

# Time course visualization of cerebral autoregulation index over the CPP

## U - shaped curve

Bernardo Yelicich<sup>1</sup>, Corina Puppo<sup>1</sup>, Alberto Biestro<sup>1</sup>, Leandro Moraes<sup>1</sup>

<sup>1</sup>Neuromonitoring Group, Intensive Care Unit, Hospital de Clinicas, Universidad de la República, School of Medicine, Montevideo, Uruguay

### Background:

Cerebral autoregulation (CA), the ability of the brain's arterioles to attenuate fluctuations in cerebral blood flow during arterial blood pressure changes, can be assessed by several indexes of continuous CA (CAx) named Mx, PRx and Tox. Optimal cerebral perfusion pressure (CPPopt) and optimal mean arterial blood pressure (MAPopt) are defined by the lower CAx in the U – shaped CPP or MAP curve (CPP or MAP vs CAx).

In this work we proposed a way to improve visualization of the time course of the CAx during CPP variations throughout the entire monitoring period. Time is displayed in a colorbar scale. Blue indicates the monitoring starting time and red the ending time.

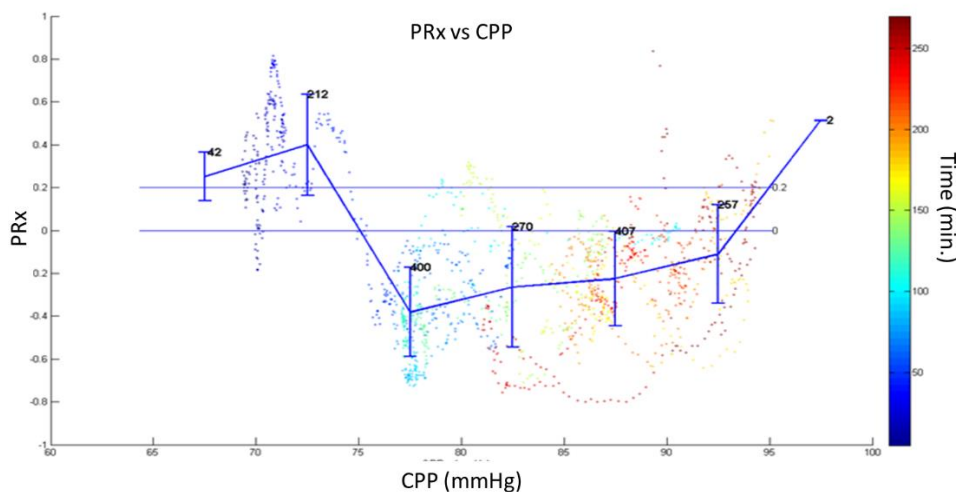


Figure 1: Visualization of the PRx vs CPP with time evolution data in a colorbar.

### Materials and methods

For calculations our “in house” made “CONTINE”<sup>®</sup> system was used, with a sampling rate of 50 SPS, mean calculated every 10 seconds and 30 points of moving window to calculate each CAx value.

### Results

The graph is presented in a new different way that makes more intuitive the analysis of the U – shaped CPP or MAP curve, the upper limit of AR (ULA) and the lower limit of AR (LLA). Throughout the monitoring time we could easily follow where the patient CPP or MAP was located according to his best CPP. At the beginning (first 50 minutes) CPP was around 70 mmHg corresponding to a PRx above 0,2. Next (time point: 100 minutes) CPP was 75 – 80 mmHg corresponding to the lowest PRx (-0,4) or CPPopt. Finally (from 150 minutes to the end), CPP started to increase leading to PRx incrementation (or CA deterioration).

### Conclusion

This way of presenting acquired data has the advantage of visualizing the CAx vs CPP curve to determine the CPPopt and shows the time course of CAx. Information on the current situation of CPP and its evolution can be instantly obtained from the graph.