Pupil metrics are significantly associated with increasing markers of mass effect in ischemic and hemorrhagic stroke.

**INTRO**

- Cerebral Edema (CE) is pathologic brain swelling that can result in mortality after ischemic and hemorrhagic stroke.
- Unilateral compression of pupillary pathways can lead to subjective increased pupil size and decreased reactivity.
- Bedside Quantitative pupil measurements may be an indicator of increasing mass effect from Cerebral Edema or hemorrhage.
- We hypothesized that we would find a significant association between decreased pupil reactivity & radiographic markers of mass effect.

**METHODS**

- N = 35, 15 Supratentorial Intraparenchymal Hemorrhage (IPH) and 20 Anterior Ischemic Stroke (AIS) patients.
- Collected quantitative pupil measurements and radiographic markers of edema from patient head CT scans that occurred within 2 hours of each other.
- Constructed mixed effect linear models showing significant effects of radiographic markers on pupil reactivity and size adjusting for age, lesion volume (IPH), MCA stroke burden and hemorrhagic conversion (ECASS score) (AIS).

**RESULTS**

**MEASUREMENTS**

- MLS - Maximum distance from bony midline to septum pellucidum.
- PGS – Distance from bony midline to furthest edge of Pineal Gland.
- IA - Angle between cerebral peduncles.
- IPS – Max distance from bony midline to midline of cerebral peduncle.
- IMW/CMW – ratio of length from edge of midbrain to midline of midbrain on the ipsilateral side to the contralateral side.

Variability of radiographic measurements was taken between two raters to evaluate measurement reliability of measurements. Average Intraclass Correlation Coefficient was >90%.

**ADDITIONAL RESULTS**

Quantitative Pupillometry and Radiographic Midbrain Compression

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(A) MLS- Midline Shift; (B) PGS – Pineal Gland Shift; (C) IA- Interpeduncular Angle; IPS – Interpeduncular Shift; (D) IMW/CMW– ratio between Ipsilateral Midbrain Width and Contralateral Midbrain Width.