

**USEFUL INFORMATION FOR PATIENTS ELIGIBLE FOR  
TRANS-URETHRAL ENUCLEATION OF PROSTATIC  
ADENOMA WITH HOLMIUM LASER  
(HoLEP)**

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Dear Patient,

After a careful evaluation of your case, you have been deemed eligible for Holmium laser enucleation of the prostatic adenoma (HoLEP).

We are glad that, for your surgery, you have chosen our Department, where approximately 300 HoLEPs are performed every year. The experience we have gathered over the years on this type of surgery makes the San Raffaele Hospital one of the top institutions in the field. Additionally, in our research hospital we have conducted many studies (and many are ongoing) on what are the major determinants of postoperative outcomes such as urinary continence and erectile function.

We hope that this reinforces your trust in our Department and our Team and that these aspects reassure you.

In this document, we summarize essential information on your condition and possible treatments and important information that will help to make your hospital stay, and subsequent complete recovery, as short as possible.

## Benign prostatic hyperplasia (BPH)

Benign prostatic hyperplasia is a common pathology and affects people older than 40-50 years of age. Anatomically, it is an enlargement of the central part of the gland (adenoma), which causes a change in size of the prostatic urethra that passes through it with a consequent obstacle to urine outflow (figure 1).

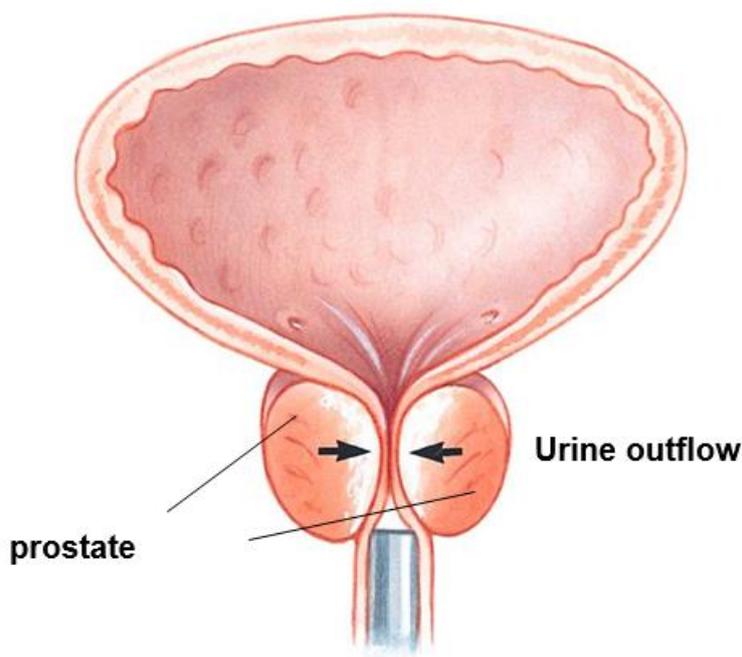


Figure 1. Prostate enlargement which create an obstacle to urine outflow

The enlargement of the prostatic adenoma is major determinant of lower-tract urinary symptoms, which are: difficulty in urinating, reduction of the urinary stream, urinary urgency, and the need to urinate frequently, even during the night.

The disease progresses over time; the major enlargement of the gland corresponds to symptoms worsening; however, there is not always a close correlation between prostate size and symptoms. There are asymptomatic patients with a very large prostate, as well as subjects with a small prostate who have heavy symptoms.

In the initial phase of the disease, the bladder can at least partially balance the obstruction; it can contract with greater power allowing the urine to

overcome the obstacle produced by the adenoma. Over time, however, the bladder becomes exhausted and begins to fail in its function causing difficulty in urinating with subsequent possible stagnation of urine. This can cause frequent urinary tract infections due to the presence of bacteria. If this condition is not resolved, functional damage to the bladder can occur, which can lead, in extreme cases, to the need for permanent bladder catheterization.

