

Inductive study of ESWL outcomes for proximal and distal ureteric stones

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Abstract - The introduction of ESWL caused a revolution in the treatment of ureteral calculi. In the present study we evaluated the success rates of ESWL in patient with proximal and distal ureteral calculi. Between October 2015 and December 2016, 275 patients were treated with in situ ESWL monotherapy in Khoramabad /IRAN. During the in situ ESWL to determine the place of the stone, only fluoroscopy was used. Data from the 275 patients were prospectively collected for stone size, stone place, number of treatment sessions, and number of shock waves used. From among 275 cases reviewed, 62 % (173) were male and 32 % (102) female. Stone-free rate was 85.26%, 87.20% and 75.53% for proximal, middle and distal ureteric respectively. Stone-free rate achieved for stones smaller than 15mm was 90.41%. Overall success rate was 82.54% (227 of 275 patients)

Key Words: ESWL, Renal stone, Stone-free rate

1. INTRODUCTION

Urinary calculi cause miss function of kidney is a significant disease in developing countries (1, 2). The extracorporeal shock waves lithotripsy (ESWL) was presented in the early 1980s and made a revolution in the management of urolithiasis (3). Nowadays ESWL is one of the most common approaches for the treatment of urolithiasis and ureteric stones (2, 4). Its efficiency ranges from %68 to %84 when is used as a primary treatment option for upper tract stones. It has become the common treatment for simple renal and proximal ureteral calculi with a diameter less than 15mm (5). It is shown that fragmenting the ureteral stones needs higher energy and a greater number of shock waves than those of kidney stones (2). Stone decomposition and clearance of the fragments are really important in stone clearance after ESWL(6). Recommendations of guidelines for the use of ESWL are results of stone size and type, pulse characteristics (such as frequency and gated or un-gated) and number and power of shock waves(7). According to Guidelines of American urological Association, average (SFR) s was 85% and 83% for distal and proximal ureteric stones, respectively(1). There are different attitudes among urologists to use of ESWL for the proximal and middle ureter (2,8, 9). In present study we evaluated the success rates of ESWL in patient with kidney and ureteric calculi.

2. METHOD

275 patients were treated with in situ ESWL monotherapy in Khoramabad/IRAN Between October 2012 and December 2013. There were no patients with a single kidney and renal anomalous. None of the patients had stents or hypodermic nephrostomies inserted before the therapy. All patients were treated with an electrohydraulic lithotripter (MPL 9000, Dornier GmbH, Germany) under sedoanalgesia on an outpatient basis. Only fluoroscopy was used during the in situ ESWL to determine the place of the stone. The patients were divided into three groups according to the place of the stone: proximal ureteric, main ureteric and distal ureteric; and every group categorized two subgroups according to the age and sex. Patients were appraised with a plain film of the renal, ureter and bladder, intravenous urography and ultrasonography urinalyiss, urine culture and ligation examines before the process. Data from the 275 patients were prospectively collected for stone size, stone place, number of treatment sessions, and number of shock waves used. Therapy was carried out by technician under supervision of a senior urologist who selected the energy and the number of shock waves for each patient. Successes was considered as complete clearance of stones as declared by KUB, ultrasonography and IVU done two weeks after the treatment to permit enough time for clearance. Results based on various places and size was compared in term of clearance rate, number of shock waves and treatment sessions. All statistical calculations were done using SPSS (Statistical Package for the Social Sciences) version 16

3. RESULT

A total of 275 patients with urinary stones were treated. From among 275 cases reviewed, 173(62.9%) were male and 102(32.02%) female. The majority of the patients 165(60%), was made up of patients who were 40 years or less, and the other group, 110(40%), was made up of those who were 40 years and more. The success of ESWL in patient was 98.78% and 58.18% for person who was less than 40 years and more than 40 years respectively. The number of patients whose stones were localized in the proximal, middle and distal ureter was 95, 86 and 94, respectively. Stone-free rate was 85.26%, 87.20% and 75.53% for proximal, middle and distal ureteric stones, respectively. Stone-free rate

