Is resting blood pressure associated with emotional modulation of pain?

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Introduction

Blood pressure (BP) is associated with pain processing and pain modulation. For example, resting BP is associated with the effectiveness of conditioned pain modulation (i.e., pain inhibiting pain). To the best of our knowledge, however, no study has investigated the relationship between BP and the effectiveness of other forms of pain modulation techniques. In an effort to expand this literature, the current study will investigate the relationship between BP and the effectiveness of emotional modulation of nociception (ECON) and resting blood pressure in healthy pain-free individuals.

Methods: Resting Blood Pressure

- Systolic and diastolic blood pressure was measured using a DINAMAP Pro Care monitor attached to the participants left arm.
- Blood pressure was recorded three times while participants were at rest.
- The average systolic and diastolic blood pressure was used in the analysis.
- Resting blood pressure readings were taken before pain testing procedures began.

Methods: Emotional Controls of Nociception [ECON]

- Participants received electrocutaneous stimulations while viewing:
  - Unpleasant Pictures (e.g., injured bodies)
  - Neutral Pictures (e.g., household objects)
  - Pleasant Pictures (e.g., people in sexual acts)

Procedures

- These data were taken from a parent study investigating pain processing in Native American individuals.
- Stimulating electrode was applied over the sural nerve of the left ankle.
- Resting blood pressure (systolic/diastolic) readings were taken before pain testing procedures began.

EMOTIONAL CONTROLS OF NOCICEPTION (ECON) VAS (0-100)

[Image]

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Participants

- Healthy Participants: N = 142
  - Participant Characteristics: Male (51.4%), White, non-Hispanic (43.7%), Single (71.8%), average age 28.46 years (SD=12.19)

- Exclusion Criteria:
  - <18 years of age
  - Cardiovascular, neurological, circulatory and/or chronic pain problems
  - Recent use of analgesic medication
  - Cardiovascular, neurological, circulatory and/or chronic pain problems
  - >18 years of age

Results

- Diastolic Pain Rating
  - Picture Content was significant, F(2,575.67)=69.56, p<.001
  - Diastolic Group was significant, F(1,67.94)=11.73, p=.001
  - Content X Diastolic Group was significant, F(2,570.67)=6.70, p=.001
    - BMI was not significant, F(1,67.94)=14, p=.17
  - Simulation intensity was significant, F(1,57.94)=5.59, p=.02
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    - Simulation intensity was significant, F(1,57.94)=5.59, p=.02

- Systolic Pain Rating
  - Picture Content was significant, F(2,570.04)=54.07, p<.001
  - Systolic Group was not significant, F(1,66.91)=33, p=3.37
  - Content X Systolic Group was significant, F(2,570.04)=3.58, p=.09
    - BMI was not significant, F(1,66.76)=.22, p=.65
    - Simulation intensity was significant, F(1,66.91)=13.17, p=.001

Conclusion

- These results suggest that resting BP is associated with pain processing, such that individuals with high diastolic blood pressure reported more pain. Furthermore, people with high blood pressure (diastolic/systolic) did not show positive emotion induced analgesia. These results may reflect that people with high blood pressure have a pain system which fails to inhibit.