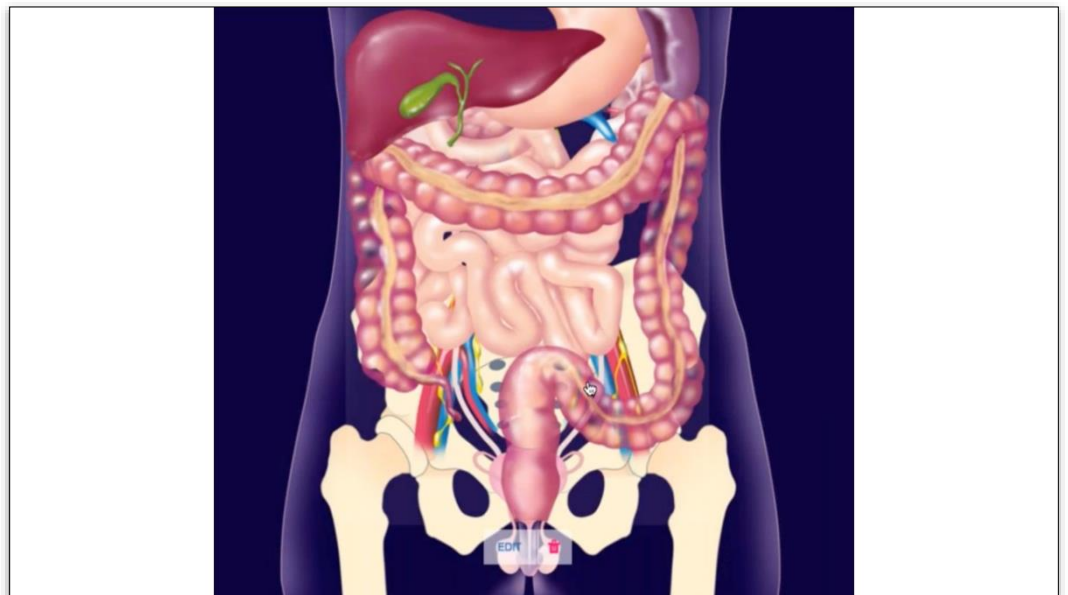
Dr. Alexander Kutikov: Well, many cancers, including bladder cancer, hijack this lymphatic system and use it as a highway for cancer to spread. When a bladder is removed, and along with the bladder removal in males, the prostate is removed ... We'll talk about sort of what organs are removed during during a female cystectomy in a minute, because it's really changing.

But when cystectomy is done, it's important to also harvest lymph nodes in the pelvis, and it serves a dual purpose. It serves a diagnostic purpose. It allows us to know where things stand and whether the cancer has spread. Then it also serves, some believe, a therapeutic purpose. Where if in some patients who have a low volume of lymph node positive disease, sometimes we can get a very long disease free interval and potentially even a cure. These lymph nodes that are shown here are removed during cystectomy on both sides. When we talk about urinary diversion, we talk about having to get the urine out once the bladder has been removed.

These ureters are cut and they obviously need to be plugged into something in order for the urine to leave the body. Some patients ask a great question, "Why can't you just take the ureters and put them to the skin and put a bag on it and not use anything else to plug the ureters in?" That actually can be done. It's called cutaneous ureterostomy. The problem with that is that they don't stay open. They stricture and they close down. Also the appliance to collect urine is very difficult to keep on a cutaneous ureterostomy, because it basically leaks under the adhesive on the appliance and it's very difficult to take care of. We actually use the gastrointestinal track to help us divert the urine. Let's talk about the gastrointestinal tract. Basically, you have the stomach, which is here. Then the stomach leads to the small bowel, which is the duodenum to jejunum. This last part of the small bowel right here is called the ileum. This ileum leads into the colon. This is the right colon, this is a transverse colon, this is the descending colon, and the sigmoid colon, and this is the rectum.

