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Results and complications of lasertripsy for ureteric calculi using the Holmium-Yag laser

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Introduction: Lasertripsy for ureteric calculi has become an accepted method of endoscopic stone destruction, but the equipment is costly. The holmium yttrium-aluminium-garnet (Ho-Yag) laser emits at a wavelength of 2·1 μm, which is absorbed well by water. It is used both for treatment of calculi and bladder tumours and is therefore cost-effective. However, as soft tissue is destroyed there is a risk of ureteric damage.
Patients and methods: Seventy-nine patients with ureteric stones were treated with the Ho-Yag laser; 57% had upper ureteric, 19% mid-ureteric and 24% lower ureteric stones.
Results: Fifty-seven patients (72%) had an uneventful procedure and were stone-free after one treatment. In six patients, fragments migrated into the kidney requiring further treatment (three by ESWL, and three by laser). Sixteen patients (20%) developed complications. The ureter was perforated in 11 patients; in three, the remaining calculi required open ureterolithotomy, six patients were stented and recovered without further complication, and two have developed a stricture. Four further patients developed strictures; in two, stone migration had occurred during lasertripsy but in two others the procedure was considered uneventful. One patient returned with renal pain, the other with hypertension. IVUs showed strictures at the site of the previous calculi. There was no correlation between stone size, site, operator grade or energy used and stricture formation. Strictures were significantly more common with impacted stones, in cases of ureteric perforation and when no stent was used.
Conclusions: The development of complications, particularly strictures, is worrying. Whether they are the result of the laser itself, surgical inexperience or stone impaction with an already damaged ureter is uncertain. We now arrange an IVU on all patients after lithotripsy.

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An ideal energy for intracorporeal ureterolitholapaxy: an audit

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Introduction: The ideal intracorporeal energy source for disintegrating stones in the ureter would be one which maximizes stone clearance rates, is associated with minimum morbidity and is economical. We report an energy audit of ureteroscopic stone disintegration performed at this centre during the last 2 years.
Patients and methods: Since January 1994, 91 ureteric stones have been treated by intracorporeal disintegration. The stone was situated in the mid or upper ureter in 56% of the cases,.the remainder being in the lower third of the ureter. A pulsed-dye laser for intracorporeal disintegration was available until October 1994. A Lithoclast has been used since mid-1994. The electrohydraulic lithotripter (EHL) was available during the whole period of the study. More than half the procedures were performed by trainees under supervision.
Results: Laser disintegration was used in 41 procedures. Complete stone clearance on day 1 was achieved in 56% and 66% were stone-free after 2 months with no auxiliary procedure; 21 patients were treated with the Lithoclast, of whom 52% were stone-free on day 1 and 81% after 2 months with no auxiliary methods. Using EHL alone in 29 patients, 21% were stone-free on day 1 and 64% at 2 months post-operatively. Auxiliary means for stone clearance were required in 34%, 19% and 36% of the cases using laser, Lithoclast and EHL, respectively. Per- and post-operative complications were encountered in 12%, 5% and 31% of cases using laser, Lithoclast and EHL, respectively.
Conclusion: The Lithoclast on its own, with an 81% stone-free rate at 2 months and a low morbidity, was more effective than the laser. EHL, although as effective as the laser at 2 months, had a higher complication rate.

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In situ ESWL for ureteric stones; the adverse effects of JJ stenting

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Introduction: Dual imaging, precision focusing and careful positioning of the patient have allowed the treatment of most ureteric calculi *in situ*. It is generally observed, however, that the treatment of stones in stented tracts is protracted when compared to those in non-stented tracts. A clinical and experimental study was undertaken to examine the dissipation of energy in stented urinary tracts.
Patients and methods: The clinical arm of the study involved 122 consecutive patients presenting with symptomatic ureteric stones. All patients were treated on the Storz Modulith SL20 Lithotripter; 36 patients had stented ureters while the remaining 84 were treated with no prior instrumentation. The mean treatment rate was 2·26 sessions in patients with stented ureters and 1·19 sessions in those without stents. The experimental arm of the study was composed of two parts. Firstly, the acoustic energy output was measured at the focal point of the shock wave using a needle hydrophone in the presence and absence of ureteric stents. Secondly, stone 'phantom' model balls (n = 30) were suspended in a 1·5 mm mesh at the focal point and treated in the presence and absence ureteric stents. The dry weights of the stone retained in the mesh were compared.
Results: Both arms of the study revealed a significant reduction in the efficiency and strength of the shock wave in the presence of a ureteric stent.
Conclusion: Our observations question the routine manipulation and stenting of patients with ureteric stones, when lithotripsy is readily available, and confirm that stenting reduces the efficacy of the disintegration and clearance of ureteric stones.

