

- extracorporeal shock wave lithotripsy of ureteral stones. *J. Urol.* 1991; 146: 8-12.
6. Tung, K.H., Tan, E.C., Foo, K.T.: In situ extracorporeal shock wave lithotripsy for upper ureteral stones using EDAP LT-01 lithotripter. *J. Urol.* 1990; 143: 481-482.
 7. Selli, C. and Carini, M.: Treatment of lower ureteral calculi with extracorporeal shock wave lithotripsy. *J. Urol.* 1988; 140: 280-282.
 8. Grace, P.A., Gillen, P., Smith, J.M. and Fitzpatrick, J.M.: Extracorporeal shock wave lithotripsy with the lithostar lithotripter. *Brit. J. Urol.* 1989; 64: 117-121.
 9. Cole, R.S. and Shuttleworth, E.D.: Is extracorporeal shockwave lithotripsy suitable treatment for lower ureteric stones? *Brit. J. Urol.* 1988; 62: 525-530.
 10. Becht, E., Moll, V., Neisius, D. and Ziegler, M.: Treatment of prevesical ureteral calculi by extracorporeal shock wave lithotripsy. *J. Urol.* 1988; 139: 916-918.
 11. Ahlawat, R.K. Bhandari, M., Kumar, A. and Kapoor, R.: Treatment of ureteral calculi with extra corporeal shock wave lithotripsy using lithostar device. *J. Urol.* 1991; 146: 737-741.
 12. Erturk, E., Herrman, E. and Cockett, A.T.K.: Extracorporeal shock wave lithotripsy for distal ureteral stones. *J. Urol.* 1993; 149: 1425-1426.

(7.9%) were lost to follow up. 78 patients were cleared after first session, 156 were cleared after second session, and 200 were cleared or treated after third sessions. Mean shocks for each session were 2361 and mean K.V. per session was 16.5. Mean stone size was 10.31mm, and mean sessions to break a calculus were 2.036.

The results were compiled according to the location of the calculus and then were compared. There was no significant difference found between the number of shock waves, mean K.V. and the number of sessions given in the upper middle and lower ureter. T.test for detection of significance in the mean stone size with reference to final outcome was done, it confirmed that stone size differed significantly between the successful and failure group, being 9.87mm and 12.44mm respectively.

In the final outcome 182 patients (82.7%) were cleared of calculi and were declared successful and 38 patients (17.3%) did not benefit or were lost to follow up.

Discussion

It is observed that 60% ureteric calculi pass spontaneously¹. In the past ureteric calculi that failed to pass have generally been treated by open surgical procedures².

But the management of urinary calculi has been revolutionised in the recent past with the advent of new technology, particularly Extra corporeal shock wave Lithotripsy (E.S.W.L.)³, Percutaneous Nephrolithotripsy (P.C.N.L.), Ureterscopy with the incorporation of ultrasound, electrohydraulic generators and Lasers for ureteric stone disintegration⁴.

Third generation lithotriptors with dual mode of localising, have an enhanced capacity to treat ureteric calculi all along its length. Consequently management of ureteric calculi primarily by ESWL has become a common practice in the units where this facility exists.^{5,6,7} Recently incorporation of secondary procedures i.e. Percutaneous

Nephrostomy, Push Back/By pass and Double-J catheter placement have further enhanced the effectiveness of E.S.W.L.

Lately many studies have proven the efficacy of ESWL in the management of ureteric calculi.^{7,8,9} In our study the success rate of (82.7%) was comparable to similar studies.^{10,11,12} Among these 129 patients (58.6%) were treated in-situ, whereas some kind of intervention was done in the rest.

Most common among this was PCN, it was done in 34 patients (15.5%) who had either obstructed kidneys or had radiolucent calculi. In this study 15 patients (7.8%) required surgical intervention after the failure of ESWL.

In this time and era role of ESWL as a primary mode of treatment has become well established, and auxiliary procedures like D.J. catheter placement and push back/by pass have enhanced its efficiency to almost perfection.