Dr. Alexander Kutikov:

That's the GI tract, and it's really the main urine diversions are performed using the ileum. Because the ileum is actually part of the bowel that it doesn't do as much absorption, which is what you want when you're trying to store urine. You don't want things to go back into the body. We also, for Indiana pouches that I'll show you, we use the colon. These are the three main urinary

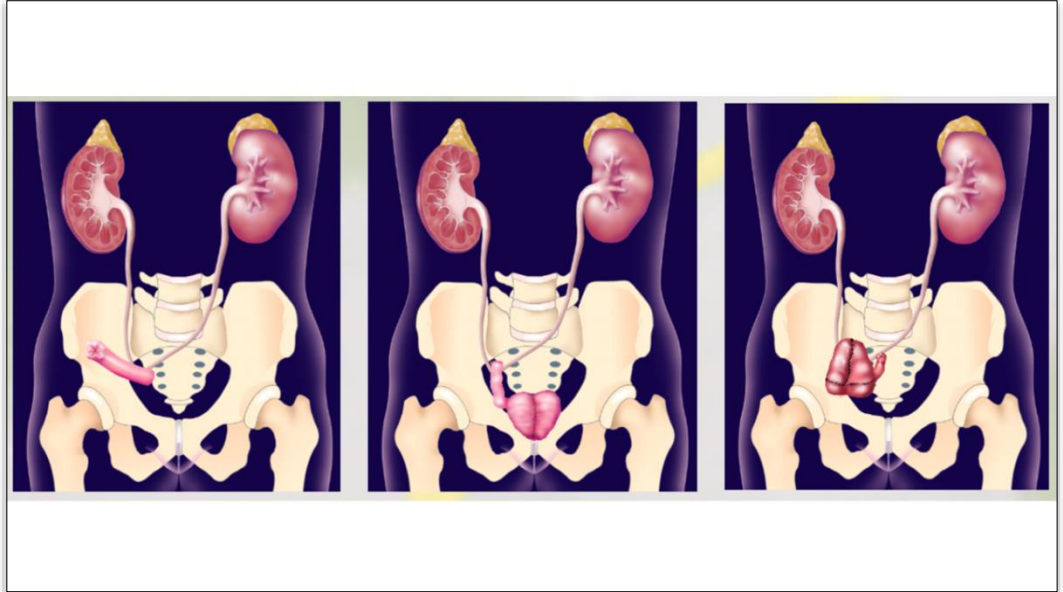


diversions. There is the ileal conduit, which is right here. We basically take a small segment of the small bowel, we disconnect it from the remainder of the small bowel. We're reconnect the small bowel, so

obviously the gastrointestinal track is in continuity. Then we plug in the ureters into this ileal conduit. It's a conduit for urine to leave the body. We'll talk a little bit about this in a minute, but basically this end of the ileal conduit comes out of the body wall, and that's how urine collects on the body wall into an appliance. This diversion is called the neobladder.

Dr. Alexander Kutikov:

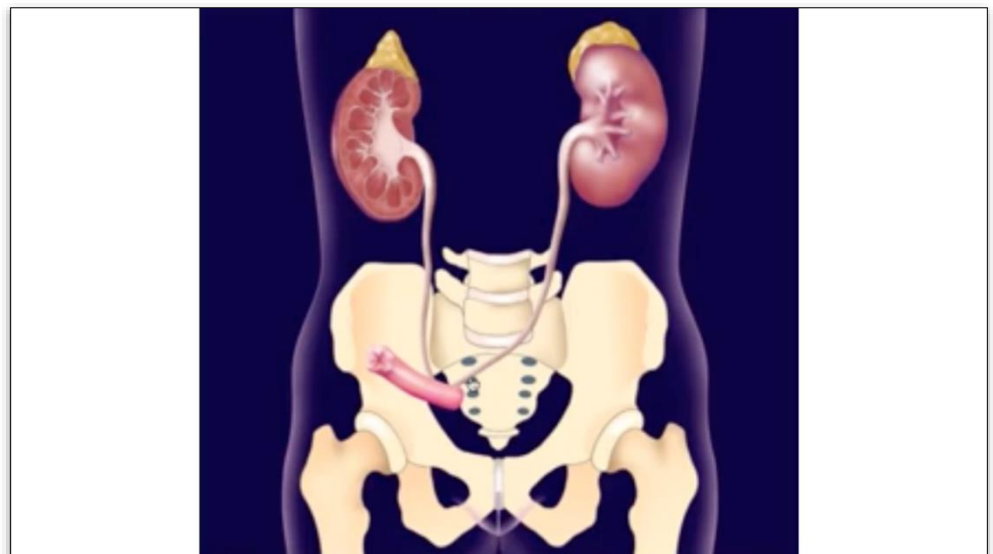
It's taking a longer segment of the small bowel, about 60 centimeters, and sewing it into a first of all, detubularising it. Which is important because the bowel kind of has this peristaltic motion, and it's going to push urine in a certain direction. You want to disrupt that motion, so you detubularise it, and then you sew it into a spherical reservoir about the



