COMPARISON BETWEEN MANUAL AND ELECTRONIC VON FREY FOR THE EVALUATION OF MECHANICAL ALLODYNIA IN RAT MODELS OF NEUROPATHIC PAIN

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COMPARISON BETWEEN MANUAL AND ELECTRONIC VON FREY FOR THE EVALUATION OF MECHANICAL ALLODYNIA IN RAT MODELS OF NEUROPATHIC PAIN.

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Introduction

Tactile and mechanical allodynia are symptoms experienced by many patients suffering from various pathologies, especially neuropathies. In patients with post-traumatic / postsurgical neuropathic pain, different methods are used to evaluate tactile and mechanical allodynia. In rat, models such as Chronic Constriction Injury (CCI) and Spared Nerve Injury (SNI) mimic neuropathic pain symptoms. The objective of companies is to develop new analgesics to treat this specific pain and there is a growing need for *in vivo* models of neuropathic pain but also for relevant tests able to detect the small variation of pain and especially tactile allodynia.

The objective of this study was to assess tactile and mechanical allodynia in rat models of neuropathic pain using manual and electronic von Frey.

Materials and Methods

- Male Sprague-Dawley rats (SPF status, Janvier, France), 100-140 g and 200-280 g the day of the surgery
- CCI model : sciatic nerve loose ligation
- SNI model : tibial and peroneal tight nerves ligation + section
- Test 14 days after surgery

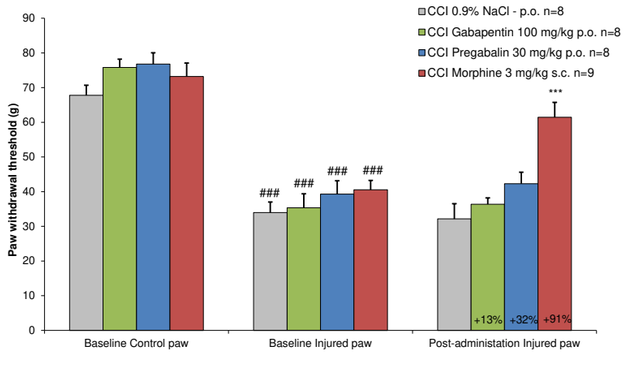
- Tactile allodynia: manual von Frey (mVF) and the up-and-down method described by Chaplan *et al*, 1994
- 50% response threshold

- Mechanical allodynia: electronic von Frey (eVF).
- Paw withdrawal thresholds

- Drugs: Morphine, Gabapentin and Pregabalin.

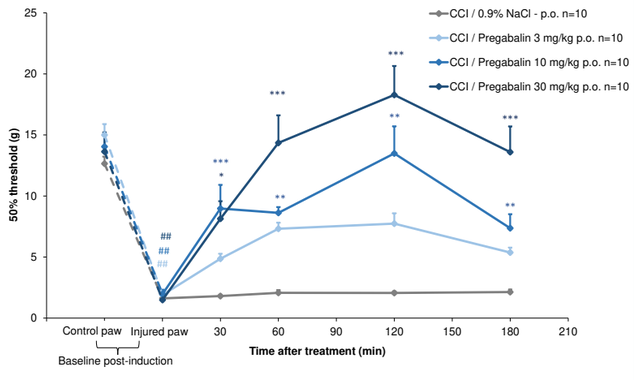
Chronic Constriction Injury (Bennett and Xie, 1988)

Assessment of the antiallodynic effects of a single administration of Gabapentin and Pregabalin: electronic Von Frey test.



Results are expressed as mean ± s.e.m. Gabapentin and Pregabalin were administered 120 min before testing. Morphine was administered 30 min before testing. ###: p<0.001, as compared to the control paw of the corresponding group, Bonferroni's test after significant two-way ANOVA. ***: p<0.001, as compared to the vehicle-treated group, Bonferroni's test after significant one-way ANOVA.

