

Original article

Dorsal penile nerves and primary premature ejaculation

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Keywords: dorsal nerve of penis; primary premature ejaculation; anatomy

Background Based on our clinical experience, the number of dorsal penile nerves in patients with primary premature ejaculation (PPE) is not consistent with the average number (2 branches). In this study, we evaluated the number and distribution of dorsal penile nerves among healthy Chinese adults and patients with PPE.

Methods The dorsal nerve of the penis, the deep dorsal vein of the penis, and the dorsal artery of the penis between the deep fascia of the penis and the albuginea penis were carefully educed, observed, and counted in 38 adult autopsy specimens. The number and distribution of the dorsal penile nerve in 128 surgical patients with PPE were determined.

Results The numbers of dorsal penile nerves of the 38 cases were as follows: 7 branches in 1 case; 6 branches in 1 case; 5 branches in 6 cases; 4 branches in 9 cases; 3 branches in 14 cases; and 2 branches in 7 cases. Most of the dorsal nerves were parallel to each other and in the dorsum of the penis. In only 8 cases, the branches were connected by some communicating branches. In 4 cases, 1 or 2 thin dorsal nerves continued their pathway over the ventral aspect of the penis. The average number of branches of the dorsal penile nerve in patients with PPE was 7.16.

Conclusions Based on the study of 38 cases, the average number of dorsal penile nerves was 3.55 branches and that of patients with PPE was greater. These preliminary results suggest that the excessive dorsal penile nerves may have an impact on PPE via increased sensitivity and provide topographic data for the possible treatment of PPE.

Chin Med J 2009;122(24):3017-3019

It is generally thought that the dorsal nerve of the penis lies in the surface of the tunica albuginea of the human glans penis lateral to the dorsal artery of the penis, and there is a branch of the dorsal penile nerve in each human corpus cavernosum.¹ However, it is found during surgery of patients with primary premature ejaculation (PPE) that the number of dorsal nerves is not consistent with the general number.² To determine the number of dorsal penile nerves in healthy adults, we studied 38 adult autopsy specimens. The number of dorsal penile nerves in the surgical treatment patients with PPE was counted.

METHODS

Clinical data

Thirty-eight male corpses from the Teaching and Research Office of Anatomy served as specimens for the current study. Their ages ranged from 20 years to 50 years, and the causes of their death were unknown. The height ranged from 160 cm to 180 cm, with an average height of 173 cm. The corpses were infused with formaldehyde (8%–10%), and preserved in formaldehyde solution (3%–5%) for 3–6 years. Since some of the corpses had been previously used for teaching, their heads, limbs, trunks, and abdominal parts were already dissected. However, the penises and pubic symphyses were completely preserved. None of the corpses had malformations of the external genitalia.

Operation

Two oval cuts were made at the root of the penis and the

coronary sulcus, the skin of the penis was not educed and resected, and the superficial and deep fascia of the dorsum of the penis was reflected to expose the dorsal nerves of the penis and the blood vessels which lie between the deep fascia of the penis and the albuginea penis. The dorsal nerves of the penis, the deep dorsal vein of the penis, and the dorsal artery of the penis were carefully educed. The number of dorsal nerves of the penis was counted at the mid-point between the root of the penis and the coronary sulcus.

RESULTS

Based on the study of 38 cases, the numbers of dorsal nerves of the penis were as follows: 7 branches in 1 case; 6 branches in 1 case; 5 branches in 6 cases; 4 branches in 9 cases; 3 branches in 14 cases; and 2 branches in 7 cases. The greatest number of dorsal penile nerves was 7 in only 1 case; the dorsal penile nerves were parallel to each other and lay in the vascular shallow (Figure 1). Each branch was distributed parallel to one another, except for the branches that were found to be connected by some

DOI: 10.3760/cma.j.issn.0366-6999.2009.24.020

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communicating branches in 8 cases. On the lateral aspect of the penis, some fine branches were identified coming from some dorsal nerves of the penis. In 4 cases, some thin dorsal nerves continued their pathway over the ventral aspect of the penis. Some fine branches passed through the coronary sulcus and entered into the glans penis. Some dorsal nerves, taking pathways in a chiasma, were not connected with each other. We also observed the number of dorsal nerves of the penis in 128 patients undergoing operative treatment for PPE and found the following: 5 branches in 37 cases, 6 branches in 28 cases, 7 branches in 19 cases, 8 branches in 11 cases, 9 branches in 15 cases, 10 branches in 11 cases, and 11 branches in 7 cases, which was far greater than the average value of 3.55 branches. The average number of dorsal penile nerves in these patients with PPE was 7.16 branches, which were parallel to each other and traveled through the vascular sheath (Figure 2).