References

1. Morse, R.M., and Resnick, M.L.: Ureteral calculi: Natural history and treatment in an era of advanced technology. *J. Urol.* 1991; 145: 263-265.
2. Liong, M.L., Clayman, R.V., Gittes, R.F., Lingeman, J.E., Huffman, J.L. and Lyon, E.S.: Treatment options for proximal ureteral Urolithiasis: review and recommendations. *J. Urol.* 1989; 141: 504-507.
3. Chaussy, C., Brendel, W. and Schmiedt, E.: Extracorporeally induced destruction of kidney stones by shock waves. *Lancet.* 1980; 11: 1265-1268.
4. Zerbib, M., Flam, T., Belas, M., Debre, B. and Steg, A.: Clinical experience with a new pulsed dye laser for ureteral stone lithotripsy. *J. Urol.* 1990; 143: 483-484.
5. Tiselius, H.G.: Anesthesia free in situ

MANAGEMENT OF URETERIC CALCULI WITH EXTRA CORPOREAL SHOCK WAVE LITHOTRIPSY (E.S.W.L.)

*NAEEM AKHTAR, **ZULFIQAR AZIZ, ***FATEH KHAN AKHTAR

Abstract

A group of 220 consecutive patients presenting with ureteric calculi were treated with extra corporeal shock wave lithotripsy using SIEMEN'S lithostar plus Lithotripter. Stone localisation was done flouroscopically, 116 calculi were in the upper ureter, 30 calculi in the middle ureter and 74 calculi in the lower ureter. 182 patients were cleared of calculi and 38 patients did not benefit or were lost to the follow up. The combination of auxiliary procedures with E.S.W.L has made it the treatment of first choice for the management of ureteric calculi.

Keywords: Ureteric calculi, Lithotripsy.

Introduction

Calculus disease in the urinary system has inflicted human being since times immemorial. Pakistan is located geographically in area of high incidence of urinary stones. Last decade has seen great changes in the management of urinary calculi after the advent of E.S.W.L. We have reviewed the results of all the patients with ureteric culculi who under went lithotipsy from April 1991 to December 1992, in our unit.

Patients and Methods

We reviewed 220 consecutive cases of ureteric calculi managed in the unit from April 1991 to December 1992 by Siemen's Lithostar Plus Lithotripter. The stones wre categorised by their

lcoation. Upper ureter was defined as extending from pleviureteric junction to L4 vertebra. middle ureter from lower border of L4 vertebra to lower margin of Sacroiliac joint, and lower ureter from lower part of Sacroiliac joint, to the intra mural ureter. All the patients had Hb, TLC, DLC, S. Creatinine & Electrolytes, B.T. C.T. IVU, Urine C/E & C/S.

During the procedure the patients did not need anasthesia or sedation. Lithotripsy was carried out using flouroscopy. Patients with calculi in mid ureter were positioned prone. In patients with completely obstructed kidney either percutaneous nephrostomy (PCN), was done under L.A, or ureteric catheter was placed under G.A. to relieve the obstruction.

In patients where in-situ treatment failed, attempts were made to push back/by pass the calculus. In the upper and middle ureter P.C.N. was done in patients who had radiolucent ureteric calculi with hydronephrosis, to relieve the obstruction and also to opacify the tract at the time of lithotripsy.

Results

Among the 220 patients whose mean age was 38 years, 44 (20%) were females and 176 (80%) were males. 116 calculi (52.7%) were in the upper ureter. 30 calculi (13.6%) in the middle ureter, and 74 calculi (33.6%) in the lower ureter.

129 calculi (58.6%) were treated in-situ, 5 calculi (2.3%) had ureteric catheter placement, PCN was done in 34 cases (15.5%), push back in 22 cases (10%) and by pass in 27 cases (12.3%).

182 calculi (82.7%) were cleared by E.S.W.L., 15 calculi (7.8%) required surgery, and 16 patients

Address all Communications to:

* Associate Professor, Department of Urology, Mayo Hospital, Lahore.

** Department of Urology, King Edward Medical College / Mayo Hospital, Lahore.