INTRODUCTION

It is particularly well-known that the childbirths lead to the weakening of pelvic floor muscles (PFM) and pelvic nerve to the onset of stress urinary incontinence (SUI)1. A previous study demonstrated that simulated birth trauma with vaginal distention (VD) in rats induces urethral dysfunction and SUI2. In addition, lower urethral resistance was obtained in the rats whose pelvic nerve somatomotor branch (Smb) to pubococcygeus muscles (Pcm) were transected bilaterally3. Thus, PFM play important roles in lower urinary tract functions4. Peripherical nerve injury causes denervation and causes a great variety of muscle changes such as atrophy5. In the skeletal muscle, it is reported that a change in morphology and fiber type distributions occurs after nerve transection6. However, it is unknown that nerve injury after childbirth occurs PFM compositions change. From the above, it is expected that nerve injury after childbirth can cause muscle atrophy of the PFM and change muscle fiber type distributions. The aim of this study was that morphological examination of PFM in the rat model of childbirth trauma in transection of Smb.

METHODS

Study design

Seventeen female Sprague-Dawley rats (210-330g) (1) a control group (n=5) (2) 4-week after transected the Smb (1M group, n=6) (3) 12-week after transected the Smb (3M group, n=6) Smb: pelvic nerve somatomotor branch

Surgery

In the1M and 3M groups, Smb transection was carried out under sodium pentobarbital anesthesia. The nerve branch was located in the pelvic area, after a ventral abdominal incision, where it crosses the internal iliac vessel (Fig.1).

Tissue harvesting

A midline incision was made from the abdomen to the perineal vagina and harvest Pcm (Fig.2). For morphological examination, Pcm were frozen in liquid nitrogen and stored at –80°C.

Morphological examination

We used the adenosine triphosphates (pH10.2) and succinate dehydrogenase (SDH) activity to identify muscle fiber type (type I, type II a, type II b) distribution.

Parameters

1) Pcm wet weight
2) Distribution of type I, II a, II b fibers

Statistical analysis

One-way analysis of variance was performed to compare the data among 3 groups. P value of less than 0.05 was regarded to be statistically significant.

The present study was conducted after being approved by Animal Study Facility Ethics Committee in our institute (No. 19-0062).

RESULTS

• The Pcm wet weight was significantly lower in 1M group (p = 0.022) and 3M group (p = 0.015) than in control group (Fig. 3).

After 1 month of transaction, the percentage of type I fibers showed significantly decreased compared to the control group (Fig. 4, 5).

• The percentage of type I fibers decreased from 11±3.4 % to 6.2±2.0 % (p = 0.022) (Fig. 4, 5).

CONCLUSIONS

The vaginal delivery can be involved in PFM atrophy due to denervation, and contribute to the elucidation of the mechanisms of SUI.

REFERENCES

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DISCLOSURE STATEMENT

Conflict of Interest (COI) of the principal presenter: No potential COI to disclose

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