



UNIVERSITY OF  
CAMBRIDGE



# Monitoring of cerebrovascular reactivity in infants: the use of ICM+ in the neonatal intensive care

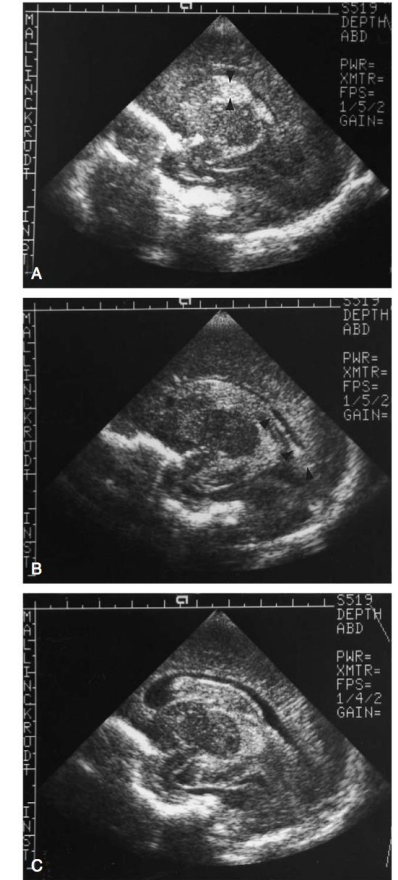
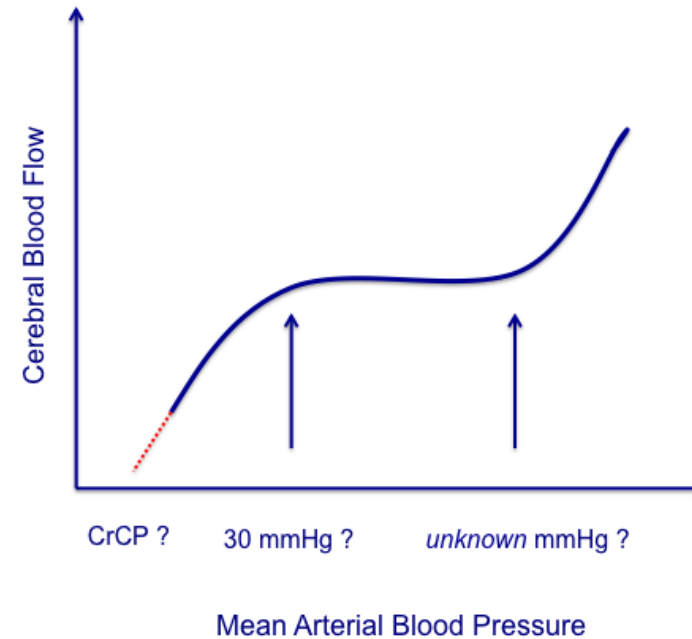
Cristine Sortica da Costa

