

## Transurethral Holmium laser cystolithotripsy using 80 watt energy

### Abstract

The aim of the study was to evaluate the feasibility, efficacy and safety of cystolithotripsy using 80 Watt Holmium; YAG laser. Patients with vesical stones > 3 cms treated by transurethral Holmium laser lithotripsy using energy used, stone composition and any complication. Patients were followed up for one year. Demographic, laboratory complications and follow up data were analyzed. 80 watt energy parameters assessed were size of the stones, Operation time, total KJ. Total ten patients underwent Ho: YAG cystolithotripsy from year 2002 to 2008. The size of the bladder calculi ranged from 3 to 8cm. No intraoperative or postoperative complication occurred. No patient required blood transfusion. Large bladder calculi more than 3cm can be managed safe and effective.

Key words: Bladder calculi, cystolithotripsy, Ho: YAG laser

### Introduction

There are several modalities for the management of bladder calculi including Cystolithotripsy (electro hydraulic, ultrasonic, laser or pneumatic Energy), precutaneous cystolithotomy, open cystolithotomy and shock wave lithotripsy. Many authors reported their experience on management of bladder stones with HO: YAG. Stone with Ho: YAG laser. In most of the series the energy used was 10, 15 and 30 watt.[1]

Photo thermal effect of the HO: YAG slowly causes disintegration of the stone from within resulting in smaller fragments and more controlled breakage. In addition, the shallower depth of penetration (0.4mm) of the Ho: YAG laser might provide some safety margin over others. [2] We present our experiences of using 80 watt energy for cystolithotripsy of bladder stones more than 3 cm in size.

### Materials and Methods

We analyzed records of our patients who were managed for bladder calculi larger than 3cm in size with Holmium: YAG laser using 80 watts energy. All patients had preoperative work up as per our protocol for urinary stone. This included serum biochemistry (Urea, creatinine, Hematocrit, calcium, phosphorus Uric, Acid, sodium potassium), urine culture and sensitivity, X-Ray KUB and intravenous pyelogram.

Parameters assessed were six of the stones, operation time total energy used, stone composition and any complication. Patients were followed up for one year. Demographic, laboratory, preoperative and intraoperative complications and follow up data were analyzed.

### Result

Ten patients were treated with ho: YAG laser using 80 watt energy during the period of seven years (2002 to 2008). We used 550 microns fiber. The size of the bladder calculi range from 3 to 8 cm. Two patients had Benign enlargement of prostate (BEP) with bladder calculus. They underwent simultaneous Holmium laser enucleation of prostate (HoLEP) and Ho: YAG cystolithotripsy [3-6]. Size of prostate was 60cc and 8-cc total duration of operation was 80 minute and 90 minute respectively. Time taken for lithotripsy was 25 and 30 minutes respectively. Total Ho: YAG laser energy used varied from 10 to 15 kJ. Mean time taken for cystolithotripsy was 29 min (Range 24-40 min). Out of ten patients six had calcium acid stone, two had calcium oxalate stones and two mixed stones.

Duration of catheterization for patients who also underwent HoLEP was 48 hours. No catheter was indwelled post operatively in patients who underwent cystolithotripsy only. All were discharged within 24 hours.

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No intra operative or post operative complication occurred. None of our patients had haematuria, fever, pain bladder perforation. No patient required blood transfusion. After two years of follow up all patients were doing well without the evidence of recurrence of stone, lower urinary tract symptoms. Patients who underwent simultaneous HoLEP had satisfactory flow after two years without evidence of urethral stricture, bladder neck contracture.

## Discussion

There has been a shift towards laser surgery in all surgical sub specialties in decided. Use of holmium laser has expanded the field of many surgeries. This may be due to many advantages of holmium laser over other laser. Ho: YAG laser have been used in many urological cases. It has been used for stones. Structures and tumor. Review of published data had shown that in many center use of low energy for bladder calculi. We present our date of 10 cases of cystolithotripsy with Ho: YAG laser using 80-watt energy.

Most of the bladder stone form in the bladder itself and most of them are uric acid stone. Other types of bladder stones are struvite, calcium oxalate, calcium phosphate and cystine stones. Ho: YAG cystolithotripsy has been shown to be effective in stones of all compositions and safe.

To compare the efficacy and safety of electrohydrolic and Holmium laser in the treatment of bladder calculi Electrohydrolic remains as effective and variable option despite its rare yet sometime serious complication. This is due to long operation time with laser if use in low energy.

Holmium YAG lithotripsy of uric acid calculi in vitro produced cyanide consistently. Study of risk off productive of cyanide raised significant safety.

In Kara D, 13 patients under went HLC (Holmium Laser cystolithotripsy) for bladder calculi > 3cm. mean operativeform was 51 minutes (465-64) minutes. The energy used was below 30 watts. In j. techman 4 patients underwent HLC for bladder calculi >4 cm. median anaesthesia times was 57 minutes [7]

We used 80 watt laser at settings of 32 Hz frequency and 2.5 KJ energy our otmeanture time was 29 min. In most published series low watt energy (upto 30 watt) was used. Prolonged operation time with low watt holmium laser can cause complications like urethral stricture [1, 8-11]

The advantages of high 80 watt energy are rapid fragmentations of stones as a result procedure can be completed fast and large vesical stones can be treated by Holmium-Laser lithotripsy. As the total duration is less, there are less chances of post operative complication like stricture of urethra [12-13].

## Conclusion

Ho: YAG cystolithotripsy using 80 watt energy is feasible, safe and effective for management of large bladder calculi of any composition without any complicate. Simultaneous HoLEP for BEP is an option without increasing the complications.

## References

1. Kuo RL, Aslan P, Zhong P, Preminger GM. Impact of holmium laser settings and fiber diameter on stone fragmentation and endoscope deflection. *J Endourol.* 1998 Dec;12(6):523-7.
2. Olson EJ, Utz JP, Prakash UB. Therapeutic bronchoscopy in broncholithiasis. *Am J Respir Crit Care Med.* 1999 Sep;160(3):766-70.
3. Larizgoitia I, Pons JM. A systematic review of the clinical efficacy and effectiveness of the holmium:YAG laser in urology. *BJU Int.* 1999 Jul;84(1):1-9.
4. Kara C, Resorlu B, Cicekbilek I, Unsal A. Transurethral cystolithotripsy with holmium laser under local anesthesia in selected patients. *Urology.* 2009 Nov;74(5):1000-3.
5. Teichman JM, Rogenes VJ, McIver BJ, Harris JM. Holmium:yttrium-aluminum-garnet laser cystolithotripsy of large bladder calculi. *Urology.* 1997 Jul;50(1):44-8.
6. Teichman JM, Vassar GJ, Glickman RD, Beserra CM, Cina SJ, Thompson IM. Holmium:YAG lithotripsy: photothermal mechanism converts uric acid calculi to cyanide. *J Urol.* 1998 Aug;160(2):320-4.
7. Escolar E, Bellanato J. Analysis of feline urinary calculi and urethral plugs by infrared spectroscopy and scanning electron microscopy. *Vet Rec.* 2003 May 17;152(20):625-8.
8. Tugcu V, Polat H, Ozbay B, Gurbuz N, Eren GA, Tasci AI. Percutaneous versus transurethral cystolithotripsy. *J Endourol.* 2009 Feb;23(2):237-41.