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LETTER TO THE EDITOR

The effect of oral presentation on salivary 3-methoxy-4-hydroxy-phenylglycol (MHPG) and cortisol concentrations in training doctors: a preliminary study

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Exposure to a stress task activates the sympathetic nervous system. Salivary 3-methoxy-4-hydroxy-phenylglycol (MHPG; the major metabolite of norepinephrine) concentrations closely reflect the plasma MHPG levels and are used as indices of noradrenergic activity. On the contrary, exposure to a stress task also activates the hypothalamic–pituitary–adrenal (HPA) axis resulting in the secretion of cortisol from the adrenal cortex. The level of salivary cortisol elevates in response to a stress task including oral presentations. We examined concentrations of salivary MHPG (sMHPG) and cortisol levels in a sample of doctors in training (6 males: mean age = 29.6 ± 3.0 years; 6 females: 26.8 ± 0.2 years) exposed to oral presentations. All the participants gave written informed consent, and this study was approved by the ethic committee of the Faculty of Medicine, Saga University. Each subject gave an oral presentation in a training course. In brief, each participant gave an oral presentation about the same theme: "How to treat patients who suffered from diabetes mellitus" to the audience who were invited. All the presentations were started in the afternoon at 2 p.m. and lasted for 1 h. After the presentation, the performance of each trainee was evaluated by the audience. Salivary sample was collected three times (just before the beginning of the presentation, immediately, and at 10 min after the presentation) for each participant. The concentration of sMHPG was measured by the gas chromatography-mass spectrometry. Salivary cortisol was measured using a commercially available enzyme immunoassay kit [1, 2].

The mean concentration of sMHPG did not change in both male (pre, 11.7 ± 2.1; post, 12.2 ± 1.3; 10 min, 11.7 ± 2.0 in ng/mL) and female (pre, 10.8 ± 1.7; post, 10.7 ± 2.1; 10 min, 10.5 ± 2.0) participants after the oral presentation. In contrast, the mean concentration of salivary cortisol was significantly increased in males (pre, 0.16 ± 0.03; post, 0.43 ± 0.09; 10 min, 0.31 ± 0.06 in μg/dL) but not in females (pre, 0.21 ± 0.05; post, 0.29 ± 0.07; 10 min, 0.24 ± 0.07) immediately and at 10 min after the oral presentation. Two-way analysis of variance with repeated measures revealed that the cortisol × sex interaction was significant ($F = 5.64$, $P = 0.039$).

Male subjects are reported to show greater cortisol responses compared with females in response to public speaking. In contrast, female subjects show greater increase in cortisol levels in response to social rejection challenges [3]. Situations involving interpersonal concerns are perceived as more stressful for females, while the intellectual inferiority or failures of performance are perceived as more stressful for males. Our study supports recent findings suggesting that oral presentations might be more stressful for males. There are few reports on how stress tasks affect sMHPG and cortisol concentrations in a same population. Challenging behavioral tasks including simulated public speaking elevate sMHPG but not cortisol concentrations in volunteers who were injected with typhoid vaccine [4]. This suggests that a psychological stress could affect sMHPG but not cortisol concentrations. Our preliminary report suggests that a psychological stress could affect salivary cortisol but not MHPG concentrations.

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References

1. H. Raff, Salivary cortisol and the diagnosis of Cushing's syndrome: a coming of age. Endocrine (2012). doi:10.1007/s12020-012-9661-8
2. Z.E. Belaya, A.V. Iljin, G.A. Melnichenko, L.Y. Rozhinskaya, N.V. Dragunova, L.K. Dzeranova, S.A. Butrova, E.A. Troshina, I.I. Dedov, Diagnostic performance of late-night salivary cortisol measured by automated electrochemiluminescence immunoassay in obese and overweight patients referred to exclude Cushing's syndrome. Endocrine (2012). doi:10.1007/s12020-012-9658-3
3. B.M. Kudielka, D.H. Hellhammer, S. Wüst, Why do we respond so differently? Reviewing determinants of human salivary cortisol responses to challenge. Psychoneuroendocrinology **34**, 2–18 (2008)
4. L. Brydon, C. Walker, A. Wawrzyniak, D. Whitehead, H. Okamura, J. Yajima, A. Tsuda, A. Steptoe, Synergistic effects of psychological and immune stressors on inflammatory cytokine and sickness responses in humans. Brain Behav. Immun. **23**, 217–224 (2009)