HoLAP Technique and Tips

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Introduction

Recent advances in surgery, in general, and in urology, in particular, have lead to the development of more minimally invasive and bloodless techniques. While transurethral resection of the prostate (TURP) remains the gold standard for the treatment of benign prostatic hyperplasia, use of the holmium laser for ablation of the prostate (HoLAP) results in a shortened hospital stay and less blood loss than traditional TURP.

Indications

The holmium laser, which can be used to fragment stones, ablate urothelial tumors and incise strictures, can also be used to incise small fibrous prostates (transurethral incision of the prostate or TUIP) and ablate prostate tissue. Moderate sized prostates can be ablated expeditiously and with minimal blood loss. Larger prostates can be ablated but an extended procedure is necessary, making the operation less time effective. There is, however, still minimal blood loss with larger prostates.

Surgical Technique

After induction of anesthesia, a continuous flow resectoscope with a laser bridge is introduced into the urethra with a side-firing DuoTome™ holmium fiber that emits laser energy at a 70 degrees angle. The VersaPulse® PowerSuite™ 100 Watt laser is used with settings at 2.0 J at 50 Hz resulting in 100 Watts of power for the procedure. Water or saline can be used as an irrigant.

Incisions of the prostate are made at 5 and 7 o'clock and then the fiber is rotated over the area to be ablated until prostatic capsule is reached. If a bleeding vessel is encountered, the fiber is held over the vessel until hemostasis is achieved. Vaporization occurs at a rate of approximately 1 gram/minute.

Removing your foot from the foot pedal frequently will slow the procedure considerably. Care is taken not to vaporize distal to the verumontanum.

Postoperative Care

A Foley catheter is placed for 23 hours. The patient is given a voiding trial the next morning and discharged home. Some investigators have reported performing the procedure as an outpatient and maintain that placement of a catheter postoperatively is optional.

Summary

HoLAP is an excellent treatment option in patients with BPH that results in decreased blood loss and shortened hospital stay. It is a relatively easy procedure to learn and can be performed in hospitals that already have a 100 Watt holmium laser without the purchase or lease of additional capital equipment.

HOLAP
Holmium Laser Ablation of the Prostate

HoLAP Technique and Tips

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Introduction

HoLAP represents a significant advance in the surgical treatment of patients with obstructive urinary symptoms caused by BPH. The availability of a powerful 100 Watt holmium laser has made it possible to efficiently vaporize any size prostate. Patients have no significant perioperative bleeding and experience excellent improvement in clinical symptoms.

Equipment

The 100 Watt Lumenis VersaPulse® PowerSuite™ holmium laser with a DuoTome™ SideLite™ fiber is used as the laser energy source and delivery system. Laser settings are usually 2 J and 50 Hz.

A 25F or 27F continuous flow resectoscope, preferably with a revolving laser bridge, is recommended. A fiber bridge big enough to accommodate the DuoTome fiber (7.2F diameter) is used to stabilize the fiber during treatment.

Procedure

HoLAP can be done with spinal or general anesthesia. It is mostly performed as an outpatient procedure. Sterile water or normal saline is used for irrigation.

The procedure is generally started at the vesicle neck by first vaporizing the median lobe if present. The laser tip is placed 1-2 mm from but not necessarily touching the tissue when the laser is activated.

The endoscope is kept proximal from the verumontanum at all times while the laser is activated. Vaporization is performed by rotating the fiber and moving it back and forth until circular fibers of the prostate capsule are visible. Lateral lobe vaporization starts at 5 o'clock position. A wide groove from 5 to 3 o'clock is extended by gently pulling the fiber distally as it is rotated sideways. Both the lateral lobes and anterior tissue followed by the base of the prostate are then vaporized.

Apical tissue is vaporized at the end. Special care should be taken to not damage the proximal urethra. This is done by keeping the endoscope stationary and moving the fiber sideways, not back and forth. Intraoperative bleeding is minimal and the procedure is virtually bloodless.

The procedure is complete when capsule fibers have been reached and an open prostatic cavity is present.

Procedural Tips

- The fiber tip should be close to tissue to vaporize most efficiently.
- To avoid damaging the telescope do not pull the fiber tip into the scope past the black circular marking.
- The scope tip should always be positioned proximal to the verumontanum when the laser is activated to protect the membranous urethra.
- Bleeding is controlled by moving the fiber tip 2-3 mm away from the bleeding vessel while activating the laser.

