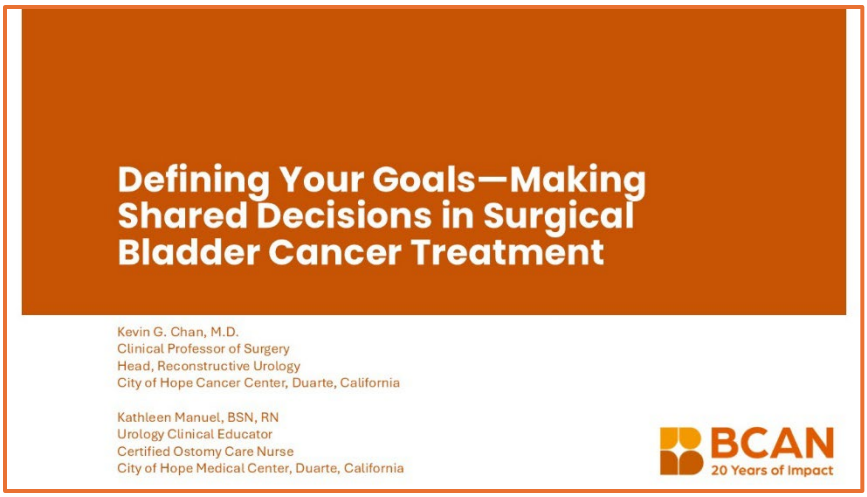
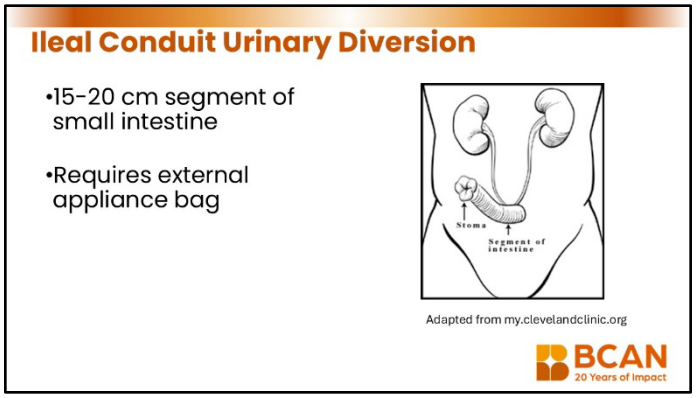


Part 2 of 4

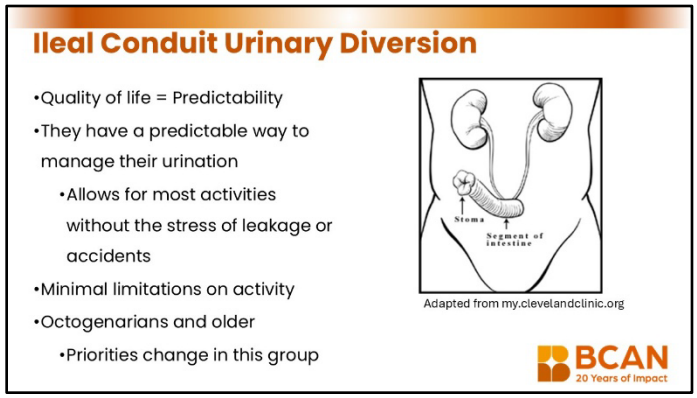
Dr. Kevin Chan:

The ileal conduit is the simple option. It uses a short segment of intestine and we hook the kidneys into one end and we make a stoma at the other end. That stoma requires an external bag that sticks to your abdomen with skin adhesive like a band-aid.



