

综述评论

体外冲击波碎石技术的力学机理的研究

陈景秋¹; 韦春霞¹; 邓艇¹; 田祖安¹; 张晓燕¹

重庆大学工程力学系¹

收稿日期 2006-10-8 修回日期 2007-4-19 网络版发布日期 2007-11-25 接受日期

摘要 体外冲击波粉碎结石术(extracorporeal shock wave lithotripsy, ESWL)是冲击波和聚焦原理在医疗领域的最成功的应用,因其无手术介入,使用方便,碎石率高,治疗费用低,已成为尿路结石的首选治疗方法.但是这种技术也有尚待完善之处,例如:对于大结石ESWL的治疗效率较低;对人体组织有短期或长期的副作用,甚至可能造成器官功能的不可逆性丧失等.ESWL通过一系列作用力粉碎结石和损伤人体组织的过程颇为复杂.从ESWL技术诞生之时起,人们就同步开展了关于ESWL的实验室的和临床的基础研究,以期达到最好的碎石效果和最小的副作用.至今ESWL的破坏机制逐渐被人们所认识,但仍然存在争论.冲击波直接的破坏机制已经比较清楚,而它诱发的空化破坏机制是当前ESWL研究的一个具有挑战性的热点.评定碎石机冲击波以及碎石效率的标准还在不断的完善之中.

关键词 [体外冲击波碎石术](#), [层裂](#), [疲劳](#), [空化](#), [准静态挤压](#)

分类号

STUDIES ON MECHANICAL MECHANISM ABOUT STONE COMMINUTION AND TISSUE TRAUMA IN EXTRA-CORPOREAL SHOCK WAVE LITHOTRIPSY

Abstract

Extracorporeal shock wave lithotripsy (ESWL) is a most successful application of shock wave and its focusing technique in clinical fields. Because of its non-invasive nature, high patient comfortableness and high lithotripsy efficiency with lower costs, this treatment has been at the forefront of treatment of kidney stones. But there are some shortcomings, such as lower lithotripsy efficiency for big stones, short- or long-term side effects, nonreversible loss of organ functions. The process of stone disintegration and concomitant tissue injury caused by actions in ESWL is very complicated. To maximize the effect of stone disintegration and minimize that of tissue damage, the theoretical study of ESWL, both laboratorial and clinical, has been carried out along with the invention and the improvement of ESWL. Today the mechanism of stone comminution and tissue damage is much better understood, but some important aspects remain to be cleared. While the direct mechanisms of stone comminution and tissue trauma of focusing shock waves are better understood now, its indirect mechanism, the cavitation induced by shock waves, is not very clear and is still a challenge and a hotspot of the researches on ESWL. The standard on the efficiency and the security of ESWL is in a process of improvement.

Key words [ESWL](#) [spallation](#) [fatigue](#) [cavitation](#) [quasistatic squeezing](#)

DOI:

通讯作者 陈景秋 jqchen@cqu.edu.cn

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