

The efficacy of the Medispec EM-1000 lithotripter for the disintegration of renal and ureteral stones –

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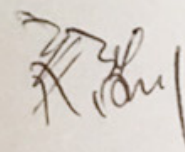
Aim: The aim of this study was to evaluate the efficacy of lithotripsy (ESWL) by EM-1000 an electromagnetic lithotripter (Medispec Ltd.) on previously untreated renal and ureteral stones. EM-1000 was used with an X-ray imaging system for determining stone location.

Methods: Between August 2016 To March 2017, 148 treatments of stones' fragmentation were performed in 136 patients with renal or ureteral stones by ESWL (EM-1000 Medispec electromagnetic lithotripter).

Data gathered included stones size and location before and after treatments. Patients were followed by fluoroscopy and ultrasound to assess' residual stones burden. In order to comply with the recommendation of the minimal stone size that may to be treated by ESWL, 124 patients with stone largest dimension < 1.5 cm treated 133 times were included in this study's evaluation. Success was defined as complete disintegration of the stone ("stone free") or fragmentation of the stone to fragments less than 0.5 mm. Patients were treated by either 4000 or 4500 shocks.

Results: The success rate of ESWL in the first and second treatment was 66% and 70% respectively. Stones located at the renal site were most susceptible to treatment. Success rate at this location reached 74% (2 patient needed to be re treated with 100% success). Success at DU (distal ureter and PU proximal ureter (PU) reached 67% and 68% respectively. Numbers of patients that underwent further treatments was too small to evaluate 3 out of 124 patients that were evaluated underwent surgery following unsuccessful ESWL. As regards to the number of shocks given-a total of 68 patients were treated by **4500** shocks. Of them 44 became stone free after first treatment (65%). 6 patients underwent a second treatment and of these 3 became stones free. In comparison, 41 out 56 patients who were treated by a protocol of **4,000** shocks per treatment remained stone free after first treatment (73%). While 2 patients underwent additional treatment and both became stone free. Therefore the results obtained with 4000 shocks in comparison to 4500 shocks are equal or even superior in terms of stone disintegration. This is advantageous as fewer shocks given per treatment lower the risks of potential side effects.

Table 1: distribution of Patients' weight



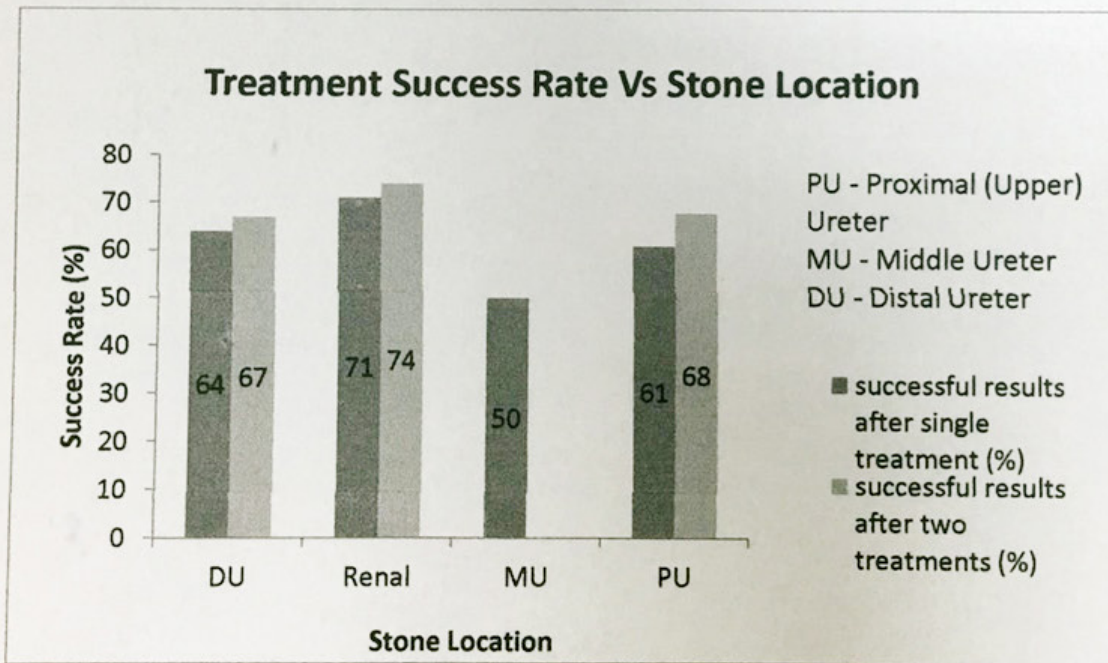
Body Weight Of treated patients in kg.	Number of patients
41-50	10
51-60	25
61-70	52
71-80	36
81-90	15
91-100	7
101-110	5

Table 2: The success number and rate (%) of patients per stones' location after 1st and 2nd treatments*.