Dr. Kevin Chan:

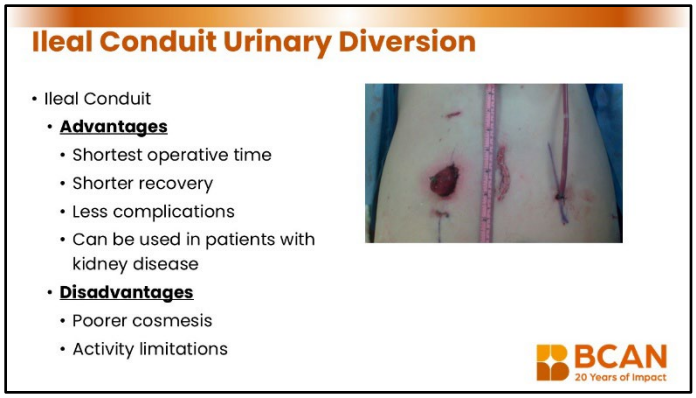
So when we talk about the ileal conduit, I always say quality of life equates to predictability. Meaning if you empty that bag, you know you're good for four hours. You can be at dinner with family or friends, you could be at the grocery store, you can be in a wedding. You have a way of managing this urine without stressing about having an accident or knowing what to do or some unpredictable event. So I



would say honestly, that's the biggest benefit of an ileal conduit is that it's predictable.

We talk about some mild activity limitations. Kathy and I have a patient that rides a road bike 25 miles a day with his external bag. We have another gentleman who hit a hole in one golfing nine months after his surgery with his external bag. So honestly, I think the activity restrictions are pretty limited. I think you can pretty much do anything you want, and there's ways to make that happen.

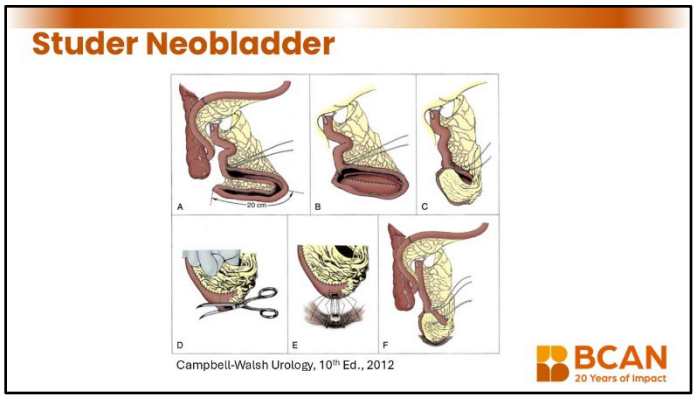
Dr. Kevin Chan:



So the advantages of an ileal conduit are it is a shorter operative time, I'd say, versus the others by usually about, I'd say two hours. There's a little shorter recovery, and that's because urine's going straight into the bag. It's not getting reabsorbed by the intestine. There's less complications just simply because there's just less steps involved. So it's a much more straightforward surgery. With this reconstruction or this urinary diversion, we can use it in patients without great kidney function. So if somebody has problems with their kidneys, this is usually the best option for them.

The potential downsides is obviously the mental hurdle of accepting that there's a bag on your abdomen draining urine. Honestly, as I tell patients, the majority of the time most of us walk around with a shirt on. I think it's a small mental hurdle, but in the big scheme of things, it doesn't really make a big difference in your quality of life per se. We talked about really some just mild activity limitations.

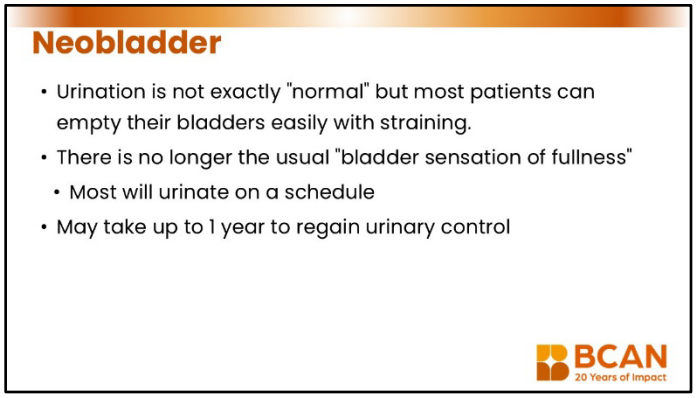
Dr. Kevin Chan:



Then there's the neobladder. We perform a Studer neobladder, but there's a number of different kinds of neobladders that are performed. The concept is the same. We use about two feet of intestine. We create a spherical reservoir. For the Studer there's a little chimney that we hook the kidneys in and we hook

this spherical reservoir to the urethra so you can pee through the penis or the vagina again. So it sounds great and it often works incredibly well.

