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Letters

Vulvar rejuvenation and high-intensity focused ultrasound: the pioneering of an aesthetic field

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1. Introduction

The natural aging process can indeed lead to various physiological changes, and among the most commonly noticeable are alterations in the skin, which are easily visible.[1] As skin loses its characteristics, such as elasticity through loss of collagen, it results in wrinkles and fine lines. This may be attributed to both physiologic and external factors. Although some extrinsic factors may be modifiable, such as poor nutrition or ultraviolet rays, inherent factors such as hormonal or aging is inevitable.[2] However, with the development of diverse aesthetic procedures, there has been an increasing demand for these anti-aging processes by tightening the skin. Vulvar rejuvenation is meaningful as it addresses both aesthetic concerns and women's sexual confidence, which is a crucial part of psychological well-being. Considering that the vulva is susceptible to external stimuli and stress, there is a need for safe and effective procedures that prioritize women's health.[3]

Currently, one of the most commonly used equipment primarily utilizes radiofrequency (RF), where monopolar RF delivers heat into the epidermal skin layers to achieve skin tightening through stimulating collagen production.[4] However, recently developed method involves the utilization of high intensity focused ultrasound (HIFU), which is a non-invasive measure as it can reach deeper tissues without damaging the epidermis. HIFU can reach mid and deep reticular dermis, where it thermally denatures collagen leading to immediate tissue contraction, and initiating neocollagenesis.[5] Previous studies indicated that HIFU shows higher level of neocollagenesis and neoelastogenesis in the deep reticular dermis without causing damage to superficial tissue compared to RF.[6] Furthermore, in a comparative study, HIFU was found to induce more focal collagen production compared to RF, which delivers heat in a more diffuse way. This suggests that HIFU may offer more accurate and precise aesthetic procedures.[7]

As HIFU has emerged as a novel treatment for skin tightening and rejuvenation, primarily for the neck and face,[8] there have been attempts to identify its application as a non-surgical method of vaginoplasty. This approach aims to address conditions such as vaginal laxity and atrophy. Therefore, our study aims to describe the efficacy and safety of HIFU by comparing symptoms

and patient satisfaction after HIFU procedure. By utilizing the data from our survey, it would be possible to assess the improvement of symptoms, which are the most prevalent in patients, and evaluate the efficacy of HIFU in clinical settings.

2. Methods

This is a single-center, before-after study conducted at the Honest women's clinic (Seoul, South Korea). The data used in this study were approved by the Institutional Review Board of the Korea Biomedical research Institute (E-2023-000-01). This study was conducted in accordance with the principles of the Declaration of Helsinki and all participants signed a written informed consent form. The data were extracted from 15 females who had symptoms related to vulvovaginal laxity. A questionnaire asking about 10 symptoms related to vulvovaginal laxity was utilized to evaluate the subjective symptoms of patients both pre- and post-treatment. The scoring ranged from 1 to 5, where a score closer to 1 indicated a higher level of discomfort for each item using visual analogue scale score ranging from 0 to 5. The mean age of patients participating in this study was 41 years (95% CI, 36.90 to 45.63). Characteristics of participants before vulvovaginal laxity test are illustrated in Table 1. Additionally, 66.6% of patients had a history of delivery. Statistical analyses were performed using SAS (version 9.4; SAS Institute Inc., Cary, NC, USA).[9] The data are presented as mean with 95% confidence intervals (CIs). A two-sided p-values less than 0.05 were considered statistically significant.

3. Results

Before the procedure, the most common symptoms were dull tone, reduced elasticity, wrinkles, and loss of sexual confidence. Upon examining each symptom, except for dull tone, three symptoms showed notable improvement (Table 2). For elasticity, the score increased from 3.07 (95% CI, 2.49 to 3.64) before HIFU to 3.93 (95% CI, 3.49 to 4.38), while for wrinkles, there was an increase from 3.13 (95% CI, 2.63 to 3.64) to 3.73 (95% CI, 3.29 to 4.18), and sexual confidence improved from 2.33 (95% CI, 1.75 to 2.91) to 3.67 (95% CI, 3.13 to 4.21). A pie chart in Fig. 1 shows that 80% of patients reported no discomfort after the procedure, while 13.3% experienced stinging and itching, and 6.7% reported swelling.

4. Discussion

Recently, minimal invasive procedures have become widely utilized in cosmetic dermatology, gradually replacing traditional surgical interventions.[10] However, there is a limitation number of studies specifically examining improvements in subjective symptoms reported by patients and safety concerns following HIFU treatment in vulvar areas, particularly in Asian females. While some recent have suggested the effectiveness and safety of HIFU in vulvar areas, these studies primarily included Caucasian and Hispanic females,[11] who may have different skin types with Asian females. Our study also shows high patient satisfaction with the treatment, suggesting its efficacy in Asian females. Despite reports of some discomfort during the HIFU procedure, the symptoms subsided without the need for analgesics. Furthermore, the observed side effects were

Table 1. Characteristics of the participants before vulvovaginal laxity test.

