PP-102

The effects of hydronephrosis and stone burden on success rates of shockwave lithotripsy in pediatric population

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Objectives: To evaluate the efficacy of shockwave lithotripsy (SWL) with a third-generation SWL machine in the pediatric age group and to determine the effects of stone burden and the degree of hydronephrosis on the results.

Methods: Between 2004-2011, SWL performed to 320 children with urinary system stones with Siemens Lithostar Modularis Uro-Plus. Of 320 childeren 176 were boys and 144 were girls aged between 3 months and 17 years. Sessions were performed with 60 shockwaves/min. The number of the shocks was determined by the urologist, and the session was ended when stone fragmentation was achieved or the number of shocks administered was 2500. The stone localization was 72 calculus in the lower calyx, 54 in the middle calyx, 39 in the upper calyx. Hundred and thirty six calculus were in renal pelvis,49 in upper ureter, 27 middle ureter and 21 calculus in distal ureter.The patients were divided into three groups according to stone burden (group 1:<100mm2; group 2: 101–200mm2; group 3: >200mm2) and into four groups according to the degree of hydronephrosis (group 0: absent; group 1: mild; group 2: moderate; group 3: severe). These groups were compared in terms of the success rate of SWL.

Results: Three hundred and ninety-eight renoureteral units of 320 patients were treated with 552 SWL sessions. The average stone burden was 100,3mm2 (range: 11–525). The overall success rate was 86.1%. According to stone burden, the success rate was 91.9% in group 1, 84.5% in group 2, and 67.1% in group 3. According to the degree of hydronephrosis, the success rate was 90.9% in group 0, 88.6% in group 1, 71.1% in group 2, and 64.2% in group 3. The average energy, number of shockwaves, number of sessions, retreatment rate, auxiliary procedure rate, and overall efficacy quotient were 1.76 units, 2060, 1.4, 33%, 8.2%, and 0.62, respectively.

Table 1. SWL success rate according to stone burden

Stone Burden	Success rate (%)
Group 1 (<100 mm2) (n:212)	91.9
Group 2 (101-200 mm2) (n:107)	84.5
Group 3 (>200 mm2) (n:79)	67.1
Average	86.1

Table 2. SWL success rate according to hydronephrosis degree

Hydronephrosis Degree	Success Rate (%)
Group 0 (absent) (n:192)	90.9
Group 1 (mild) (n:89)	88.6
Group 2 (moderate) (n:75)	71.1
Group 3 (severe) (n:42)	64.2
Average	86.1

Conclusion: SWL is an effective treatment method in selected patients in pediatric age group. However, percutaneous nephrolithotomy can be the first alternative for stones larger than 200mm2. It should also be kept in mind that the success rate of SWL decreases when the degree of hydronephrosis increases.

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