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## Surgical Treatment of LUTS in Men with BPE

The underlined terms are listed in the glossary.

You have been diagnosed with benign prostatic enlargement (BPE) and your doctor recommends surgery. This section describes different treatment options, which you should discuss with your doctor. Together you can decide which approach is best for you.

Factors which influence this decision include:

- Your symptoms and quality of life
- The size of your prostate
- Your medical history
- The kind of treatment available at your hospital and the expertise of your doctor. Ask your urologist about his or her experience with the recommended treatment option. You have the right to know the complication rate of the surgeon who will do the operation
- Your personal preferences and values. There is no single treatment which is ideal for all patients

### When should I consider surgery?

- When your symptoms get worse, even if you already receive drug treatment
- When you have complications of BPE or if you are at risk of getting them. Complications include:
  - Kidney failure
  - Dilatation of your kidneys
  - Inability to urinate (urinary retention)
  - Recurring urinary tract infection
  - Recurring blood in the urine
- If you do not tolerate drug treatment very well
- If you prefer surgery over drug treatment

During surgical treatment the doctor will remove the enlarged part of your prostate (also known as adenoma). There are different types of surgical procedures, but all of them aim to relieve your symptoms and improve the flow of urine.

The main procedures are:

- Transurethral resection of the prostate (TURP)
- Transurethral incision of the prostate (TUIP)
- Open prostatectomy
- Laser treatment
- Prostate stents
- Transurethral needle ablation (TUNA)
- Transurethral microwave therapy (TUMT)

This section also discusses ethanol and botulinum toxin injections. Research on the effects of these procedures is still on-going and their use is experimental.

Each procedure has its own advantages and disadvantages. The choice of treatment depends on your individual situation and preference.

This section offers general information about surgical treatment and situations can vary in different countries.

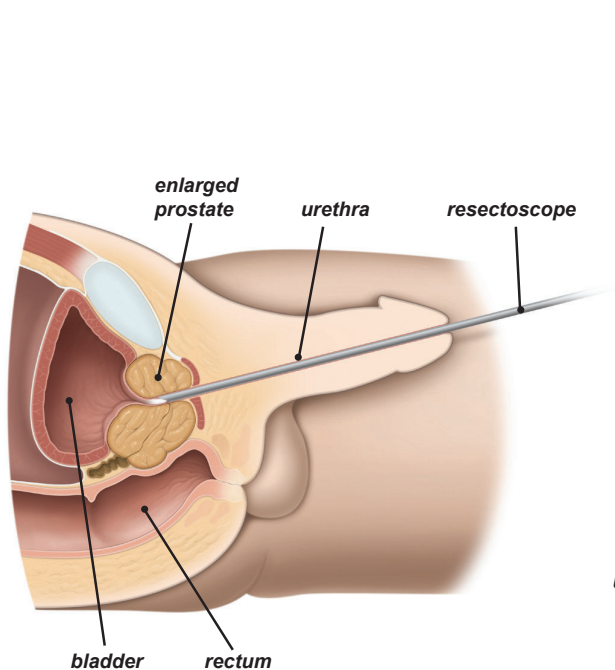
## Transurethral resection of the prostate (TURP)

TURP is the standard surgery for BPE. The aim is to remove the part of the prostate which causes the symptoms. The procedure is done through the urethra without making an incision in your lower abdomen (**Fig. 1**). This type of surgery is known as minimally invasive treatment.

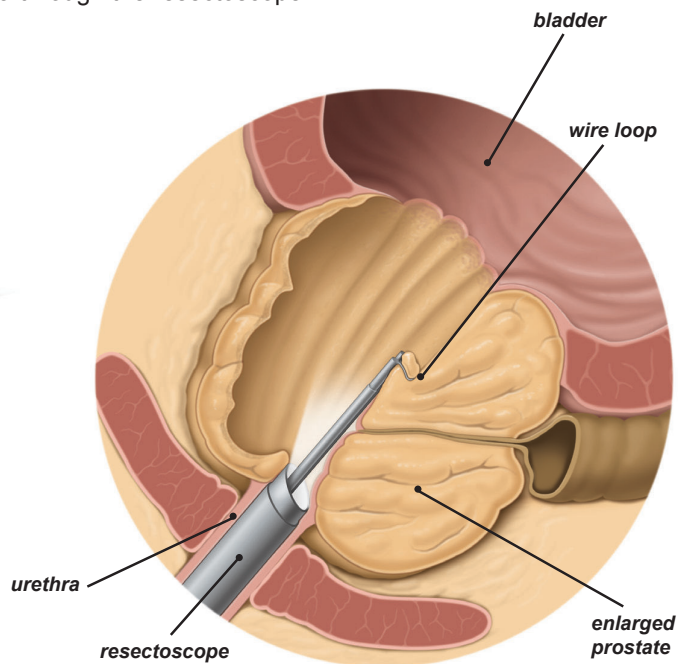
### How is TURP performed?

For TURP you will receive general or spinal anaesthesia. Once you are under anaesthesia, the doctor uses a resectoscope to enter the bladder through the urethra. This is a type of endoscope with a wire loop which uses a high-frequency electrical current to cut the prostate tissue. The resectoscope also has a camera which allows the doctor to see a high-quality image of the prostate on a video monitor.

