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Gastrointestinal Radiology

Sex Differences in Anorectal Angle and Perineal Descent

Elwira Skomorowska and Viktor Hegedüs

Department of Diagnostic Radiology, Glostrup Hospital, University of Copenhagen, Copenhagen, Denmark

Abstract. To elucidate whether sex differences have a significant influence on anorectal angle (ARA) and perineal descent (D), female and male asymptomatic volunteers were examined, using cinedefecography. We found ARA generally bigger in male than in female patients. Mean male values resembled those measured in females with anal incompetence. We also found that the spread of normal ARA in male patients was nearly twice that in female patients, suggesting little value of this variable. D, however, is similar in the 2 groups. Our conclusion is that ARA measured in males has no clinical value. D can probably be useful in both male and female patients for preoperative evaluation of corrective surgery.

Key words. Anorectal angle – Perineal descent – Sex differences, anorectal.

Anorectal angle (ARA) and perineal descent (D) are increasingly used when planning corrective surgery for anal insufficiency or other incapacitating lesions connected with defecation. Several publications have appeared on this topic, the majority of which do not take sex differences into consideration [1–5]. It is therefore reasonable to question whether sex differences have a significant influence on ARA and D. The results of an investigation of this problem are presented here.

Materials

The ARA and D measurements were performed in 80 asymptomatic volunteers: 40 women with a mean age of 51 years (range, 23–80) and 40 men with a mean age of 52 years (range, 27–74).

Address reprint requests to: E. Skomorowska, M.D., Department of Diagnostic Radiology, Glostrup Hospital, University of Copenhagen, Copenhagen, Denmark

Methods

Investigation

For cinedefecography the patients were prepared as for a barium enema, by cleaning the colon. Approximately 200 ml thick barium contrast medium (a mixture of half volume Mixobar esophagus® and half volume Mixobar suspension®) was instilled through a catheter into the rectum. At the end of instillation, the catheter was carefully withdrawn so as to mark the anal canal with contrast. The patient was then placed on a standardized pot chair in front of a fluoroscopic unit, with the lateral view of the rectum positioned in the center of the field. Fluoroscopy was registered on videotape during rest and evacuation. From the video sequence, static images were acquired at rest and maximum strain during evacuation. These images were taken as photographs.

Evaluation

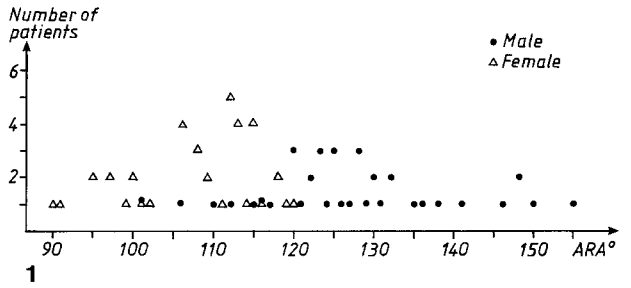
The measurements of ARA and D were made on the static images. In this material ARA is defined as the angle between the long axis of the rectal ampule and the anal canal during rest, and D is defined as the difference in centimeters between the level of the anal opening during rest and under maximum strain. For this measurement, the edge of the pot chair served as reference.

Statistical Analysis

The degree of significance between the results from the 2 groups of subjects was assessed by Student's unpaired *t*-test and the Mann-Whitney *U*-test. Results were defined as statistically significant when both tests yielded P values <0.05.

Results

Fig. 1 shows the results of ARA measurements in asymptomatic women and men. Mean ARA during rest in women was evaluated to be 108° (range, 90–120); mean ARA during rest in men was 127° (range, 101–155). The ARA values in the 2 groups are significantly different ($P<0.05$). Fig. 2 shows the results of D measurements in asymptomatic women and men. Mean D in women was 4.5 cm



