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Mini Review

Effects of Different Delivery Methods on The Functional Status of The Postpartum Pelvic Floor and Guidance on Pelvic Floor Rehabilitation Training

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Abstract

Objective: This study is to investigate the effects of normal and cesarean delivery on the pelvic floor function of pregnant women in the early postpartum period.

Methods: 277 pregnant women who delivered in our hospital were divided into two groups: normal delivery and cesarean delivery, and pelvic floor muscle function testing was performed at 42 d after delivery to compare the functional status of the pelvic floor in the two groups.

Results: The overall score of the cesarean delivery group was higher than that of the normal delivery group; among the indicators, the incidence of abnormal pelvic floor muscles in the pre and post resting stages was higher in the cesarean delivery group than in the normal delivery group, and the incidence of abnormalities in the fast and slow muscle stages and the endurance test stage was lower than that in the normal delivery group, and the differences were statistically significant (p<0.05).

Conclusion: Although cesarean delivery could reduce the incidence of early pelvic floor muscle abnormalities, postoperative pelvic floor muscle function and life would still be affected to a certain extent, and early instruction of pelvic floor rehabilitation training for pregnant women was beneficial to the recovery of pelvic floor function.

Keywords: Caesarean, Normal delivery, Pelvic floor function, Rehabilitation training

Introduction

The pelvic floor is composed of muscles, ligaments and fascia that support the pelvic organs such as the bladder, genitals and rectum [1]. Pelvic Floor Dysfunction (PFD) occurs most often in women after childbirth and is closely related to damage to the supporting structures of the pelvic floor [2]. The female pelvic floor, as a muscle group supporting important pelvic organs, has a very important role in protecting women from stress urinary incontinence [3], vaginal wall bulge [4], uterine prolapse, and other diseases [5]. Many factors influence PFD, and some studies have reported that the pelvic floor muscles are subject to continuous stretching and tearing and thus relaxation during pregnancy and childbirth, making them two independent risk factors for PFD [6]. Currently, biofeedback combined with electrical stimulation therapy [7] is commonly used clinically to treat PFD and to guide pregnant women to perform pelvic floor rehabilitation training. In this study, pelvic floor function was tested by 277 postpartum pregnant women in our hospital. The postnatal resting state muscle tone, fast and slow muscle contraction force and endurance were used as evaluation indexes to analyze the effect of delivery mode on the postnatal pelvic floor function condition of pregnant women, and to suggest pelvic floor rehabilitation training for patients with pelvic floor abnormalities in order to protect women's physical and mental health and postnatal quality of life, and to provide theoretical basis for the prevention and treatment of PFD.

Materials and Methods

General Data

277 women who delivered in our hospital from February to October 2021 and underwent pelvic floor function testing at 42 d postpartum were selected as study subjects. The control group was delivered by cesarean section with 107 cases and the average age was (30.2±5.1) years; the observation group was delivered vaginally with 170 cases and the average age was (30.3±5.5) years, and the general data of the two groups were comparable with no statistical significance (p>0.05).

Inclusion and Exclusion Criteria

Inclusion criteria: All were women who underwent delivery in our hospital, full-term singleton, without inflammatory symptoms such as vaginal bleeding and edema, and patients were informed and agreed to participate in this study.

Exclusion criteria: Patients with pre-pregnancy diseases such as urinary incontinence, previous pelvic surgery or pelvic floor rehabilitation treatment.

Methods

In this study, the neuromuscular stimulation therapy instrument(MLD B4 Medlaner, Nanjing, Jiangsu, China) was used to measure the pelvic floor function in postpartum pregnant women [8]. was used to measure the pelvic floor function in postpartum pregnant women. The procedure was as follows: the bladder was emptied, the pregnant woman was instructed to be in a supine position, relaxed, with the knees separated at shoulder width, the perineum was exposed, and the electrode pad site was disinfected. The electrode was then fixed and the instrument probe was extended to 5cm into the vagina, and muscle contraction and relaxation were performed according to the requirements of the instrument to test the anterior and posterior resting states, the fast and slow muscle phases and the endurance test phase of the pelvic floor muscle. The assessment indexes included the overall score, the mean value of the anterior resting phase (reference value <4 μV), the mean value of the fast muscle contraction (reference value >40 μV), the mean value of the slow muscle contraction (reference value >35 μV), the mean value of the endurance test (reference value >30 μV), and the mean value of the posterior resting phase (reference value <4 μV).