Postoperative Care

An 18F Foley catheter is left indwelling at the end of the procedure. Patients are usually discharged without catheters within 24 hours. Antibiotics are prescribed for a week. Pain medications are generally not needed. Patients may resume normal activities in 2 to 3 weeks. Heavy exertion should be postponed for about a month.

Conclusion

The HoLAP procedure provides excellent improvement in clinical symptoms for patients with little perioperative bleeding and few if any complications.

HOLAP
Holmium Laser Ablation of the Prostate

HoLAP for Large Prostates

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Introduction

The holmium laser optimal penetration of less than 0.5 mm and its remarkable hemostatic properties make it an ideal laser for treating BPH symptoms. With the availability of a 100 Watt laser, holmium has become efficient for vaporization of any size prostate, including those in excess of 100 cc that are generally treated with open prostatectomy.

Early Results

The mean prostate volume reduction was 56% following the procedure. This was a substantial reduction in prostate volume comparable to the amount removed with TURP. A summary table of early clinical experience using HoLAP for very large prostate glands is provided below.

The mean prostate volume was reduced postoperatively from 143 cc to 63 cc. AUA symptom scores were reduced from 23.6 to 6.6. Maximum flow rates increased fourfold. No transfusions were required. Urethral catheters in all but 3 patients were removed before discharge. There were no intraoperative complications and postoperative complications were infrequent.

One patient had clot retention postoperatively at 4 weeks. Five patients had episodes of urinary retention that resolved in a few days when treated with catheterization and bethanechol. All patients were voiding well at the 3- to 4-week follow-up.

HoLAP vs GreenLight PVP

The KTP laser in my experience of over 100 PVP cases does not come close to providing the level of success possible with the holmium laser, particularly with glands larger than 50 cc for several reasons.

- The KTP laser, with its deeper tissue penetration, tends to leave more coagulated necrotic tissue behind resulting in prolonged postoperative symptoms.
- The KTP fiber tip degradation with continuous use in larger glands can lead to deep coagulation without vaporization. Deep coagulation can result in dysuria, retention and delayed symptom relief.
- During treatment of larger glands, the orange safety glasses used with KTP laser make the procedure very difficult to do in the presence of even slight bleeding. The clear glasses used with the holmium laser, however, allow the procedure to continue even if bleeding occurs.
- The KTP laser needs special electrical and plumbing hook-ups in the operating room, thus limiting its use to these rooms.

Conclusion

The holmium laser is remarkably efficient for vaporizing prostate glands of any size, including those in excess of 100 cc.

TABLE: Early clinical experience using HoLAP for very large prostates.

HoLAP Results on 13 Patients with Large Prostate Glands		
Variable	Preop.	Postop.
AUA Symptom Score	23.6	6.6
Max Flow Rate	4.9 cc/sec	22.3 cc/sec
Serum Sodium	137	136
Hemoglobin	13.2	12.8
Mean Prostate Vol. Preop.	143 cc (90-232)	
Mean Prostate Vol. Postop.	63 cc (35-115)	
Average Operating Time	95 min (46-203)	
Average Hospital Stay	1.4 days	

HOLAP
Holmium Laser Ablation of the Prostate

HoLAP Technique and Tips

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Introduction

The holmium laser is a versatile tool. The 100 Watt high-powered VersaPulse® PowerSuite™ lasers can not only be utilized to fragment urinary calculi of any composition but also to efficiently ablate, or vaporize, obstructive prostate tissue with minimal blood loss.

The HoLAP technique has a flat learning curve and can be incorporated very quickly into one's surgical practice. HoLAP outcomes are similar to those achieved by TURP. The minimal penetration depth of holmium energy minimizes postoperative irritative voiding symptoms, while the ability to use normal saline as the irrigant during treatment virtually eliminates the possibility of dilutional hyponatremia. Long-term follow-up of HoLAP patients over a seven-year period has shown durable improvements in both maximal urinary flow rates as well as AUA symptoms scores.

Indications

HoLAP is offered for the same indications as TURP. In my practice, I use a volume of 60 cc as an upper limit for treatment, with larger glands treated using the Holmium Laser Enucleation technique (HoLEP). Glands larger than 60 cc can be treated with the HoLAP technique; however, more time needs to be allotted for the procedure. Approximately 1 cc/minute can be treated with the HoLAP technique.

Instruments and Settings

My standard setup includes a 26 F resectoscope sheath with laser bridge and 30° lens. I use the 100 Watt VersaPulse PowerSuite holmium laser in conjunction with a 550µ side-firing holmium laser fiber (DuoTome™) as the delivery device. A video camera and monitor is essential.