During the procedure, the doctor removes the adenoma in small parts with the wire loop (**Fig. 2**). The doctor then flushes the cut tissue out of the bladder and the urethra through the resectoscope.



**Fig. 1: Surgery through the urethra.**



**Fig. 2: The resectoscope removes parts of the prostate tissue during TURP.**



### Interesting Fact

TURP has been performed since the 1930s and it has become the standard treatment option in the last 40 years. It has greatly improved in the past decade because of new technologies.



### Interesting Fact

In the early days, the doctor had to look directly into the endoscope to see the prostate. Nowadays, the camera projects a magnified image onto the video monitor in front of the doctor. Because of high-definition technology, the doctor can see even the smallest details.

After the operation a catheter is placed in your bladder to drain urine. It is also used to continuously flush your bladder and urethra with sterile solution to prevent blood clots. You will need the catheter for 1-3 days until the urethra is healed and you can urinate on your own.

### When should I consider TURP?

Today, TURP is the preferred surgical option for men with moderate to severe symptoms caused by BPE. It is most suited for men with prostates between 30-80 millilitres.

### How do I prepare for the procedure?

Your doctor will advise you in detail about how to prepare for the procedure. You must not eat, drink, or smoke for 6 hours before surgery to prepare for the anaesthesia. If you are taking any prescribed medication, discuss it with your doctor. You may need to stop taking it several days before surgery.

### How long will it take me to get back to my daily activities?

Usually you can leave the hospital 2 or 3 days after surgery. The length of hospital stay can vary in different countries. There may be some blood in your urine for several days. You may also suffer from urgency and feel pain when you urinate, which can last up to several weeks.

For 4-6 weeks after the surgery:

- Drink 1-2 litres every day, especially water
- Do not lift anything heavier than 5 kilograms
- Do not do any heavy exercise and avoid bike riding

- Do not take thermal baths or go to the sauna
- Prevent constipation by adapting your diet
- Discuss any prescribed medication with your doctor

Avoid having sex for 2-3 weeks. After TURP, you may suffer from retrograde ejaculation. This is a chronic condition where semen can no longer leave through the urethra during orgasm. Instead it goes into the bladder and later leaves your body during urination.

You need to go to the doctor or go back to the hospital right away if you:

- Develop a fever
- Are unable to urinate on your own
- Have heavy blood loss or pain

### Advantages of TURP

- The procedure is safe and widely used
- Optimal and long-lasting improvement of the symptoms
- Short hospital stay

### Disadvantages of TURP

- Risk of bleeding
- Risk of retrograde ejaculation
- Risk of urethral stricture
- Risk of urinary retention
- Low risk of urinary tract infection and urgency
- Very low risk of incontinence

## Transurethral incision of the prostate (TUIP)

TUIP is effective in men with prostates smaller than 35 millilitres who do not suffer from severe obstruction. This procedure is rarely used for the treatment of BPE because it has the same results as drug treatment. TUIP is recommended if you cannot tolerate drugs for BPE symptoms.

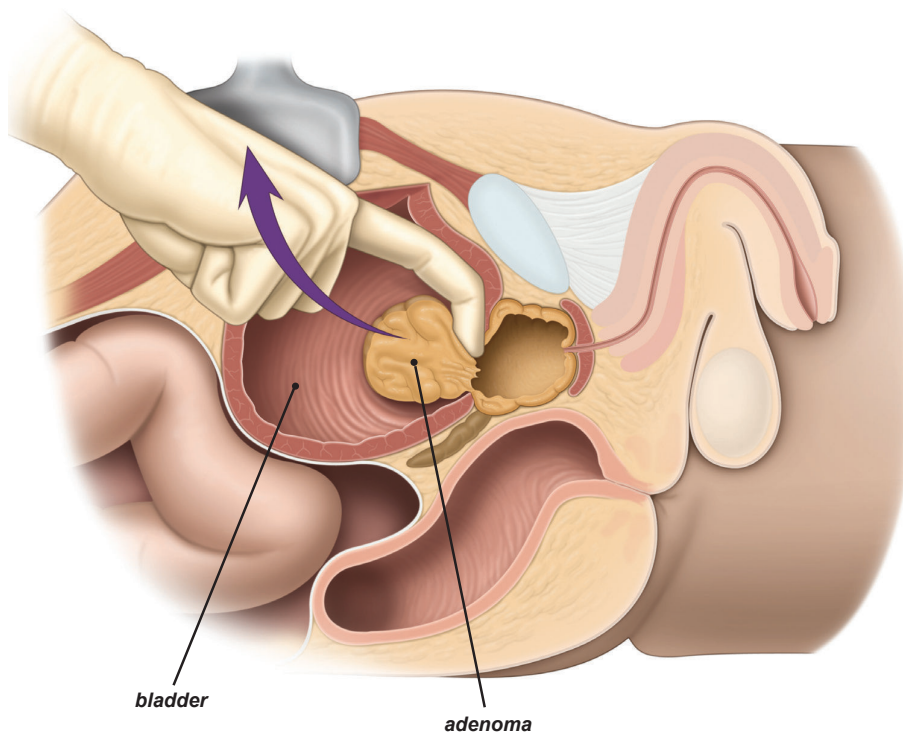
During TUIP, the doctor cuts into the prostate through the bladder neck with a resectoscope to improve the flow of urine. After the operation a catheter is placed in your bladder to drain urine. The catheter is also used to continuously flush your bladder and urethra with sterile solution to prevent blood clots.