Statistical Methods

SPSS 23.0 software was used to process and analyze the data. The measurement data were expressed as mean ± standard deviation (±S), and t-test was used for comparison between groups. Count data were expressed as percentages (%), and the chi-square test was used for comparison between groups, and differences were considered statistically significant at p<0.05.

Results

1. Comparison of pelvic floor muscle function scores between two delivery methods at 42 d postpartum

The average score of pelvic floor muscle at 42 d after delivery was 67.49 in the cesarean group and 70.84 in the cesarean group, and the total score of the cesarean group was significantly higher than that of the cesarean group, and the difference was statistically significant (p<0.05) (Table 1).

2. Comparison of the incidence of pelvic floor muscle abnormalities at each stage between the two delivery methods

The pelvic floor function of pregnant women at each stage of the two delivery methods is shown in Table 2.The incidence of pelvic floor muscle abnormalities in the anterior resting and posterior resting states was higher in the cesarean group than in the cesarean group, and the difference was statistically significant (p<0.05); the incidence of pelvic floor abnormalities in the fast muscle, slow muscle and endurance test stages was higher in the cesarean group than in the cesarean group, and the difference was statistically significant (p<0.05) (Table 2).

Table 1: Comparison of maternal pelvic floor muscle composite scores between the two groups (n=277, ±S).

Group	Normal delivery group(n=170)	Cesarean section group(n=107)	t-value	P-value
Overall score of pelvic floor muscles	67.49±13.75	70.84±12.31	-2.05	0.041

Table 2: Comparison of abnormal rates of each index of pelvic floor muscle between the two groups (n=277, number of cases (%)).

Index	Normal delivery group(n=170)	Cesarean section group(n=107)	c^2value	P-value
Pre-resting state				
Normal	91（53.5）	37（34.6）	9.48	0.002
Abnormal	79（46.5）	70（65.4）		
Fast muscle phase				
Normal	23（13.5）	61（57）	58.75	0
Abnormal	147（86.5）	46（43）		
Slow muscle stage				
Normal	41（24.1）	39（36.4）	4.86	0.027

Abnormal	129（75.9）	68（63.6）		
Endurance test phase				
Normal	41（24.1）	44（41.1）	8.93	0.003
Abnormal	129（75.9）	63（58.9）		
Post resting phase				
Normal	113（66.5）	51（47.7）	9.62	0.002
Abnormal	57（33.5）	56（52.3）		

Discussion

The pelvic floor muscles, as the muscle groups that support the pelvic organs, are important parts of the body that ensure the smooth functioning of the female organism such as excretion. During pregnancy and childbirth, the muscles in the pelvic cavity are stretched to varying degrees, while under the influence of hormones and the fetus, the pelvic floor muscles can cause certain damage, which in turn can lead to different degrees of pelvic floor dysfunctional diseases [9,10]. Therefore, it is of great importance to pay attention to the pelvic floor function of postpartum women, to perform pelvic floor muscle strength testing as early as possible, and to instruct them to perform pelvic floor rehabilitation training in abnormal cases to ensure the physical and mental health of pregnant women after delivery.

This study evaluated the pelvic floor function of pregnant women in the early postpartum period by detecting five indicators including resting muscle tone using the neuromuscular stimulation therapy instrument(MLD B4, Medlaner, Nanjing, Jiangsu, China). The specific significance includes the following:

1) The anterior resting phase mainly focuses on static pelvic floor muscle tone, and when the average value >4 μV indicates elevated resting pelvic floor muscle tone, there is a risk of pelvic floor muscle ischemia, painful intercourse, urinary retention and constipation.

2) The fast muscle stage mainly monitors the muscle strength and reaction speed of dynamic class II muscle fibers, and when the muscle strength is insufficient, it will cause incontinence, sexual incoordination, and other related problems.