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Laparoscopic ureterolithotomy is the treatment of choice in patients with failed endourological management

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Introduction: ESWL and/or ureteroscopy remain the treatments of choice for ureteric calculi. However, there remains a small group of patients where these techniques fail to clear the ureter of stones because of stone size, hardness, impaction, or problems with access or localization due to obesity. Open ureterolithotomy in stone management should be confined to these patients.
Patients and methods: Eight patients with difficult ureteric stones have undergone laparoscopic ureterolithotomy, with a mean stone size of 16 mm. Four patients had undergone at least two attempts each with ureteroscopy with either failure of access or fragmentation. One patient's stone failed to fragment after two treatment sessions on the Dornier MPL 9000 lithotripter and in the remaining three patients laparoscopic ureterolithotomy was offered electively.
Results: The mean operating time was 90 min and mean post-operative stay was 5 days. The ureterotomy was sutured laparoscopically and all patients had a drain sited through one of the 5 mm ports.
Conclusions: We have performed laparoscopic ureterolithotomy (LUL) in this group of patients with a 100% stone-free rate, minimal morbidity and no long-term complications and thus eliminated the need for open ureteric stone surgery in our centre.

We had reserved laparoscopic ureterolithotomy as a second procedure but in view of the success rate and low morbidity, we now offer LUL electively to patients with a large stone burden, impossible ureteroscopic access and impacted hard stones. It is arguable that LUL offers a better cost effective alternative to repeated endourological procedures in selected patients with difficult ureteric stones.

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Autoradiographic study of renal blood flow during ureteric obstruction

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Introduction: No gold standard exists for the measurement of renal blood flow. We have used autoradiography to measure changes in renal blood flow (BF) after unilateral ureteric obstruction (UO) and to examine the role of prostaglandins in mediating these changes.
Materials and methods: Sprague Dawley rats were assigned to four groups (six per group) with group (A) control; (B) 10 min of UO; (C) 30 min of UO (D) 30 min of UO followed by 30 min release; (E) 30 min of UO with diclofenac administration before obstruction; (F) 24 h UO. ^{14}C-iodoantipyrine was infused over 15 s whilst 12 timed arterial blood samples were taken. Autoradiographs were produced from frozen kidney sections. The absolute BF was calculated using Kety's theory of diffusion of an inert tracer.
Results: Mean BF (SEM) mL/100g/min

GROUP	A	B	C	D	E	F
Outer cortex	807 (63·3)	900 (36·0)	1018 (8·4)*	526 (50·4)*	618 (29·1)*	493 (12·9)*
Inner cortex	258 (40·0)	298 (22·9)	210 (10·6)	157 (16·2)*	133 (6·4)	190 (9·6)
Medulla	105 (18·5)	65 (7·9)*	67 (4·9)*	37 (8·4)	63 (7·8)	69 (18·5)*

*$P < 0.05$ compared to controls

Conclusions: In the early stages of ureteric obstruction, release of the vasodilating prostaglandin E2 causes increased blood flow throughout the kidney which can be inhibited by the cyclo-oxygenase inhibitor, diclofenac. Autoradiography overestimates BF to the medulla because of tracer entering the medulla via tubular fluid in the loop of Henle. This effect is reduced by the increased tubular pressures seen in ureteric obstruction. Blood flow to the cortex is not homogenous, suggesting that there are sites of variable resistance in the vasculature. The resultant resistance is a function of the interplay between various mediators.

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Do patients with renal stones need long-term follow-up?

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Introduction: Contemporary studies of patients with upper urinary tract stones have concentrated mainly on short-term follow-up. An earlier study from this institution failed to show any metabolic abnormality in a consecutive series of 100 patients presenting *de novo* with stone disease and therefore the need for long-term follow-up for all patients with renal stone disease is open to question.
Patients and methods: We first established a Stone Clinic in September 1987. By December 1988, 200 patients from this region had been treated and their records have been examined to determine treatment outcome and clinical progress.

A total of 102 men and 98 women (mean age 49·1 years (range 2–87) have been followed for a maximum 8·3 years. There was a left-sided preponderance of stone (53·5%), bilateral stones were present in 25 patients and were multiple in 24·5%; 42 patients presented with ureteric stones. All were treated with lithotripsy on a Wolf Piezolith. Nine patients also required percutaneous nephrolithotomy and 24 patients required retrograde manipulation of ureteric stone. No patient required open surgery.
Results: Overall, 128 patients (64%) remain stone-free. Only 27 patients have required any form of treatment in the last 5 years and of these 20 (74%) had bilateral stones.
Conclusions: Long-term follow-up of all patients with stones has previously been recommended by many authors. However, well over 6500 patients are now registered with us and the financial and logistical cost of follow-up is considerable. We have shown that only a minority of patients, largely with bilateral stones, develop a recurrence requiring treatment. Therefore, we suggest that patients with unilateral stones should be discharged after treatment once they are symptom-free.