## Open prostatectomy

Open prostatectomy is an operation which is done by making an incision in the lower part of the abdomen. Because TURP has similar or better results, open prostatectomy is now only done in selected situations.

### How is open prostatectomy performed?

For open prostatectomy you will receive general or spinal anaesthesia. During the operation the surgeon cuts into the lower abdomen to reach the bladder and the prostate. The surgeon then uses his finger to remove the adenoma (**Fig. 3**). After the operation a catheter will drain the urine. It is also used to continuously flush your bladder and urethra with sterile solution to prevent blood clots. You will need the catheter for several days until the wound is healed and you can urinate on your own.



**Fig. 3:** The surgeon removes the adenoma during open prostatectomy.



### Interesting Fact

Open prostatectomy was a major breakthrough in early 1900s when prostate surgery was first pioneered. Although it has been replaced by TURP as the gold standard treatment, open surgery is still recommended for the treatment of very large prostates.

## When should I consider open prostatectomy?

Open prostatectomy is recommended if your prostate is larger than 80 millilitres because other types of surgery would take more time to achieve the same result. Your doctor may also recommend open prostatectomy if you have bladder stones or a condition called bladder diverticulum.

## How do I prepare for the procedure?

Your doctor will advise you in detail about how to prepare for the procedure. You must not eat, drink, or smoke for 6 hours before surgery to prepare for the anaesthesia. If you are taking any prescribed medication, discuss it with your doctor. You may need to stop taking it several days before surgery.

## How long will it take me to get back to my daily activities?

Usually you can leave the hospital 5 to 7 days after surgery. The length of hospital stay can vary in different countries. There may be some blood in your urine for several days. You may also suffer from urgency and feel pain when you urinate. It will take several weeks to completely recover from the surgery.

For 4-6 weeks after the surgery:

- Drink 1-2 litres every day, especially water
- Do not lift anything heavier than 5 kilograms
- Do not do any heavy exercise and avoid bike riding
- Do not take thermal baths or go to the sauna
- Prevent constipation by adapting your diet
- Discuss any prescribed medication with your doctor

Avoid having sex for 2-3 weeks. After open prostatectomy, you may suffer from retrograde ejaculation. This is a chronic condition where semen can no longer leave through the urethra during orgasm. Instead it goes into the bladder and later leaves your body during urination.

### Advantages of open prostatectomy

- Optimal and long-lasting improvement of the symptoms

### Disadvantages of open prostatectomy

- Will leave a scar
- Longer hospital stay
- Longer use of catheter
- Significant bleeding may occur
- Risk of urinary retention, urinary tract infection and urgency
- Risk of bladder neck stricture
- Very low risk of urinary incontinence



## Laser treatment

Laser treatment is a common treatment option for BPE. The laser uses intensive light to cut or vaporize the prostate tissue. At the same time, the heat from the laser is used to close blood vessels. This is why only a small amount of blood is lost during this type of surgery.

There are two main types of laser surgery for BPE:

- Laser vaporization of the prostate
- Laser enucleation of the prostate

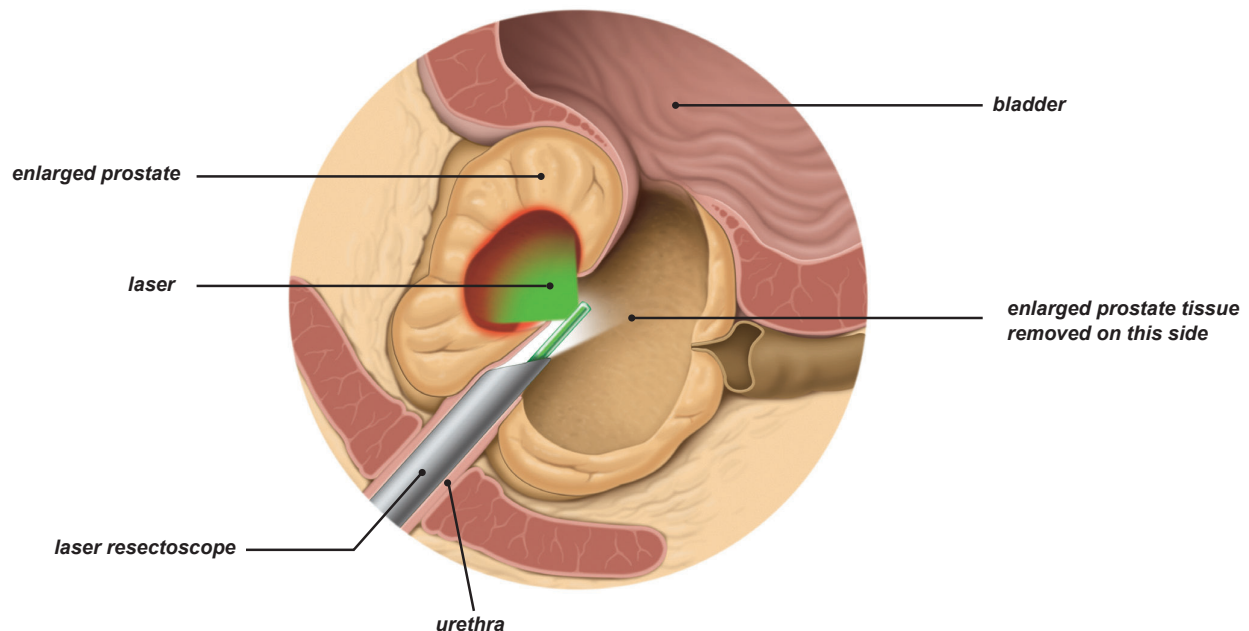
These types of surgery can be done with different laser systems. The choice of the laser depends on the expertise of your doctor and what is available in your hospital.

