Accuracy of Digital Palpation for Size Assessment of the Prostate Evaluated by Transrectal Sonography

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Ohe, H., Ohnishi, K., Watanabe, H., Itakura, Y. and Inaba, T. Accuracy of Digital Palpation for Size Assessment of the Prostate Evaluated by Transrectal Sonography. Tohoku J. exp. Med., 1988, 154 (4), 323-328 — In order to clarify how precisely digital palpation gives information on prostatic size, evaluation of the size measurement of the prostate by means of transrectal sonography was performed on 1,543 subjects with various prostatic disorders. There was little agreement between the assessment of prostatic size by digital palpation and the ultrasonic measurement. The larger the prostate the less accurate was digital palpation. The prostatic size assessed by digital palpation was particularly dispersed widely in the prostate of 'hen's egg' size. It was proved that the size assessment by digital palpation was only effective statistically in a two-step differentiation, 'hen's egg' size and smaller. More complicated size classification was of little clinical value in digital palpation.

digital palpation; transrectal sonography; size assessment; ultrasonic measurement

Digital palpation (DP) has been the most traditional examination for the diagnosis of the prostate. However, it has been suggested in some previous papers (Watanabe et al. 1975; Meyhoff and Hald 1978; Chodak et al. 1986) that DP included false information, particularly regarding size assessment. In order to clarify this problem over a large number of cases, evaluation of the size measurement of the prostate was performed through a comparative analysis of DP and transrectal sonography (TRS).

MATERIALS AND METHODS

We started an original mass screening system for prostatic diseases using TRS for the primary study in 1975 (Watanabe et al. 1984). From August, 1984 to October, 1985, 1,543 males over 55 years of age were submitted to this mass screening program.

Each examinee was first examined by DP of the prostate and then by TRS for the primary study.

DP was performed by experienced urologists on all subjects. The size assessment of the prostate by DP was graded as 'pigeon egg', 'walnut', 'overwalnut' or 'hen's egg'.

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A chiar typed equipment (USI-51, Aloka, Tokyo) (ultrasound frequency: 3.5 MHz) with special modification for the screening system was employed for TRS. Normally 8 to 10 pictures were recorded for each examinee from the top to the bottom of the prostate at 0.5 cm intervals on 35 mm black and white film.

The relationship between the size assessment by DP and the ultrasonically estimated weight of the prostate was evaluated in 1,371 subjects in which sufficient data were obtained out of the 1,543 subjects mentioned. The relationship between the size assessment by DP and the lateral diameter, the anterior-posterior (A-P) diameter or the superior-inferior (S-I) diameter obtained by ultrasonic measurement was also evaluated in 1,410, 1,382 and 1,426 subjects, respectively.

The lateral diameter and the A-P diameter were calculated from the maximum horizontal cross section of the prostate. The S-I diameter was calculated from the distance moved by the transducer between the level on which the prostate first appeared and the level on which it disappeared.

The prostatic weight was estimated as follows: An area of each horizontal cross section of the prostate was measured by planimeter. The area of section multiplied by 0.5 was taken as the volume of the section of 0.5 cm in thickness. The whole volume of the prostate was then calculated from a sum of the sections. The prostatic volume was regarded as the approximate prostatic weight, because the specific gravity of prostatic tissue ranged from 1.050 to 1.060. In this way, the prostatic weight could be estimated with an error within 5% (Watanabe et al. 1974).

**Results**

Fig. 1 shows the relationship between the size assessment by DP and the ultrasonically measured weight of the prostate. The larger the prostate was estimated by DP the heavier its weight. However, the size assessed by DP was distributed over a considerably wide range, especially in the group of 'hen's egg' size.

Fig. 2 shows the percentage distributions of the estimated prostatic weight in 4 steps of the size assessment by DP, i.e., 'pigeon egg', 'walnut', 'overwalnut' and 'hen's egg'. The 3 steps smaller than 'overwalnut' overlapped with each other and a statistical significance was only noticed between these 3 steps and the 'hen's egg' step ($p < 0.05$).

Figs. 3, 4 and 5 show mean values of the prostatic lateral diameter, A-P

![Fig. 1. Relationship between the size assessment by digital palpation and ultrasonically measured weight of the prostate.](image-url)
diameter and S-I diameter respectively among the 4 steps of DP. The distribution of these 3 diameters also varied and overlapped between each step.

There were some examples in which a remarkable discrepancy was noticed between DP and ultrasonic measurement. Fig. 6 shows a sonogram of a case in which the estimated prostatic weight was below 30 g in spite of 'hen's egg' size by DP. Fig. 7 also shows a sonogram of a case in which the prostatic weight was over 40 g in spite of 'walnut' size by DP. The former had a flat prostatic section.
with a relatively shorter A-P and longer lateral diameter, while the latter a round section with a longer A-P diameter.

**Discussion**

Cases suspected of some prostatic diseases are first assessed by DP and judged for prostatic size, thereafter examined usually by TRS. There were, however, some discrepancies between the estimation of prostatic size by DP and ultrasonic measurement. The larger the prostate the less accurate was DP, as shown in Fig. 1. The error was particularly noticeable when the size of the prostate was of 'hen's egg' size. In several cases, as shown in Fig. 6, the prostate was actually smaller than 'walnut' size but estimated as being of 'hen's egg' size by DP, because of the large lateral diameter compared with the A-P diameter. In the other cases, as shown in Fig. 7, the prostate was actually larger than 'hen's egg' size but estimated as of 'walnut' size by DP, because of the large A-P diameter compared
with the lateral diameter.

It was proved clearly from these results that DP had some drawbacks for estimating the prostatic size accurately. It is natural that DP has limits in the evaluation of prostatic size, because the A-P diameter, which is one of the most important factors in the evaluation of the prostatic enlargement, cannot be assessed by DP.

In order to evaluate the prostatic size by DP accurately, it is necessary to know that the volumes of ‘pigeon egg’, ‘hen’s egg’, ‘goose egg’ and ‘apple’ are approximately 15, 20, 60, 150 and 300 ml, respectively (Igari 1976). From our investigations, however, it appears that even experienced urologists can distinguish the size of the prostate accurately by DP only in 2 categories; ‘hen’s egg’ and smaller than that size.

It is, therefore, emphasized that TRS, instead of conventional DP, should be employed for the purpose of scientific investigations necessitating an accurate estimation of the prostatic size, such as determining the effect of drug therapy or monitoring the result of cancer treatment.

References