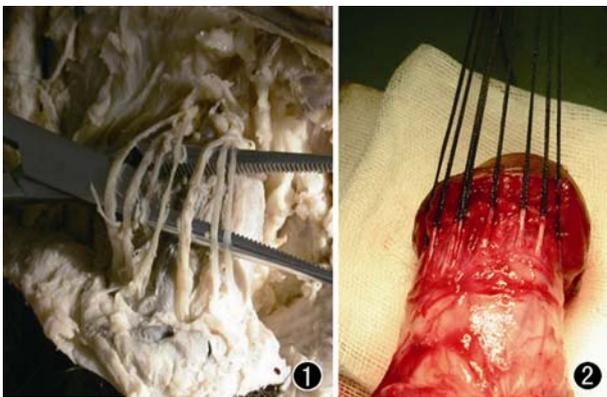


Figure 1. The number and distribution of the dorsal nerve of the penis (7 branches).

Figure 2. The number and distribution of dorsal penile nerves in a patient with primary premature ejaculation.

DISCUSSION

Based on the study of the 38 cases, the average number of dorsal penile nerves was 3.55 branches, which is different from the traditional known number of 2 branches. Moreover, this result was consistent with clinical reports showing 2 dorsal nerves at the root of the penis, and 1–4 dorsal penile nerves on the right side of the middle part.² In this study, we found that the branches of the human dorsal nerve of the penis in the overhanging do not enter into the corpus spongiosum, and only in the coronary sulcus did some branches do. Traditionally, the dorsal nerve of the penis has been thought to be located in the deep fascia and the tunica albuginea around the dorsal penile artery and deep vein. However, the results of the current study showed that the dorsal nerve of the penis was located in the superficial layer of the dorsal artery and deep vein of the penis. There was some structure-like membrane between the penile dorsal nerve and the dorsal artery and deep vein of the penis.

There is a large number of free nerve endings and

characteristic sensibility in the tunica albuginea of the corpus spongiosum of the human glans penis, which is the most sensitive part.³ The lateral arcading branches of the nerve of the penis provide a sensory pathway on the ventral and lateral penile shaft, and the termination of the fibres at the corpus spongiosum is consistent with pudendal innervation of the penile urethra.^{4,5} The dorsal nerves of the penis are not only branches of pudendal nerves, but also include the nNOS nerve fibers from nerve ganglions in the post-lateral part of the prostate. There are no nNOS nerve fibers in the glans penis. Therefore, the dorsal nerves of the penis not only transmit dermal sensation to the penis, but also impact on penile erection.⁶ This indicates that the main function of the glans penis is sensation. It is believed that the general reason for PPE is glans penile hypersensitivity and hyperexcitability of the ejaculation centre.⁷⁻⁹ We therefore question if there is a correlation between glans penile hypersensitivity and the abnormal distribution of the dorsal nerves. Thus, this research was intended to verify: (1) if patients with PPE have more dorsal nerves of the penis than healthy adults; and (2) if the dorsal nerves of the penis in patients with PPE are more closely set than in healthy patients.

Some reports have shown that selective serotonin reuptake inhibitors may be useful to treat PPE,^{10,11} and phosphodiesterase-5 (PDE5) inhibitors as also an useful agent in the treatment of PPE.¹² The clinical treatment for patients with PPE involves reducing penile sensitivity through local application of an anesthetic on the penis.¹³⁻¹⁵ The symptoms of secondary primary ejaculation (SPE) can be alleviated by treating the primary disease, while it takes a long time to cure PPE. Thus, we infer that the redundant dorsal nerves on the glans penis in patients with premature ejaculation (PE) may be responsible for PPE. This abnormal distribution of dorsal nerves on the glans penis in patients with PE possibly leads to glans penile hypersensitivity, lowering the threshold value as well as shortening the ejaculation latency time.

Because the tunica albuginea of the corpus spongiosum of the human glans penis is the most sensitive part, male circumcision has been reported to treat PE. But in fact, the majority of patients with PE do not achieve satisfactory results following dorsal neurotomies. After all of the dorsal penile nerves were completely exposed, we reserved two branches of the dorsal penile nerve and the rest of the dorsal penile nerves were cut off at 3 cm; if the dorsal nerve continued to branch to the penis head, we cut off the branch of the dorsal nerve and reserved the trunk. The effective rate of dorsal neurotomies in 128 patients with PPE was 87.5%,¹⁶ and the average number of dorsal penile nerves in these patients with PPE was 7.16 branches, which is greater than in the healthy adult. Therefore, further evidence from the anatomic distribution of penile dorsal neural variation may account for the disadvantages of circumcision. Our investigation

on the distribution and number of dorsal penile nerves in Chinese adults may provide data regarding how many dorsal nerves of the penis should be reserved in dorsal neurectomies for patients with PPE.

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(Received April 27, 2009)

Edited by SUN Jing