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Editorial Comment on: Evaluation of Renal Stone Comminution and Injury by Burst Wave Lithotripsy in a Pig Model by Maxwell et al.

(From: Maxwell AD, Wang Y-N, Kreider W, et al. J Endourol 2019;33:787–792; DOI: 10.1089/end.2018.0886)

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Burst wave lithotripsy (BWL) is one of energy sources other than extracorporeal shockwave lithotripsy (SWL) for noninvasive urinary stone disintegration. It depends on focusing sinusoidal ultrasound waves applied in bursts in the form of a beam equal or larger than the stone. Physical characters of BWL are different from those of SWL in that BWL has lower pressure and higher frequency. This study is the last one from the same group who first tested the feasibility of stone fragmentation *in vitro* by BWL in 2015.[1] Then, they evaluated renal injury caused by BWL in an animal model using real-time ultrasound and MRI in 2017.[2]

In this study, the authors evaluated both safety and efficacy of BWL parameters detected from their two previous studies in a porcine model. They used 6–7 mm human stones, mainly calcium oxalate monohydrate.[3] This technique allows real-time detection of cavitation bubbles that are known to cause renal parenchymal injury. Avoiding such injury can be achieved by lowering the peak pressure that was translated to limiting histologic changes after BWL to the mucosa surrounding the stone and sparing the renal parenchyma. This novel method caused comminution of 87% of the stones' mass to fragments <2 mm. As for any new technology, there are some concerns about the applicability in humans. They include longer skin to stone distance compared with the animal model used in this experiment, modifications needed to fragment stones >7 mm, effect of respiration on stone presence in the target of BWL, and monitoring for complete stone fragmentation. Most of these concerns can be clarified in the future when testing BWL in human studies.

References

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