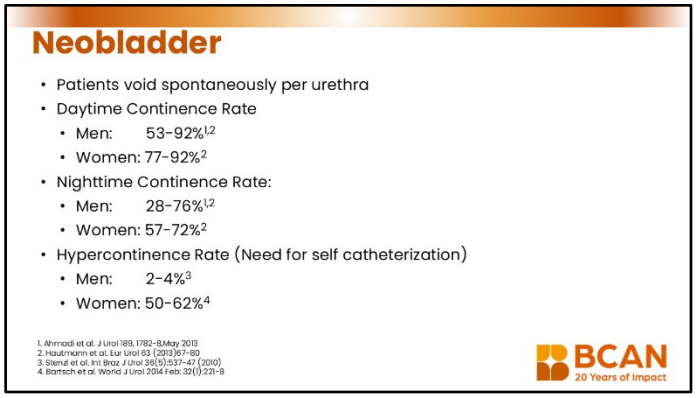
Dr. Kevin Chan:



Urination is not exactly normal. Remember that this is a piece of intestine, so it doesn't have the ability to push urine out like you normally would. You'd actually have to strain almost like a bowel movement to empty the bladder. Like I said, there's no sensation. So you urinate more on the schedule.

Every once in a while patients say they do have some sensation or some physical cue that their bladder is full, but we essentially have patients urinate essentially on a clock just to make sure they don't get too full. It can take up to a year to regain somebody's urinary control.

Dr. Kevin Chan:



Probably the most important things patients want to know with an neobladder is continence. What are the chances I'm going to have to wear a diaper? I'd say overall the numbers range, but my general number is I think it's about 75% chance you will not need a diaper in men and women. Really, if you're urinating on the schedule in the daytime, usually it's not a problem. The last to come back is the nighttime control, and that's because you have no sensation. So if you're sound asleep and your bladder gets too full, it's just going to start leaking and you have no warnings to tell you that. So what we tell patients is we try to set an alarm once or twice in the middle of the night, and if we can do that, if we can empty it before it gets too full, generally we have good nighttime control as well.

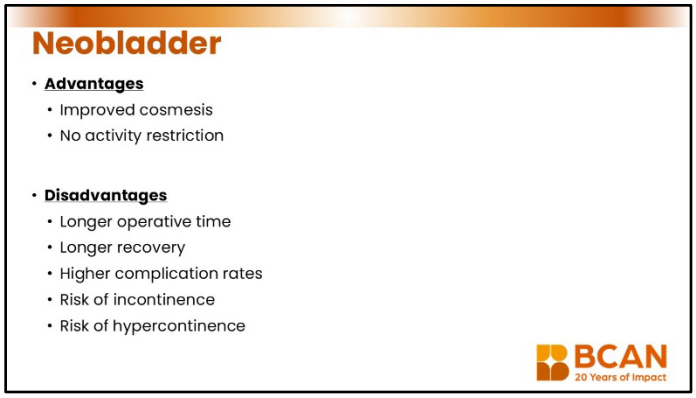
There's also something called hypercontinence. This is a weird concept where there's no physical blockage, but patients just simply cannot urinate. They push and strain

as hard as they can and no urine comes out. We can scope them, we can put a catheter in, but for whatever reason, they can't urinate. It's almost like it's kinked. In men, this is very uncommon. It's about 2% to 4%, but in women it happens about 50% of the time.

