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# Focusing difficulties in ESWL for urinary stone treatment

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**Introduction:** Focusing the urinary calculi during ESWL treatment is an important factor in this procedure. The aim of this study is to identify factors involved in focusing during ESWL in order to improve the final results.

**Material and Method:** Between 1991 and 2011, 10743 patients with urinary lithiasis were treated by ESWL in our department (24036 ESWL procedures). 15050 ESWL procedures (5405 patients) were performed using Dornier Compact Lithotripter (1991-2001) with primary ultrasound and secondary X-ray focusing. 8986 ESWL procedures (5338 patients) were performed using Siemens Lithostar Multiline Lithotripter (2001-2011) with primary X-ray and secondary ultrasound focusing. Focusing indicators were: fluoroscopic focusing time, simple ultrasound focusing, or combined X-ray and ultrasound focusing, IVP during ESWL when necessary.

**Results:** In 14082 procedures (58.5%) focusing was performed using ultrasound control, in 8633 procedures (36%) focusing was performed using X-ray control, and 1321 procedures (5.5%) needed both focusing methods. Average fluoroscopic time was 23 seconds. Difficulties in focusing appeared in patients with renal malformation in 78 cases, the average fluoroscopy-time rise to 51 seconds, and ultrasound was a must. The most frequent malformation was “Horse shoe kidney” – 47 cases needed average fluoroscopy-time of 57 seconds, malrotation in 25 cases (average fluoroscopy-time of 44 seconds) and renal ectopy – 6 cases with an average focusing time of 44 seconds. In 1643 cases the difficulty in focusing was represented by obesity, with an average fluoroscopy-time of 49 seconds. Urinary stones in skinny patients were easily focused. For children patients shorter than 1 meter, a special device was used, and both methods – fluoroscopy and ultrasound were performed in all cases (fluoroscopy mean time of 26 seconds). Skeletal deformities represented a challenge in focusing the stones, due to special condition of these patients (69 cases, average focusing time – 46 seconds). IVP during ESWL was performed in 17 selected cases.

**Conclusions:** Ultrasound is in our study the most frequent focusing method (58.5%). It is an easy and safe method to locate and focus renal stones. Ultrasound used during the fragmentation is also very informative and it is useful in order to decrease the X-ray dose. In cases of ureteral radiopaque stones, focusing by radiology was considered the most proper method. For patients with renal malformations, skeletal deformities and obesity combined focusing can offer more chances for a good ESWL result. All focusing methods were very important in ESWL urinary stone treatment, and in many cases they completed each other in order to obtain the best result.

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