Emotional modulation of trigeminal pain and the nociceptive blink reflex (NBR) in persons with migraine

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Introduction

Migraine is a neurological condition characterized by severe head pain in addition to other physiological symptoms that tend to be treat-resistant. The cause of these symptoms is poorly understood, but one factor that could contribute is a dysfunction of supraspinal pain modulation.

Our laboratory has shown that trigeminal pain and nociception can be modulated by emotional processes, a paradigm called emotional control of nociception (ECNO). This paradigm involves the presentation of emotionally-charged pictures during which noxious electrocutaneous stimuli are delivered to the supraorbital branch of the trigeminal nerve to elicit pain and the nociceptive blink reflex (NBR, a physiological measure of trigeminal nociception). This research has shown that unpleasant pictures attenuate, whereas pleasant pictures inhibit pain and trigeminal nociception. The current study assessed emotional modulation of pain and nociception in migraine headache sufferers and controls.

Picture-Viewing: Emotion Induction

The International Affective Picture System (IAPS) was used to recruit participant groups. A total of eight pictures per content were rated (0-100) for valence, arousal, and dominance. These contents were rated significantly different within each diagnosis. Ratings were significantly lower during erotic pictures when compared to neutral and attack pictures.

Results: Emotional Reactions to Pictures

Valence Ratings (0-9)

Migraine Group (education=14.50 (SD=.36))

Controls Migraine

Attack and Neutral pictures were rated significantly different within each diagnosis. No significant Main Effect of Diagnosis (p=.36) was significant. Pictures were rated significantly lower during erotic pictures when compared to neutral and attack pictures.

Arousal Ratings

Migraine Group (education=14.47 (SD=.26))

No significant Main Effect of Diagnosis (p=.36) was significant. Pain ratings were only modulated by emotion in the control group which suggests migraine participants did not modulate pain successfully.

Subjective Emotional Evaluation

A self-assessment manikin (Bradley & Lang, 1994) was used to rate pain, affect, and valence. Pain ratings were only modulated by emotion in the control group which suggests migraine participants did not modulate pain successfully.

Noxious Stimulations to Trigeminal Nerve

Concentric stimulating electrode—left trigeminal nerve

NBR recording electrodes—left orbicularis oculi muscle

Data Analysis

All participants endorsed the same picture contents were rated significantly different from one another. No significant Main Effect of Diagnosis (p=.36) was significant. Pain ratings were only modulated by emotion in the control group which suggests migraine participants did not modulate pain successfully.

Conclusions

Further research is needed to determine the physiological basis for this dysfunction which could provide advances in the treatment of headache disorders and more specifically migraine headache.

Pleasant

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