This is obviously something to consider as we think about this option. I will say though that these patients with hypercontinence in general do pretty well because if you think about it, at least they're continent. They're not wearing diapers. They have a predictable way of managing the urination. They have an extra step to urinate.

For some people, this is not a big deal. So they'd say, "Hey, you know what? I'm okay with taking this chance." I think in men, it happens so rarely. I think it's something that you have to be willing to do, but it's not common. In women, it's a definite possibility.

Dr. Kevin Chan:

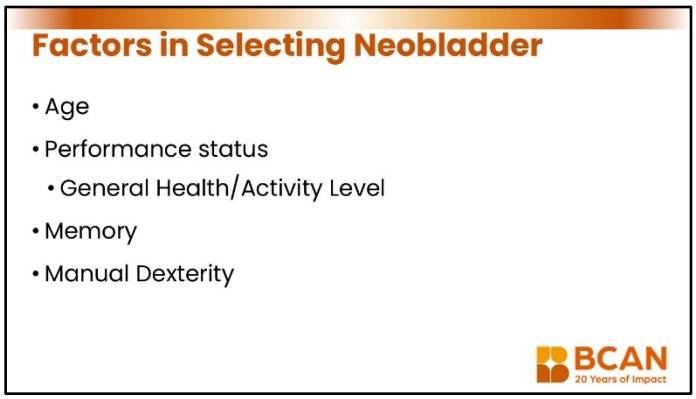


So with the neobladder, the advantage is obviously the improved cosmesis and there's no activity restrictions. The downsides are there's a little longer operative time by about two hours, a little longer recovery, and that's because you have a live piece of intestine that's holding urine for four hours. So it's going to reabsorb a lot of those toxins and metabolites your kidneys are trying to get rid of.

The way that manifests to you as a patient is that your energy level, your appetite does this up and down for a good two to three months after the surgery until your body really makes those adjustments and goes, okay, I get it. Your kidneys are working double time and figuring things out and making those adjustments.

Then there's a little higher complication rate. I say that just because there's just more steps involved in doing a neobladder, so there's a few more things that can go wrong. We talked about the risk of incontinence as well as the risk of hypercontinence.

Dr. Kevin Chan:

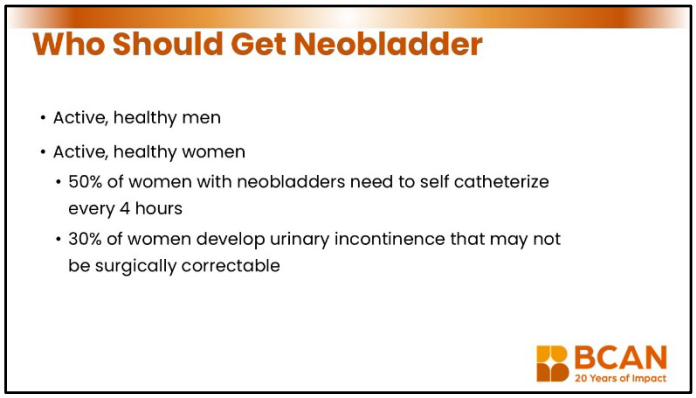


So I'd say one of the easy factors in selecting neobladder is age. When you're in your 60s or younger, I think it's a pretty straightforward answer to say we can definitely do a neobladder. I think those patients do great. When you're in your 80s, we tend to try to go a little simpler, minimize complications and try to get patients back to the life as quickly as possible, maybe with a little less fancy reconstruction.

When we get into your 70s, it's a gray area, and that's where performance status plays a role. Performance status is a metric that says, how independent is this patient? Are they able to do all the activities of daily living on their own or do they require a caregiver? What goes into that is your activity level, are you super active and independent kind of thing.

So if you're a 75-year-old that's very active and independent, you probably gravitate towards wanting the neobladder. If you're more sedentary, have a lot of medical problems, maybe you want to go a little simpler with a conduit. Then I always worry about memory and manual dexterity in the event that somebody needs to catheterize.