For the majority of the ablation process, I use settings of 3.2 J and 25 Hz. I have found that higher energy levels allows more efficient tissue vaporization with less tissue scatter into the endoscopic field. For bleeding points, I change the settings to 2.5 J and 40 Hz.

Surgical Technique

I position the tip of the resectoscope at the bladder neck and extend the tip of the DuoTome fiber until the distal end is seen in the field. I usually begin treatment at 6 o'clock, vaporizing the median lobe tissue at the bladder neck region by rotating the tip of the fiber over the surface of the prostate. The ablation is deepened to the level of the surgical capsule, seen by the appearance of well-defined circumferential fibers. I then proceed distally to ablate the remainder of the median lobe, match the depth of ablation achieved proximally. Similar maneuvers are utilized to ablate the lateral lobes, thus creating a widely patent channel. Hemostasis is achieved by defocusing the tip of the side-firing fiber (moving away from the surface 1-2 mm) over a bleeding point and activating the laser at the aforementioned settings.

Postoperative Care

The vast majority of patients are discharged the day of surgery. If a patient is treated early in the day and does not have a significant history of retention, I will remove the catheter in the recovery room and start the patient on voiding trials. For others, I will leave the catheter indwelling overnight and schedule either home or office removal the following morning.

Summary

HoLAP is an excellent alternative to TURP and provides long-term symptomatic relief with a minimal morbidity profile. Its short and flat learning curve makes it an attractive procedure for urologists to add to their BPH armamentarium.

HOLAP
Holmium Laser Ablation of the Prostate

HoLEP Technique and Tips

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Introduction

The holmium laser is a versatile instrument that is effective in treating urinary calculi of all compositions as well as soft tissue pathology such as papillary transitional cell carcinoma and ureteral strictures. The 100 Watt high-powered VersaPulse® PowerSuite™ lasers can also cut cleanly through prostate tissue with minimal blood loss. The holmium laser enucleation of the prostate (HoLEP) technique allows entire lobes of the prostate gland to be dissected from the surgical capsule and displaced into the bladder. A morcellator is then used to remove the prostatic tissue from within the bladder. The minimal penetration depth of holmium energy minimizes postoperative irritative voiding symptoms, while the ability to use normal saline as the irrigant during treatment virtually eliminates the possibility of dilutional hyponatremia.

Indications

HoLEP is an excellent alternative whenever a TURP or open simple prostatectomy is indicated. Multiple studies, including prospective, randomized series, have shown that HoLEP provides equivalent outcomes when compared to TURP and open simple prostatectomy. Although the HoLEP technique can be used to effectively treat prostates of any size, the minimal morbidity and superb outcomes associated with this procedure are particularly attractive as gland sizes increase.

Instruments and Settings

My standard setup includes a 28 F resectoscope sheath with laser bridge and 30° lens. I use the 100 Watt VersaPulse PowerSuite holmium laser unit in conjunction with a 550µ end-firing holmium laser fiber (SlimLine™) as the delivery device. A video camera and monitor are essential when utilizing the holmium laser at maximal power settings.

For the majority of the enucleation process, I use settings of 2 J and 50 Hz. When dissecting the apical tissue of both lateral lobes, settings are reduced to 2 J and 40 Hz while working near the external sphincter. For control of bleeding points, I utilize settings of 2.5 J and 40 Hz.

Surgical Technique

With a typical trilobar hyperplasia situation, grooves are cut at the 7 and 5 o'clock positions along the sulci lateral to the median lobe. The grooves proceed from the bladder neck distally to the verumontanum and are deepened to the level of the surgical capsule. The distal points of the 7 and 5 o'clock grooves are then connected by incising with the laser fiber in a transverse fashion just proximally to the verumontanum. The beak of the resectoscope is then used to place upward traction on the median lobe adenoma, which defines the attachments of the tissue to the capsule. These attachments are divided in a retrograde fashion and the median lobe displaced into the bladder. The planes between the lateral lobes and the capsular floor are then developed and the apical tissue of both lateral lobes dissected away from the capsule. Another groove is made at the 12 o'clock position (anterior commissure) and then the anterior planes between the lateral lobes and the capsule developed. The mucosal strips, which identify the lateral junction between the floor and anterior planes are then defined and divided. The remaining lateral lobe attachments to the capsule are divided retrogradely and both lateral lobes displaced into the bladder. Prior to morcellation, which requires a clear endoscopic field, complete hemostasis is achieved by defocusing the tip of the end-firing fiber (moving away from the surface 1-2 mm) over a bleeding point and activating the laser at the aforementioned settings. The morcellator is then used to remove the adenoma tissue from the bladder.

