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**Title**: Characterization of the pupillary light reflex (PLR) in patients receiving ultra-low dose ketamine infusion
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**Background:** Ketamine an analgesic and sedative drug used to treat several chronic pain syndromes. It is used in clinical therapy among patients with opioid tolerance, acute hyperalgesia, and chronic neuropathic pain [2]. Ultra Low dose ketamine (ULD ketamine) (<0.5 mg/kg/hr) serves to reverse the central sensitization of the nervous system that occurs with neuropathic pain states via NMDA antagonist activity. This therapeutic intervention relieves pain without causing prolonged sedation and respiratory depression [3]. Ketamine infusion treatments typically consist of monitoring the patient’s vital signs and level of consciousness, the pupillometer could potentially be used supplement these means of monitoring by evaluating the PLR of these patients. In addition of providing functional information about the autonomic nervous system in patients being treat for dysautonomia, monitoring the PLR may give valuable information guiding dosing parameter for patients with neuropathic pain, and opioid induced hyperalgesia.

**Hypothesis:**

1. There will be repeatable changes in specific parameter of the PLR baseline in a time dependent fashion.
2. Evidence of noradrenergic effects will be present in patients receiving higher dose (i.e., 0.1mg/kg/hr vs. 0.2mg/kg/hr).

**Purpose:** This study aims to characterize the impact on the individual parameters of the PLR by ULD, by examining the pupillary light reflex every two hours, in patients receiving low dose ketamine infusion.

**Methods:** Ketamine infusions take place in the pediatric pain clinic. The study is carried out at controlled ambient room temperature (230C) in a quiet room dedicated to perform the test. Each patient is submitted to two assessments per subject, one in the right and one in the left eye is performed with 30seconds between each measurement. No more than 3 attempts is executed until the successful reading is obtained. Pupillary readings are taking every two hours over the course of the 8 hours infusion. Successful readings mean acquisition of 8 parameters (maximum and minimum diameters of the pupil, percentage of constriction, latency: time of the onset of constriction, average and maximum constriction velocity, dilation velocity and total time taken by the pupil to constrict and the return to 75% of the initial resting pupil size) displayed on green on the screen as showed in the figure. [3]

**Significances/ Result:** The PLR ofeach patient on ketamine infusion shows a constant changes in specific parameter every two hours. For example, the percentage maximum diameter of patient I decrease from 17.544% to 8.7% after 4 hours, to 5.26% after 6 hours and to 10.52% after 8 hours. Although the percentage changes in parameters are not consistent over time, there is a noticeable changes of the PLR baseline for each patients. These changes could be evidences of therapeutic effects, dose ranging effects or NMDA effects.

**Next Steps:** We hope to examine the mechanism behind the PLR baseline changes of patients receiving ULD and assess accurate information guiding dosing parameter for patient with chronic pain.