Dr. Kevin Chan:



So who should get a neobladder? I think definitely the active, healthy man. That's because even in the event of incontinence, we can put an artificial sphincter in and fix the leakage. So there's no situation where we can't fix. So I think for men, either they do quite well from a continence standpoint, but if not, we can fix it with an artificial sphincter.

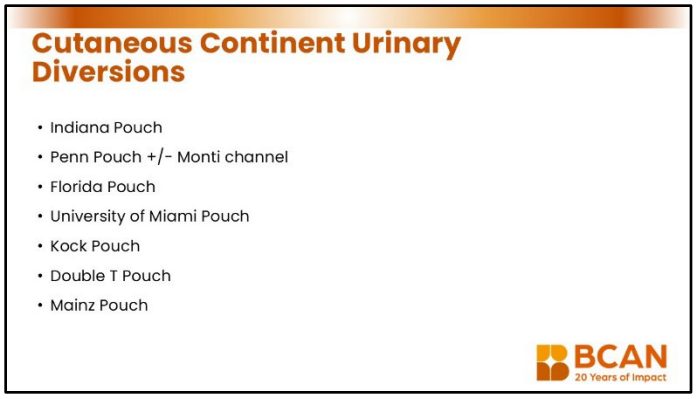
Then in the select active healthy woman, I might recommend a neobladder, but there is a caveat to this. 50% of women will have to catheterize themselves every four hours to urinate. This is their urethra. So that's something that I'd say most 70-year-olds and 60-year-olds may not want to do. So that plays a role and maybe there's a better option for this group.

I also worry about the 30% of women that can develop incontinence that's bothersome because it's very hard to surgically correct. If I do a sling for incontinence in a neobladder, remember this bladder has no ability to push urine out, so then they will become hypercontinent.

So it's either making patients hypercontinent to fix the problem or converting them to an Indiana pouch, which I'll talk about in a second. So it does have to be that select woman that understands there's a little more uncertainty with the neobladder, but I definitely think the neobladder is appropriate in some women.

I did a neobladder in a 40-year-old woman who was still dating and for natural reasons, she just wanted to be as quote, unquote, normal, if you will. So she got a neobladder and she actually was hypercontinent. So she's perfectly continent, doesn't wear diapers, does have to catheterize herself to urinate, but is hiking, works as a mail carrier, is back to her normal life. So for the right person, it can be the right option in women, but it's a little more complicated when deciding which women should have that.

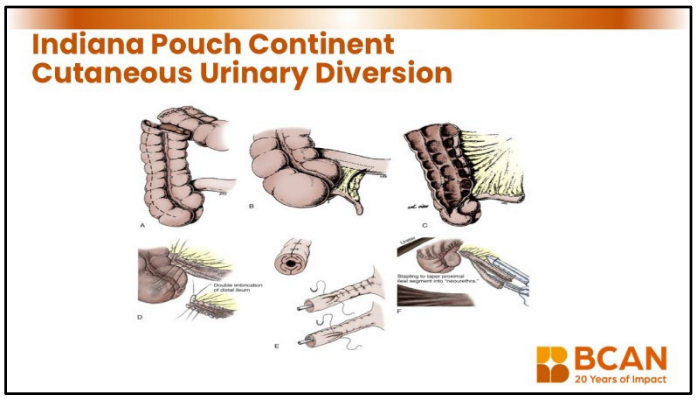
Dr. Kevin Chan:



So then there's the third option, the continent-cutaneous urinary diversion. The one we do is called an Indiana pouch. There's a number of pouches out there, the Penn pouch, Florida pouch, the Miami pouch. These are all variations of a similar concept. There's an intestinal pouch made out of intestine that's on the inside and there's a catheterizable channel made out of intestine to the skin and you catheterize that opening on the skin every four hours to urinate.