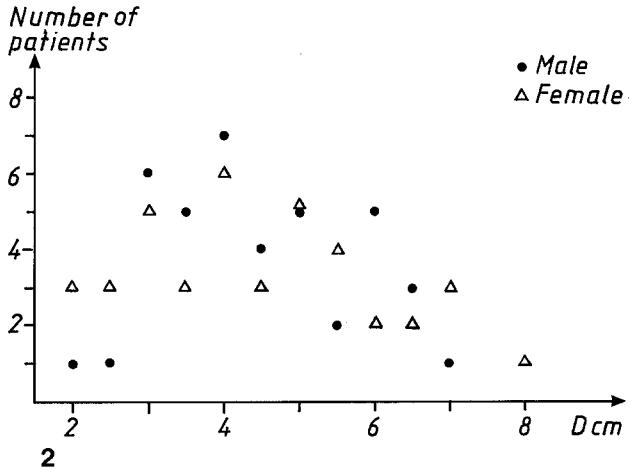


Fig. 1. ARA in 40 asymptomatic female and 40 male volunteers.

Fig. 2. D in 40 asymptomatic female and 40 male volunteers.

(range, 2–8), and mean D in men was also 4.5 cm (range, 2–7).

Discussion

The results presented here are based upon examination of volunteers who were investigated with barium enema for various reasons but not for defecation abnormalities. Thus, it is reasonable to accept these patients as having normal defecation habits. Because some of the women were in their childbearing years, the presence of pregnancy was controlled in all of them previous to the examination. Thus, the magnitude of radiation given is regarded as acceptable in view of the importance of the information achieved.

It is obvious that differences in the contents of the male and female pelvis must influence the position of the rectum (Fig. 3). The male pelvis is less "crowded," thus allowing for bigger individual variations in the position of the rectum. The value of ARA and D measurements is already limited in female patients, although there are significant differences between patients with and without symptoms [1, 6]. The results in the male patients presented here show that ARA measurements are

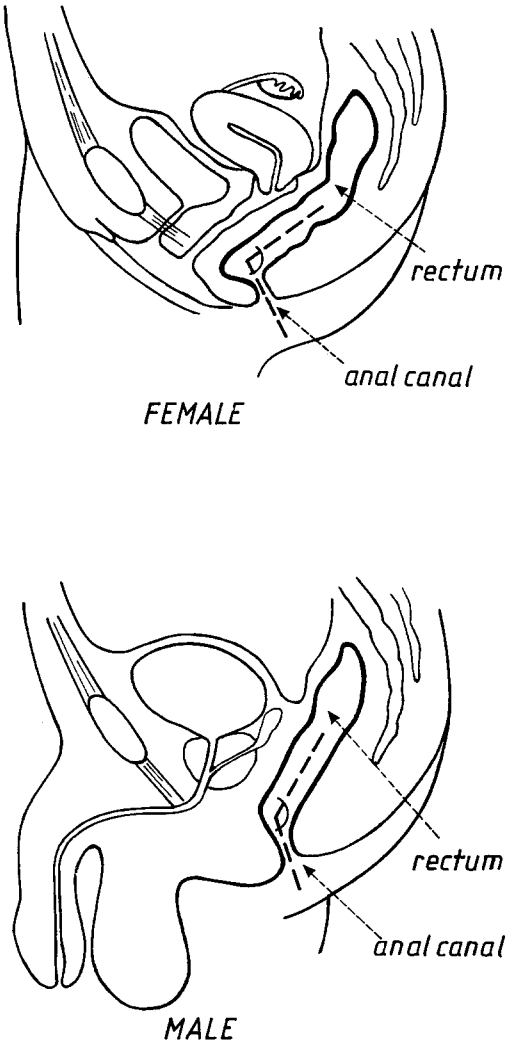


Fig. 3. Pelvis in the female and male.

even less applicable in men to a preoperative evaluation of corrective surgery, but 2 features are worth mentioning. First, the ARA is generally bigger in male than in female patients, indicating a more vertical placement of the rectum. If this sex-related difference is neglected, the ARA values in the majority of men will equal those measured in women with anal incompetence [6]. Second, the spread of normal ARA values is close to twice as great in men as in women, indicating greatly reduced clinical applicability. D is similar in the 2 groups. However, use of D alone has limited value, except in patients with a very large D [6].

The present study suggests that one should refrain from measuring ARA in men, since little is gained from it. No clinical importance should be attached to the result. Measurement of D can probably be useful in both male and female patients.

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