same volume as one's bladder. You have this thing called the chimney, which actually does peristalsis and it pushes the urine this way away from the kidneys into the neobladder. Then the neobladder is sewn to the urethra. Both men and women can have this diversion, and they urinate out of the urethra. They don't have an appliance, they don't have a bag. This is definitely an option for some patients. We'll talk a little bit in a minute about what the trade-offs are. Why shouldn't everybody get this? This is called an Indiana pouch. This is a pouch that's made out of that right colon. This is a colon pouch.

Although this pouch, there is a stoma here, and you can even, in younger patients, put it in the belly button where you can hide it in one's belly button and their umbilicus, patients have to catheterize themselves through the belly button or through a small stoma on the side to get the urine out. Again, it's a good option for the right patient, and we'll talk a little bit about who selects these and why choose one versus another.

Let's talk about the ileal conduit first. This is certainly the type of urinary diversion that gets employed by most patients and surgeons. A lot of patients come in for a cystectomy at an older age. They're frail, they have other medical problems, and this is the simplest



diversion to perform and this is associated with the least complications. But even those younger patients who are candidates for other diversions, sometimes choose this one because sometimes this one is not associated with some risks that a neobladder or an Indiana pouch can expose the patients to. We'll talk about sort of what those risks are. What are the big risks for folks who have ileal conduit?

Dr. Alexander Kutikov:

One of the biggest hassles for somebody who has an ileal conduit is having a parastomal hernia. Which is basically bowel sneaking next to the opening that one used to create an ileal conduit in the abdominal wall, and what's called a fascia. Fascia is kind of the leather that keeps one together, and you have to make a hole in it in order to pull through

the ileal conduit. This is what it looks like. This is what an ileal conduit, the tip over that of that conduit looks like on one's skin. Basically a bulge here next to it can happen over months and years and can, a, be problematic where bowels can get stuck in there. But more commonly can just cause a bulge and it'd be uncomfortable to patients and make it difficult to have the appliance fit. This is a significant issue in patients with ileal conduit, and it happens in about a quarter of patients, about 25%.


Recently, this is just this last year, there was a prospective randomized trial that was done in Sweden, where surgeons put in mesh, put in prophylactic hernia mesh at the time of bladder cancer surgery in order to try to prevent these hernias. Now, why wasn't this done before? Because there were concerns. There were concerns that you're putting a foreign material, mesh, during a surgery where you have urine in the field and you actually have bowel content in the field because you're opening the bowel and reconnecting it. People were worried about infections, but this was a prospective randomized trial, which is what's called level one evidence in medicine. Which is as good as it gets. Over a two year study

period, there was no increase in complications, no increase in length of stay or other really clinically relevant negative outcomes. Really patients did just as well, whether they got this mesh or not. The rate of hernias, the rate of parastomal hernias with this mesh was cut down in more than half. It went from 20 ... It wasn't perfect. Still 11% of patients

Parastomal Hernias

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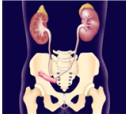
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Bladder Cancer – Editor's Choice

Preventing Parastomal Hernia After Ileal Conduit by the Use of a Prophylactic Mesh: A Randomised Study

