

The "success group" comprised patients who had successful stone fragmentation and subsequent stone clearance. The "failure group" comprised patients who failed to clear the stone because fragmentation either did not occur at all or did occur, but, with significant residual fragments (5 mm or larger in size).

Statistical analyses including chi-square, analysis of variance (ANOVA), correlation, regression and 95% confidence intervals were performed on the data to test the statistical significance of the various relationships between ESWL outcome and stone fragmentation on one side, stone density, size and location on the other side.

Results

The characteristics of both groups are shown in Table 1. The mean stone diameter of the failure group was marginally larger though statistically insignificant ($P = 0.577$). The mean stone density, of the failure group was nearly 60% larger than that of the success group; 1075 HU compared to 675 ($P = 0.000$). On average, the failure group had received 2.6 ESWL treatment sessions compared to only 1.4 sessions in the success group; a difference of nearly 86%. On average, nearly 7200 shock waves were delivered to the failure group compared to only nearly 4000 in the success group (both P -values = 0.000).

Table 1. Characteristics of ESWL treatment outcome groups

Variable	Variable mean and (standard deviation)			P Value
	Success group N = 46	Failure group N = 19	Both groups N = 65	
Age (years)	42.7 (17.4)	42.0 (17.3)	42.5 (17.2)	0.770
Stone diameter (mm)	18.3 (6.6)	18.8 (6.8)	18.4 (6.7)	0.577
CT Stone Density (Hounsfield units)	675 (285)	1075 (255)	785 (332)	<0.001
Number of ESWL treatment sessions	1.4 (0.7)	2.6 (0.9)	1.8 (0.9)	<0.001
No. of shock waves until fragmentation	4015 (1830)	7218 (2525)	4950 (2510)	<0.001

Stone Density

The patients were further analyzed by dividing them into three groups according to stone density. The "low density group" comprised all patients with stone densities of less than 500 HU, the "medium density group" comprised all patients with stone densities of 500-1000, while, the "high density group" comprised all patients

with stone densities of more than 1000. ESWL treatment outcomes, according to stone density levels are shown in Table 2 showing high success rate in low density group (94%), A chi-square test analysis revealed statistically significant association between ESWL treatment outcome and stone density (chi-square = 12.4, df = 2, $P = 0.002$).

Table 2. ESWL treatment outcome according to CT stone density

CT stone density level (Hounsfield units)	Number of Patients (and %) with		
	Stone clearance (Success)	Non-stone clearance (Failure)	Total number
Low density group (< 500)	15 (94%)	1 (6%)	16 (100%)
Medium density group (500-1000)	22 (73%)	8 (27%)	30 (100%)
High density group (> 1000)	6 (32%)	13 (68%)	19 (100%)
Total	43 (66%)	22 (34%)	65 (100%)