## **Diagnostic investigations**

For the diagnosis of this disease, there are several tools available:

- **Digital rectal exploration:** allows the physician to palpate the prostate and understand its size and consistency (a hard or uneven prostate may raise suspicion about the presence of a tumour).
- **PSA:** PSA is a protein produced by the prostate with an important function for seminal fluid activity. It is not a specific marker, but usually its value is slightly increased in patients suffering from BPH. When the PSA is found to be high, it is also essential to exclude the presence of prostate cancer. We should also remember that prostate cancer can be related to normal PSA values.
- **Trans-rectal ultrasound:** a probe is placed in the rectum, through which it is possible to directly measure the volume of the entire prostate and the adenoma. This allows the physician to precisely define the size of the prostate and also to detect the possible presence of suspicious or pathological areas.
- **Multi-parametric magnetic resonance imaging (MRI):** this non-invasive examination is required for patients for whom there is a suspicion of prostate cancer. Targeted and systematic fusion prostate biopsies are performed if the MRI identifies any suspected areas for cancer.
- **Uroflowmetry and Urodynamic Examinations:** they allow the physician to evaluate the behaviour of the urinary system during urination. The information collected about urine flow speed, bladder wall function and other parameters are used to quantify patient's symptoms. At the end of Uroflowmetry, the post-urination bladder residue can also be assessed. In a healthy patient, this amount is zero, while in the case of BPH it can reach very high levels.

- **Urinalysis:** highlights possible urinary tract infections in progress, along with the presence of blood (potential indicator of other pathologies).

## Treatment

The objectives of the therapy for benign prostate hyperplasia are the resolution of low tract urinary symptoms, the prevention of bladder and kidney damage and the improvement of the patient's quality of life.

In the initial phase of the disease, when patients present symptoms of irritation without clear urinary obstruction, medications which have an effect on urinary symptoms can be used.

Several categories of medications are available today: 1. Plant extracts such as *Serenoa Repens*; 2. Alfa-lithic drugs 3. Inhibitors of 5-alpha reductase, such as Dutasteride and Finasteride; 4. 5-phosphodiesterase inhibitors.

On the other hand, a surgical approach is advised when the disease is characterized by a clear urinary obstruction. The surgical procedure might be useful to resolve patient's symptoms and to protect bladder and kidney function.

Surgery for BPH consists in removing the adenoma, which is the part of the prostate responsible for the urinary obstruction.

Several techniques are currently available, which are:

Endoscopic surgery:

- **Trans-urethral resection of the prostate (TURP):** an instrument is inserted into the urethra and it allows to perform a resection of the hypertrophic tissue (using a diathermic loop) of the central part of the gland responsible for the obstruction. This surgical technique is normally used for prostates weighing up to 80 g. Complications may include slight bleeding or the need to maintain a bladder catheter for 3-4 days after surgery, which could cause irritative urinary symptoms.

- **Enucleation of prostatic adenoma with Holmium laser (HoLEP):** this technique is similar to the previous one. In this case the adenoma is not resected but rather removed from the prostate capsule through the use of Holmium laser. This surgical procedure is commonly used for prostates up

to 300 g and it presents many advantages: lower bleeding rate, lower bladder catheter maintaining time (usually 24 hours), and subsequent shorter hospital stay.

Traditional open surgery:

- **Trans-vesical prostatic adenomectomy:** through a cut below the umbilicus, the surgeon reaches the prostate through the bladder, removing the adenoma from the prostate capsule. This is a traditional surgical technique used especially by surgeons untrained in the HoLEP technique. Currently this approach is reserved exclusively for very large prostates (generally over 100 g). With this type of surgery, the bladder catheter must be kept in place for 4-6 days, which could cause irritative urinary symptoms. It is also associated with a major risk of blood transfusions in the post-operative period (about 10% of cases).