## Laser vaporization of the prostate

### How is laser vaporization performed?

For laser vaporization you will receive general or spinal anaesthesia. Once you are under anaesthesia, the doctor uses a resectoscope to enter the bladder through the urethra without making an incision in your lower abdomen (**Fig. 1**). The resectoscope has a laser for vaporization and a small camera. The camera allows the doctor to see a high-quality image of the prostate on a video monitor.

During the procedure, the laser heats up a small part of the prostate. When the tissue reached boiling point it starts to vaporize. In this way, the whole prostate can be treated (**Fig. 4**). After the operation a urinary catheter will be placed in your bladder to drain urine. It is also used to continuously flush your bladder and urethra with sterile solution to prevent blood clots. You will need the catheter for some days until the urethra is healed and you can urinate on your own.



**Fig. 4:** The heat from the laser vaporizes parts of the prostate tissue.

## When should I consider laser vaporization of the prostate?

Vaporization may be an option if your prostate is smaller than 80 millilitres. Because vaporization causes very little blood loss, it is recommended for men who need to take blood-thinning medication for other conditions.

## How do I prepare for the procedure?

Your doctor will advise you in detail about how to prepare for the procedure. You must not eat, drink, or smoke for 6 hours before surgery to prepare for the anaesthesia. If you are taking any prescribed medication, discuss it with your doctor. You may need to stop taking it before surgery.

## How long will it take me to get back to my daily activities?

Usually you can leave the hospital 1 or 2 days after surgery. The length of hospital stay can vary in different countries. There may be some blood in your urine and you may feel pain when you urinate. This can last up to several weeks.

For 4-6 weeks after the surgery:

- Drink 1-2 litres every day, especially water
- Do not lift anything heavier than 5 kilograms
- Do not do any heavy exercise and avoid bike riding
- Do not take thermal baths or go to the sauna
- Prevent constipation by adapting your diet
- Discuss any prescribed medication with your doctor

Avoid having sex for 2-3 weeks. Your semen may be stained with blood for a few weeks. After laser vaporization, you may suffer from retrograde ejaculation. This is a chronic condition where semen can no longer leave through the urethra during orgasm. Instead it goes into the bladder and later leaves your body during urination.

You need to go to the doctor or go back to the hospital right away if you:

- Develop fever
- Are unable to urinate on your own
- Have heavy blood loss or pain

### Advantages of laser vaporization

- Immediate improvement of the urine flow
- Short hospital stay
- Shorter period of using a catheter
- Low risk of complications
- No need to stop blood-thinning medication

