Commentary

Commentary to low-energy shock wave therapy ameliorates erectile dysfunction in a pelvic neurovascular injuries rat model, published in *J Sex Med* 2016;13:22-32 by Li H, Matheu P, Sun F, *et al*.

Javier C. Angulo

Clinical Department, Universidad Europea de Madrid, Hospital Universitario de Getafe, Madrid, Spain

Correspondence to: Javier C. Angulo. Clinical Department, Universidad Europea de Madrid, Hospital Universitario de Getafe, Madrid, Spain. Email: jangulo@futurnet.es.

Provenance: This is a Guest Commentary commissioned by Section Editor Yongde Xu, PhD (Department of Urology, First Hospital Affiliated to Chinese PLA General Hospital, Beijing, China).

Comment on: Li H, Matheu MP, Sun F, *et al.* Low-energy Shock Wave Therapy Ameliorates Erectile Dysfunction in a Pelvic Neurovascular Injuries Rat Model. J Sex Med 2016;13:22-32.

Submitted Sep 11, 2016. Accepted for publication Sep 13, 2016.

doi: 10.21037/tau.2016.11.12

View this article at: http://dx.doi.org/10.21037/tau.2016.11.12

Low-energy shockwaves (LESW) have been widely used to treat musculoesketal disorders and the therapeutic application of this technology is currently expanding to treat vasculogenic erectile dysfunction (ED) of varying severity and different etiologies, and also ischemic heart disease. In 2012 a working group reported results better than placebo for LESW in patients with ED (1). Since then numerous scientific papers evaluating or reviewing the effect of this treatment with various generating devices have been published. Several randomized trials are currently ongoing and a recent systematic review and meta-analysis confirms treatment with LESW for ED is effective, both in the short and medium term to assess efficacy based on the change in the International Index of Erectile Function (IIEF-EF) (2). Also this review confirms LESW is more effective than placebo in the short term; however to evaluate long-term efficacy data appear still insufficient. Well-designed prospective blind studies are still not abundant. What is worse, it must be admitted that good-quality experimental studies to explain the role of this therapy according to specific causes of ED are also needed.

The fundamental reason that explains the mode of action of therapeutic ultrasound is based on the cellular microtrauma and cavitation caused promote revascularization through recruitment of endothelial progenitor cells (3,4). Young and Dyson were the first to demonstrate that therapeutic ultrasound promotes angiogenesis by enhancing the expression of vascular endothelial growth factor (VEGF) (5). Likely this mechanism has potential in the treatment of coronary artery disease and other processes such as diabetic ulcers, calcifying tendinitis and fracture healing application, and could explain some therapeutic role in vasculogenic ED (6). Animal studies have also shown neoangiogenesis in tissue flaps and skin infarction (7). Before accepting the widespread use of this non-invasive treatment for ED more solid clinical and experimental data should be wellcome.

A very innovative article on the field has been recently published (8). A rat model of pelvic neurovascular injury proves that LESW therapy improves erectile function by leading to angiogenesis, tissue restoration and nerve regeneration through activation of Schwann cells, and also that Schwann cell activation markers appear upregulated after LESW treatment (8). The coincidence of nerve regeneration with angiogenesis and Schwann cell activation opens a new perspective to get to know the mode of action of shock waves in patients with ED. We do not know if this mechanism of peripheral nerve regeneration is present in all patients responding to this treatment. Once this question is answered the search for a marker of response will follow and that will be welcome by clinicians and therapists (9).

Only randomized multicentric clinical trials, some of

them ongoing and many others still not conducted, will give final light upon the clinical benefit of LESW and especially on patient selection and the optimum therapeutic schedule and dose on the particular patient.

Acknowledgements

None.

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

References

1. Vardi Y, Appel B, Kilchevsky A, et al. Does low intensity extracorporeal shock wave therapy have a physiological effect on erectile function? Short-term results of a randomized, double-blind, sham controlled study. J Urol 2012;187:1769-75.
2. Angulo JC, Arance I, de Las Heras MM, et al. Efficacy of low-intensity shock wave therapy for erectile dysfunction: A systematic review and meta-analysis. Actas Urol Esp 2016. [Epub ahead of print].
3. Aicher A, Heeschen C, Sasaki K, et al. Low-energy shock wave for enhancing recruitment of endothelial progenitor cells: a new modality to increase efficacy of cell therapy in chronic hind limb ischemia. Circulation 2006;114:2823-30.
4. Mittermayr R, Hartinger J, Antonic V, et al. Extracorporeal shock wave therapy (ESWT) minimizes ischemic tissue necrosis irrespective of application time and promotes tissue revascularization by stimulating angiogenesis. Ann Surg 2011;253:1024-32.
5. Young SR, Dyson M. The effect of therapeutic ultrasound on angiogenesis. Ultrasound Med Biol 1990;16:261-9.
6. Kikuchi Y, Ito K, Ito Y, et al. Double-blind and placebo-controlled study of the effectiveness and safety of extracorporeal cardiac shock wave therapy for severe angina pectoris. Circ J 2010;74:589-91.
7. Yan X, Zeng B, Chai Y, et al. Improvement of blood flow, expression of nitric oxide, and vascular endothelial growth factor by low-energy shockwave therapy in random-pattern skin flap model. Ann Plast Surg 2008;61:646-53.
8. Li H, Matheu MP, Sun F, et al. Low-energy Shock Wave Therapy Ameliorates Erectile Dysfunction in a Pelvic Neurovascular Injuries Rat Model. J Sex Med 2016;13:22-32.
9. Gao LM, Seliman HX. Professor Run Wang: can erectile dysfunction be cured? Transl Androl Urol 2015;4:684-5.

Cite this article as: Angulo JC. Commentary to low-energy shock wave therapy ameliorates erectile dysfunction in a pelvic neurovascular injuries rat model, published in *J Sex Med* 2016; 13:22-32 by Li H, Matheu P, Sun F, *et al*. Transl Androl Urol 2016;5(6):956-957. doi: 10.21037/tau.2016.11.12