## **PRE-SURGICAL ASSESSMENT**

Before surgery, your overall health status will be carefully evaluated and, in general, the following examinations will be performed or ordered:

- **Laboratory blood tests**
- **Electrocardiogram and cardiological examination**
- **Anesthesiologic assessment**, during which:
  1. The suitability for surgery is ascertained
  2. Additional exams or other physician evaluations may be ordered
  3. Any changes in, or suspensions of, chronic therapies are agreed upon
- **Chest x-ray** (if the patient has not recently undergone a chest CT scan)

We are glad to inform you that the need for blood transfusions is nowadays extremely low thanks to the use of the Holmium laser.

**Yet, it is extremely important to inform us whether you are taking any anti-platelet or anti-coagulant (“blood thinners”) medication. The suspension and/or replacement with other medications must be determined by your physician or by the anesthesiologist before surgery. These medications might increase the risk of intraoperative bleeding and their suspension or titration have to be carefully examined before surgery.**

In some cases, it may be necessary to replace oral anti-coagulants (“blood thinners”) with low molecular weight heparin (injections). The anesthesiologist or coagulation specialist from our hospital will advise you in this regard.

If you do not inform us on time about these medications and they are subsequently not interrupted on time, the surgical procedure will have to be postponed, thus wasting precious time for your health!

A cardiological evaluation, in the 30 days prior to surgery is required.

## **Anaesthesia**

The day before surgery, you must lead a normal life and eat as usual until the evening before surgery.

For the endoscopic enucleation of prostate adenoma with Holmium laser (HoLEP), a local regional ("spinal") anaesthesia is preferred because of its minimal invasiveness which allows for fewer consequences on your psychophysical state. The anaesthesiologist, who will evaluate you pre-operatively, may also decide on the administration, before entering the operating room, of pre-anaesthesia medications to reduce anxiety, agitation and other adverse events.

If the patient's clinical conditions do not allow the execution of this type of anaesthesia, the anaesthesiologist will perform a traditional general anaesthesia or deep sedation.

Both methods provide an analgesic therapy which is started during surgery and could continue postoperatively for 24 hours. Pain control is therefore usually optimal and allows the patient to quickly recover from surgical-anaesthesiologic trauma.

The minimal invasiveness of this surgical technique usually allows the patient to start drinking, feeding, and mobilizing just a few hours after surgery.

The prevention of thrombotic and thromboembolic complications is carried out by placing elastic stockings on the patient's lower limbs before surgery, and by the early mobilization of the patient.

## Notes on the surgical technique

The procedure is carried out using a trans-urethral access (without cuts); with a Holmium laser fiber that allows for the removal of prostatic adenoma (figure 2 and 3).

