

Two Year Review of 120 patients treated for BPH using the RevoLix 2 micron Continuous Wave Laser

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The RevoLix 2 micron continuous wave lasers has many advantages over the Holmium and KTP laser for the treatment of Benign Prostatic Hyperplasia (BPH). This paper reviews a group of 120 patients that were treated over a two year period.

KEY WORDS – RevoLix, 2 micron, urology, lasers, continuous wave, fiber, fiber delivery, fiber optic, BPH, strictures, bladder tumors, Holmium, prostate, KTP, Ho:YAG, TURP, Vaporesection

Introduction.

Benign Prostatic Hyperplasia is a common disorder of many men over the age of 40. A number of laser based procedures have been developed to treat this and other urological disorders. In the past the pulsed Holmium laser has been used for many urological procedures from lithotripsy to strictures and enucleation of the prostate. The wavelength of the Holmium laser (Ho:YAG) is 2123 nm, which means that the target chromophore is water, which is present in all tissue. Optical penetration at this wavelength in tissue is about 0.35 mm. The peak power that is produced from the pulsed Holmium laser is extremely high (5,000 – 15,000 watts) and can be useful when it is used to fragmenting calculi. However, it is not the best form of energy when it comes to cutting and vaporization of soft tissue.

The KTP lasers on the other hand with a wavelength of 532 nm have a target chromophore of hemoglobin. The penetration of the KTP laser heavily depends on the degree of tissue vascularity. If there is reduced vascularity then the penetration of laser radiation will increase, the vaporization efficiency will decrease and more necrotic tissue will be produced.

This paper reviews the results of a 120 patients that were treated over a 2 year period with the new RevoLix 2 micron continuous wave laser. The RevoLix laser has been specifically designed to vaporize and incise soft vascular and non vascular tissue with good hemostasis and without damage to surrounding structures. The target chromophore is water, the same as for the Holmium laser, but it is a continuous wave laser, not a pulsed laser. The RevoLix is a diode pumped solid state laser (DPSS) with a wavelength of 2013 nm or 2 microns. Another important feature is that this laser wavelength allows the use of clear safety glasses that do not produce any color distortion and provide a clear view of the surgical site.

Patients and Method

A group of 120 consecutive patients who have been treated for BPH using the RevoLix laser were reviewed. The age ranged from 45 to 87 with a mean of 58.3 years. Prior to laser treatment patients were examined, 3 patients had acute urinary retention and 7 patients were on anticoagulants. The size of the prostate ranged from 20 to 80 grams in the group.

The RevoLix 2 micron continuous wave laser was used at a power level of 70 watts. An endfiring 550 micron fiber was used with a continuous flow 26F cystoscope. Vaporization of the prostate was performed on small to medium prostates, while VapoResection was found to be much faster on large prostates. VapoResection is a protocol whereby the laser is used to vaporize tissue and resect small pieces of prostate - similar to the TURP protocol. These pieces are small enough to be easily flushed out of the bladder without the need for morcellation. The advantage of the Vaporesection procedure is that the procedure time is much shorter and tissue samples are available for histology if required just like a TURP procedure without any of the TURP side effects.

Results

Only minor bleeding was observed on three patients and coagulation of these vessels was easily achieved by defocusing the laser beam. Foley catheters were inserted immediately post op and were removed on average after 3 to 4 hours. Patients that were treated in the morning were released that afternoon, while patients that were treated in the late afternoon were released the following morning.

		<u>pre op</u>	<u>post op</u>
Number of Patients	120		
Age	45 to 87yr		
Mean	58.3 yrs		
Mean AUA- SS		21.9	7.9
Mean Q-max ml/sec		0 – 7.6	21.9
PVR (ml)		109.8	14.5

No patients required additional treatment such as bladder neck incisions, strictures etc.

Discussion

The Holmium laser was for a long time the Gold Standard for Prostate Resection but recently the vaporization of the prostate using the KTP laser has become more popular.

The hemostatic effect of the 2.1 micron wavelength was the prevailing advantage for application of the Holmium laser for the enucleation of the prostate. However the pulsed emission mode of the Holmium laser only favored the enucleation protocol which requires additional morcellation of the enucleated tissue. Vaporization and clean resection of prostatic tissue with this laser is made more difficult and requires a long learning curve.

The hemostatic effect of the RevoLix laser allows the successful treatment of patient who are on an anticoagulant medication.

The KTP laser wavelength has been used for a long time in the treatment of vascularized tissue, as for example in the treatment of the epidermis. This wavelength is heavily absorbed by hemoglobin and causes an immediate hemostatic effect. In less vascularized tissue the absorption of this wavelength is reduced and the unintentional interaction with deeper tissue becomes more likely.

However the continuous wave 2 micron RevoLix laser appears to solve many of the limitations of both these devices. This wavelength is heavily absorbed by any tissue independent of the degree of vascularization. The strong absorption of this wavelength by any irrigation fluid allows the use of front firing fibers without any risk to effect the opposite bladder wall. Front firing fibers allow varying between vaporization and resection of tissue only depending on the degree of pressure of the fiber tip to the tissue.

Both techniques combined offer the ability to vaporize or vaporesect or resect the prostate which is a big advantage allowing surgeons to approach TURP like speeds without any of the complications. This treatment bandwidth of the RevoLix laser allows this laser to be used even for larger glands where vaporization takes too much time and the resection effect becomes an advantage.

Patients that have already had a TURP procedure very often develop low vascularized bladder neck sclerosis. In this case a retreatment with the KTP laser is more difficult because of the lack of hemoglobin in the sclerotic tissue to absorb the KTP laser radiation. Contrary the RevoLix laser finds its target molecule independent of the degree of vascularization and therefore is the preferred laser.