

## Global cerebral autoregulation, resistance to CSF outflow and cerebrovascular burden in normal pressure hydrocephalus

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### Introduction

We previously examined the relationship between global autoregulation pressure reactivity index (PRx), mean arterial blood pressure (ABP), the Resistance to CSF outflow (Rout) and their possible effects on outcome after surgery on 83 shunted patients. In this study, we aimed at quantifying the relationship between all parameters that influence Rout, their interaction with the cerebral vasculature and their role in shunt prognostication.

### Methods

We studied a cohort of 88 shunted NPH patients. All patients had undergone a CSF infusion test in parallel with non-invasive ABP monitoring, the correlation between these two being PRx. After shunting, 6 months patients' outcome after was marked using a simple scale (improvement, temporary improvement, and no improvement). We explored the relationship between age, different CSF dynamics variables, and vascular parameters using multiple linear regression model, after which we sought the AUC for outcome prediction.

### Results

There was a strong and significant relationship between the interaction of age, PRx, ABP and Rout ( $R=0.53$  ;  $p= 7.28e-0.5$ ). 69 patients responded to shunting, versus 19 non-responders. The AUC between the two groups and our linear model was 86.4% (80.5-92.3%). The overall sensitivity was 94%, specificity 75 % PPV 54%, and NPV 97%.

### Conclusions

In patients with low Rout and high cerebrovascular burden, as described by high ABP and disturbed global autoregulation, response to shunting is less likely. The low PPV of high resistance, preserved autoregulation and absence of hypertension could merit further exploration.