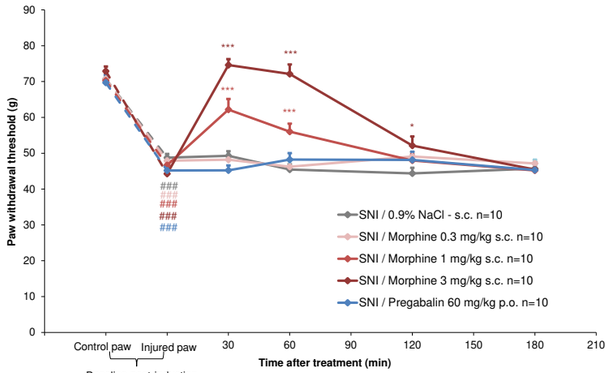
Assessment of the antiallodynic effects of a single administration of Pregabalin: manual Von Frey test.



Results are expressed as mean ± s.e.m. ##; ###: p<0.01 and 0.001, respectively, as compared to the control paw of the corresponding group, Kruskal-Wallis ANOVA on ranks. *; **; ***: p<0.05, p<0.01 and p<0.001, respectively, as compared to the vehicle-treated group, Kruskal-Wallis ANOVA on ranks.

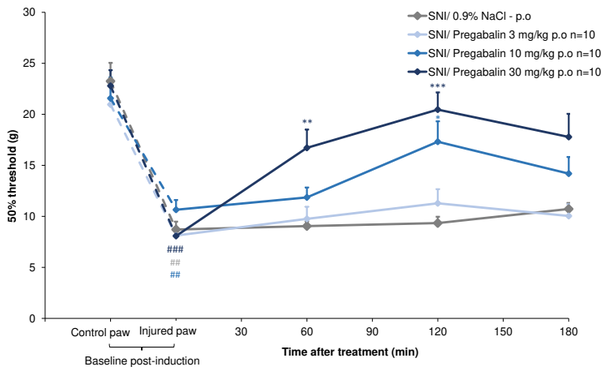
Spared Nerve Injury (Decosterd and Woolf., 2000)

Assessment of the antiallodynic effects of a single administration of Morphine and Pregabalin: electronic Von Frey test.



Results are expressed as mean ± s.e.m. Pregabalin was administered 120 min before testing. Morphine was administered 30 min before testing. ###: p<0.001, as compared to the control paw of the corresponding group, Bonferroni's test after significant two-way ANOVA. *; ***: p<0,05 and p<0.001,respectively, as compared to the vehicle-treated group, Bonferroni's test after significant two-way repeated measures ANOVA.

Assessment of the antiallodynic effects of a single administration of Pregabalin: manual Von Frey test.



Results are expressed as mean ± s.e.m. #; ##: p< 0.05 and p<0.01, respectively, as compared to the control paw of the corresponding group, Tuckey's test after significant Kruskal-Wallis ANOVA. $; $$: p< 0.05 and p<0.01, respectively, as compared to the control paw of the corresponding group, Mann Whitney rank sum test. **: p<0.01 as compared to the vehicle-treated group, Tuckey's test after significant Kruskal-Wallis ANOVA.

Results

Tactile and mechanical allodynia were evidenced in both models.

Mechanical allodynia (eVF):

- Marked increase in paw withdrawal thresholds was observed in both neuropathic pain models after a single administration of morphine (3 mg/kg, s.c).
- No efficacy of Gabapentin (100 mg/kg, *p.o.*) and Pregabalin (30 or 60 mg/kg, *p.o.*).

Tactile allodynia (mVF):

- 50 % response thresholds were decreased in a dose-related manner after Pregabalin administration (3-30mg/kg, *p.o.*).

Conclusions

In this study, manual Von Frey using the Chaplan method showed more sensitive measurement of the tactile allodynia as evidenced by a better detection of the pharmacological efficacy of Pregabalin.

Our study demonstrated a difference of sensitivity between both technics of evaluation of tactile and mechanical allodynia and helped to be more relevant in the choice of the technic used depending on the pharmacological treatment with the objective of development of new analgesic compounds for the neuropathic pain treatment.

Bibliography

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Conflict of Interest

Authors are employees of ANS Biotech.

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