

Robotic Kidney Surgery **for various kidney/adrenal/upper urinary tract conditions**

I. Knowing your condition:

Your urologist has recommended you consider a robot-assisted kidney/adrenal/upper urinary tract surgery. There are multiple possible conditions for which this type of surgery may be indicated; these will be reviewed below. Our team is very experienced in performing these types of surgeries. The principal use of robotics in urology has been in the performance of fine technical and reconstructive procedures. Initial experience gained from robotic prostate surgery has led us to the use of the da Vinci surgical robot in the performance of variety of robotic renal, adrenal, and upper urinary tract surgery. Robotic surgery gives patients a surgery that's more precise and associated with less pain and faster recovery times. Using a state-of-the-art da Vinci Xi surgical system, our surgeons perform*:

- **Robot-assisted Partial Nephrectomy:**

Robotic surgery to remove a kidney tumor/mass/lesion while preserving the healthy aspects of the kidney (also known as nephron-sparing surgery) is the ideal treatment option for amenable renal tumors. Typically, this is a treatment option for small renal masses (<4 cm) but can occasionally be performed for complex, large tumors, including tumors close to the major blood vessels of the kidney. After reviewing your history, physical examination, and imaging findings, we will be able to help decide if this is an option in your situation. Sometimes we think pre-operatively that a partial nephrectomy is possible and in the operating room ultimately need to remove the entire kidney based on the operative findings. Occasionally we need to convert from robot-assisted surgery to open surgery.

- **Robot-assisted Radical Nephrectomy:**

Robotic surgery to remove the entirety of your kidney, fat surrounding the kidney, sometimes the adrenal gland (or part of the adrenal gland) and (rarely) lymph nodes near the kidney. The robot permits meticulous, high-definition dissection of the major blood vessels of the kidney (the "hilum") which decreases the risk of major bleeding due to optimized vision.

- **Robot-assisted (Simple) Nephrectomy or Nephroureterectomy:**

Robotic surgery that involves removal of the kidney and ureter (tube that drains urine from your kidney to your bladder) for benign, non-cancerous conditions.

- **Robot-assisted Radical Nephroureterectomy with Bladder Cuff Excision and Regional Lymphadenectomy**

Robotic surgery performed for patients with upper tract urothelial carcinoma (UTUC) not amenable to endoscopic management. This involves removal of the entire kidney, fat surrounding the kidney, adrenal gland (or part of the adrenal gland), ureter, and lymph nodes in the region depending where the tumor of interest is along the urinary tract. This is more involved than the "simple" nephroureterectomy in that it is performed for cancer and, usually, involves cutting out the part of the bladder where the ureter plugs in ("bladder cuff excision") which is

repaired primarily with stitches. Robotic manipulation can us stitch the defect in the bladder closed during surgery, allowing replication of traditional open surgical steps.

- **Robot-assisted Pyeloplasty (“UPJ obstruction repair”)**

Robotic surgery done to repair of a blockage (internal or external) in the area where the ureter (tube that drains urine from your kidney to your bladder) joins the kidney, also known as uretero-pelvic junction (UPJ) obstruction. Robotic surgery is of particular help in patients undergoing pyeloplasty for this condition. This surgery requires precise reconstruction of the UPJ and the magnification and dexterity afforded by the robot can facilitate accurate placement of sutures. A ureteral stent is placed during this operation, which will typically be removed in the urology office 4-6 weeks after surgery.

- **Robot-assisted Upper Urinary Tract Reconstruction**

Robotic surgery to repair a blockage, or “stricture” in the upper urinary tract. There are multiple different approaches to performing this operation, which depends on multiple factors including the location, length, and cause of the stricture. Occasionally this may require placement of a graft such as buccal mucosa (the inner lining of your cheek) to bridge the gap and optimize the repair.

- **Robot-assisted Pyelolithotomy**

Robotic surgery to remove large kidney stones that are not amenable to endoscopic nor percutaneous management options—or those who have failed all other management options. This may be performed at the same time as a pyeloplasty, as above, or on its own.

The established and potential advantages of robotics make it an exciting, innovative tool in the armamentarium available to urologists dealing with kidney and upper urinary tract diseases.

