

(132) Diffuse noxious inhibitory control function in women with provoked vestibulodynia

K Sutton, C Pukall, S Chamberlain; Queen's University, Kingston, ON

Provoked Vestibulodynia (PVD), the most common form of chronic genital pain affecting 12% of women in the general population, is characterized by a severe burning pain in response to pressure to the vaginal entrance. Research indicates that women with PVD display similar responses as individuals with other chronic pain conditions (i.e., heightened sensitivity to both painful and non-painful stimuli in affected and non-affected areas). This increased pain sensitivity has been demonstrated in other chronic pain conditions to be due, in part, to impairment in centrally acting endogenous pain modulation systems, such as Diffuse Noxious Inhibitory Control (DNIC). DNIC is triggered by the simultaneous application of two painful stimuli, with pain at one body site inhibiting pain at a distal body site. The major aim of this research was to investigate DNIC function in women with PVD. Twenty women with PVD and 24 controls underwent thermal sensory testing to determine the integrity of DNIC function. Participants underwent three trials of testing for heat pain tolerance on the forearm before, during, and after immersion of the opposite arm in a cold water bath. When DNIC was measured by temperature change, there was no significant difference between groups in terms of number of women with an intact DNIC response (Control $N = 79\%$; PVD $N = 80\%$), $t(42) = -.07$, ns. However, when measured by subjective pain ratings, 75% of control women and only 45% of women with PVD had an intact DNIC response, resulting in a significant difference between groups, $t(42) = 2.06$, $p < .05$. Results will be discussed in terms of discrepant findings between psychophysical and subjective ratings and the implications this holds for future research in the areas of chronic pain and PVD. Supported by a grant from the Canadian Institutes of Health Research.

Human Pain Models—Other

(133) The relation of stress and heart rate variability to placebo analgesia

P Aslaksen, M Flaten; University of Tromsø, Tromsø, Norway

The present experiment investigated whether administration of placebo affected heart rate variability during heat pain. It was hypothesized that the ratio of low frequent to high frequent (LF/HF) heart rate variability would decrease after administration of an inert substance together with information that it was a powerful painkiller. In a within-subjects design, 63 participants (32 females) were tested on two separate days, one day for the placebo condition and one day for control. In the placebo condition, the participants received two capsules containing 75mg lactose each during the second of five pain tests, with information that the capsules were a high dose of a standard analgesic with high pain analgesic effect on heat pain. In the control condition, the same subjects underwent the same five pain tests, but without placebo administration. Pain tests consisted of heat pain (+46C, duration 240 seconds) to the forearm. ECG was recorded continuously. Subjective pain intensity, pain unpleasantness, stress and arousal were measured on VAS scales during each pain test. In addition, mood was measured by the SAM. Results revealed that the LF/HF ratio during painful stimulation decreased significantly in the placebo condition after placebo administration ($F(1, 57) = 7.08$, $p = 0.01$). There was lower pain intensity ($F(1, 62) = 20.53$, $p < 0.01$) in the placebo condition compared to the control condition. Subjective stress during pain was decreased after placebo administration ($F(1, 62) = 7.45$, $p < 0.01$), and there was lower subjective stress in the placebo condition compared to the control condition ($F(1, 62) = 5.39$, $p = 0.02$). There were no significant effects on pain unpleasantness, arousal or mood. The results from the present experiment suggest that placebo analgesia is accompanied by a reduction in cardiac autonomic activation and a reduction of subjective stress.

(134) More women than men experience referred pain in an experimental model of muscle pain

L Frey Law, T McMullen, J Lee, K Sluka, T Graven-Nielsen; The University of Iowa, Iowa City, IA

Sex-differences in pain intensity, threshold, and tolerance have been reported previously. Some chronic pain conditions, such as fibromyalgia, are more prevalent in females than males. While referred pain is a common phenomenon with musculoskeletal pain conditions, few studies have investigated whether it varies by sex. The purpose of this study was to determine if the incidence of referred pain during experimental muscle pain is sex-dependent. Experimental pain was induced via acidic (pH 5.2) intramuscular (IM) infusion of the left anterior tibialis muscle in 69 healthy volunteers (34 M, 35 F). The infusion was maintained at a constant rate (40 ml/hr) for 15 min (10 ml total). Moderate spontaneous pain was induced. Mean (SEM) peak pain ratings (Borg CR10 scale) were not sex-dependent at the primary site: 3.3 ± 0.4 and 2.8 ± 0.2 ($p=0.23$), for women and men, respectively. Overall, 62% of volunteers experienced referred pain (peak pain ≥ 0.5 on Borg CR10) distally at the ankle. However, referred pain occurred nearly twice as often in women ($n=28/35$; 80%) than men ($n=15/34$; 44%) ($\bar{O}2=9.46$, $p < 0.005$). Further, in women the primary site pain was significantly greater than in those with referred pain (3.9 ± 0.4) than those without (1.0 ± 0.2 ; $p < 0.0001$) whereas in men there was no difference between groups (2.8 ± 0.4 and 2.7 ± 0.3 , $p = 0.83$). It has been suggested that referred pain, a centrally-mediated phenomenon, occurs when primary pain exceeds a minimum threshold. Our findings support this for the female volunteers, but not for the male. These findings may suggest women are more prone to centrally-mediated referred pain, which may have clinical implications for conditions such as fibromyalgia. We conclude experimental muscle pain results in greater incidence of referred pain in women than men. Funded by grants from IASP and APS.

(135) Differential engagement and functioning of visceral- and somatic-specific pain networks in irritable bowel syndrome, irritable bowel syndrome with fibromyalgia, and healthy controls

J Labus, B Naliboff, L Chang, S Berhan, B Suyenobu, M Mandelkern, E Mayer; University of California, Los Angeles, Los Angeles, CA

Alterations in the central processing and modulation of visceral and somatic sensory information may manifest as syndromes characterized by chronic visceral and/or somatic discomfort and pain, such as irritable bowel syndrome (IBS) and fibromyalgia (FM). This study aimed to better understand the neural networks associated with clinical visceral and somatic pain and the effect of disease on the functioning of these networks. Twenty-five women (10 IBS patients, 9 IBS+FM, 6 healthy controls) received $H_2^{15}O$ PET scans during 4 conditions: resting baseline (non-INF), certain expectation (EXP) of visceral pain, rectal balloon inflation (INF), and painful somatic pressure (SOM). Task partial least squares (PLS) tested for patterns of brain activity discriminating groups and conditions. Task PLS revealed two significant networks ($p's < .01$) explaining 28% and 16% of the variance in the data, respectively. The first network comprised cortical (orbital medial and dorsal lateral prefrontal cortex (PFC)), limbic (right amygdala), and homeostatic afferent (thalamus, insula, mid-cingulate cortex, and dorsal pons) regions. Group differences in the engagement of this network were observed during non-INF, INF, and EXP. For example, during INF, in comparison to CTRLS, IBS showed weaker engagement of this network and FM+IBS failed to engage this network. The second network comprised cortical (dorsal PFC, ventral lateral PFC), limbic and paralimbic (rostral anterior cingulate cortex, amygdala, hippocampus) and homeostatic afferent (thalamus, insula, pons) regions. Group differences in the engagement of this network were observed during all conditions. For example, during SOM, in comparison to CTRLS and IBS, FM+IBS showed the greatest engagement of this network. These findings highlight disease-specific engagement and functioning of neural networks associated with somatic and visceral pain. Support Contributed By: K08 DK 071626(JSL), P50 DK64539(EAM), R24 AT002681(EAM), DK 64539 (EAM).