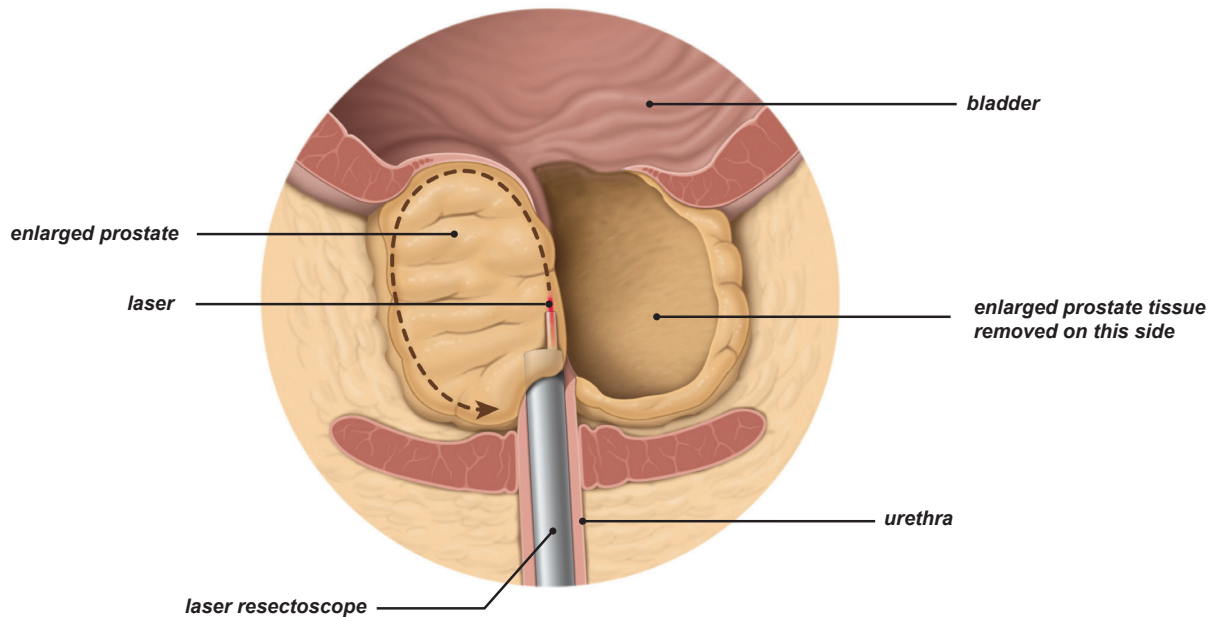
### Disadvantages of laser vaporization

- Less effective for very large prostates
- Painful urination for some time after the surgery
- May need another surgery after several years because the prostate continues to grow
- No possibility to analyse the prostate tissue after the surgery
- Risk of urinary retention, urinary tract infection and urgency
- Very low risk of urinary incontinence

# Laser enucleation of the prostate

## How is laser enucleation performed?

For laser enucleation you will receive general, spinal, or intravenous anaesthesia. Once you are under anaesthesia, the doctor uses a resectoscope to enter the bladder through the urethra without making an incision in your lower abdomen (**Fig. 1**). The resectoscope has a small camera through which the doctor can see the prostate. During laser enucleation the doctor uses the laser to cut prostate tissue and in this way the whole prostate can be treated (**Fig. 5**). The doctor then uses an instrument known as morcellator to flush the cut tissue out of your body through the bladder and the urethra.



**Fig. 5:** The laser cuts out parts of the prostate tissue during laser enucleation.

After the operation a urinary catheter is placed in your bladder to drain urine. It is also used to continuously flush your bladder and urethra with sterile solution to prevent blood clots. You will need the catheter for some days until the urethra is healed and you can urinate on your own.

## When should I consider laser enucleation of the prostate?

If your prostate is over 80 millilitres, laser enucleation may be the best option for you, because it removes the whole adenoma. This type of surgery is also a good option for men with smaller prostates.

Laser enucleation is suitable for men who take blood-thinning medication for other conditions. It is important to discuss your individual situation with your doctor.

## How do I prepare for the procedure?

Your doctor will advise you in detail about how to prepare for the procedure. You must not eat, drink, or smoke for 6 hours before surgery to prepare for the anaesthesia. If you are taking any prescribed medication, discuss it with your doctor. You may need to stop taking it before surgery.



## How long will it take me to get back to my daily activities?

Usually you can leave the hospital 1 or 2 days after surgery. The length of hospital stay can vary in different countries. There may be some blood in your urine and you may feel pain when you urinate. This can last up to several weeks.

For 4-6 weeks after the surgery:

- Drink 1-2 litres every day, especially water
- Do not lift anything heavier than 5 kilograms
- Do not do any heavy exercise and avoid bike riding
- Do not take thermal baths or go to the sauna
- Prevent constipation by adapting your diet
- Discuss any prescribed medication with your doctor

Avoid having sex for 2-3 weeks. Your semen may be stained with blood for a few weeks. After laser enucleation, you may suffer from retrograde ejaculation. This is a chronic condition where semen can no longer leave through the urethra during orgasm. Instead it goes into the bladder and later leaves your body during urination.

You need to go to the doctor or go back to the hospital right away if you:

- Develop a fever
- Are unable to urinate on your own
- Have heavy blood loss or pain

## Advantages of laser enucleation

- Immediate improvement of the urine flow
- Short hospital stay
- Shorter period of using a catheter
- Low risk of complications
- Effective for all prostates, especially for large ones
- Possibility to analyse the prostate tissue after the surgery

## Disadvantages of laser enucleation

- Surgery may take longer for small prostates
- Painful urination for some time after the surgery
- Risk of urinary retention, urinary tract infection and urgency
- Very low risk of urinary incontinence

# Prostate stents

Prostate stents are used to keep the urethra open which improves the flow of urine (**Fig. 1**). Stents are mainly recommended for men who are not fit for surgery but who are still able to empty the bladder on their own. They are used instead of an indwelling catheter.

## How is the stent inserted?

The stent can be placed in the doctor's office or a clinic under local anaesthesia. It is inserted into the urethra until the tip reaches the bladder (**Fig. 6**). The correct position is checked with an ultrasound or a cystoscope.

## When should I consider getting a stent?

Today, stents are not recommended as a permanent treatment option. You should consider stents only if you cannot tolerate anaesthesia which is needed for surgery.

## How do I prepare for the procedure?

Your doctor will advise you in detail how to prepare for the procedure. If you are taking any prescribed medication, discuss it with your doctor. You may need to stop taking it before the procedure.

## How long will it take me to get back to my daily activities?

Usually you can go back to your daily activities on the day of the procedure. There may be some blood in your urine and you may feel pain when you urinate. This can last up to several weeks.

