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## Peculiarities of regional vascular and neural activity in minor pelvic organs revealed with bioimpedance harmonic analysis during treatment of urological diseases

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The potency of the novel method employing multicycle bioimpedance harmonic analysis was demonstrated to simultaneously assess regional vascular and neural activity in human genitourinary organs. The patients with chronic pelvic pain who received the course of physiotherapy and those with overactive bladder treated with botulinum toxin were enrolled in the study. Penile and vesical bioimpedance measurements were performed with original hardware–software system before and after treatment. The balance of the autonomic neural system was evaluated with the method of heart rate variability (HRV). In patients with pelvic pain, the total neurogenic activity in minor pelvic organs was enhanced due to augmented sympathetic activity in contrast to the patients with overactive bladder syndrome, who demonstrated prevalence of regional parasympathetic influences. The first (fundamental) cardiac harmonic C1 in vesical and penile impedance spectra was indicative of the regional circulation status while the higher harmonics reflected the vascular viscoelastic properties and vascular tone. The initially enhanced total vascular pulsatile activity in the patients with pelvic pain moderated together with sympathetic activity after successful treatment mostly due to decrease in ‘resonant’ cardiac harmonics C4-C7. Botulinum toxin enhanced fundamental C1 harmonic attesting to functional hyperemia and shifted autonomic nervous activity in favor of sympathetic influences.

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