achieved for stones smaller than 15mm was 90.41%. However, 20.36% of patients with stone size >15mm were free of stones at three month follow-up. Stone-free rate achieved for stones larger than 15mm was 46.42%. The success of ESWL was 90.41% and 46.42% for the patient with stone size < 15 mm and >15mm respectively. There is a statistical relationship between location of the stone, age and the success of ESWL (P value < 0.05). 219(79.63%) patients followed with residual stones 28 had stones 15mm or smaller. Mean number of ESWL sessions in the successfully treated group was 1.91(range 1 to 3). The mean number of shock waves per patient was 7.66(range 4 to 12). Mean energy setting was 51.6kV (range 30 to 71). Overall success rate was 82.54 % (227 of 275 patients).

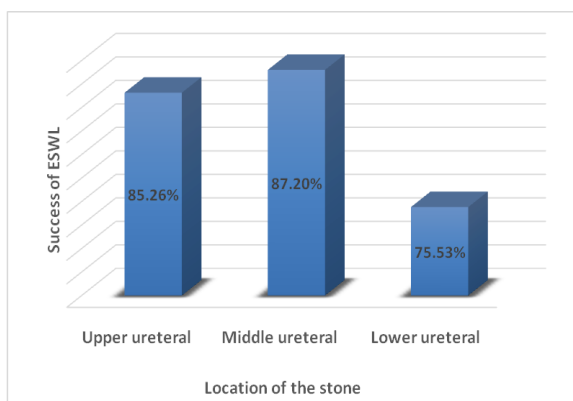


Fig1: relation between success of ESWL and location of the stone

3. CONCLUSIONS

Extracorporeal shock wave lithotripsy, when carry out according to the recommendations and guidelines developed over the two decades of its clinical use, is impressive and safe (3). In this study, all of patients were treated with in situ lithotripter (MPL 9000, Dornier GmbH, Germany) and we compare the results of the treatment for proximal and distal ureteral stones in adult patients. According to Turna et al. there are no certain prognostic factors to predict the exact result of in situ ESWL in specific patient. Although some studies mentioned that several factors affect the success rate of therapy such as lithotripter type, stone size and localization (2, 9, 10). In this study we found relationship between location of the stone, age and the success of ESWL which is in contrast with Tekin et al. study (11). Some studies reported no significant relationship between the stone size and stone clearance, especially for stone size <2cm (12, 13) while the present study showed an adverse effect of a larger stone size on the treatment results as the same as Lingeman et al. study (14). Nowadays, use of ESWL is increased and it became obvious that ureteral stones show more resistance than the renal stones against shock waves (15). In this study the extent of the overall success of ESWL was 82.54%, while in the study by Mobini et al. the overall

success for kidney stone was 80% [12]. A study by Okava showed the extent of the stone-free rate by the Sonolith-3000 Machine to be 79.5%. Also a Sessions of ESWL resulted in an increased stone-free rate compared with a single-session therapy [10]. Johnson et al achieved 90% SFRs for <10mm ureteral stones and 50% SFRs for >10mm ureteral stones [5]. Their results were comparable with our findings: 90.41% and 46.42% SFRs for stones <15 mm and stones 15mm<, respectively. Study done in Spain showed a success of 87%, a Sonolith-3000 Machine was used in this study too. Finding of the present study showed a stone-free rate for middle ureteric stones of 86%, while other studies report stone-free rate for middle ureteric stones of 77.8% which are comparable, and according to other reports the treatment for middle ureteric stones is more difficult than for upper ureteric stones because of the prone position [13]. In the present study, the number of sessions did not have a significant effect on stone clearance whereas; Brownlee et al. reported that multiplied this study of case. ESWL is a safe and effective method for the therapy of renal and ureteral stones(16). The findings show that there is statistically significant effect of stone size, location on the outcome of ESWL. Patients with residual stones can be treated successfully with ESWL after previous surgery. Therefore, we recommend that a larger study be conducted with a focus on the effect of various factors influencing stone clearance after ESWL.

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