You need to go to your doctor or the hospital right away if you:

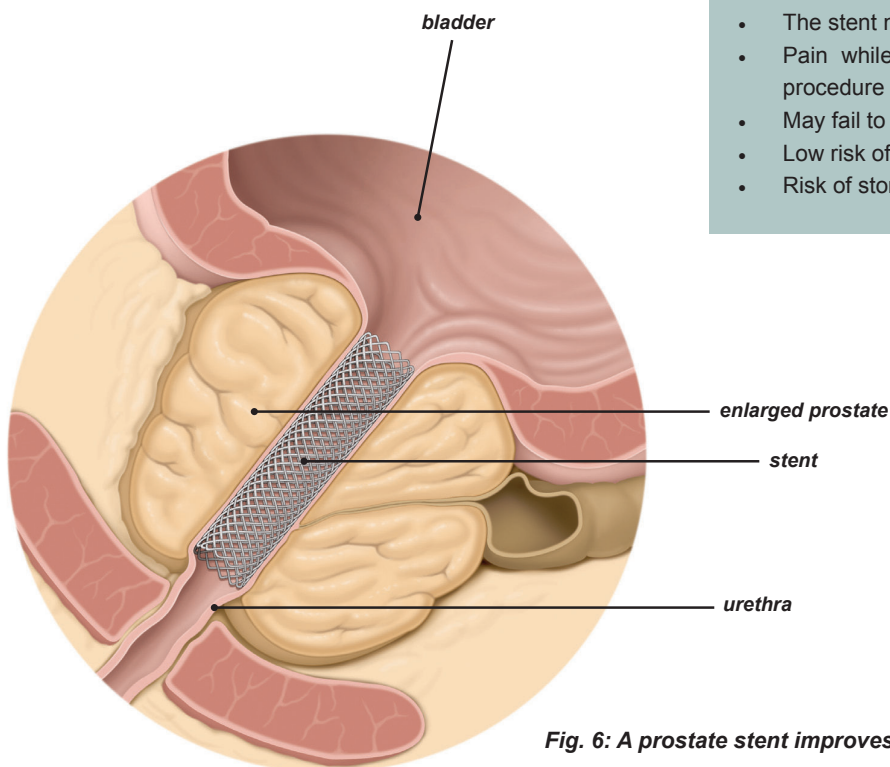
- Develop a fever
- Are unable to urinate on your own
- Have heavy blood loss or pain

### Advantages of stents

- Can be used instead of an indwelling catheter
- No hospital stay
- Local anaesthesia

### Disadvantages of stents

- The stent may shift
- Pain while urinating for some time after the procedure
- May fail to improve the flow of urine
- Low risk of urinary incontinence
- Risk of stone formation on the stent



**Fig. 6: A prostate stent improves the flow of urine.**

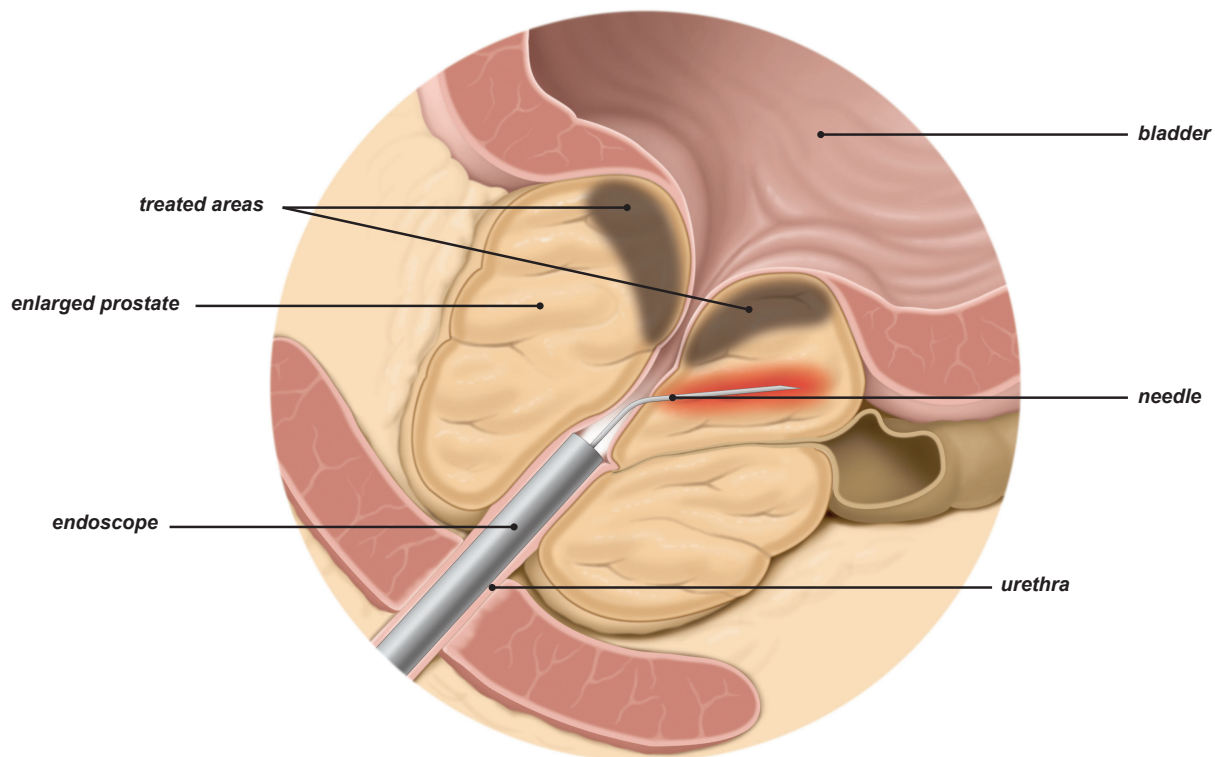
# Transurethral needle ablation (TUNA)

Transurethral needle ablation (TUNA) of the prostate is minimally invasive treatment which uses heat to harden parts of the prostate tissue. This process is called coagulation. The treated part of the prostate is either absorbed by the body or it passes with urine after the procedure. The aim of TUNA is to reduce the prostate volume and to improve the symptoms.