3) The slow muscle phase mainly observes the dynamic class I muscle fiber muscle strength and contraction control stability in pregnant women, and weaker muscle strength can cause stress urinary incontinence, pelvic organ prolapses and defecation dysfunction and other risks [11].

4) The endurance test phase mainly tests the endurance of the pelvic floor muscles, and a lower mean value indicates a decrease in pelvic floor muscle endurance.

5) Post resting phase mainly tests the static pelvic floor muscle tone, when the mean value measured >4 μV, it indicates elevated resting tone and predisposition to constipation and other diseases.

The pelvic floor muscle strength was measured in pregnant women who delivered vaginally and by cesarean section, and the results showed that the mean value of muscle tone in the anterior and posterior resting phases was significantly higher in the cesarean section group than in the normal delivery group (p<0.05). The pelvic floor muscle tone was generated by the mutual traction of muscle cells, and for pregnant women who delivered by cesarean section, the fetus in the uterus would exert pressure on the pelvic floor muscles, causing pelvic floor muscle relaxation, and after the release of the pressure after delivery, the vagina was in a state of fatigue, and there was an increase in reactive muscle tone, which might be one of the reasons why the muscle tone of pregnant women who delivered by cesarean section was higher than that of pregnant women who delivered by normal delivery. At the same time, the fetus was not delivered vaginally, and the vaginal muscles were therefore less mobile, resulting in the brain center not receiving negative feedback regulation of the muscles, which also resulted in the inability of the pelvic floor muscles to relax and thus higher muscle tone [12,13].

The results of the study also showed that the incidence of abnormalities of the pelvic floor muscles in the fast, slow and endurance test phases was higher in the cesarean group than in the cesarean group, indicating that the cesarean delivery method had less adverse effects on the function of the pelvic floor muscles in pregnant women. But pregnant women who delivered vaginally were more likely to suffer from incontinence, pelvic organ prolapse and defecation dysfunction [14,15]. In women who deliver vaginally, the fetus dilates during vaginal passage and the surrounding muscles and fascia were stretched and damaged, resulting in the inability of the pregnant woman to contract the pelvic floor muscles normally on her own and poor coordination of the pelvic floor muscles, which led to PFD [16]. Although vaginal delivery was more damaging to the pelvic floor, it was not encouraged to perform cesarean section, which was associated with the risk of intraoperative infection, inflammatory reaction, and postoperative complications, and also caused some medical damage to the pelvic floor [17]. Therefore, early detection of pelvic floor muscle function in postpartum pregnant women, analysis of the influencing factors, and guidance of pelvic floor rehabilitation training for different conditions were effective means to ensure a healthy postpartum pelvic floor and life of pregnant women [18].

Our hospital used neuromuscular stimulation therapy instrument to test the pelvic floor muscle function of postpartum

pregnant women, and only 19.5% of the comprehensive score of the test report was higher than 80, that was, the pelvic floor function is normal, and most women had different degrees of pelvic floor abnormalities in the postpartum period. Therefore, we provided biofeedback combined with electrical stimulation therapy and rehabilitation device training to patients with pelvic floor dysfunctional diseases and provided targeted treatment for patients with different degrees of pelvic floor muscle abnormalities. The specific methods were as follows. First, the strength and contraction durability of the pelvic floor muscles of pregnant women were measured by trans muscular stimulation therapy instrument, and pregnant women were instructed to perform correct pelvic floor muscle contraction, and those who could not use the pelvic floor muscles normally were treated by combining vaginal dumbbell [19] training. Later, electrical stimulation therapy was used, and the duration of treatment was controlled at 10-20 min depending on the degree, and perineal contraction training was also instructed. In the next stage, the treatment was mainly strengthened by Kegel exercises [20] and with a home rehabilitation device. In summary, the treatment methods described above had been used in clinical treatment, and the current results were good. In the later stage, we evaluated the pelvic floor rehabilitation training methods in our hospital by collecting relevant information before and after treatment for comparative analysis, in order to provide basic theoretical guidance for postpartum pelvic floor repair and physical and mental health of pregnant women.

Acknowledgments

None.

Conflict of Interest

None.

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