**Please note that this is not an exhaustive list of all procedures performed at our institution. If you are offered a surgery not listed herein, information will be provided and opportunities to ask questions will be offered during your office consultation before proceeding with surgery.*

II. Pre-Operative Instructions (before your surgery):

Depending on your other health problems, a consultation with a cardiologist or other physician may be necessary to make sure that you are healthy enough to undergo the procedure and to make sure that your risks of complications are minimized. The pre-operative evaluation consists of a history, physical exam, blood tests, and a urine sample. It may additionally include a chest x-ray, electrocardiogram, and other tests as needed such as CT, MRI, or Nuclear Renal Scan. You may also be requested to meet with an anesthesiologist and/or your primary care physician for pre-operative visits who will review your medications and answer your questions about the anesthesia you will receive. Please follow their advice very carefully.

It is important to stop your blood thinners (antiplatelet agents and/or anticoagulants) prior to surgery in coordination with your prescribing physician to minimize the risk of significant bleeding during surgery. These medications include (but are not limited to): aspirin, Plavix (clopidogrel), heparin, Coumadin (warfarin), Xarelto (rivaroxaban), Eliquis (apixaban), Pradaxa (dabigatran), Lovenox (enoxaparin). Aspirin, Aggrenox, ibuprofen, naproxen, Indocin (indomethacin), or Bufferin should be discontinued seven (7) days prior to your surgery. Plavix should typically be stopped 5-7 days prior to surgery. Coumadin / Xarelto / Eliquis / Pradaxa / heparin / Lovenox should typically be stopped at least 3-5 days prior to surgery as recommended by your prescribing physician. Depending on the need/indication/risk of holding for these medications there may be some flexibility regarding these drugs. If you have any questions or concerns, please speak with your prescribing physician. The decision to hold these medications may carry inherent risk and should be coordinated with your prescribing physician. Please ensure that we are informed of all medications you take at home.

After your surgery has been scheduled you will be given further instructions, please go through all of these carefully. In general, you should:

- Make sure to review your pre-operative advice for the medications you need to take.
- Avoid stress in the days leading up to your operation.
- Avoid taking dietary supplements and over the counter medications 2 weeks prior to surgery as they may cause bleeding or other unexpected reactions.
- Let your treating doctor know about all of the medications and supplements that you are taking.
- The day before your surgery eat only light meals with only clear liquids after breakfast. Clear liquids include water, apple juice, Jell-O with no fruit, coffee with no cream, tea, and any soda. Milk, coffee creamer, dairy products, orange juice, grapefruit juice, any juice with pulp, and combination juices are NOT clear liquids.
- Please take two tablets of Dulcolax® (bisacodyl) the afternoon on the day prior to surgery. If you have problems with constipation then please follow the instructions of your primary care physician / gastroenterologist. This is to make sure your bowels are cleared prior to your operation. These medications are available over the counter. After your surgery we want to avoid constipation and will typically prescribe a stool softener at the time of discharge. While you are admitted to the hospital post-operatively you will typically be prescribed suppositories and/or enemas to minimize the risk of constipation / ileus post-operatively.
- Have nothing to eat or drink after midnight the night before your surgery. Cape Cod Hospital will contact you the day before surgery to go over final instructions with you regarding your diet pre-operatively. Please follow their instructions carefully. Clear liquids are anything you can see through. Examples of clear versus non-clear liquids:

	Choose these foods/beverages	Do not eat these foods/beverages
Fruit/Juices	Clear fruit juices without pulp such as apple, grape, and cranberry juice	Nectars, canned, fresh or frozen fruits
Soups	Broth, bouillon, fat free consommé	Cream soups, soups with vegetables, noodles, rice, meat or other food in it
Beverages	Coffee, tea (hot or cold), Kool-Aide, soda, water, lactose free supplements if recommended by your doctor	All others
Sweets and desserts	Fruit ice (without chunks of fruit), plain gelatin, clear hard candy, popsicles made from clear juices	All others
Vegetables	None	All
Milk and dairy products	None	All
Breads, cereals and grain products	None	All

- Follow the instructions given by your anesthesiologist and hospital staff.
- Take your medications on the morning of your procedure as instructed by your surgeon, anesthesiologist, primary care provider, AND/OR staff.
- Bring a relative or friend to assist you on the day of surgery.
- We also encourage deep breathing, meditation, and/or physical exercise so you will be relaxed as possible on the day of surgery. Furthermore, for our overweight patients, we encourage for you to make a serious attempt to lose weight in the weeks leading up to your surgery. Weight reduction can make the operation easier, reduce the risk of complications, and improve surgery results.

