

Comparison between Optically Controlled Adjustable and Non-adjustable Spark Gap System

Authors:

C. C. Chang, L. K. Lu, Y. R. Pu, I. Manousakas, Y.C. Tong, F. M. Yu, S. M. Liang;

Institution:

Dept. of Urology, ESWL Laboratory, Institute of Aeronautics and Astronautics, National Cheng Kung University and Hospital, Tainan, Taiwan, R.O.C.

Purpose:

Extracorporeal shock wave lithotripsy (ESWL) is the main treatment for patients with urinary stones. Meanwhile, ESWT is progressively developing. Nevertheless, the distance between the electrodes is fixed in conventional Electro-hydraulic Shock Wave generator. The shock wave power will decay during treatment. We have developed an optically controlled adjustable spark gap system to deal with the above problem. The system was tested in this experiment.

Materials & Methods:

Two experiments were performed to evaluate the efficiency between the adjustable and non-adjustable system: 1. Stone fragment ratio, 2. Stone fragment weight ratio.

Results:

In the first experiment, the stone fragment ratio was 100% fragmented by 713 ± 21 shocks by the adjustable electrode. The ratio was $77.2\% \pm 4.8$ by 1500 shocks for the non-adjustable electrode. In the 2nd experiment, the weight ratio were $40.1 \pm 5.1\%$ for the adjustable electrode and $12.2 \pm 5.3\%$ for the non-adjustable electrode.

Conclusion:

The results showed that the optically adjustable electrode is better than the non-adjustable electrode in the performance and efficiency. The former one could save more treatments and send out more stable shock wave in both of ESWL and ESWT.