Postoperative Care

Typically, continuous bladder irrigation can be quickly titrated off following HoLEP completion. The vast majority of patients are discharged the day after surgery following early morning removal of the 3-way Foley catheter and a successful trial of void.

Summary

HoLEP is an excellent alternative to TURP and open simple prostatectomy. This technique results in a superior extirpation of obstructive prostate tissue with minimal blood loss and an extremely favorable complication profile.

HOLAP
Holmium Laser Ablation of the Prostate

HoLAP for Beginners

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Introduction

There are a variety of surgical options available to treat BPH. In general, the more invasive treatment will result in a better result. The traditional treatments of TURP and open simple prostatectomy are complicated by risks of bleeding and hospital stays. Additional risks of impotence, stricture, contracture and incontinence also exist.

Holmium laser technology has special characteristics that facilitate endoscopic urologic surgery. Holmium cuts and coagulates simultaneously which allows for a uniquely bloodless field that reduces the risks of bleeding. The shallow penetration of holmium limits the necrotic tissue in the prostate minimizing inflammation, scarring and postoperative irritation.

Indications

HoLAP can be used for incision and ablation of prostate tissue. It is an ideal treatment for prostatic obstruction from median bar.

Small prostates less than 20 grams are easily treated with incisions. Prostatic obstruction of larger prostates can be treated with a combination of incision and ablation of the lateral lobes. The larger the prostate, the longer the procedure lasts. Prostates can also be treated very effectively with HoLEP, but this technique is not addressed here.

Surgical Technique

Equipment used is a continuous flow scope with a laser bridge. The fiber used is the DuoTome™ side-firing fiber that emits laser energy at 70 degrees forward. Higher energy is preferable and a rapid repetition rate leaves a smoother cavity. The VersaPulse® PowerSuite™ 100 Watt laser is used with settings of 2.0 J at 50 Hz. Water or saline can be used for irrigation.

After introduction of the scope, incisions are made at 5 and 7 o'clock. If needed, a third incision can be made at 12 o'clock. The fiber is passed across the area to be incised. Laser energy is discharged as the fiber is withdrawn slowly (l mm/sec). The DuoTome is rotated as it is withdrawn to vaporize a trough. Repeated passes are made until the desired depth is reached.

After the incisions, placing the fiber in contact or near contact directly ablates obstructing lateral lobe tissue. The lateral lobe tissue in the path of the laser melts away. Once the surgical capsule is reached the procedure is completed.

Postoperative Care

Catheter placement is optional. A catheter is placed in patients who have large residuals or pre-existing bladder dysfunction. A Foley catheter is also placed in patients who have had spinal or epidural anesthesia. The catheter is removed in a few hours prior to discharge from the outpatient unit or the next morning.

HoLAP vs TURP

- Similar symptomatic improvement but very little bleeding and no transfusions.
- Shorter catheter time and hospital stay.
- Can treat anticoagulated patients while they are anticoagulated.

Holmium vs KTP

- KTP penetrates deeper, leaving necrotic tissue that can cause postoperative irritative voiding symptoms.
- It is harder to vaporize tissue as it becomes desiccated with KTP, slowing the procedure down over time.

Conclusion

HoLAP is an easy to learn procedure that provides excellent surgical results comparable to TURP in an outpatient setting with few complications.

HOLAP
Holmium Laser Ablation of the Prostate

LUMENIS BOOTH 968

Clinical Experience with HoLAP

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Introduction

The holmium laser is used for many urologic procedures including fragmentation of urinary calculi, ablation of urothelial tumors, incisions of urinary strictures and surgical management of benign prostatic hyperplasia (BPH). The holmium laser can cut, vaporize, resect or enucleate prostatic tissue with minimal bleeding, making it an ideal endoscopic surgical tool for the management of BPH. Holmium laser ablation of the prostate (HoLAP) creates a channel identical to transurethral resection of the prostate (TURP). The two techniques also share similar objective and subjective voiding outcomes.

The holmium laser coagulates tissue during the ablation process, making HoLAP a relatively bloodless technique. Normal saline is the irrigant used, which helps in avoiding dilutional hyponatremia. The indications for HoLAP are the same as for TURP.