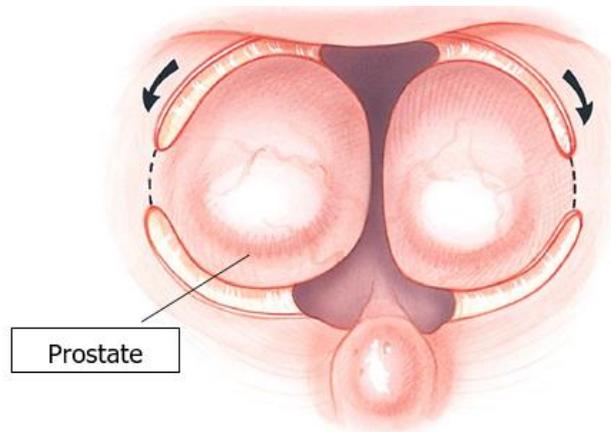


Figure 2: Endoscopic Vision: incision lines during HoLEP

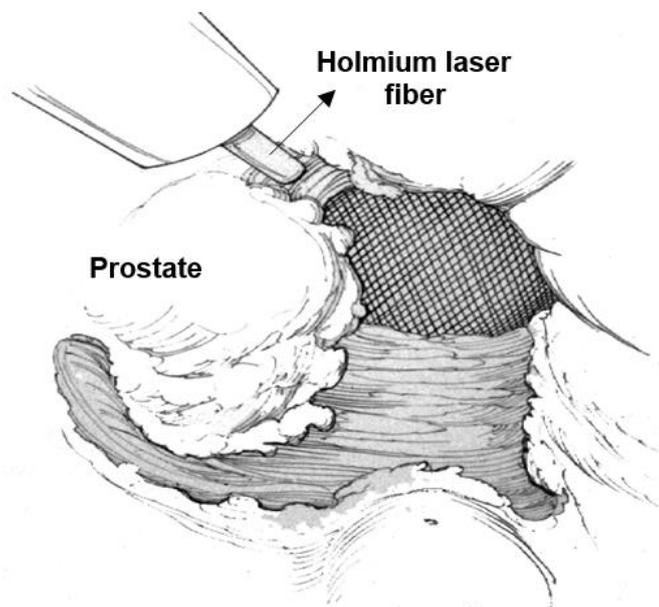


Figure 3: Enucleation of prostate adenoma

The large portions of tissue removed are then pushed into the bladder. Subsequently, a morcellator is introduced. This instrument removes the enucleated prostatic tissue (figure 4) which is sent to the pathology

department for the histological examination. The procedure usually lasts from 40 to 60 minutes, depending on the size of the adenoma.

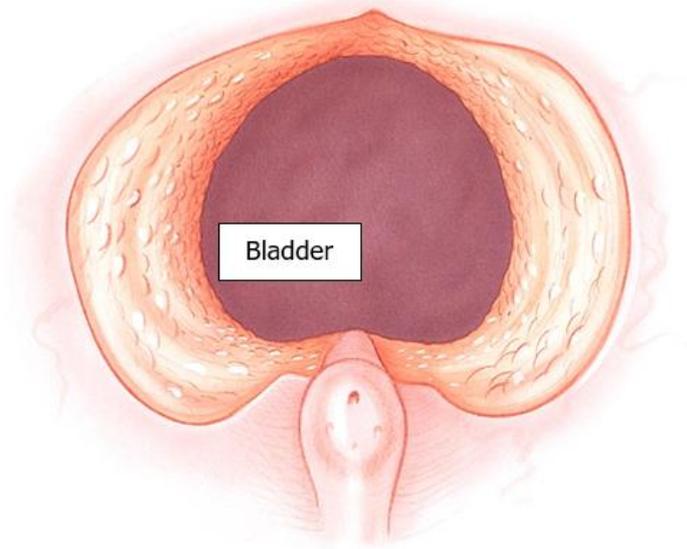


Figure 4. Prostatic lodge after Holep surgery freed from adenoma

Although very rare, it can happen that prostatic adenoma enucleated by laser is too big or too hard to be brought out endoscopically. In these cases, it is necessary to make a small incision on the lower abdominal wall to extract the enucleated prostatic tissue. This occurs in about 2% of cases.

At the end of the procedure, a bladder catheter is placed. The minimal invasiveness of the surgery performed with Holmium laser usually allows for the removal of the bladder catheter after 24 hours. The presence of the bladder catheter could determine in some patients an irritation characterized by a slight burning of the penis, sometimes accompanied by urgency in urination.

Such disorders usually regress easily with the administration of analgesic drugs. To minimize the symptoms and the risk of obstruction of urine outflow, a continuous bladder irrigation will be performed through the catheter during the first post-operative day.

Once the bladder catheter is removed, the patient is kept under control for a few hours to verify the spontaneous and valid resumption of urination. Once the correct resumption of spontaneous diuresis is verified, the patient is then discharged from hospital during the same day.

Sometimes, after the removal of the bladder catheter, difficulty in urination can occasionally arise due to the presence of blood clots or urethra muscle contractions (about 15% of cases), so it may be necessary to re-place a bladder catheter and keep it in place for a few days. This risk increases for patients with a high previous prostate volume.

Patients already carrying a bladder catheter or with a history of significant obstructive symptoms before surgery might face difficulties in emptying the bladder. Despite the surgical removal of the obstructive prostate adenoma, they might need to perform daily self-catheterizations to completely empty the bladder.

