

VIBRATORY SENSATION IN FEMALE PATIENTS WITH STRESS URINARY INCONTINENCE

Hypothesis / aims of study

Stress urinary incontinence (SUI) in females could be due to urethral hypermobility and/or sphincter deficiency; both might partly secondary to functional defects in nerves innervating pelvic floor and urethral sphincter. Biothesiometry is a convenient, non-invasive and reliable method to determine functional status of nerves by measuring vibratory perception. We applied biothesiometry to examine vibratory sensation in females with SUI and in controls.

Study design, materials and methods

66 patients, mean aged 60.2 years, with SUI were recruited. These patients received videourodynamic study to measure valsalva leak point pressure (VLPP) and bladder neck descent distance on abdominal strain. Vibratory perception threshold (VPT) over clitoris, index finger and middle toe was determined by a biothesiometer. A higher VPT value indicates a lower sensitivity to vibratory stimulation. All patients completed a questionnaire inquiring types of motion which may induce incontinence. We enrolled 2 control groups. All of them do not have SUI. One control group consists of 16 age-matched females with a mean age of 60.4 years. Another control group consists of 60 younger females with a mean age of 37.5 years. All controls received biothesiometry test. Intrinsic sphincter deficiency (ISD) was defined as valsalva leak point pressure (VLPP) less than 60 cm H₂O. Independent t test and Mann-Whitney U test were used as statistic methods.

Results

Patients with SUI are less sensitive to vibratory stimulation with higher vibratory perception threshold (VPT) than young control group (index finger 5.9 v.s. 3.1, clitoris 8.0 v.s. 4.6, both $P < 0.001$). However, VPT over all 3 measured sites between SUI patients and Non-SUI age-matched controls is not different. There was no significant correlation between VPT and bladder neck descent distance in SUI patients. VPT in patients with ISD was not significantly different from that in non-ISD patients. It is interesting to note that patients whose stress incontinence could be induced by walking upstairs and downstairs have higher VPT over index finger (8.5 v.s. 5.1, $p=0.002$) and toe (12.3 v.s. 7.8, $p=0.007$), but not over clitoris (9.6 vs 7.5, $p=0.27$), than those whose SUI did not occur when going upstairs/downstairs.

Interpretation of results

SUI patients are less sensitive to vibratory stimulation than young non-SUI controls. But lower vibratory perception should not be a precipitating factor for SUI, since non-SUI age-matched controls have similar VPT as SUI patients'.

VPT in SUI patients does not have a significant correlation with bladder neck descent distance and VLPP. It is possible that biothesiometry is not sensitive enough to detect the differences in pudendal nerve function. Another possibility is that if vibratory sensation testing over clitoris could reflect functional status of pudendal nerve, our findings suggest that impaired urethral sphincter function and urethral hypermobility do not relate to pudendal nerve dysfunction in our patients. Other mechanisms, like pelvic nerve dysfunction or impairment in more centrally located continence controlling pathway, may contribute to SUI in our patients.

It is hard to understand the reasons for poor vibratory perception in patients who develop SUI on going upstairs/downstairs. One possibility is that since their sensation of feet is dull that they might subconsciously increase muscle contraction, including abdominal wall muscle, to ensure adequate power to go upstairs/downstairs for achieving stable and safe movement. The increased intra-abdominal pressure will lead to SUI.

Concluding message

There is no difference in vibration sensation between SUI patients and age-matched non-SUI females. Vibratory sensation doesn't correlate well with urethral sphincter function and the urethral mobility. Patients develop SUI on walking upstairs/downstairs have poorer vibratory sensation than patients who do not have SUI when walking upstairs/downstairs

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HUMAN SUBJECTS: This study did not need ethical approval because The information is obtained by our routine clinical examinations. but followed the Declaration of Helsinki Informed consent was not obtained from the patients.