

## Poster 226

### Incongruence in Constriction Velocity and Neurological Pupil Index™

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#### Introduction

The historical tradition of examining the pupillary light reflex (PLR) required the examiner to score the size and reactivity of the pupil. A change in the PLR from brisk to sluggish or fixed may be a marker of a pathological process and a need for intervention. The PLR has been difficult to quantify and has poor inter-rater reliability. Handheld pupillometry provides several novel measures, such as the neurological pupillary index™ (NPi) and constriction velocity (CV) that may be more quantifiable than the PLR. The purpose of this analysis is to examine the relationship between CV and NPi in neurologically injured patients.

#### Methods

The END-PANIC Registry is a prospective registry of pupillometer values and variables associated with intracranial dynamics (e.g., ICP). This analysis from 946 adult (over 18 years) patients from 2 hospitals includes 42,568 pupillometer readings; left eye (20,943), and right eye (21,625).

#### Results

Subjects had a mean age of 57.9 yrs and 48.1% were male. The primary admission diagnosis included neoplasm (241), ischemic stroke (169), SAH (82), ICH (81), TBI (9), and other (364). The left eye mean/s.d. CV (1.6/0.9) NPi (4.1/0.9) and Size (3.5/1.2) were similar to the right eye CV (1.6/0.9) NPi (4.1/0.9) and size (3.5/1.2); statistically significant difference related to large sample size. The correlation between left eye CV and NPi ( $r^2=0.068$ ,  $p<0.001$ ) was significantly improved after controlling for size ( $r^2=0.67$ ,  $p<0.001$ ). The correlation between right eye CV and NPi ( $r^2=0.048$ ,  $p<0.001$ ) was significantly improved after controlling for size ( $r^2=0.67$ ,  $p<0.001$ ).

#### Conclusions

Constriction velocity is highly dependent on size of the pupil. Further studies need to be undertaken to determine the sensitivity and specificity of abnormal NPi and CV in detecting pathological processes such as midline shift or 3rd nerve compression that effect pupillary reactivity.