## How is TUNA performed?

For TUNA you will receive intravenous, spinal, or local anaesthesia. Once you are under anaesthesia, the doctor uses a resectoscope to enter the bladder through the urethra. The doctor uses an endoscope which has two needles and a camera. The needles are used to puncture the prostate and to heat up the tissue with radiofrequency energy (Fig. 7). This is done 4 to 8 times to treat the whole adenoma. The camera allows the doctor to see a high-quality image of the prostate on a video monitor.

You will need a catheter for some days until the urethra is healed and you can urinate on your own. The catheter is removed by the urologist at the hospital or clinic.



**Fig. 7: The needle heats up the prostate tissue with radiofrequency energy.**

## When should I consider having TUNA?

TUNA is advised for men with a prostate between 30 to 80 millilitres, who prefer minimally invasive treatment or who are not fit to have surgery because of other medical conditions.

## How do I prepare for the procedure?

Your doctor will advise you in detail about how to get ready for the procedure. To prepare for the anaesthesia you should not eat, drink, or smoke for 6 hours before the procedure. If you are taking any prescribed medication, discuss it with your doctor. You may need to stop taking it.

## How long will it take me to get back to my daily activities?

Usually you can leave the hospital or clinic a few hours after TUNA. Do not drive a car when leaving the hospital because you may still be drowsy after the anaesthesia. Make sure you get enough rest on the day of the procedure.

With the catheter still in your urethra, you can start getting back to your daily activities the next day. Your urine may contain traces of blood which can last up to several weeks.

For 4-6 weeks after the surgery:

- Drink 1-2 litres every day, especially water
- Do not lift anything heavier than 5 kilograms
- Do not do any heavy exercise and avoid bike riding
- Do not take thermal baths or go to the sauna
- Prevent constipation by adapting your diet
- Discuss any prescribed medication with your doctor

Avoid having sex for 2-3 weeks. Your semen may be stained with blood for a few weeks.

You need to go to the doctor or go back to the hospital right away if you:

- Develop a fever
- Face problems with the catheter
- Cannot urinate on your own after the catheter is removed

### Advantages of TUNA

- No hospital stay in most cases
- Low risk of complications
- No need to stop blood-thinning medication

### Disadvantages of TUNA

- Less effective for large prostates and in case of severe obstruction
- Use of catheter at home for several days after the procedure
- Slow improvement of symptoms and the flow of urine
- May need another treatment after several years because the prostate continues to grow

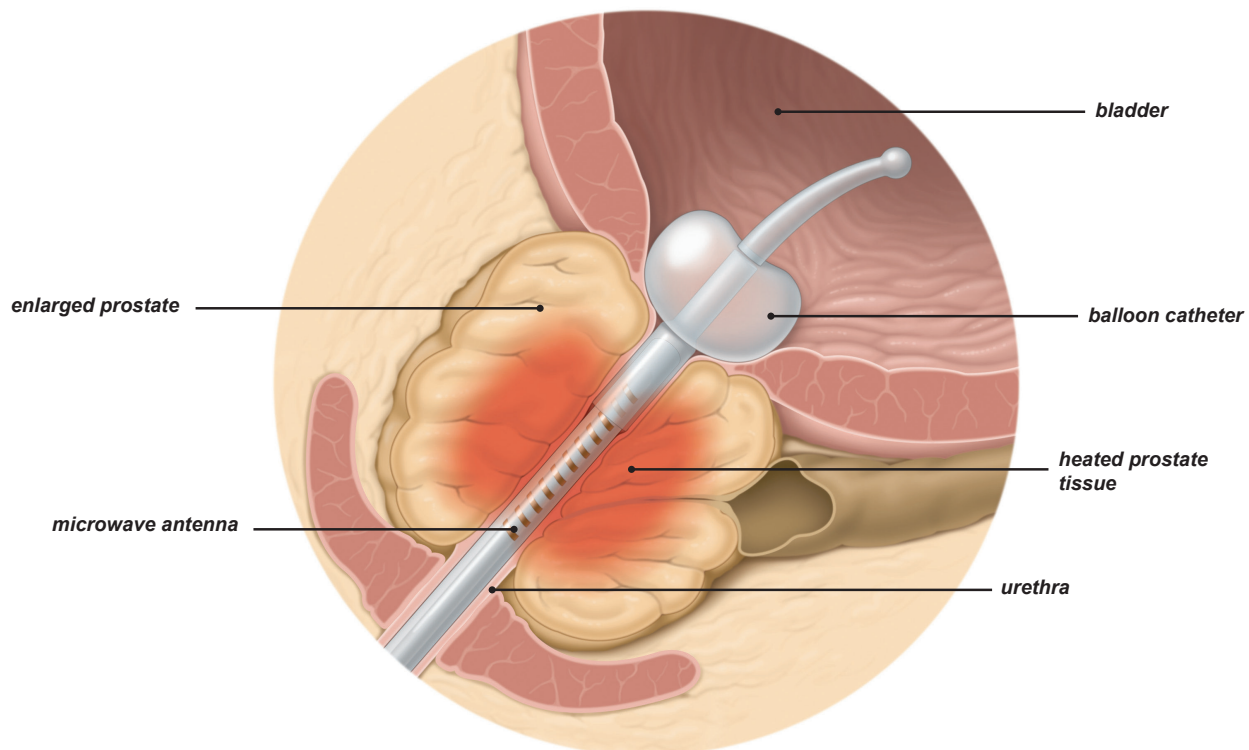
## Transurethral microwave therapy (TUMT)

