The origin of benign prostatic hyperplasia

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Since 1902 (Albarran) it has been believed that benign prostatic hyperplasia (BPH) arises from the internal gland and the external gland is therewith compressed outside. It is said that the external gland is composed of Lowsley’s 7 lobes (1912), while the internal gland consists of the periurethral gland, mucosal gland and submucosal gland. Randall (1931) distinguished the prostatic hyperplastic lobes into the lateral, middle, subcervical, subtrigonal and anterior lobes. Randall’s prostatic hyperplastic lobes do not arise from the Lowsley’s prostatic lobes, but arises from the periurethral gland. According to McNeal (1983), the prostatic gland is divided into the central, peripheral and transition zones, and BPH arises from the transition zone. But this does not seem to be feasible, because it is not possible to explain the reason why the typical BPH such as the lateral and middle lobes arises from the periurethral gland, which exists in the urethra circumferentially.

Therefore we have studied the origin of BPH.

Ten whole prostatic specimens with the urethral bulbus, the bladder and the rectum in autopsy were taken out through anterior and perineal incisions. Twenty prostates were obtained for study by means of open prostatectomy. The posturethral lumen was fixed with a formalin solution. The prostates were cut in serial sections, clockwise or in parallel, with respect to the urethral axis.

1. The anatomy of the normal prostate in adults

The glands of the posterior urethra are divided into the true prostatic gland and the urethral gland. The true prostatic gland is formed by the central and the peripheral zone (Fig. 1). The central zone may be composed of the lateral, middle, anterior and subcervical lobes, but these lobes can not necessarily be distinguished from each other in adults. The peripheral zone is the posterior lobe. The distinction between the central and the peripheral zone is possible through the differences in the structure of the gland, the amount and quality of the stroma and the presence of the membrane between the two zones. The two zones transform into different patterns with ages.

The urethral gland exists in the suburethral mucosa and the preprostatic sphincter. The urethral gland is the gland peculiar to the urethra.

2. The anatomy of benign prostatic hyperplasia case

A benign nodular hyperplasia is recognized clearly in the central zone in one case. In
small BPH cases the multiple nodular prostatic hyperplasia can be recognized in the region of the native central zone and the peripheral zone is compressed outside the region of the

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Fig. 1 Anatomy of the normal prostate

A: Colonar section
B: The structure of the central zone and the peripheral zone.
\(a\): cross section at the proximal urethra, \(b\): cross section at the distal urethra.
CZ: central zone, PZ: peripheral zone, APF: anterior preprostatic fascia, AFS: anterior fibromuscular stroma

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Fig. 2 The structure of BPH cases

A: The typical multiple nodular hyperplasia region and the peripheral zone can be found. This case is the prostate of a 74-year old white man with 20% increase in volume. The peripheral zone is not so compressed outside, but the native central zone can not be found out anywhere. (Trichrome, reduced from \(\times 3\))
B: Anatomy of BPH cases
Colonar section and cross section
PZ: peripheral zone, AC: anatomical capsule, APF: anterior preprostatic fascia, AFS: anterior fibromuscular stroma
BPH and the central zone has lost its original structure even in the case of small BPH (Fig. 2). Moreover the change of nodular hyperplasia could not be recognized in the submucosal and the preprostatic sphincter. It is suggested that BPH arises mainly from the central zone. That is, BPH arises from the lateral lobe and the subcervical lobe or the middle lobe of the Lowsley.

Lowsley2 divided the prostate into 7 lobes in the human embryo but in adults only the posterior lobe can be distinguished from other lobes. Since 1983 (McNeal4) the prostate has been divided into the peripheral zone, i.e., the posterior lobe, and the central zone, i.e., all the lobes other than the posterior lobe.

Since 1902 (Albarran1) it has been believed that BPH arises from the internal gland. But the definitions of the terms internal and external gland are ambiguous, thereby causing confusions. McNeal (1983)4 explained that there was a specific transition zone between the prostate and the urethra, and BPH originated in the transition zone. According to the present studies, no specific glands exist except the central zone, the peripheral zone and the urethral gland. Consequently, judging from his figure4 McNeal's transition zone must be the same as the central zone. It is because his transition zone is located exactly in the native position of the central zone. It is suggested that BPH arises from the central zone. We should understand that the peripheral zone is the external gland and the central zone is the internal gland.

The purpose of this study was to clarify the origin of benign prostatic hyperplasia. Being different from the conclusions of earlier investigations, BPH was found to arise in the central zone (or internal gland) of the gland rather than the periurethral gland. Multiple nodular hyperplasia was found mainly in the central zone. The previous notion of a compressed central zone outside the hyperplasia region could not be confirmed, nor could any nodular hyperplasia be found in the periurethral glands. We believe that prostatic hyperplasia originates in the central zone.

References

3) Randall, A: Surgical Pathology of Prostatic Obstructions, Williams & Wilkins, Baltimore, 1931.

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