Instruments and Settings

As with any advanced urologic technique, proper instrumentation and equipment are of utmost importance. Our standard setup includes an endoscopic camera, 26 F continuous flow resectoscope, laser fiber bridge, DuoTome™ side-firing fiber and 100 Watt holmium laser. The laser bridge stabilizes laser fiber and fixes the tip of the fiber at the 6 o'clock position in the endoscope. Laser settings are at 2 J and 50 Hz for a total of 100 Watts for the procedure.

Surgical Technique

The first step of the HoLAP procedure is bladder neck incisions. Bladder neck incisions are made at the 5 and 7 o'clock positions (median lobe) from the bladder neck to the verumontanum to the surgical capsule of the prostate. Once the incisions are made, the adenoma is completely ablated to the surgical capsule between the two incisions. The fiber is rotated as it is withdrawn to vaporize the tissue. Repeated passes are made until the desired depth is reached.

Once the median lobe is vaporized, a third bladder neck incision is made at the 12 o'clock position. The fiber is then used to ablate the adenoma between the 12 o'clock position and the 5 o'clock position (left lateral lobe) to the prostatic capsule. Similarly, the right lateral lobe is treated by ablating the tissue between the 12 o'clock position and the 7 o'clock position to the surgical capsule. If bleeding is encountered, it is treated by defocusing the laser beam at the bleeding site and then activating the laser. The procedure is complete when the surgical capsule is reached.

Postoperative Care

Many of these patients are discharged within 23 hours catheter free. Certain patients are candidates for outpatient procedure and are discharged without a catheter the same day.

Summary

The HoLAP procedure is an excellent alternative to TURP and can be performed in an outpatient setting. In addition, the HoLAP technique has a short learning curve making an attractive procedure for urologists to learn. The advantage of using holmium to treat coexistent urethral strictures, bladder stones, ureteral stones and strictures, superficial bladder tumors and the prostate makes the holmium laser an ideal endoscopic tool for urologists.

HOLAP
Holmium Laser Ablation of the Prostate

HoLAP vs KTP for Prostate Vaporization

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Introduction

There are a variety of surgical options available to treat BPH. In general, the more invasive the treatment is the better the result. The traditional surgical methods of TURP and open prostatectomy are effective but include risks of bleeding, hospitalization, impotence, strictures, contractures and incontinence.

The holmium laser characteristics of simultaneous cutting and coagulating enable an unusually bloodless field that reduces the risks of bleeding. The shallow penetration of holmium limits the necrotic tissue in the prostate minimizing inflammation, scarring and postoperative irritation.

Indications

Holmium can be used for incising and ablating prostate tissue. Small prostates less than 20 grams are easily treated with transurethral incisions of the prostate. HoLAP is an ideal treatment for prostatic obstruction from median bar and prostates larger than 20 grams.

Surgical Technique

The equipment used includes a VersaPulse® PowerSuite™ 100 Watt holmium laser, DuoTome™ side-firing fiber and a continuous flow scope with a laser bridge. Water or saline is used for irrigation. Laser settings of 2 J and 50 Hz or 3.2 J and 25 Hz are usually used.

After introduction of the scope, incisions are made at 5 and 7 o'clock. The fiber is passed across the area to be incised. Laser energy is discharged as the fiber is withdrawn slowly, about 1 mm per second. The DuoTome fiber is rotated as it is withdrawn to vaporize a trough. Repeated passes are made until the desired depth is reached. After the incisions, tissue is ablated by placing the fiber in contact or near contact with the lateral lobe tissue and moving it back and forth.

Once the surgical capsule is reached the procedure is completed.

Postoperative Care

Catheter placement is optional. A catheter is placed in patients who have large residuals or pre-existing bladder dysfunction. A Foley catheter is also placed in patients who have had spinal or epidural anesthesia. The catheter is usually removed in a few hours prior to discharge from the outpatient center.

HoLAP vs GreenLight KTP

- The holmium laser has minimal depth of penetration, which avoids the irritative voiding symptoms associated with other lasers including GreenLight KTP. The KTP laser (PVP procedure) penetrates deeper, which can result in side effects including frequency, urgency, and dysuria.
- Unlike KTP, holmium lasers can treat coexisting pathologies such as urethral strictures, bladder stones, ureteral stones and bladder tumors.
- Unlike KTP, no special external water connections or 220 V 50 A electrical connections are needed for the holmium laser. These special KTP hookup requirements are cumbersome and costly.
- The KTP safety glasses make it difficult to see during a procedure. The colorless holmium glasses allow clear vision, even if bleeding occurs.

Summary

HoLAP provides excellent surgical results comparable to TURP without the traditional surgical risks in an outpatient setting with excellent patient satisfaction.

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