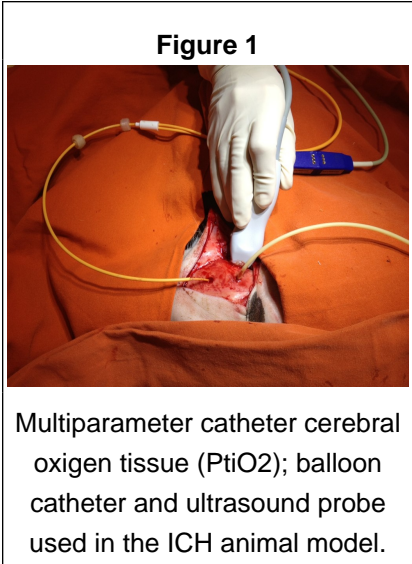


# Effects of intracranial hypertension on cerebral autoregulation: an experimental study

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## Introduction

CBF tends to vary passively with changes of ABP during cerebral autorregulation (CA) impairment. This condition can lead to cerebral hyperemia or oliguemia and can be linked with brain edema and intracranial hypertension (ICH). The objective of this research is to analyze the CA during induced ICH and verify what is the effect of ICH treatment over CA.

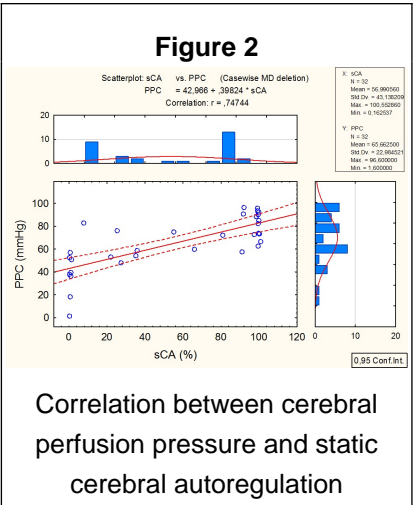


## Methods

Two-month old piglets were anesthetized with Propofol. Two 3-mm roles were performed located 1 cm lateral to the metopic suture: multiparameter catheter cerebral tissue (Neurovent-PTiO®; Raumedic) and pediatric bladder catheter, which was inflated with 0.9% saline solution; 4 ml and 7 ml triggered low intracranial pressure (ICP) and intracranial hypertension (ICH) respectively. After 1.5h, 3% saline solution was infused in the venous catheter. After 30 min the balloon was deflated. Low ICP was considered = 25 mmHg and ICH > 25 mmHg. The cerebral static autoregulation index (sARI) was evaluated through blood flow velocities (VM) obtained by ultrasound Doppler before and after each experimental step. Statistic: A two-way repeated-measures ANOVA was performed to determine the intervention’s effect on variables between the two groups.

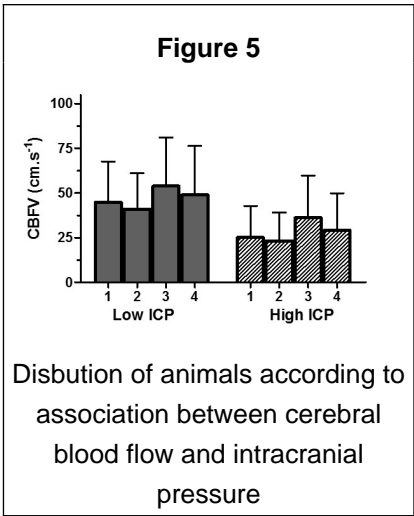
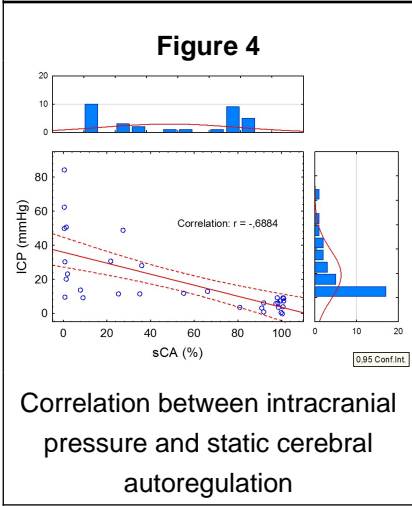
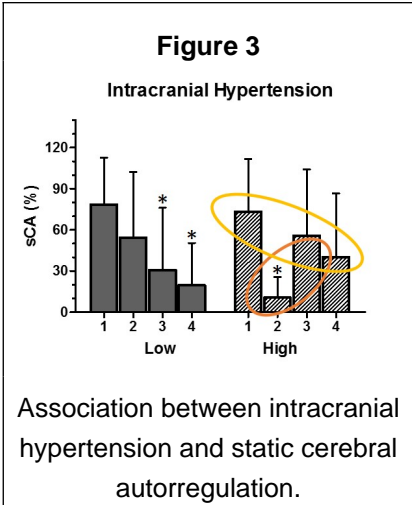
## Results

A total of 16 piglets underwent all data collection. There was increase in sCAI level after the saline injection (p<0.02) and after surgery (p=0.04) in the ICH group. There was an inverse correlation between ICP and sCAI (r = -0.68 and p<0.05) and direct correlation between cerebral pressure perfusion (CPP) with sCAI (r = 0.74 and p<0.05).



## Conclusions

ICH impairs CA, which can recover normal levels after interventions to reduce the ICP.



## References

Paulson OB, Strandgaard S, Edvinsson L. Cerebral autoregulation. Cerebrovasc Brain Metab Rev. 1990; 2: pp. 161–192

user AG, Cipolla MJ. Cerebral blood flow autoregulation and edema formation during pregnancy in anesthetized rats. Hypertension. 2007; 49: pp. 334–340.

Coulson RJ, Cipolla MJ, Vitullo L, Chesler NC. Mechanical properties of rat middle cerebral arteries with and without myogenic tone. J Biomed Eng. 2004; 126: pp. 76–81