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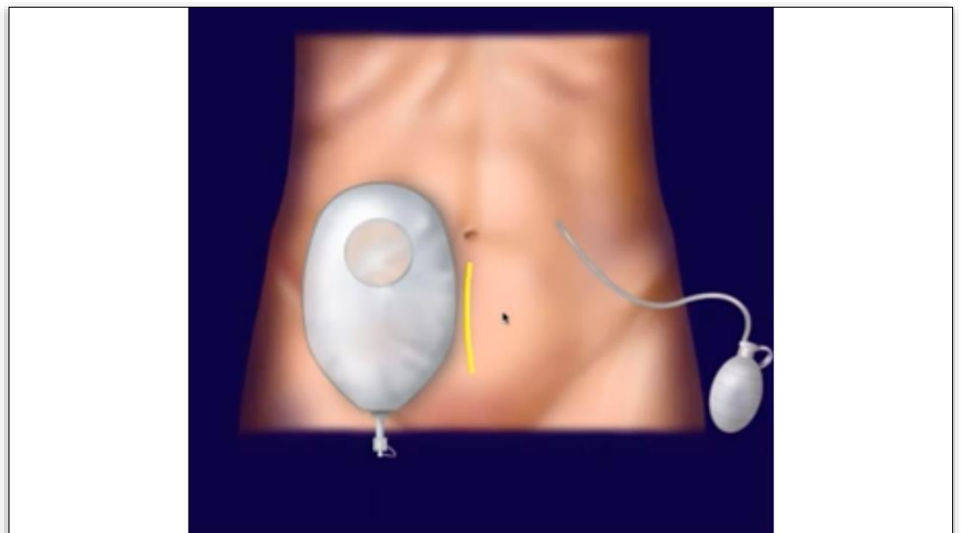


This trial, represents the best available evidence for any strategy to prevent parastomal hernia

Placement of a synthetic mesh around the stoma underneath the rectus muscle decreases the risk of developing a clinical parastomal hernia from approximately 23% to 11%.

This adds to the length of the operation but no increase in complications, length of stay, or other clinically relevant negative outcomes were noted over the >2 year study period.

Fox Chase Cancer Center recently rolled out program to offer patients prophylactic parastomal hernia mesh at time of radical cystectomy/ileal conduit



got it but it went down to a rate of 23% to 11%.

Dr. Alexander Kutikov:

Again, this is, they had half the patients walk through a door where they didn't get mesh, and they had half the patients walk through a door where they got mesh and the compared results. There was a market reduction. Many centers, including our center at Fox Chase, we're now offering this prophylactic

mesh to our patients and find it quite helpful. I showed you this. This is an incision from an open radical cystectomy and ileal conduit. We'll talk about robotic cystectomies, but let me just show you what that looks like. There's a couple of ways to do robotic cystectomy. One is to take the bladder out robotically and then have small incisions that basically where you took it out, you still have to open the abdomen to remove the specimen. Through that small incision, you do the bowel

work and the ureter work. What's been happening recently is that people have been trying to do all that work with the robot without actually opening. We'll show there's a lot of sort of discussion controversy around that approach. But in the right hands, that's a fine operation.

Again, we'll jump to the deliverables of robotics in bladder cancer, but unlike some other spaces, especially spaces that I work in, like prostate cancer and kidney cancer, where really robotics is a game changer, in bladder cancer, there's a lot more controversy on whether it is a superior approach to a small incision such as this. We'll talk about that in a minute. This is what it looks like soon postoperatively, a small open incision. Here's the ileal conduit.

These are stents. These are stents that are coming out of the stoma, and I'm going to show you those in the minute. They come out of the stoma like this. These stents really go all the way up to the kidneys and they help with these connections that we make from the kidneys to the ileal conduit. As I'll show you, that's another source of complications after these operations. The one thing I do want to talk about is

Incisional Hernias

14.3% develop incisional hernias

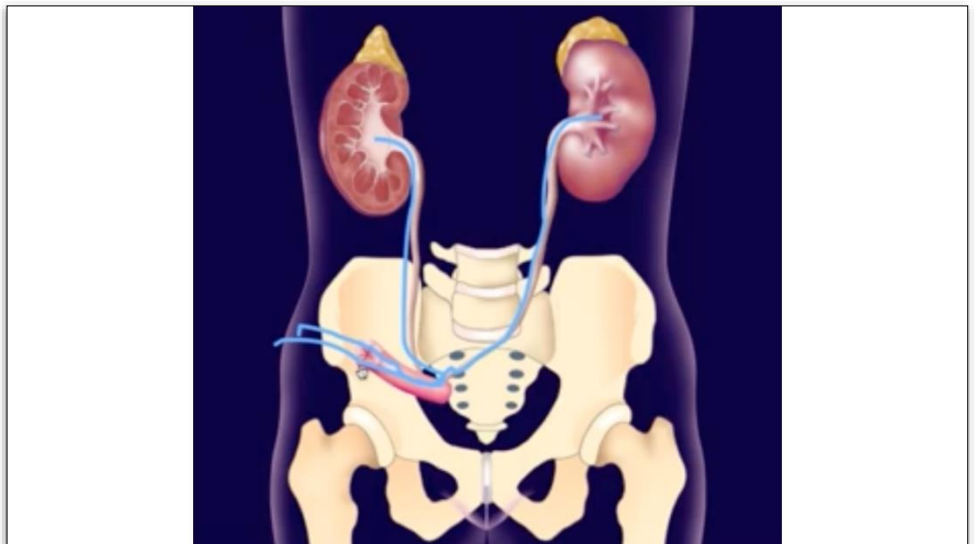
- 13.6% open
- 20.3% robotic (p=0.15)

