Predictive Effect of Pelvic Floor Ultrasound Parameters on Stress Urinary Incontinence After Cesarean Section

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Abstract: Objective: To explore the predictive effect of pelvic floor ultrasound parameters on stress urinary incontinence after cesarean section. Methods: The pregnant women who underwent cesarean section in our hospital from April 2021 to April 2022 were selected as the study subjects. Fifty pregnant women with SUI within 6 months after delivery were selected as the study subjects in the experimental group. However, 50 patients who underwent cesarean section for 6 months after delivery and did not initially choose SUI were selected as the control group study subjects. The experimental content was to observe the probability of PUA, BNS, LHA, BND, URA in two groups of pregnant women under resting state. To analyze the predictive effect of ultrasound parameters on SUI after cesarean section. Results: There was no significant difference in PUA and LHA between the two groups of pregnant women at rest (P>0.05); The BNS in the resting state and the maximum Valsalva state in the experimental group were significantly lower than those in the control group. Through comprehensive collection of six data, it is possible to summarize the predictive role of pelvic floor ultrasound parameters for stress urinary incontinence after cesarean section. The data obtained by the combined diagnosis method is significantly higher than the single prediction data. Conclusion: Basin ultrasound parameters have a high predictive value for postpartum SUI after cesarean section, and combining ultrasound parameters can improve the diagnostic efficacy of postpartum SUI after cesarean section.

Keywords: Pelvic Floor Ultrasound; Cesarean Section; Stress Urinary Incontinence; Forecast

1. Data and Methods

1.1 Information

The pregnant women who underwent cesarean section in our hospital from April 2021 to April 2022 were selected as the study subjects. Fifty pregnant women who developed SUI six months after cesarean section were selected as the experimental group, and 50 pregnant women who did not develop SUI six months after cesarean section were selected as the control group. The diagnostic standard for SUI is that changes in abdominal pressure occur when the patient's posture changes such as laughter, cough, sneezing, and exercise, ultimately leading to uncontrollable urinary leakage in the pregnant woman. Parturients participating in the experiment need to complete some tests, first of all, the bladder neck lift test and pressure induced test are both positive, and the urodynamic test confirms the diagnosis of postpartum stress urinary incontinence. The patient was determined to undergo a cesarean section in our hospital. Before delivery, the patient did not have any congenital diseases, especially urinary system diseases, etc. At the same time, the patient and their family members should sign an informed consent form. Exclusion criteria: Natural spontaneous childbirth women do not participate in the research experiment. "A woman with a urinary system may also cause urinary incontinence in the patient. It is not possible to determine whether the woman has postpartum urinary incontinence or urinary incontinence caused by the urinary system, so

she cannot participate in the experimental study.". A woman who has cognitive impairment such as mental, visual, and hearing impairment. Maternal women with severe pelvic diseases; Women with urinary incontinence due to infection, trauma, neurological abnormalities, and other reasons; A pregnant woman who cannot complete the Valsalva action.

1.2 Method

All the subjects underwent pelvic floor ultrasound examination using GE Voluson E10 and Voluson S8 ultrasound diagnostic instruments from the United States. The three-dimensional volume probes RM6C and RIC5-9W-RS were used, with a probe frequency of 4-8MHz. Instruct the subject to urinate 10 to 20 minutes before testing to empty the bladder. Take the bladder lithotomy position, apply an appropriate amount of coupling agent to the probe surface, apply a sterile isolation sleeve, and then apply an appropriate amount of coupling agent to the isolation sleeve. Place the probe on the midsagittal section of the lower edge of the pubic symphysis at the pelvic floor for scanning, and sequentially display the urethra, bladder, and vagina. The posterior vesicourethral angle (PUA), the horizontal and vertical distance (BNS) from the bladder neck to the lower edge of the pubic symphysis, and the area of the levator ani fissure (LHA) under the resting state and the maximum Valsalva state were collected, as well as the difference between the distance between the bladder neck and the lower edge of the pubic symphysis (BND) under the two states, and the difference between the urethral inclination angle under the two states, namely, the urethral rotation angle (URA). The ultrasound examination and measurement of all subjects were performed by the same physician.

