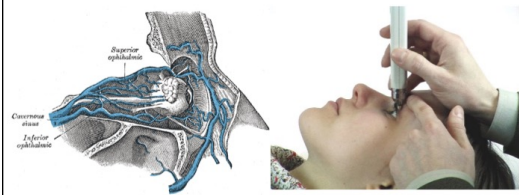


## Purpose

The indirect transmission of intracranial pressure (ICP) to the orbit via the intervening venous anatomy has led to the proposal of intraocular pressure (IOP) as a non-invasive means of detection of intracranial hypertension (IC-HTN). We therefore sought to determine the diagnostic accuracy of IOP for IC-HTN.

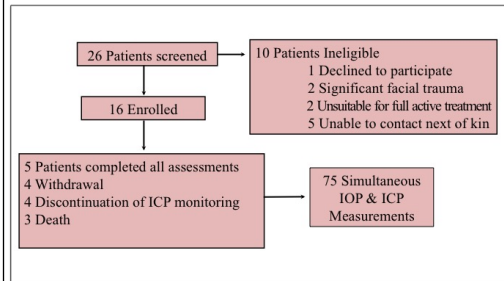
## Figure 1. Intraocular Pressure Measurement



## Methods

Patients' =18 years of age and warranting ICP monitoring were screened for enrollment. In instances of nonemergent ICP monitor placement, the measurement of IOP was performed immediately prior to and following monitor insertion. The simultaneous measurement of IOP and ICP was subsequently performed twice daily for up to eight measurements or until the termination of ICP monitoring. Outcomes included measures of the diagnostic accuracy of an IC-HTN predictive index devised through the evaluation of regressor terms for age, Glasgow Coma Scale motor score (GCS-M), hypotension, Injury Severity Score, Rotterdam CT Head Classification, PaCO<sub>2</sub>, serum sodium, and IOP.

## Figure 2. Participant Enrollement and Follow-Up

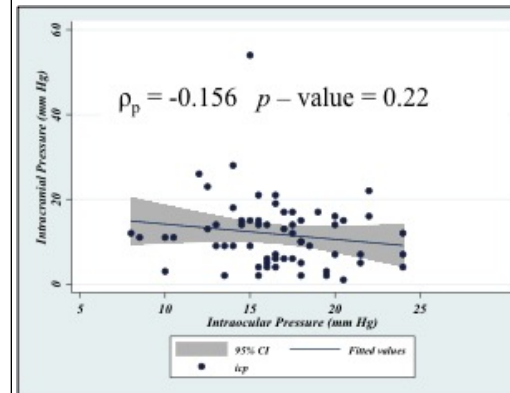


## Table 1. Characteristics of Study Participants

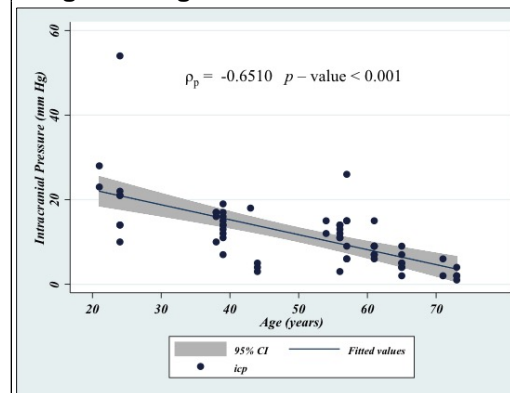
Variable	
Mean age, yrs (SD)	48.8 (15.4)
Male	63%
Mean GCS on Presentation	7.7 (4.1)
Neurosurgical Intervention Prior to ICP Monitoring	38%
Mean Rotterdam CT Head Score on Presentation (SD)	2.4 (1.2)
Etiology of Neurologic Injury	
Intracranial Hemorrhage	38%
Aneurysmal Subarachnoid Hemorrhage	31%
Trauma	25%
Mean ICP (mm Hg)	11.8 (1.1)
Mean IOP (mm Hg)	16.5 (0.5)
Mean IOP & ICP measurements per patient	4.7
Presence of IC-HTN during IOP Measurement	44%
At any point during ICP monitoring	11%
Complications of ICP Monitoring	
Malposition (Requiring Repositioning)	19% (13%)
Track Hemorrhage	6%
Infection*	7%
Catheter Malfunction	13%
Complications of IOP Measurement	0%
Undiagnosed Glaucoma	6%
Outcomes	
Completed All Assessments	32%
Death	19%
Discontinuation of ICP Monitoring	25%
Study Withdrawal	25%

\* - Excluding those with a diagnosis of ventriculitis on presentation

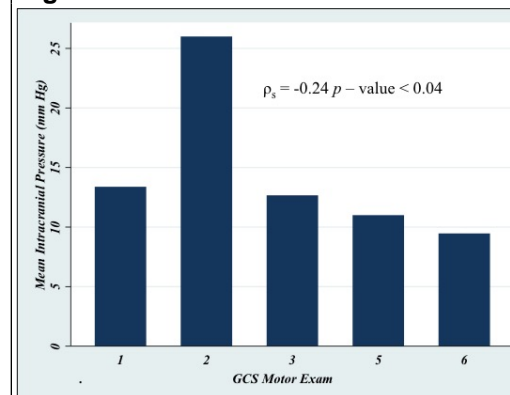
## Figure 3. Intraocular & Intracranial Pressure



## Figure 4. Age & Intracranial Pressure



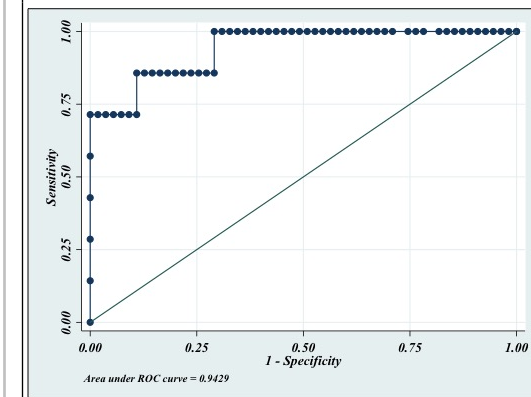
## Figure 5. GCS-M & Intracranial Pressure



## Results

A total of 75 IOP measurements were obtained. The prevalence of IC-HTN during IOP measurement was 11%. Of the clinical characteristics evaluated, GCS-M, age, and serum sodium were correlated with IC-HTN (coefficients of -0.24 [p-value<0.04], -0.65 [p-value<0.001], and 0.26 [p-value<0.06] respectively). The area under the receiver-operating-characteristics curve associated with an IC-HTN predictive index incorporating IOP, age, and GCS-M was 0.94 with a positive predictive value of 42.3% and a negative predictive value of 97.9%. No adverse events relating to IOP measurement occurred.

## Figure 6. Receiver operating characteristic Curve



## Conclusions

A predictive index incorporating IOP with clinical characteristics known to be associated with ICP may aid in the recognition of ICHTN. Spectrum bias due to the low prevalence of IC-HTN among subjects may limit the utility of the derived index. Further investigation is therefore warranted prior to its adoption.