9.0% undergo repair

- 8.2% open
- 12.5% robotic (p=0.21)

Supraumbilical rectus diastasis width (RDW) was an independent predictor of both developing an incisional hernia (OR 1.52, p = 0.023) and needing it repaired (OR 1.43, p = 0.039)

Edwards... Kutikov Incisional hernia after cystectomy: incidence, risk factors and anthropometric predisposition. *The Canadian journal of urology* 25, 9573–9578 (2018).



incisional hernias. These are hernias through the cut, and a lot of folks are coming to these surgeries not sort of after chemotherapy and some nourishment issues and incisional hernias are quite common.

Dr. Alexander Kutikov:

15% of the time that they happen, in about 9% of the time, at least in the experience that we published, they have to be repaired. That's another risk that bladder cancer patients face and what we actually looked at our center. At least when we did the robotic approach by making a small incision to do the extracorporeal work for doing the bowels, the hernia rates were, not statistically significantly higher, but actually a bit higher.

At least not better. We were hoping maybe robotics solves that issue, and it doesn't look like it does, at least with the standard approach with robotics. The one thing that predisposes one to a hernia like this, if your belly, when you're sitting up and you have a bulge what's called diastasis recti, which is under your breastplate. Where your belly starts, you see a bulge when you're sitting up, that's called diastasis recti. If you have that, your chances of developing an incisional hernia for any surgery is about 50% higher. This is what the cystectomy patient sees when they come out of surgery.

They have the appliance on the stoma and they have a drain. The drain sort of allows one to have a window into the belly. Usually, these drains come out before one leaves the hospital. Although some surgeons in some instances you do have to go home with the drain. The drain site, if it gets removed, sometimes leaks for a while. Which is just the bruise fluid, it's called peritoneal fluid. But because everything is so inflamed inside, your body produces a lot of it. Sometimes that drain site leaks quite a bit, and sometimes actually needs an appliance bag just for the drain site for a few days and sometimes even for a few weeks. Also, both in men and in women, you can have leakage of this fluid that this drain is picking up. Then after it's removed, you might have some fluid coming out of the penis or out of the urethra remanent or the vagina in women. That sometimes is disconcerting, but it's something that's often expected and obviously speak to your surgeon, but not something that need to be overly concerned about because that's very common.

Dr. Alexander Kutikov:

These are the stents, I showed you that. The stents are used to prevent strictures, prevent this area where the urinary tract is sewn into the gastrointestinal track from shutting down. The stents stay there anywhere from one to three weeks, depending on your surgeon's preference. When they get removed in the office, it's not a painful procedure. The stents are there to allow this area to heal. The removal of the stents and the stents clogging up before is sort of a common source of urinary tract infection. About 30% of patients get a urinary tract infection around the time of cystectomy and whenever you manipulate those stents, sometimes that's when it happens. Even though we'll give you antibiotics a lot of us in practice before, during and after stent removal, sometimes we still can't prevent these infections. One of the very common

Ureteral Anastamotic Strictures

Real-time indocyanine green angiography with the SPY fluorescence imaging platform decreases benign ureteroenteric strictures in urinary diversions performed during radical cystectomy

Jim K. Shea, Jazir Jannagawalla, Bartram E. Yuh, Mitchell R. Bassett, Anish Chohan, Jonathan R. Warner, Ali Zhunkhawala, Jonathan L. Yarnes, Christopher Whelan, Nora H. Ruel, Clayton S. Lau and Kevin B. Chan