III. Post-operative & Discharge Instructions (after your surgery)

Dietary Advice:

- Typically, immediately following surgery, you will be restricted to a liquid diet. The morning after surgery, after a trial of liquids and if you are progressing as anticipated, you will typically be permitted to have regular food.
- It is important to note that you do not need to eat / drink everything on the plate and your appetite will be somewhat lower than it was before surgery.
- At first, you should start by eating small meals frequently throughout the day and ultimately building up to the normal 3-meals-per-day.
- We strongly recommend taking all efforts to avoid constipation, especially in the first few days/weeks after surgery. Straining to have a bowel movement puts pressure on the surgical site inside your abdomen and at the incision sites, increasing the risk of hernia formation. To minimize the risk of constipation, stay well-hydrated, increase roughage in your diet, and drink prune juice or orange juice. If necessary, please take an over-the-counter stool softener or laxative of your choice. We typically prescribe a stool softener called docusate (Colace®) at your discharge from the hospital. Polyethylene glycol 3350 (MiraLAX®) is often administered during your hospitalization and is a laxative that can be taken as needed at home (over-the-counter).
- If you notice blood in your urine, increase your fluid intake to dilute the urine.
- In the first few days after surgery avoid carbonated drinks such as soda/carbonated beverages.
- Drink 8-10 glasses of water/fluid every day if you do not have any fluid restrictions to make sure you remain hydrated after surgery.

Movement/Activity:

- Walking is critically important after surgery. One of the major benefits of robotic surgery is the improved pain relative to open surgery, and in most cases, we will advise you to start walking the same day as surgery. Walking encourages early return of bowel function (allows you to pass gas and have a bowel movement sooner than you otherwise would have), effective breathing, mobilizes secretions, improves circulation, reduces the risk of blood clots and pneumonia, prevents stiffness of the joints, and relieves pressure. The goal is to be walking in the hall for approximately 2-3 hours/day while you are awake.
- If an activity hurts, stop doing it.
- Do not sit in one place for longer than 90-120 minutes at a time.
- Avoid heavy lifting (greater than 10 lbs) which is approximately the weight of a gallon of milk for approximately 4-6 weeks. This reduces the risk of hernia formation at the incision sites. Avoid strenuous activity, especially after a partial nephrectomy, for at least 2-4 weeks. Stairs should not be a problem. Take them slowly and use support if needed.
- Place your hand over your incision sites (especially the incision where the surficial specimen was removed, usually the largest incision present) while coughing, straining, and during bowel movements. Absolutely NO biking, motorcycling, or horseback riding for 4 weeks after surgery.
- You can do as much walking and stair climbing as you can tolerate. Go slowly and work your way back to your pre-surgery activity level.
- You may shower 48 hours after surgery. Do not scrub your incisions, simply allow soap and water to run down over them. Gently pat your incisions down after your shower. Do NOT tub bathe/swim/submerge your incisions under water for 4 weeks after surgery.
- Do not drive if a catheter is in place at the time of your discharge and while taking pain medications. If you have any pain that would make it difficult to stop the car suddenly you should not be driving.
- Avoid bending at the waist when possible. If you must pick something up, bend with your knees, not your waist. Stoop to pick up the item.
- Continue judicious walking when you are discharged home following your hospitalization. This will help you build back your strength and speed up your recovery. Gradually increase the amount

walking each day but do not “over-do” it. It is best to take short frequent walks throughout the day and gradually increase the distance you walk each time. Take planned rest periods during the day. The best gauge is your own body and how you feel. Walking also reduces the risk of blood clots forming in the legs.

Abdominal Incisional Sites/Incisions:

- You will typically have 4-6 port sites (small incisions through which the robotic instruments are inserted into the body) that are typically closed with absorbable suture material and skin glue (Dermabond). Occasionally these skin sites are closed with staples which typically should be removed at your follow-up appointment. There may be gauze dressings over these incisions which should be removed within 48 hours after surgery.
- A small amount of drainage from the incisions can happen. Please do not apply any lotions, creams, alcohol or hydrogen peroxide to your incisions as this will interfere with the protective covering. This skin glue will dissolve and fall off over time. Do not scrub the incisional sites.
- If there is pus or bad smelling fluid draining from an incision or if the incisions become red and painful, contact our office immediately as these can be signs of infection.

Urinary/Foley Catheter:

- When you wake up from surgery you will have a urinary catheter in your bladder. In most cases, this will be removed the day after surgery. It may need to remain in place longer depending on the type of surgery. Some patients go home with the catheter. Your individual plan will be communicated with you around the time of surgery.

