HEMODYNAMIC RESPONSE THROUGH AN INNOVATIVE AND CONSERVATIVE TREATMENT IN THE MANAGEMENT OF ERECTILE DYSFUNCTION: PRELIMINARY RESULTS OF A RANDOMIZED CLINICAL TRIAL

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HYPOTHESIS / AIMS OF STUDY

The aim of this study is to verify the hemodynamic response of radiofrequency, shock waves and combined techniques in the treatment of erectile dysfunction.

STUDY DESIGN, MATERIALS AND METHODS

This is a preliminary result of a randomized clinical trial that evaluated men with complaint of recurrent inability to get or keep an erection sufficient for sexual satisfaction**.** The inclusion criteria is age between 20 and 80 years old with complaint of recurrent inability to get or keep a penile erection long enough for sexual satisfaction. Exclusion criteria were less than six months of prostatectomy surgery, history of neurological disease, uncontrolled diabetes mellitus, uncontrolled arterial hypertension, Peyronie's disease, psychiatric disease, as well as those who have anatomical malformations in the genital region or who have a penile prosthesis. Accompanied by an experienced researcher, the patient answered a questionnaire with sociodemographic data and basic anamnesis. In addition, he answered the self-administered questionnaires International Index of Erectile Function (IIFE) and Erection Quality Questionnaire (QQE). Penis Doppler Ultrasonography (UDDP) by a radiologist and the parameters that were used in the UDDP to provide an overall vascular diagnosis include Peak Systolic Velocity (PSV), End Diastolic Velocity (EDV) and cavernous artery diameter, all measurements were collected from both corpora cavernosa. UDDP measurements were performed after the application of an inducing injection with 0.5mL of papaverine (9mg/mL), phentolamine (1.1mg/mL), atropine (0.11mg/mL) and prostaglandin (12mcg/mL) from the Flukka laboratory. The patients were randomized into 3 groups. In the Radiofrequency group (RFG), radiofrequency was applied with the Neartek device from the manufacturer Ibramed®, with the patient in dorsal decubitus on both sides of the penis, at a temperature of 39ºC for two minutes. Twelve RF sessions were performed twice a week. In the Low-Intensity Shock Wave Therapy Group (LSWT), the THORK Shock Wave from the manufacturer Ibramed® was used, with the patient in the supine position, with a frequency of 12Hz, energy of 180mJ and 2,000 shots on each side of the penis. Twelve LSWT sessions were held twice a week. As for the patients allocated in the Combined Therapy Group (CTG), two procedures in the same service with the same parameters described above, first the RF and then the ESWT, for 12 sessions, twice a week. For the elaboration of the database, descriptive and analytical analysis, the Statistical Package for Social Sciences (SPSS) software, version 14.0 for Windows, was used. Data normality was performed using descriptive statistics, graphs and the Shapiro-Wilk test. After this analysis, the variables considered as no transgression or small transgression were considered with normal distribution. The results were presented in tables; categorical variables will be expressed in absolute and percentage values – n (%). Continuous variables with normal distribution were expressed as mean and standard deviation (±SD), and those with non-normal distribution as median and interquartile range (IQ). Inferences for paired categorical variables were used the Chi-Square Test. For paired analyzes of variables with normal distribution, repeated measures ANOVA two way was used to compare intervention between groups. The significance level adopted will be 5%. The patients signed the informed consent form and the study was approved by the Ethical Committee.

RESULTS

The sample consisted of 42 patients, of these 32 completed treatments, 12 in RFG, 8 in LSWTG and 12 in CTG, 10 were excluded for not completing the second assessment. The mean ages were 62.5±14.1, 67.7± 9.0 and 61.0±6.1 in RFG, LSWTG, and TCG respectively (p=0.4). Regarding the prostatectomy, 33.3% of the individuals from the RFG, 25.9% from the LSWTG and 40.7% of CTG underwent the procedure, without difference between groups (p=0.7). The other variables sociodemographic and clinical (age, marital status, ethnicity, education and number of people living in the house) also showed no difference. It is observed that the groups were different from each other in relation to the right peak systolic velocity, both at baseline and after treatment (p=0.01), however this difference was not an effect of the intervention and there was no interaction. PSV and EDV showed no significant difference when compared with measurements taken before and after treatment. Likewise, the diameters before the intracavernous injection and 10 minutes after its administration, both of the right and left cavernous arteries, despite presenting caliber variations, were not significant. There was also no significant interaction between groups. These data can be seen in Table 1.