Robotics and Laparoscopy BJUI

Use of indocyanine green to minimise uretero-enteric strictures after robotic radical cystectomy

Noriman Ahmadi, Akbar N. Ashraf, Natalie Hartman, Aliogor Shokir, Giovanni E. Cacciaroni, Daniel Freitas, Niranjan Rajanubendra, Carlos Foy, Andre Borges, Mihir M. Desai, Indrabir S. Gill and Mariah Avon

Fox Chase Cancer Center is employing SPY fluorescence imaging to reduce rates of ureteral anastamotic strictures

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complications of bladder cancer surgeries is to have a urinary tract infection. Which it sounds like not a huge deal, but it actually, around the time of cystectomy, it is a big deal. A lot of times you need a readmission to the hospital.

It sets once recovery back, you get exhausted, sometimes need IV antibiotics, you have high fevers, even sepsis. We haven't figured out a perfect way to prevent them, but the stents sort of sometimes contribute to them. If this area's strictured, then your kidney gets hydronephrotic. In the past, in large series, this happened anywhere from five to 15% of the time. There is now techniques, there's sort of been a disruption in this space where this technological SPY fluorescent imaging has been used to look at the blood supply. This is a picture from one of the surgeries of Fox Chase, where you can see this is the left ureter through the SPY camera. You can see kind of the bright vascularized area of the ureter go all the way down to the tip. Whereas here, this area is gray. If this area was connected to the ileal conduit, it would've likely strictured because of the blood supply is not good. I'm not showing you sort of interoperative pictures, because I know some folks don't want to see those. But I'll tell you that it looks identical through white light, through surgeon's eyes.

Dr. Alexander Kutikov:

You can't tell the difference between these. This SPY technology allows you to visualize the blood supply. You can do this both through open and robotic cystectomies. The trick here is just to cut back this ureter. Sometimes it makes the surgery a little bit more challenging because there's sort of plumbing and length issues, but almost always it's possible. That way it helps prevent strictures. There's been a couple of publications now, and I've adopted this in my practice several years ago and I find it extremely helpful to cut down on the rate of urethral strictures. Which are really complications that set patients back and make recovery much more challenging. What other complications briefly? There're recurrent infections. I mean, other infections right after surgery, but about a quarter of patients have urinary tract infections after the receiver urinary diversion. These data are from 15 years of followup for pioneers in cystectomy like Studer, where they follow their patients diligently for decades. These are the numbers.

25% of recurrent infections, urinary stones and these complications usually occur beyond on five and 10 years. Impaired kidney function due to obstruction or ureter reflux happens in about a third of patients. We always got to watch kidney function after these diversion. Stomal complications, we talked about that.

Other Complications

- recurrent kidney infections (~ 25%),
- urinary stones (this complication often occurs beyond 5 to 10 years after surgery, ~10%)
- impaired kidney function due to obstruction or ureteral reflux (~27%)
- stomal complications (~25%) such as parastomal hernia, stenosis, and bleeding/skin irritation.
- up to 25% of patients may have bowel complications, such as small bowel obstruction, fistula formation, and diarrhea.
- ~30% readmission
- >60% overall complication rate even at most experienced centers
- The vast majority of issues that arise can be handled non-operatively, but some do require re-operation.

Up to 25% may have bowel complications. Which is you're cutting the bowel, you're reconnecting it, and things like small bowel obstruction, fistula formation, diarrhea, are very difficult sort of problems to

tackle and very difficult for patients. But these are the kinds of the most feared complications by surgeons and patients. Usually manageable, but definitely sort of very frustrating for everybody involved. 30% of patients get readmitted. If you count all the complications, these are surgeries. Regardless of what center you look at, and some of the busier centers are most honest about sort of reporting their complications, greater than 60% complication rate. I tell my patients, there's only about a 40% chance and potentially less that you get through the surgery without any issues, without any glitches.

Dr. Alexander Kutikov:

We've got to brace ourselves that there are going to be some bumps in the road, and this is why it's important to partner with a center and a surgeon whom you trust. Because this is not a single event, the surgery, this is a process. This is a journey that you got to go through together. The vast majority of issues that arise can be handled non-operatively, but some do require a second surgery.

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