Stone location	Total number of patients	Successful results after single treatment	No. of patients who underwent further treatments	success	Total success
DU	33	21 (64%)	1	1 (100%)	22 patients (67%)
MU	2	1(50%)	-	-	1 patient (50%)
PU	31	19 (61%)	5	2 (40%)	21 patients (68%)
Renal	58	41 (71%)	2	2 (100%)	43 patients (74%)
Total	124	82(66%)	8	5 (63%)	87 (70%)

* Only patients where the larger diameter of the stone was smaller than 1.5 cm were enrolled.

Graph 1: Success vs stone location.

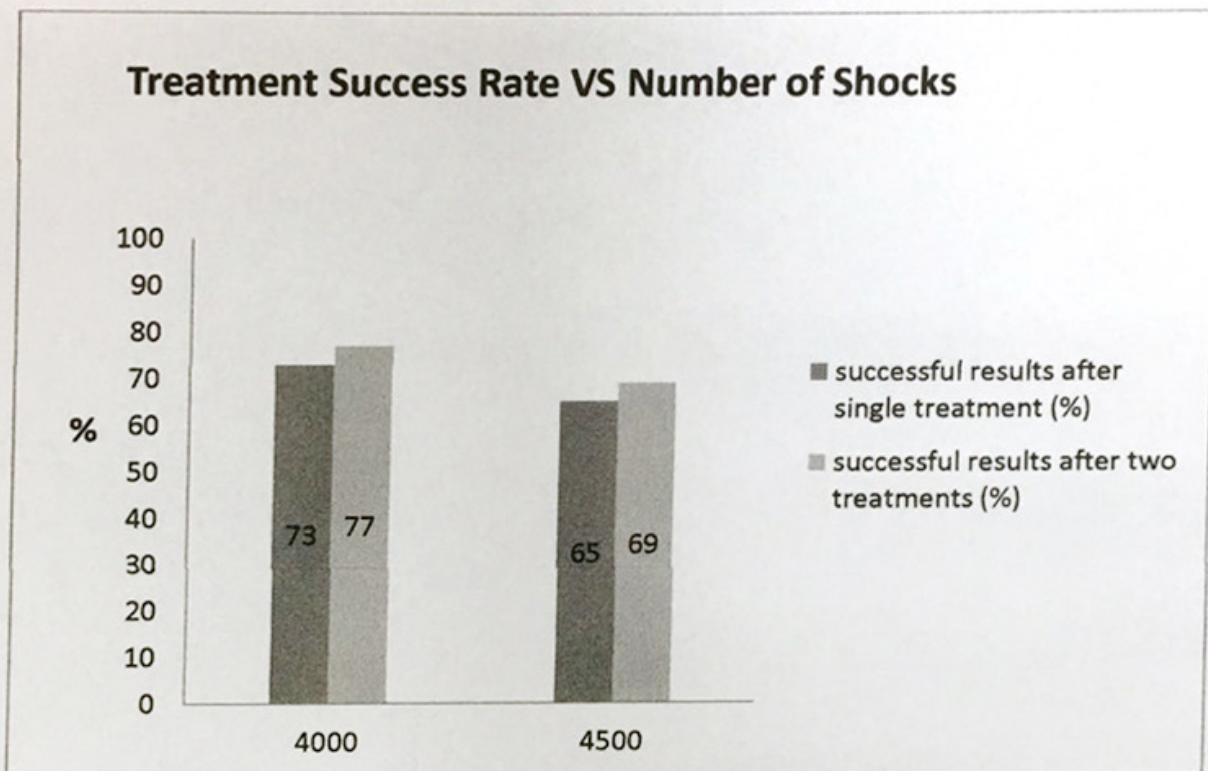


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Table 3: Success of treatment as per number of emitted shocks

Treatment Protocol (number of shocks)	Number of patients per this protocol	Success rate after single treatment	Success rate after two treatments
4000	56	73% (41 patients)	77% (43 patients)
4500	68	65% (44 patients)	69% (47 patients)

Graph 2: success after first and second treatment as per number of shocks emitted per treatment.



Conclusions:

We conclude that ESWL by Medispec's EM-1000 lithotripter is safe and effective for the disintegration of renal and ureteral calculi with success rate which is comparable to the HM3 lithotripter considered as the "Gold Standard" in SWL we also conclude that 4000 shocks per treatment should be the treatment of choice protocol.

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