Abdominal Drain

- At the conclusion of your surgery, you may have a small drain coming out of the abdomen. This is used to drain excess or collected blood/fluid from the surgical site if deemed necessary in the operating room. Typically, this will be removed prior to discharge home in your hospital room. This does not require anesthesia to remove and should be mildly uncomfortable but not significantly painful.

Pain Medication

- It is expected to have some pain after surgery. Your nurses and physicians will monitor your pain level and adjust medications as needed to keep your pain under control and manageable. We use a combination of pain medications after surgery, and many do not require opioid (“narcotic”) medications after robotic surgery due to the minimally invasive nature of the surgery.

Incentive Spirometry

- You will be provided with a plastic device after surgery to expand your lungs to prevent post-operative pneumonia/respiratory complications and ensure recovery. This will be used throughout your hospital stay. It is recommended that you use this device approximately 10x per hour while you are awake. We encourage patients to use this device prior to surgery if possible/available.

Sequential Compression Devices (SCDs)

- These devices will be applied to your lower legs and will inflate/deflate periodically to improve the circulation in your legs. These devices, occasionally in combination with medications to thin the blood around the time of surgery, help prevent blood clots from forming in your legs.

Foot exercises

- Recommended to additionally help prevent blood clots from forming. Begin with pointing your toes towards the foot of the bed. Then point your toes up to your face. Repeat this simple exercise as frequent as possible while you are awake.

IV. Reasons to call the office / present for evaluation:

Please call 911 for medical emergencies. For non-urgent medical concerns, please contact our office (508-771-9550) or seek medical care, specifically should you experience any of the following:

- Significant bleeding around your incision site(s).
- Incision site(s) become red, swollen, painful, or warmer to the touch.
- Pus drainage from the incision(s).
- There is new gap noted in an incision or it opens up.
- Fever/chills with temperature of 101° F or higher.
- Worsening abdominal pain, distension, and/or bloating.
- Nausea/vomiting preventing you from eating/drinking.
- Severe pain not relieved by medications.
- Inability to pass gas or have a bowel movement.
- Leg pain, swelling, or redness.
- Chest pain or shortness of the breath (please call 911 if severe / sudden).
- Difficulty passing urine or your urine output becomes less than it normally has been.
- Sensation of feeling low, fainting, and/or low blood pressure.

PREPARING FOR SURGERY

You have been advised by your physician of the need for a major surgical procedure. In order to have the best outcome possible, and to improve your recovery time, it is important to prepare yourself for the stress of surgery. The stress of surgery has been related to running a marathon. It is important to make yourself as fit as possible between now and the time of your surgery. Being fit reduces your complications after surgery and helps you get back to your normal activities quicker. There are important areas you can work on to improve recovery including nutrition and exercise. If you smoke or have diabetes, smoking cessation, and keeping your blood sugar levels controlled are also important. Optimizing these areas between now and the time of your surgery can make a big difference in the success of your procedure and your recovery.

Nutrition

Studies show that complications after surgery are decreased and recovery is shorter for people who have been eating a heart healthy diet prior to surgery.

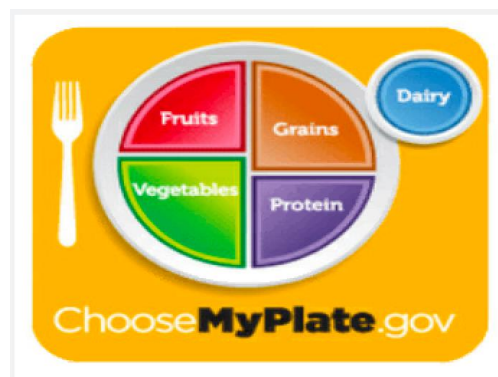
Between now and your surgery:

1. Avoid sugary and processed foods as well as saturated fats.
2. Concentrate on eating lean protein, whole fruits and vegetables and whole grains. For dairy products, consume low or fat free dairy items.

Examples of lean protein: low or fat free dairy, beans, fish and shellfish, nuts and seeds, skinless chicken or turkey, lean beef, pork loin, bison, and egg whites.

Examples of whole grains: whole wheat bread, whole wheat pasta, whole wheat cereal, whole grain rye, whole grain barley, oatmeal, brown and wild rice, quinoa and buckwheat.

3. Stay well hydrated. Drink multiple 6-8 ounce glasses of fluid (ideally water) daily.
4. It is also important to limit your alcohol. Drinking more than 2 drinks per day may increase the risk of complications after surgery. You should not consume any alcohol for at least 24 hours before your surgery.