Characteristics, mean (95% CI)	Total (n=15)
Age, years	41.27 (36.90 to 45.63)
Dry	3.40 (2.71 to 4.09)
Tone	2.93 (2.40 to 3.47)
Elasticity	3.07 (2.49 to 3.64)
Wrinkles	3.13 (2.63 to 3.64)
Shape	3.40 (2.78 to 4.02)
Poor fat	3.40 (2.82 to 3.98)
Excess fat	4.07 (3.53 to 4.60)
Decreased sexual sensitivity	3.60 (3.10 to 4.10)
Inflammation	3.60 (3.10 to 4.10)
Sexual confidence	2.33 (1.75 to 2.91)

CI, confidence interval;

Table 2. Mean difference symptoms between before- and after-vulvovaginal laxity test, with two-sided test

Variables	Pre-test, mean (95% CI)	Post-test, mean (95% CI)	Difference between pre-test and post-test	
			Mean difference (95% CI)	P value
Dry	3.40 (2.71 to 4.09)	3.40 (3.12 to 3.68)	0.00 (-0.69 to 0.69)	1.0000
Tone	2.93 (2.40 to 3.47)	3.13 (2.58 to 3.68)	0.20 (-0.96 to 0.56)	0.5816
Elasticity	3.07 (2.49 to 3.64)	3.93 (3.49 to 4.38)	0.87 (-0.24 to 1.94)	0.0099
Wrinkles	3.13 (2.63 to 3.64)	3.73 (3.29 to 4.18)	0.60 (-0.10 to -1.10)	0.0230
Shape	3.40 (2.78 to 4.02)	3.33 (2.84 to 3.83)	-0.07 (-0.74 to 0.61)	0.8358
Poor fat	3.40 (2.82 to 3.98)	3.20 (2.57 to 3.83)	-0.20 (-0.76 to 0.36)	0.4577
Excess fat	4.07 (3.53 to 4.60)	2.93 (2.26 to 3.61)	-1.13 (-1.91 to -0.35)	0.0075
Decreased sexual sensitivity	3.60 (3.10 to 4.10)	3.40 (2.90 to 3.90)	-0.20 (-0.63 to 0.23)	0.3343
Inflammation	3.60 (3.10 to 4.10)	3.47 (2.96 to 3.97)	-0.13 (-0.72 to 0.45)	0.6337
Sexual confidence	2.33 (1.75 to 2.91)	3.67 (3.13 to 4.21)	1.33 (-0.29 to 2.37)	0.0156

CI, confidence interval;

P value < 0.05 indicates significant differences.

Data in bold indicate significant differences (P < 0.05).

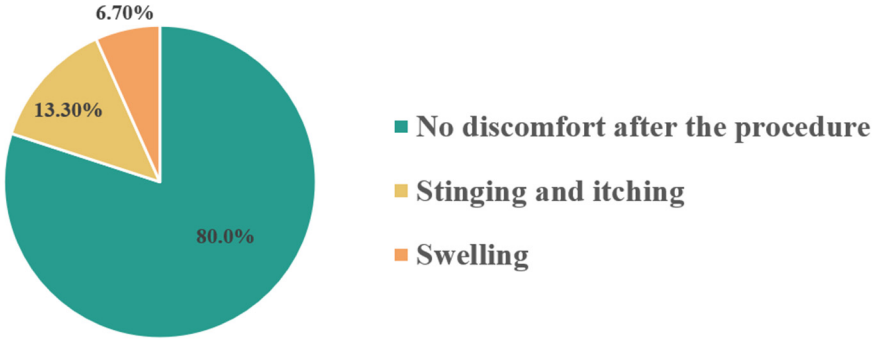

Fig. 1. Reported adverse reaction after the procedure

generally mild, including itching and swelling, with the majority of patients reporting no significant discomfort. It's important to acknowledge the limitations of our study, such as the relatively small sample size and the short-term follow-up period.

In conclusion, HIFU treatment appears to be an effective and safe option for skin and subdermal tightening in the vulvar areas. This treatment may reduce wrinkles, improve tone and elasticity, and enhance sexual confidence. Given that symptoms of vulvar laxity may be associated with mental stress, self-confidence, and overall quality of life, HIFU treatment could offer significant benefits to females experiencing these concerns in a safe way. However, further studies with higher levels of clinical evidence are necessary to validate these results comprehensively.

Ethics Statements

The data used in this study were approved by the Institutional Review Board of the Korea Biomedical research Institute (E-2023-000-01). This study was conducted in accordance with the principles of the Declaration of Helsinki and all participants signed a written informed consent form.

Patient and Public Involvement

No patients were directly involved in designing the research question or conducting the research. No patients were asked to interpret or write up the results. However, we plan on disseminating the results of this study to any of the study participants or wider relevant communities on request.

Data availability statement

Data are available on reasonable request.

Transparency Statement

The leading author (HL) are an honest, accurate, and transparent account of the study being reported.

Author Contribution

Dr HL had full access to all of the data in the study and took responsibility for the integrity of the data and the accuracy of the data analysis. All authors approved the final version before submission. Study concept and design: all authors; Acquisition, analysis, or interpretation of data: all authors; Drafting of the manuscript: all authors; Critical revision of the manuscript for important intellectual content: all authors; Statistical analysis: HL; Study supervision: HL. HL supervised the study and is guarantor for this study. HJC and SL were equally contributed. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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Competing Interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Provenance and Peer review

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