
Holmium Laser

Stone Therapy in Modern Endourology

Requires Holmium Laser

Interview with PD Dr. med. Sven Lahme, August 2005, St. Trudpert Hospital, Pforzheim, Germany

Sven Lahme

Department of Urology, St. Trudpert Hospital, Pforzheim, Germany

For more than 20 years the extracorporeal shock-waves lithotripsy (ESWL) is well established in the field of treating urinary calculi. Nevertheless, the present trend towards endoscopic treatments can't be ignored. What do you think this is reduced to?

As a matter of fact, ESWL has changed the treatment of urinary calculi. Thanks to ESWL a treatment option is now available that combines minimal invasivity with low morbidity and qualifies for uroliths in the upper urinary tract as well as ureteroliths. However, apart from these advantages one has to allow for the fact that ESWL only leads to the disintegration of calculi, so the passing of the particles has to be watched. Therefore the stone free rate depends on size and localization of calculi. Especially in lower renal calices only 60 percent of patients become stone free. Another aspect is the period of treatment after ESWL. Although ESWL is an outpatient treatment, it will take weeks and months till the patient will be stone free. On the other hand there is, these days, the patient wishing for a short-term clean-up of calculi.

What did entail the increasing spread of endoscopic treatments of calculi?

Technological advance and the gain of practical experience in ureterorenoscopy has lead to reduced morbidity in endoscopy. Nowadays rigid ureteroscopes show an instruments cross-section of 6,5 Fr. They enable primary endoscopy of the ureter in patients of all ages, thus in children too. The stone

free rate of distal ureteroliths adds up to 90 percent, the course of treatment only takes a couple of days. Due to the procedure's good results, national and international urology societies recommend primary endoscopy treatments of distal ureteroliths.

How about the endoscopy of the renal pelvis calices system? Is primary endoscopy justifiable there as well?

Renal pelvis and renal calices calculi are still the domain of ESWL – though with the mentioned difficulties that can lead to residual calculi and growth of calculi again. Performing a flexible endoscopy of the upper urinary tract is, these days, from a technical point of view no problem anymore. The development of flexible endoscopes that enable an active deflection up to 270 degrees has contributed considerably to this achievement. Apart from these endoscopes there are active secondary deflection endoscopes too, so nowadays one can rightly claim there would be hardly any spot of the calices of the renal pelvis that is inaccessible for endoscopes.

Does this mean you are recommending the primary endoscopic treatment of renal calices calculi?

I don't. I only want to go so far as to recommend the flexible endoscopy to the patient either as treatment alternative or for removing residual concretions after ESWL. It's not without its little problems that medical societies make no mention of these treatment alternatives in their guidelines. Still, having performed



Figure 1 Flexible endoscope with a flexion of 270 degree
(Richard Wolf GmbH, Knittlingen)
Picture: S. Lahme

Figure 2 Flexible endoscope being used in the
renal pelvis calices system, contrast medium injected
Picture: S. Lahme



several hundred flexible endoscopies of the upper urinary tract, own experiences substantiate the morbidity after these treatments as comparable with the one after ESWL, but with 90 percent of patients being stone free the rate is a good deal more propitious.

Which devices do you use for lithotripsy in flexible endoscopy?

Flexible endoscopy of the upper urinary tract necessitates comparably flexible probes for disintegration. A flexible probe for ballistic lithotripsy, electrohydraulic lithotripsy, and laser lithotripsy are basically suitable for this purpose. The probe for ballistic lithotripsy is not applicable to modern flexible endoscopes. Electrohydraulic lithotripsy bears the risk of damaging devices and altering the renal pelvis, so the method of disintegration in flexible endoscopy is to me the laser, especially the holmium laser.

What are the advantages of laser lithotripsy from your point of view?

Probes of laser lithotripsy have a very small cross-section. The thinnest fibers have a core diameter of 200 μm and an external one of 440 μm . So that means, the small diameter of the working channel allows for enough rinse flow and excellent vision while the laser fiber is inserted. These thin fibers also enable to use the endoscopes' whole angle of deflection. To succeed in performing flexible endoscopy, in my opinion laser lithotripsy is indispensable.

Does this mean laser lithotripsy can only be used for flexible endoscopies?

No, it doesn't. As a matter of course, the holmium laser can be used for every rigid ureterorenoscopy. Compared to well established lithotripsy systems on rigid URS, the holmium laser bears even less risks concerning the ureterolith's migration to the renal pelvis.

Do you see any risks in the application of laser lithotripsy?

In laser lithotripsy as in every other procedure one has to play for safety too. At first, and as far as possible, the probe should be only inserted if the instrument is either stretched or slightly deflected, so as to avoiding damages to the device's working channel. Also, it is important to pay attention to the risk of laser fiber breaking. In this respect, the elimination of the fiber's synthetic coating just as far as necessary has stand the test. If holmium laser lithotripsy is appropriately applied, tissue damage of the renal pelvis can be avoided in such a way as to more or less neglect this kind of risk.

What kind of calculi can be disintegrated by the laser?

The disintegration very much depends on the mineralogical composition of calculi and the kind of laser used. The holmium laser, for instance, is able to disintegrate all sorts of urinary calculi independently of their colour, hardness, and composition.

Endoscopy and laser are considered to be expensive treatment modalities. How about covering the costs of urinary calculus treatments?

Flexible endoscopy and holmium laser lithotripsy require investments, that's right. Still, there has to be made allowance for reimbursements within the DRG system that remunerates therapy modalities with low retreatment rates. Usually inpatients will be released on the second postoperative day. In comparison, ESWL treatment can take much longer and, for billing purposes, has to be assigned to the same urinary calculus. In this respect, using endoscopy reduces hospital resources and costs as well as it compensates for the investment costs to some extent. I think this trend towards endoscopic stone therapy will go on for reasons of expense. For the same reasons fibers that are autoclavable and reusable for several times will become more and more indispensable.

One last question: How do you use flexible endoscopy combined with holmium laser lithotripsy at your hospital?

An effective therapy concept for patients with uroliths includes, in addition to ESWL, all potentialities of endourology. Taking into consideration these poten-

tialities, I see the indication for primary endoscopic treatments of distal urinary calculi. Medium sized and proximal urinary calculi are treated with primary endoscopy only at request of the patient. Otherwise they are treated with endoscopy after ESWL has failed. Renal calices calculi are still the domain of ESWL. Flexible endoscopy should be applied to residual concrements. If required by the patient being informed of treatment alternatives, I also think it would be reasonable to carry out a primary flexible endoscopic treatment of calculi in the renal pelvis. The method of disintegration is to me the holmium laser lithotripsy, which is to be regarded as an essential part of effective flexible endoscopy of the upper urinary tract.

PD Dr. med. Sven Lahme
Head of Department Urology
Hospital St. Trudpert, Pforzheim, Germany
sven.lahme@trudpert.de