

PERCEPTION OF BLADDER AND RECTAL FILLING: WHICH PERCEPTION HAS PREDOMINANCE?

Hypothesis / aims of study

Symptoms affecting bladder and bowel function often coexist. A relation between constipation and urinary incontinence has been shown to exist and therapeutic relief of the symptoms in one organ can improve symptoms and function of the other organ (1,2). However little is known on the normal interaction between bladder and rectal sensory function. It was shown in a previous study in healthy female volunteers between 18 and 25 years old, that when the rectum is full, cystometrical sensations of bladder filling are perceived at significantly smaller volumes. In other words, when the rectum is full, sensitivity of bladder filling is increased (3). A summary of the results is given in table 1.

Table 1

Bladder sensation	Empty rectum	Full rectum	P value
First sensation of filling	193 ± 100	117 ± 71	0.006
First desire to void	266 ± 115	208 ± 60	0.02
Strong desire to void	414 ± 150	307 ± 98	0.006

Volumes (mL) at which different sensations of bladder filling were reported, compared between two states of rectal distension. $P < 0.05$ was considered statistically significant

This study evaluates the opposite effect in the same volunteers. The effect of bladder fullness was studied on the rectal sensations of filling.

Study design, materials and methods

Rectal sensation of filling was evaluated in 15 healthy female volunteers between 18 and 25 years old. To evaluate rectal sensations, a balloon catheter with pressure transducer was inserted 10 cm into the rectum and continuously filled at 50 ml/min. The volunteers were asked to describe all sensations they perceived. In the first 10 volunteers, the first rectal filling was done with an empty bladder and the second after the bladder was filled through a catheter to the point at which a strong desire to void was perceived. In the last 5 volunteers, the order of rectal filling was reversed.

Results

All volunteers reported 4 different consecutive sensations during rectal filling: first sensation of filling, constant sensation of fullness, desire to defecate and strong desire to defecate. The results are shown in the table 2. When rectal filling sensation was evaluated with a full bladder, all sensations of rectal filling, except the first sensation of filling, were perceived at significantly higher volumes.

Table 2

Rectal sensation	Empty bladder	Full bladder	P value
First sensation of filling	23 ± 9	28 ± 19	0.7
Constant sensation of fullness	56 ± 20	72 ± 31	0.04
Desire to defecate	84 ± 24	103 ± 31	0.009
Strong desire to defecate	123 ± 37	139 ± 43	0.02

Volumes (mL) at which different sensations of rectal filling are reported, compared between two states of bladder distension. $P < 0.05$ is considered statistically significant

Interpretation of results

Rectal distension induces different sensations of rectal filling, similarly as observed by bladder distension during cystometry. When the bladder is full, sensations of rectal filling are perceived at significantly higher volumes. In other words, when the bladder is full, sensitivity of rectal filling is decreased. The opposite was shown in a previous study: when the rectum was full, sensitivity of bladder filling was increased. When the results of both studies are taken together, they show that when both bladder and rectum are full, perception of bladder filling increases while perception of rectal filling decreases. This suggests that perception of bladder

sensation takes priority over the perception of rectal sensation. The reason for this predominance is unclear and remains a matter of speculation, but from an evolutionary perspective, adequate sensing when the bladder is full, seems more important to survive than sensing rectal fullness, because inadequate bladder sensation may impair bladder function, increasing the risk of secondary kidney destruction.

Concluding message

This study is the first to evaluate systematically the mutual interaction between bladder and bowel sensory function in healthy volunteers. More insight into such interactions between both organs may provide a basis for a better understanding of the coexistence of bladder and rectal symptoms in patients.

References

- (1) Urological abnormalities in young women with severe constipation. Gut 29: 17-20, 1988.
- (2) Extra-intestinal manifestations associated with irritable bowel syndrome: a twin study. Alim Pharmacol Ther 16: 975-983, 2002.
- (3) Impact of rectal distention on the results of evaluations of lower urinary tract sensation. J Urol 169:1392-1394, 2003.