**Once the bladder catheter is removed, it is imperative for the patient to stay in Milan for at least 24 hours,** as inability to spontaneously resume urination may occur in this period.

**INFORMATION ABOUT HOTELS LOCATED NEAR THE HOSPITAL WHERE THE PATIENT (AFTER BEING DISCHARGED) AND HIS FAMILY CAN STAY WILL BE PROVIDED TO THE PATIENT BY THE HOSPITALIZATION OFFICE.**

**1. Hotel Rafael Via Olgettina, 60 – 20132 Milano Tel. +39 02 21765.1 – Fax +39 02 21765888 – all'interno del campus del San Raffaele – [www.rafaelhotel.it](http://www.rafaelhotel.it)**

**2. NH Hotel di Milano 2 – Via Fratelli Cervi – Milano 2, Segrate (MI) tel 022175 – [nhmilano2@nh-hotels.com](mailto:nhmilano2@nh-hotels.com)**

## **Final Pathology report**

The definitive histological report is usually available in about 30 days. In almost all cases, the histological examination will be benign prostatic hyperplasia of the gland and our clinicians will recommend some tests to evaluate the functional results of the surgery. Only in 5% of cases is it possible to find incidental prostate cancer. Although this type of cancer is typically a low-grade tumour that does not need radical treatments, the patient will be followed up more closely by PSA testing (usually performed 3 months after surgery).

## **Complications**

The enucleation of prostatic adenoma with Holmium laser (HoLEP) is associated with complications in a very low percentage of cases.

In addition to the generic risks related to anaesthesia, the possible complications related to the endoscopic surgical procedure are the following:

- Bleeding during and after surgery that may require re-intervention using thermo-coagulation of the prostate surgical field (1% of cases).
- Acute urinary retention with the need to re-place the bladder catheter (15% of cases).
- Transient urinary incontinence of various degrees, which resolves itself within the year in 95% of cases.
- Late bleeding, i.e. in the two to three weeks after surgery, caused by the dissolution of clots (0.5% of cases).
- Bladder neck sclerosis: late narrowing of the bladder neck that may require further endoscopic revision (4% of cases)
- Urethral stenosis: late narrowing of the urethral canal that may require further endoscopic intervention (2.6% of cases).

***Blood in the urine.*** Urine can remain slightly red for 3-4 weeks and this phenomenon is sometimes due to the dissolution of small clots that were present in the bladder after surgery. If this happens, drinking a lot of water will help to clear up your urine.

***Irritative urinary symptoms.*** In the first days or weeks following the surgical procedure, you may experience frequent urination, the presence of urgency, slight urinary burning, and difficulty in urinating. In this case, an appropriate medical therapy will be prescribed.

***Urinary incontinence of various degrees.*** Some patients complain of slight urine leakage during the first weeks after surgery. In our experience, this condition is transitory, and it improves over time.

The rare cases of urinary incontinence immediately after surgery can be partly due to some behavioural changes of the pre-surgical period. The obstruction created by the prostatic hyperplasia often forces the patient to urinate frequently (even at night) and to use abdominal muscle contraction to empty the bladder.

After the removal of the anatomical obstruction (adenoma), the patient needs to modify his habits, paying attention while the bladder is filling up: you need to 'teach' your bladder to fill up and be emptied at regular intervals of 3-4 hours.

These objectives can be reached more quickly through a rehabilitation session in which the patient is informed about the correct amount of liquids to introduce and the correct urination intervals that help to recreate the elasticity that the bladder has lost over time. During these sessions, the patient will learn a series of exercises designed to strengthen the muscles of the pelvic floor which are usually weakened due to the patient's continuous pushing to empty his bladder.

The rehabilitation will facilitate the return to normal continence, as well as the ability to hold urine in situations where you do not have a toilet (symptoms of urgency-frequency).

