

# In vitro Comparison of a Novel Single-Probe Dual-Energy Lithotripter to Current Generation Devices



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## Objective

- Current lithotrites used during percutaneous nephrolithotomy include the ShockPulse (Olympus) and LithoClast Select (ElectroMedical Systems/Boston Scientific). These dual-energy lithotrites use a combination of ultrasonic fragmentation with impactor function to clear stones more efficiently.
- The LithoClast Trilogy (ElectroMedical Systems/Boston Scientific) is a novel single-probe, dual-energy lithotrite that utilizes ultrasonic vibration with suction capability along with an electromagnetically-generated impact.
- Our aim was to compare the stone clearance efficiency of these three devices in an in vitro setting.

## Methods - Testing

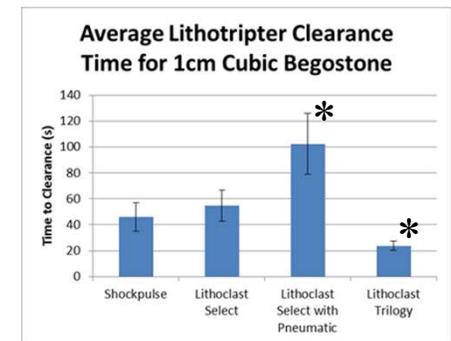
- 1 cm<sup>3</sup> cube-shaped Begostone phantoms were created to a hardness that mimics calcium oxalate monohydrate stones (Begostone-to-water ratio 15:3). A single stone was placed in a hemispherical silicone support in a water bath.
- Each lithotripter (ShockPulse, LithoClast Select – with or without continuous pneumatic function – or LithoClast Trilogy) was utilized under direct vision to fragment and suction the phantom utilizing a 300cc/min constant suction rate and comparable fragmentation settings.

## Methods - Analysis

- A single endourologist performed all trials to ensure maximum consistency. The time to stone clearance for each trial was recorded. 10 trials were performed per device.
- Statistical analysis was performed with ANOVA.

## Results

- The minimum clearance was 18 seconds with the LithoClast Trilogy.
- The LithoClast Select with continuous pneumatic function had the longest clearance time of 138 seconds.
- When comparing the four treatment methods, there was a difference between groups by one-way ANOVA ( $F[3,36] = 53.00$ ,  $p = 2.75 \times 10^{-13}$ ). Post hoc tests showed that LithoClast Trilogy was significantly faster than all other devices and LithoClast Select with continuous pneumatic function was significantly slower than all other devices ( $p < 0.01$ ).



**Figure 1.** Average lithotripter clearance time for 1cm cubic Begostone (\*, significantly different from all other devices,  $p < 0.01$ )

## Conclusions

- In an *in vitro* setting that mimics clinical percutaneous nephrolithotomy, the novel single-probe, dual-energy LithoClast Trilogy was significantly more efficient than current generation dual-energy devices.
- Further clinical testing is needed to ensure safety and efficacy in patients.

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