Consultant Neonatologist

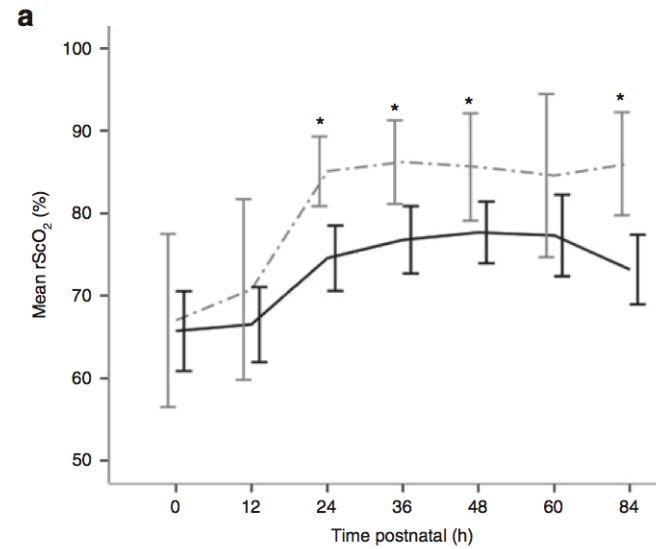
**Neonatal Unit, The Rosie Maternity**

# The importance of cotside monitoring in neonates

Preterm  
Infants

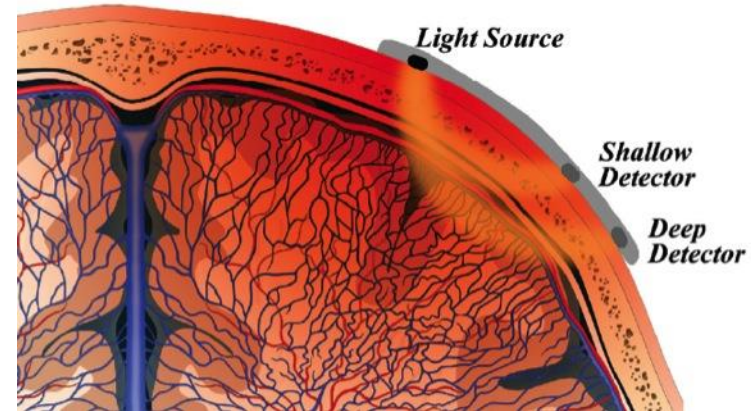
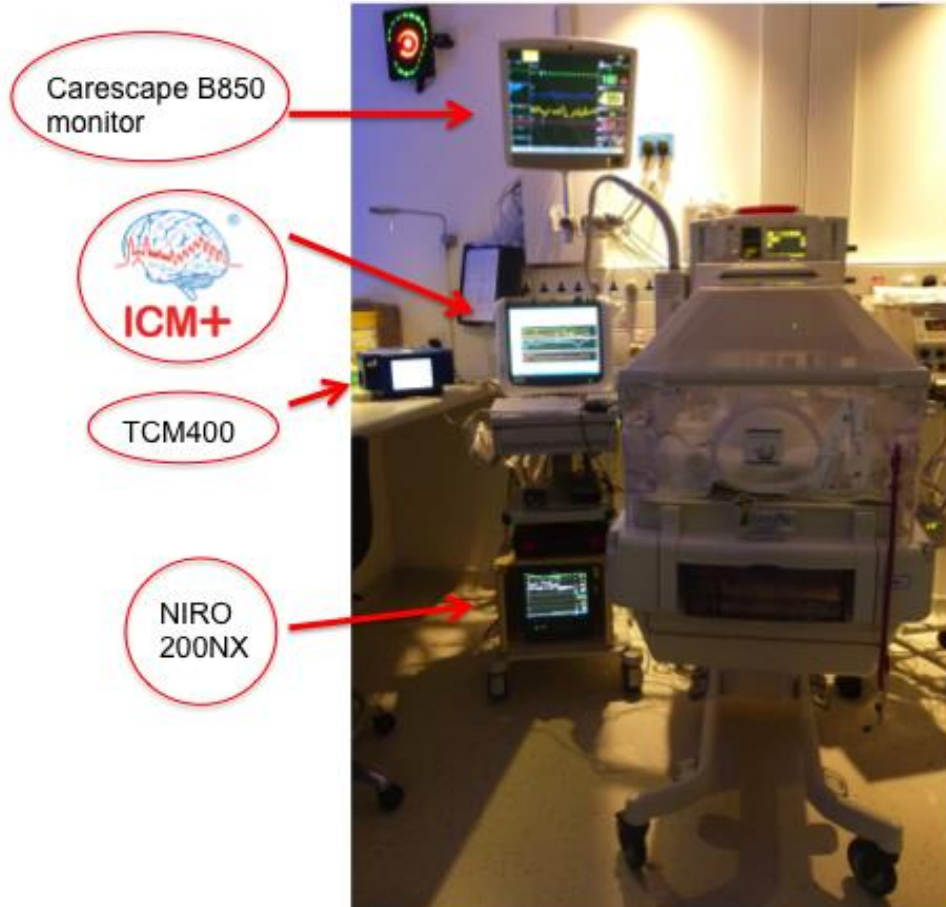


