



Comparison of the Wolf Piezolith 3000 and the Storz Modulith SLX in the Treatment of Ureteric Stones

Claire Dawkins, Mark Wynn, David Spanton, Nigel Bullock, Nimish Shah, Oliver Wiseman

Department of Urology, Addenbrooke's Hospital, Cambridge, UK



Introduction

Extracorporeal shockwave lithotripsy (ESWL) is a commonly used treatment for patients with renal and ureteric stones, however the outcome can vary significantly depending on the size and exact location of the stone. There are a number of different mechanisms used to generate the shock wave, including electrohydraulic, electromagnetic and piezoelectric. This study compares the efficacy of the Wolf Piezolith 3000 piezoelectric lithotripter with the Storz Modulith SLX electromagnetic machine.

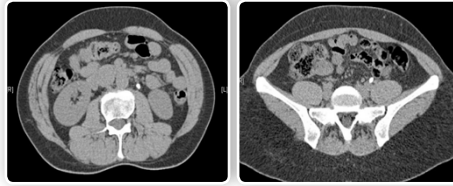
Method

The records of patients with normal collecting system anatomy who had undergone ESWL to previously untreated ureteric stones with the Wolf Piezolith 3000 or the Storz Modulith SLX lithotripters were reviewed. Treatment success was determined from their records.

Of the 53 patients identified as having been treated on the Wolf machine, 9 ureteric stones were remnants of previously treated renal stones, 8 had been treated with stents in situ, 6 were lost to follow up and 1 was discounted due to horseshoe kidney. Of the 30 patients remaining 29 were adequately matched depending on stone site, presenting stone size and patient age to those treated on the Storz machine, of which there were 96 patients, 35 of which had stents in situ, 18 being repeat treatments, 5 were lost to follow up and 8 were left unpaired. The treatment outcome in terms of stone free rates was assessed and compared using McNemar's test.

Stone Size	Size/mm	% Success
Lower Ureter	All	71,4
	≤5	100
	6-9	66,7
Upper Ureter	All	84,4
	≤5	83,3
	6-9	94,7
	≥10	57,1
Total		82,1

Table 1. Comparison of lithotripsy success rates on the Wolf Piezolith depending on site & size of stone.



CT scan of pt with left upper ureteric stone

CT scan of patient with lower ureteric stone

Results

Of the 58 patients, 46 were matched to within 1mm of their stone size, 8 to within 2mm and 4 to within 3mm. All stones were matched according to site. An effort was made to match patients by age. There were no statistical differences between the groups for age or size of stones ($p=0.97$ & 0.92 , student's t-test)

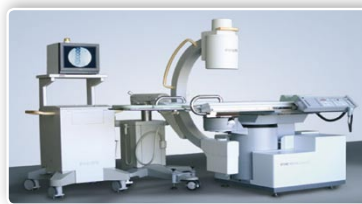
Variable	Wolf	Storz
Number of patients	29	29
Mean Age	49	54
Location	Upper	23
	Lower	6
Mean size	Presenting diameter	7
	Perpendicular diameter	5

Table 2. Comparison of patient groups treated on the Storz & Wolf machines

In 14 pairs only patients treated on the Wolf Piezolith 3000 were successfully treated, compared to 2 pairs where only the patient treated on the Storz Modulith SLX were successfully treated. Using McNemar's test the difference between the groups was statistically significant ($p = 0.0027$)

	Wolf	Storz
Mean Impulses	2709	3448
Mean Power	17.0	7.8
Mean % Hit Rate	97	85

Table 3. Comparison of mean variables used from each machine



Storz Modulith SLX lithotripter



Wolf Piezolith 3000 lithotripter

Discussion

ESWL has been found to be an effective treatment for ureteric stones, although results, as in this study, have been shown to vary significantly with the lithotripter used^{1,2}. Other factors related to the patient (eg: BMI³), and stone (eg: size⁴, site⁵ composition⁶) also affect the outcome of ESWL treatment. Patients who failed treatment with ESWL were referred for ureteroscopy. Clinically treatment by ESWL is preferred as it is a less invasive outpatient procedure that is cheaper and less demanding on resources than surgery. Our results have shown high success rates in the treatment of ureteric stones with ESWL, and have shown that the Wolf Piezolith 3000 is more effective than the Storz Modulith SLX. The reasons for this are unclear, but may be due to the fact that treatment with the Wolf machine is claimed to be less painful, meaning we were able to achieve higher power treatments, and also a higher hit rate. The number of shocks given per patient was, however, less with the Wolf Piezolith machine.

Conclusions

This study shows that, out of 58 patients with ureteric stones, lithotripsy with the Wolf Piezolith 3000 was more successful than the Storz Modulith SLX.

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