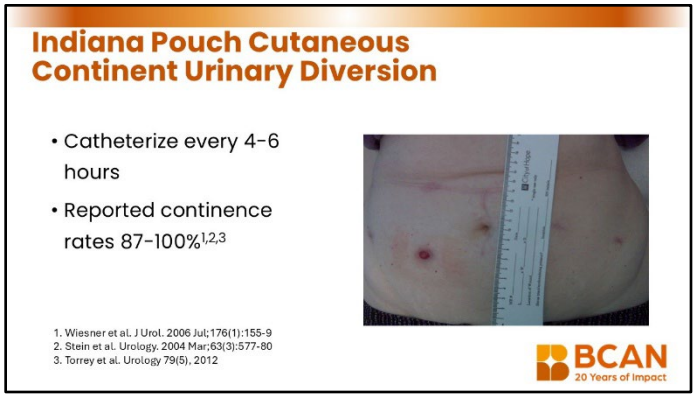
Dr. Kevin Chan:

So this is the Indiana pouch. We essentially use the colon here as the reservoir. We make it a spherical reservoir, and that little segment of ileum that's going in becomes the catheterizable channel. There's actually a valve between your small and large intestine that will work as the continence mechanism, but we taper that channel down to make it a catheterizable stoma.



Dr. Kevin Chan:

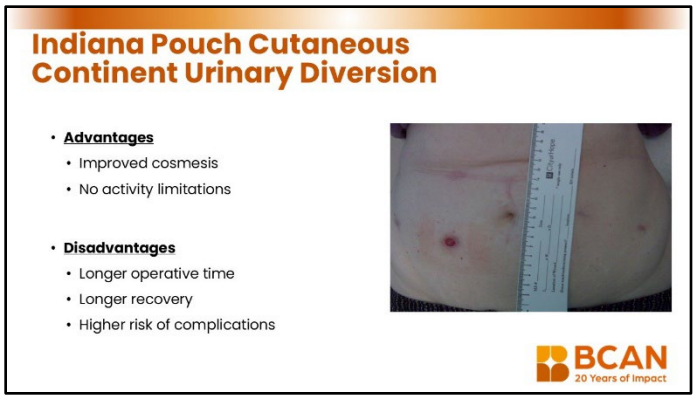
So this is what it looks like. There's a little, I always say there's like a second belly button on your abdomen, but we can do it to the belly button every once in a while if somebody really wants. You cover it with a band-aid, you put that catheter in there every four hours, empty it, throw the catheter away, and you go about your business. The continence rates are pretty high and reliable in the 87 to 100% range.



Kathy and I have a patient who runs competitive 10K races with one of these pouches. We have another patient, she teaches 14 bootcamp classes a week with an Indiana pouch. So you can be as active as you want to be. There's just a band-aid covering this spot.

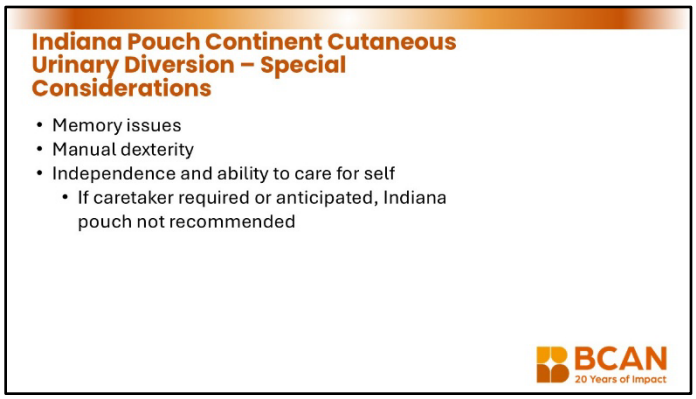
Dr. Kevin Chan:

So the advantages similar to a neobladder, improved cosmesis and no activity limitations. Again, the downsides are similar to a neobladder, a little longer operative time, a little longer recovery, and a little higher complication rate.