**This rehabilitation treatment, which must be carried out after surgery, is recommended in all cases to facilitate and accelerate the proper and regular urinary function.**

Post-operative rehabilitation is carried out in different ways, depending on symptoms:

– **Behavioural training or bladder training:** advice related to an appropriate lifestyle and an adequate daily fluid intake. These tips are personalized and based on a bladder diary kept by the patient himself for at least two consecutive days.

– **Kinesiotherapy:** for the strengthening of the pelvic floor. A series of exercises to improve the perineal musculature, between the anus and the scrotum, around the penis. Depending on the recovery obtained, these exercises might become increasingly demanding, until they are performed with the telemetry biofeedback technique (with anal manometry probe) during the execution of more strenuous physical activity (jumping and running). **Biofeedback** allows visualizing the muscular activity on a computer screen in order to identify and correct the errors of execution of physical exercises.

– In particular situations **Functional Electrical Stimulation** is used. Its objective is not only the reinforcement of the pelvic muscles, but also the awareness of the perineal floor with subsequent inhibition on the contraction which is responsible for the emptying of the bladder. In addition to the usual technique that involves the use of ring electrodes, the most recent SANS technique is preferred, which provides for posterior tibial nerve stimulation of the lower limb in case of urge-incontinence symptoms.

– **PTNS (Percutaneous Tibial Nerve Stimulation)** is a technique involving the stimulation of the posterior tibial nerve with an acupuncture needle. This technique is particularly effective in patients with symptoms of urinary frequency and urgency.

The rehabilitation treatment might support the pharmacological treatment in dealing with post-surgery problems and represents an effective way to improve patients' quality of life and accelerate the recovery of bladder function.

**A pre-operative meeting** is indicated for those patients who present a large adenoma or report long-term alterations of urinary physiology before surgery. These sessions, which begin at least twenty days before surgery,

have two main objectives: to teach the exercises that will be carried out during the rehabilitation phase and to inform the patient to about the behavioural errors he is making and how he can correct them after surgery.

**Sexual function.** Almost all HoLEP patients report an improvement in the quality of erection in the postoperative period. It is related to the urinary disorder's improvement.

The risk of new onset of erectile dysfunction after Holep is reported in less than 5% of cases.

**About 90% of patients who have undergone this surgery lose the ability to ejaculate seminal fluid during sexual intercourse due to an anatomical alteration of the bladder neck. After surgery, the seminal fluid is collected in the bladder and is then eliminated during the subsequent urination (retrograde ejaculation).**

***It is important to remember that a small amount of semen can still flow from the urethral meatus during ejaculation. This surgery therefore DOES NOT cause post-operative sterility.***

### **USEFUL TIPS AT DISCHARGE**

**It is absolutely forbidden to drive any type of vehicle for at least 7 days after removal of the bladder catheter.**

#### **Eating**

- You can resume your usual diet gradually and progressively;
- It is important to drink at least one and a half liters of water per day and moderate alcohol consumption is acceptable;
- To resume normal intestinal function, it is particularly important to vary your diet by enriching it with fresh fruit (such as kiwi) and cooked fruit at least twice a day, along with vegetables, to avoid constipation. It is very useful to drink 1 tablespoon of extra virgin olive oil with main meals. As a goal, the patient should try to have a bowel movement once a day, in order to avoid particularly hard stool formation. Hard stool could cause difficulty in defecation and the need of consequent excessive abdominal thrusts – potentially harmful after prostatic surgery.

**It is advisable not to use enemas or pearls during the first month following surgery;** in fact, in this period, the walls of the rectum are very thin and can be easily damaged.

**WHAT NOT TO DO IN THE FIRST 4 WEEKS AFTER SURGERY:**

**We advise you not to have sexual intercourse and not to use a bicycle or motorcycle as these activities can promote bleeding. After 4 weeks, all normal activity may be resumed.**

It is a great pleasure for me to have the chance to treat you. I hope you will always consider our entire medical staff as both doctors and friends.

While remaining at your complete disposal for any further clarification, I take this opportunity to offer you my best regards.

**Prof. Francesco Montorsi**

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