

Introduction

Vincristine is a commonly used chemotherapeutic agent but is associated with debilitating peripheral neuropathy that is often refractory to traditional medication (Calvetti 2015). We explore one neuromodulatory option, High Intensity Focused Ultrasound (HIFU), which may work by altering neuronal activity. Thus, we focus on the efficacy of HIFU in treating vincristine induced neuropathy (VIN) in the animal model.

Methods

VIN rodents were created using a previously used animal model (Barzegar-Fallah 2013) and neuropathy was confirmed by mechanical and thermal testing using Von Frey Filaments (VFF), Randal-Selitto (RS), hot plate (HP), and tail flick tests (TF). The VFF and RS test are measures of innocuous and noxious mechanical thresholds respectively and the HP and TF are measures of paw and tail withdrawal times to thermal stimuli. These tests were performed before neuropathy induction, after a 2 week induction period, at 24 hours after HIFU and at 48 hours after HIFU. HIFU was applied to the L5 dorsal root ganglion of the left hind paw at three watts for two minutes.

Results

Although we only have one animal in our HIFU group thus far, our preliminary data suggests that HIFU increases mechanical and thermal thresholds as compared to that of HIFU sham animals (n=5). Specifically, innocuous and noxious mechanical thresholds were increased as measured with the VFF and RS tests, and thermal thresholds were also increased as measured by the hot plate test at 48 hours after HIFU application. Our HIFU animal did not exhibit increased tail flick thresholds.

Conclusions

Our preliminary data suggests that high intensity ultrasound may be an effective way to increase mechanical and thermal thresholds in vincristine induced neuropathy.

Learning Objectives

- 1) Vincristine induces neuropathy in rats by decreasing sensory thresholds
- 2) High intensity ultrasound increases mechanical and thermal thresholds.

References

- Barzegar-fallah A, Alimoradi H, Mehrzadi S, et al. The neuroprotective effect of tropisetron on vincristine-induced neurotoxicity. *Neurotoxicology*. 2014;41:1-8.
- Carozzi VA, Canta A, Chiorazzi A. Chemotherapy-induced peripheral neuropathy: What do we know about mechanisms?. *Neurosci Lett*. 2015;596:90-107.
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