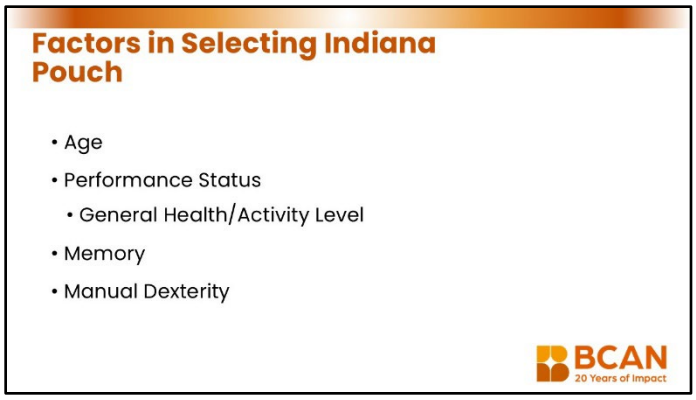
Dr. Kevin Chan:

So with the Indiana pouch, the special considerations are really memory issues and manual dexterity. For the Indiana pouch, patients really need to be able to catheterize themselves religiously. They need to be super reliable ideally, and most of the time they really have to be pretty independent. If somebody already needs to be cared for by somebody else, even if this is your spouse, the last thing we want to do is have a spouse need to catheterize you every four hours.



In fact, for a caretaker, it's much easier for somebody to empty a bag every four hours and change the bag every couple of days than it is to find a caregiver, whether that's family or not, to catheterize somebody every four hours to urinate. So that's something kind of a special consideration as you get older, a consideration in older patients for an Indiana pouch.

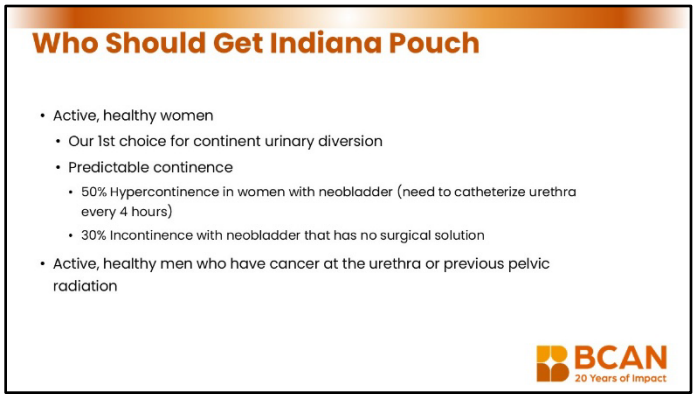
Dr. Kevin Chan:



Then similar to a neobladder, the factors in selecting Indiana pouch, age. Again, when you're in your 60s or younger, this is a pretty straightforward, great option for the healthy active woman. However, as we get into your 80s, maybe the thought of having to catheterize every four hours is a little more work than most 80-year-old patients will want to put up with.

Then when you're in your 70s, it really comes down to performance status. How independent, how able are you to take care of yourself and be able to catheterize yourself on a regular basis and be able to build it into your routine? Obviously we talked about memory and manual dexterity because you just have to be super reliable or this can be life-threatening if you forget to catheterize.

Dr. Kevin Chan:



So who should get an Indiana pouch? At City of Hope really it's my first choice for the active, healthy woman because you get what you think you're going to get. You're going to get a pouch that you catheterize every four hours, but you're not going to need to catheterize your urethra. You have an easy spot that you can see and catheterize.

We don't have that risk of incontinence that's going to require another major surgery. We don't have the risk of hypercontinence and catheterizing the urethra, which is a little more challenging than catheterizing the stoma that you can see on your abdomen.

Then the other group of patients that this is good for is that the man that's maybe had previous treatment for prostate cancer or rectal cancer. Maybe has had previous radiation or maybe previous surgery for BPH that might make the risk of

incontinence a little higher. So the Indiana pouch can be used for a number of patients that just simply want to avoid an external bag.