Transurethral microwave therapy (TUMT) of the prostate is minimally invasive treatment which uses microwave energy to harden parts of the prostate tissue. This process is called coagulation. The treated part of the prostate is either absorbed by the body or it passes with urine after the procedure. The aim of TUMT is to reduce the prostate volume and to improve the symptoms.

### How is TUMT performed?

For TUMT you will receive local anaesthesia which is sometimes combined with intravenous anaesthesia. Once you are under anaesthesia, the doctor uses a resectoscope to enter the bladder through the urethra which has a microwave antenna and a balloon. The antenna heats up the prostate tissue with microwave energy and the balloon keeps the antenna in place inside the prostate (**Fig. 8**). After the procedure a different catheter will be placed in your bladder to help you urinate.

You will need this catheter for some days until the urethra is healed and you can urinate on your own. The catheter is removed by the urologist at the hospital or clinic.



**Fig. 8:** The heat generated by the microwave antenna coagulates parts of the enlarged prostate tissue.



## When should I consider TUMT?

TUMT is recommended for men with a prostate between 30 to 100 millilitres who prefer minimally invasive treatment or do not wish to have surgery because of other medical conditions.

## How do I prepare for the procedure?

Your doctor will advise you in detail about how to get ready for the procedure. To prepare for the anaesthesia you should not eat, drink, or smoke for 6 hours before the procedure. If you are taking any prescribed medication, discuss it with your doctor. You may need to stop taking it before TUMT.

## How long will it take me to get back to my daily activities?

In most cases you can leave the hospital a few hours after TUMT. Do not drive a car when leaving the hospital because you may still be drowsy after the anaesthesia. Make sure you get enough rest on the day of the procedure.

With the catheter still in your urethra, you can start getting back to your daily activities the next day. Your urine may contain traces of blood which can last up to several weeks.

For 4-6 weeks after the surgery:

- Drink 1-2 litres every day, especially water
- Do not lift anything heavier than 5 kilograms
- Do not do any heavy exercise and avoid bike riding
- Do not take thermal baths or go to the sauna
- Prevent constipation by adapting your diet
- Discuss any prescribed medication with your doctor

Avoid having sex for 2-3 weeks. Your semen may be stained with blood for a few weeks.

You need to go to the doctor or go back to the hospital right away if you:

- Develop a fever
- Face problems with the catheter
- Are unable to urinate on your own after catheter removal

## Advantages of TUMT

- Is performed under local anaesthesia
- No hospital stay in most cases
- Low risk of complications
- No need to stop blood-thinning medication

## Disadvantages of TUMT

- Less effective for large prostates and in case of severe obstruction
- Use of catheter at home for several days after the procedure
- Slow improvement of symptoms and the flow of urine
- May need another treatment after several years because the prostate continues to grow

# Intra-prostatic ethanol and botulinum toxin injections

Today, ethanol and botulinum toxin injections are explored as possible treatment options for BPE. They may become accepted in the future, but today they are still experimental and are usually used in clinical trials.

## Intra-prostatic ethanol injections

Ethanol, which is pure alcohol, is injected through the urethra or the rectum into the prostate tissue. The aim is to reduce the size of the prostate and improve the flow of urine.

## Intra-prostatic botulinum toxin injections

Botulinum toxin is widely known by one of its trade names Botox. It is a strong toxic substance which is used in cosmetic surgery. In BPE treatment it blocks nerve endings and relaxes the smooth muscle in the prostate. Botulinum toxin reduces the size of the prostate and improves the flow of urine. It can be injected through the urethra, the rectum, or the perineum. Recent studies do not support the use of botulinum toxin for the treatment of lower urinary tract symptoms in men with BPE.

### This information was updated in September 2013.

This leaflet is part of EAU Patient Information on BPE. It contains general information about benign prostatic enlargement. If you have any specific questions about your individual medical situation you should consult your doctor or other professional healthcare provider.

This information was produced by the European Association of Urology (EAU) in collaboration with the EAU Section of Uro-Technology (ESUT), Europa Uomo, and the European Association of Urology Nurses (EAUN).

The content of this leaflet is in line with the EAU Guidelines.

You can find this and other information on urological diseases at our website: <http://patients.uroweb.org>

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