1.3 Statistical analysis

SPSS23.0 statistical software was used for data processing and analysis. The number of use cases (percentage) of counting data is expressed as [example (%)], and the comparison between groups is performed using χ 2 Inspection; The measurement data were expressed as mean ± standard deviation (x ± s) and compared between groups using a t-test; Draw the ROC curve, calculate the area under the ROC curve of pelvic floor ultrasound parameters to predict SUI, and use logistic regression analysis to determine independent risk factors for SUI after cesarean section. $P<0.05$ indicates a statistically significant difference.

2. Results

2.1 Comparison of general information between two groups of pregnant women

There were no statistically significant differences in age, body mass index, gestational week, parity, alcohol consumption during pregnancy, and educational level between the two groups ($P>0.05$), which were clinically comparable.

2.2 Comparison of pelvic floor ultrasound parameters between two groups of pregnant women

There was no significant difference in PUA and LHA between the two groups in resting state ($P>0.05$); The resting state BNS and maximum Valsalva state BNS in the observation group were significantly lower than those in the control group, while the maximum Valsalva state PUA, LHA, BND, URA were significantly higher than those in the control group, with significant differences ($P<0.05$).

3. Discussion

With the continuous improvement of people's requirements for quality of life, there is currently a high level of attention paid to the recovery of pregnant women after childbirth. After childbirth, there is a certain probability that women will experience stress induced urinary incontinence. For SUI, although it will not have an impact on the life and health of patients, due to long-term urinary incontinence in patients, these can have an impact on their mental and psychological health. In the long run, patients cannot control the excretion of urine from the body by themselves. The most serious situation is patients' feelings such as inferiority complex and depression. It seriously affects the daily life and mental health of female patients. Normal urinary control in the human body mainly depends on the patient's urethra and bladder neck. When the urethra or bladder is damaged by surrounding supporting structures, it is unable to resist the increase in abdominal pressure, resulting in uncontrollable urinary incontinence.

The main predisposing factors for SUI are generally believed to be childbirth injury and estrogen decline, while about 16% to 34% of women experience SUI after childbirth, mainly due to pelvic floor muscle damage caused by pregnancy and childbirth. A 2016 meta study showed that delivery methods are closely related to the occurrence of postpartum SUI among women, with the risk of SUI occurring during vaginal delivery being approximately twice that of cesarean section. Currently, there is a lack of recognized gold standards for the diagnosis of SUI. The widely recognized clinical test method is urodynamic examination. However, this method is expensive, cumbersome, and belongs to invasive examination. More importantly, it cannot provide the shape of the lower urinary tract. Ultrasound diagnosis is widely used in the diagnosis of clinical SUI and the evaluation of the efficacy of rehabilitation treatment due to its non radiation, strong real-time, and simple operation. Transabdominal ultrasound is easily affected by pubic and intestinal qi, and the pelvic floor structure is often not clearly displayed. Transrectal and vaginal ultrasound can cause changes in the structural position and morphology of pelvic floor organs, resulting in false negatives. The conventional examination method for SUI evaluation is transperineal ultrasound, which can clearly display the position, shape, and movement of female pelvic floor organs in the midsagittal plane. Therefore, three-dimensional ultrasound examination of the pelvic floor in postpartum women is of great significance for the diagnosis of female SUI and pelvic floor muscle dysfunction.

Through this study, it can be determined that the accuracy of predicting stress urinary incontinence after cesarean section through pelvic floor ultrasound parameters is higher. Studies have shown that the position of the urethra and bladder in women with SUI will move downward and begin to move backward. Defective supporting structures such as urethra. The urethral wall, bladder, pubic muscle, and surrounding fascia form the supporting structure of the urinary tract. The pelvic floor is supported by the levator ani muscle complex. When the supporting structure or muscle group of the urinary tract is damaged or defective, it will not be able to lift the urethra and bladder, resulting in a higher internal pressure in the bladder than in the urethra, which can lead to excessive urination. The reason for this may be that under resting state, the more parallel the human body's gravity is to the direction of the urethra, the more susceptible it is to the influence of intra-abdominal pressure and gravity. In Valsalva state, subjects are required to cooperate with breathing movements to make their abdominal muscles contract and increase intra-abdominal pressure. Ultrasound can detect the position and morphological changes of pelvic floor supporting structures such as the female postpartum urethra and bladder neck.

4. Summary

In summary, basin ultrasound parameters have a good effect on disease prediction for women with SUI after cesarean section. By combining multiple ultrasound parameters to complete the prediction of SUI diagnosis after cesarean section, they can be effectively used in clinical evaluation of SUI diagnosis and rehabilitation treatment effects.

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