INTERPRETATION OF RESULTS

We believe that the significant differences between the groups at the time of assessment and after the intervention in relation to the PSV rigth can be explained by the small size of this sample, since preliminary data of previous studies that used RF and LSWT separately demonstrated the effectiveness of these technologies in improving erectile function. As in the case of pilot study using RF in 32 patients proved to be effective, safe and easily applicable [1]. While a systematic review that analyzed the effect of LSWT on the EFSI-EF in 602 patients, observed a significant improvement in these scores, when compared to the placebo group [2]. Both cases have demonstrated that these therapies hold promise and that more rigorous randomized controlled trials are needed before there is widespread acceptance of this treatment. There are still no studies that compare the treatment modalities or combine the use of these resources, which infers the importance of studying the physiological effects of the modalities, since isolated they present positive results. With this, we understand that the mechanism of action of low-intensity shock waves generates a variety of biochemical effects, including shear stress on cell membranes, an increase in nitric oxide synthesis, a positive regulation of vascular endothelial growth, acceleration of differentiation bone marrow cells into endothelial cells, an increase in the amount of circulating endothelial progenitor cells[2], while RF is known to induce immediate changes in collagen structures with stimulation of neocollagenesis and realignment of collagen fibers to their original natural state[1]. O understanding is that even a small increase in temperature (> 5 °C) can lead to the release of heat shock proteins, which initiate a healing cascade. Thus, RF treatment can be expected to improve fiber alignment of collagen that make up 95% of the structure of the tunica albuginea, and can potentially have a positive effect on the veno-occlusive mechanism[1]. Similar to the effect of Shockwaves, RF, due to its local thermal effect, is expected to induce the same effects as TOC. Finally, we believe that the combined therapy needs further investigation, since there was a trend towards a better response from patients who received this combined modality of treatment.

CONCLUDING MESSAGE

The resources used are safe and seem to be promising when used as a combined therapy, but it was not possible to demonstrate the effect of these resources in men with ED.

Table 1 Analysis of hemodynamic parameters in the evaluation and after 12 sessions.

Variables		RFG	LSWTG	CTG	P Value Group	Intervention	Interaction
PSV Right (cm/s)	*Before*	41±24	34±15	25±14*	0.01	0.63	0.96
	After	39±17	30±17	24±10*			
PSV Left (cm/s)	*Before*	34±20	30±9	23±11*	0.01	0.90	0.88
	After	36±14	28±15	22±10*			
DV Right (cm/s)	*Before*	3.5±5.1	4.0±3.0	2.3±2.2	0.27	0.76	0.97
	After	3.5±3.3	3.6±2.9	1.9±3.1			
DV Left (cm/s)	*Before*	3.94.8	3.3±3.1	1.9±2.6	0.25	0.60	0.92
	After	3.0±3.1	3.0±2.8	1.8±2.7			
Diameter of the Right CA Before ICI	*Before*	0.4±0.1	0.5±0.1	0.4±0.1	0.14	0.67	0.36
	After	0.4±0.1	0.4±0.1	0.4±0.1			
Diameter of the Right CA 10 min after ICI	*Before*	0.6±0.1	0.7±0.2	0.6±0.1	0.08	0.25	0.88
	After	0.6±0.1	0.6±0.1	0.6±0.1			
Diameter of the Left CA Before ICI	*Before*	0.5±0.1	0.5±0.1	0.5±0.1	0.06	0.34	0.72
	After	0.4±0.1	0.4±0.1	0.4±0.1			
Diameter of the Left CA 10 min after ICI	*Before*	0.7±0.1	0.7±0.1	0.7±0.1	0.06	0.60	0.88
	After	0.6±0.1	0.6±0.1	0.6±0.1			

Data are presented as mean ± standard deviation (SD). Variables were compared by two-way ANOVA of repeated measures Peak Systolic Velocity (PSV); Diastolic Velocity (EDV); Intracavernous injection (ICI); Cavernous Artery (CA)

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