GreenLight HPS®
High Performance System

GreenLight Laser Treatment for Superficial Bladder Tumors

According to the American Cancer Society, in 2007 more than 67,000 new cases of urinary bladder cancer were diagnosed in the United States.[1] The incidence of this form of cancer is nearly four times greater in men than in women, and it is estimated that one in 28 men run the risk of developing invasive bladder cancer in their lifetime.[1] Superficial bladder tumors, involving only the inner lining of the bladder, account for approximately 70 to 80% of all bladder tumors.[2,3]

Dr. Mahmood Hai of Affiliates in Urology of Southwestern Michigan is one of the pioneering surgeons who researched the GreenLight™ laser for benign prostatic hyperplasia (BPH). He has also begun using it for superficial bladder tumors and comments in this white paper about its application for this disease state.

According to the Dr. Hai, "We find that if we remove the superficial tumor completely, the chances of any spread of the cancer is very low, compared to if the tumor has already penetrated beyond the lining into the muscle wall. Superficial tumors can be lasered or cauterized, whereas other stage and grade of tumors may require partial or complete cystectomy."

The Laser Treatment Option

The treatment of superficial bladder tumors is frequently done on an outpatient basis, in the office or in an ambulatory surgical center (ASC). In those settings, Dr. Hai sees significant benefits of using laser therapy as an alternative to the traditional hot loop electrocautery technique. "With the introduction of the GreenLight HPS EA (Extended Applications) Fiber from AMS, we now have a treatment option for bladder tumors which is ideal in these settings. There are cost and convenience factors, and pre-op and post-op recovery is very quick so it makes good sense to use it in these circumstances."

Dr. Hai sees a number of key advantages to using the GreenLight laser for treatment of superficial bladder tumors:

Avascular Procedure – One of the key features of using the GreenLight laser for superficial bladder cancers is that there is virtually no bleeding, because of the high affinity of the GreenLight wavelength to oxyhemoglobin.[4] "The laser blocks up the blood vessels as compared to the standard technique with hot loop," says Dr. Hai. "With the hot loop, when you make your first cut you open up a lot of blood vessels and that affects your visualization." That can especially be an issue when it comes to dealing with multiple or large tumors. "Less bleeding means the surgeon has better visibility in the surgical field resulting in better removal of the tumor and will allow the surgeon to spot any other lesions that may be present."

Controlled Depth of Penetration –The 532 nm laser energy of GreenLight has an optical penetration depth of 0.8 mm "That means you're removing the tumor layer by layer, with no unnecessary damage to the deeper muscular layer," says Dr. Hai. "With the old technique you were cutting out the tumor in pieces and you didn't know how deep the cuts were, which could lead to bladder wall perforation and cancer cells leaking out into the peritoneal cavity." He feels that removing the cells layer by layer puts the physician in greater control of the procedure. "And with the laser, as you vaporize you can see the muscle layer coming into view, so you know exactly where to stop, with no overcutting or undercutting," stated Dr. Hai. The laser's minimal depth of penetration also can eliminate the deeper damage that sometimes leads to secondary hemorrhage.[4] "Also with the electric loop, the damage is much deeper, and all that tissue which is damaged becomes devascularized and eventually sloughs off and can cause bleeding later," says Dr. Hai.

GreenLight Laser Treatment for Superficial Bladder Tumors

Avoiding the Obturator Reflex – "With the traditional approach to treating bladder tumors, electricity can be transmitted through the bladder wall, stimulating the obturator nerve and creating a spasm of the patient's obturator muscle that can compromise surgical control and accuracy. The GreenLight laser eliminates this problem, since electricity is not being used," says Dr. Hai.

Patient Comfort and Tolerance – "The GreenLight laser fiber can be put through a 21 French scope, while a traditional resectoscope is significantly larger," says Dr. Hai. "So you're not traumatizing the urethra as much using the laser as when you're using a loop." That means less pain and trauma and potentially less chance of causing urethral strictures. And because the bladder is clear at the end of the laser procedure, with no blood, Dr. Hai often does not find the need to put in a catheter. "Patients are much more comfortable because of the smaller cystoscope, because of the fact that we didn't do any deep tissue damage, and because there's less chance of having a catheter," stated Dr. Hai.

Treatment Approach: Dr. Hai's Technique

Prior to doing the laser procedure, Dr. Hai always performs a biopsy to gain an understanding of the stage and grade of the tumor. And if the tumor is located close to the urethral orifices, the first thing he does is put in a stent to avoid damaging the orifice and causing ureteral obstruction.

When beginning with the laser, Dr. Hai says the primary aim is to make the tumor is devascularized so it does not bleed and effect visibility. He typically sets the GreenLight HPS laser to 40W when treating bladder tumors, while most procedures are completed with less than 15,000J of energy. "The laser comes out at 70 degrees forward, so you point your aiming beam right on the tumor and start vaporizing it; start on top with a quick fire, just a few seconds. Instantly the tumor gets blanched out." Then he recommends starting from one side and vaporizing the tumor layer by layer. "I work my way around the tumor by sweeping at 10-15 degrees over the edge until I see the muscle fibers showing up." If he has any suspicion that the tumor may have gone deeper, he also takes a biopsy from the muscle layer to see if it is invasive or not.

Looking to the Future

Dr. Hai feels at this point that the GreenLight procedure on superficial bladder tumors will prove to be a more efficacious option in terms of less frequent tumor recurrence than the traditional hot loop technique, but future studies will have to confirm this.

1 Cancer Facts and Figures 2007. Atlanta: American Cancer Society 2007.
2 Skinner DG, et al. Cancer of the bladder. In: Gillenwater GY, Grayhack JT, Howards SS, Mitchell ME, eds. Adult and pediatric urology vol. 2. Philadelphia, PA: Lippincott Wiliams & Wilkins; 2002: 1297-1362.
3 Malkowicz SB. Management of superficial bladder cancer. In: Walsh PC ed. Campbell's urology 8th ed. Philadelphia, PA: Saunders: 2002: 2785-2802.
4 Chapin BF, Eisner BH, Lahey S, Tabatabaei S. The use of KTP laser tumor ablation for treatment of bladder transitional cell carcinoma (initial results). Urology 2007 Sept; 70 (Suppl 3A): 144.

AMS Solutions for Life®

American Medical Systems, Inc.
World Headquarters
10700 Bren Road West
Minnetonka, MN 55343
USA
Phone: 952 930 6000
Fax: 952 930 6157
www.AmericanMedicalSystems.com

American Medical Systems Europe B.V.
Straatweg 66H
3621 BR Breukelen
THE NETHERLANDS
Phone: 31 346 258 100
Fax: 31 346 258 130

American Medical Systems Australia Pty. Ltd.
Unit 39, Building F
16 Mars Road
Lane Cove 2066
NSW AUSTRALIA
Phone: 61 2 9425 6800
Fax: 61 2 9427 6296

American Medical Systems Canada Inc.
P.O. Box 461
Guelph, Ontario
N1H6K9 CANADA
Phone: 519 826 5333
Fax: 519 821 1356

600480-01 (10/08)