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(320) Noxious stimuli in the neonatal period in rats can cause important peripheral nervous system alterations that persist on adults in a sex-dependent manner

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Advances in medicine have increased the survival of preterm neonates, that are constantly submitted to invasive procedures, such as heelsticks, insertion of indwelling venous and arterial catheters, causing repetitive painful experiences in the neonate period. However, the consequence of early painful experiences in the peripheral nervous system remains unexplored. We aimed to evaluate the possible alterations in the sural nerves of male and female adult Wistar rats, after painful stimulation in the neonatal period. Wistar rats were followed birth to 180 days of life, separated in 4 groups: 1) Control-male group; 2) Control-female group; 3) Pain-male group; 4) Pain-female group. Pain groups received repetitive needle insertion in plantar and lateral area of the right paw, twice a day for 15 days starting at birth. Control groups were stimulated with a cotton swab, twice per day for 15 days starting at birth. When animals completed 180 days of life, they were killed, and the sural nerves were dissected, and prepared for light microscopy. Visual morphometry was performed with the aid of computer software to measure the fascicular and myelinated fiber parameters (fascicular area, number and density of myelinated fibers and Schwann cell nuclei, area and diameter of myelinated fibers and respective axons and g ratio). Female rats from the pain group show smaller sural nerve, myelinated fibers, and myelinated axon areas compared to female controls. Furthermore, the myelinated fibers diameter distribution shows that the female pain group present larger number of smaller fiber. Males showed no significant difference between groups. These results suggest that male and females can respond on different ways to neonatal injury with females showing changes in peripheral sensory nerve morphometry. In conclusion, noxious stimuli in the neonatal period in rats can cause important peripheral nervous system alterations that persist on adults in a sex-dependent manner.

(321) Association of pain catastrophizing with pain processing across the menstrual cycle in healthy women

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Pain catastrophizing is associated with enhanced pain outcomes, but little is known about whether the catastrophizing and pain relationship changes across menstrual phases. The present study assessed the relationship between state (i.e., situation-specific) and trait (i.e., traditional) pain catastrophizing and pain sensitivity in 54 healthy women during the mid-follicular, ovulatory, and late-luteal phases, which were verified by salivary sex hormone levels. Pain sensitivity was assessed from electric pain threshold/tolerance, nociceptive flexion reflex threshold (NFR; measure of spinal nociception), suprathreshold pain ratings, ischemia pain threshold/tolerance, and sensory and affective ratings of electric and ischemia stimuli. Trait catastrophizing was measured on a day prior to any laboratory pain testing, whereas state catastrophizing was assessed at each phase after delivery of painful electric stimuli. Results indicated that state catastrophizing was positively related to affect ratings for electric and ischemic pain ($p<.05$). However, there was also a Menstrual Phase X State Catastrophizing interaction for affect ratings to electric stimuli ($p<.05$), indicating that there was a stronger positive relationship between state catastrophizing and affect ratings during the ovulation phase than the late-luteal phase. There were also significant Menstrual Phase X Trait Catastrophizing and Menstrual Phase X State Catastrophizing interactions for NFR threshold ($ps<.05$). Trait catastrophizing had a stronger negative relationship with NFR threshold during the ovulation phase than the luteal phase, whereas state catastrophizing had a stronger positive relationship with NFR threshold during the ovulation phase than the late-luteal phase ($p<.05$). A significant Menstrual Phase X State Catastrophizing interaction for suprathreshold pain ratings ($p<.05$) indicated state catastrophizing had a stronger positive relationship with suprathreshold ratings during the ovulation phase than the late-luteal phase. Together, state catastrophizing was generally a stronger correlate of pain outcomes than trait catastrophizing and some relationships were moderated by menstrual cycle phase.

(322) The relationship between gender role expectations and experimental pain across phases of the menstrual cycle

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Research suggests that gender role expectations may influence pain response. However, little work has been done to examine the relationships between gender role expectations and experimental pain outcomes, or to examine these relationships across phases of the menstrual cycle. To address this, the present study examined gender role expectations across the mid-follicular, ovulatory, and late-luteal phases of the menstrual cycle in 54 healthy, pain-free women. Prior to testing, gender role expectations were measured using the Gender Role Expectations of Pain questionnaire (GREP), which was designed to measure sex-related stereotypic attributions of pain sensitivity (higher scores mean women are more sensitive), endurance (higher scores mean women have less endurance), and willingness to report pain (higher scores mean men are more likely to report). Furthermore the scale is designed to measure self attributions of pain sensitivity and endurance. Electric (NFR threshold, pain ratings of suprathreshold electric stimulations, pain threshold and tolerance, sensory and affective pain ratings) and ischemic (threshold and tolerance, sensory and affective ratings) pain outcomes were measured. Results indicated that self endurance was positively correlated with electric threshold across all phases. During ovulation, self-endurance was also positively correlated with electric tolerance and negatively correlated with suprathreshold ratings. Willingness to report pain was positively correlated with electric threshold, electric tolerance, and affective ratings of ischemia, but only during the ovulatory phase. And finally, sensory ratings of ischemia were positively correlated with pain sensitivity but only during the mid-follicular phase. In sum, results show that relationships between gender role expectations and pain can vary across the menstrual cycle. Second, results suggest beliefs about self are more strongly related to pain outcomes than stereotyped expectations of pain. And third, gender role expectations have a stronger relationship to electric pain outcomes and retrospective reports of ischemia.

E27 Visceral Pain

(323) Pudendal nerve stimulation attenuates bladder pain reflex responses in rat models of interstitial cystitis

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Clinical reports suggest painful bladder disorders (PBD; e.g. interstitial cystitis) may benefit from neuromodulation of the pudendal nerve (PN). However, a systematic evaluation of this has not been carried out. Here we investigated the effect of PN stimulation on visceromotor reflex (VMR) responses to urinary bladder distension (UBD) in rat models of bladder hypersensitivity[1-3] due to 1) early-in-life bladder inflammation, 2) acute bladder inflammation, or 3) footshock-induced stress. Electrodes were placed under the PN bilaterally to deliver biphasic pulses (100 μs) at 3x motor threshold. PN stimulation for 10 min significantly attenuated the VMR to UBD ($n=10$, $P<0.05$) in rats which had received intravesical zymosan treatments early-in-life at all three frequencies tested (10 Hz, 50 Hz, 100 Hz). Inhibition was also observed using 10 Hz PN stimulation in rats receiving acute intravesical zymosan treatment as adults ($n=8$, $p<0.05$). Overall ANOVA revealed no significant effects of PN stimulation in the chronic stress or control groups. The presence of inhibitory effects of PN stimulation within the early-in-life inflammation group and smaller-but-significant effects in the acute bladder inflammation group suggest potential utility of PN stimulation in the treatment of PBD with inflammatory mechanisms. These findings suggest PN stimulation may be less efficacious for PBD when caused by psychological stress mechanisms. Clinical follow will better direct our understanding of this potentially useful therapy. (1. DeBerry J et al. J Pain, 11: 247-255, 2010. 2. DeBerry J et al. J Pain, 8: 914-923, 2007. 3. Robbins MT and Ness TJ. J. Pain 9: 991-998, 2008.) Supported by a grant from Medtronic, Inc.