Additional nutritional tips:

Addition of high protein drink - twice a day. Your body needs protein before surgery to help maintain muscle and improve your recovery (1.2 g/kg).

Examples of high protein shakes: Ensure High Protein, Orgain Clean Protein, Fairlife Core Power Protein, Atkins Plus Protein, Boost High Protein

If you are overweight, losing some weight prior to your surgery can also help with fewer complications and shorter recovery time. It is important to talk to your surgeon regarding recommended weight loss.

Exercise

Both cardio and resistance exercise is important prior to your surgery. Exercise before surgery can help you return to your current activity level quicker. This will improve your ability to be independent and take care of yourself after surgery. If you have a low activity level you can improve your fitness in as little as a few weeks. Your improved fitness can help with an easier and quicker recovery.



Walking is a great way to improve your physical activity. If you are not physically active you will need to slowly increase your activity. Exercise does not have to be strenuous to be helpful. The goal is to be walking three miles per day. This can be done with three one mile walks or even six half mile walks. If you are very active now please continue to stay active before surgery. Other forms of cardio exercise include thirty to sixty minutes a day of swimming, cycling, gardening, dancing or taking an exercise class.

Resistance exercises help build muscle mass. This is also important prior to surgery. Muscle mass will improve your recovery and help you get back to normal quicker. If you do not already perform resistance exercises now is the time to start. Here are some beginner exercises to try:

[Wall squats](https://www.youtube.com/watch?v=Ge1Z18uw1RA&feature=youtu.be) <https://www.youtube.com/watch?v=Ge1Z18uw1RA&feature=youtu.be>

[Crunches](https://exrx.net/WeightExercises/RectusAbdominis/BWCrunch) <https://exrx.net/WeightExercises/RectusAbdominis/BWCrunch>

[Push-ups](https://www.youtube.com/watch?v=WcHtt6zT3Go) <https://www.youtube.com/watch?v=WcHtt6zT3Go>

[Bridge](https://www.youtube.com/watch?v=5NUu_IHcSMI&feature=youtu.be) https://www.youtube.com/watch?v=5NUu_IHcSMI&feature=youtu.be

[Bicycles](https://www.youtube.com/watch?v=Zj9VYEOZKb0&feature=youtu.be) <https://www.youtube.com/watch?v=Zj9VYEOZKb0&feature=youtu.be>

[Superman](https://exrx.net/WeightExercises/ErectorSpinae/ContraLateralSuperman) <https://exrx.net/WeightExercises/ErectorSpinae/ContraLateralSuperman>

[Plank](https://exrx.net/WeightExercises/RectusAbdominis/BWFrontPlank) <https://exrx.net/WeightExercises/RectusAbdominis/BWFrontPlank>

[Hamstring stretch](https://exrx.net/Stretches/Hamstrings/StandingBenchSingleLeg) <https://exrx.net/Stretches/Hamstrings/StandingBenchSingleLeg>

[Quadriceps stretch](https://exrx.net/Stretches/Quadriceps/Kneeling) <https://exrx.net/Stretches/Quadriceps/Kneeling>

[Spine stretch](https://exrx.net/Stretches/ErectorSpinae/Lying) <https://exrx.net/Stretches/ErectorSpinae/Lying>

[Hip stretch](https://exrx.net/Stretches/HipExternalRotators/LyingPiriformisMod) <https://exrx.net/Stretches/HipExternalRotators/LyingPiriformisMod>

Smoking Cessation

Smoking has many negative effects on the body and increases complications after surgery by 40%. Smoking is the leading cause of several cancers, including those involving the lung, kidney, and bladder. If you stop

smoking you can decrease your risk of complications after surgery. Smoking cessation decreases the risk of pneumonia, heart attack, infections, blood clots and wound healing complications. You need good oxygen levels after surgery for healing of tissue and blood vessels. Smokers have lower blood oxygen level due to an increase in carbon monoxide.

NicoDerm use:



What happens to your body when you quit smoking?

- 20 minutes after last cigarette your heart rate and blood pressure begin to drop to normal ranges.
- 8 hours after quitting your carbon monoxide levels will decrease.
- 24 hours after quitting your risk of heart attack decreases.
- 48 to 72 hours after quitting you may have increased secretions, wheezing or coughing.
- After 72 hours, breathing is easier and lung capacity improves.
- 2 to 4 weeks you will notice a decrease in secretions, breathing will be easier and circulation will improve.
- 4 to 6 weeks your immune system will normalize.
- 12 weeks you have improvement in your lung lining and lung function.