# HIE



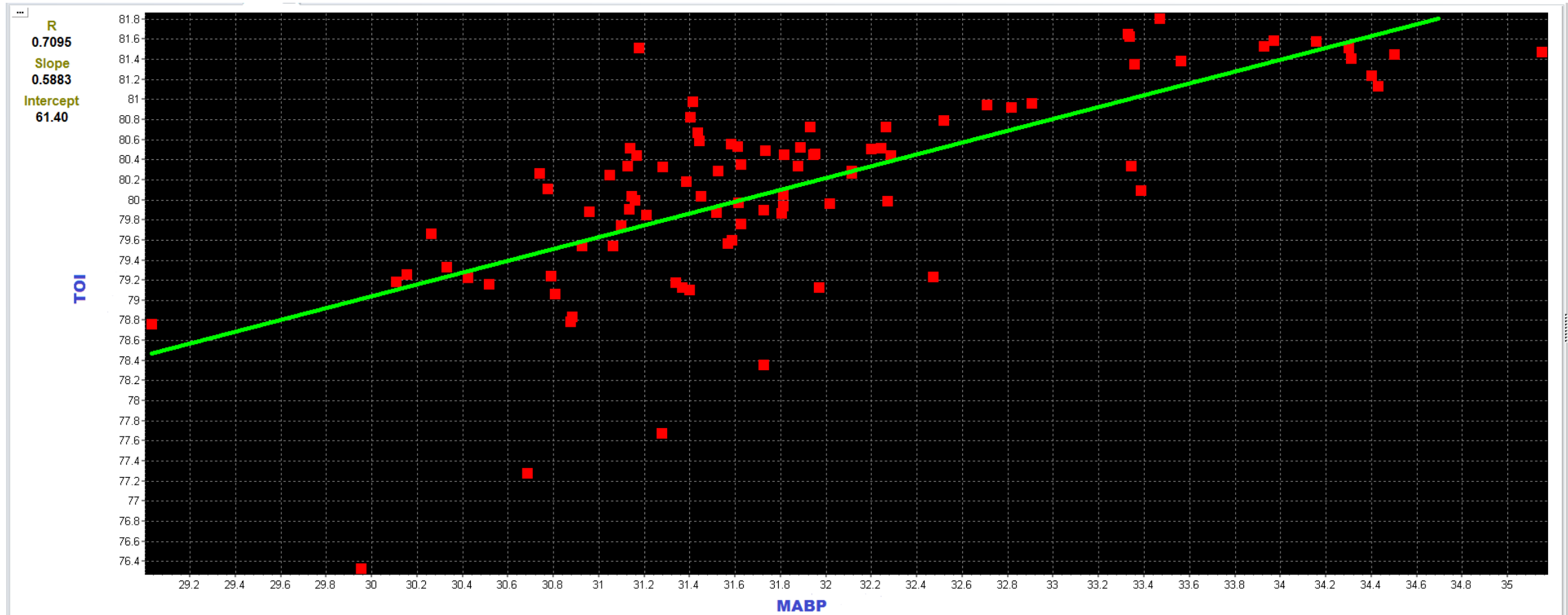


# Non-invasive monitoring of cerebrovascular reactivity in NICU



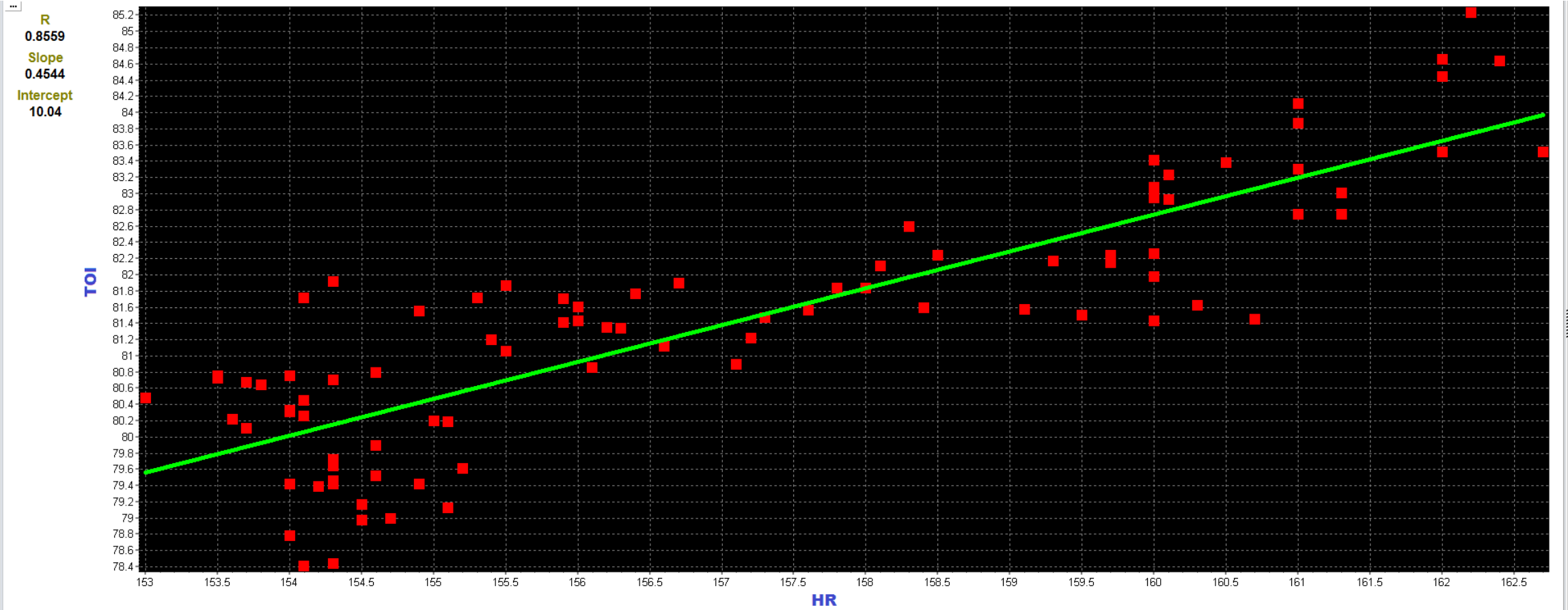
# Indices of cerebrovascular reactivity in neonates

TOx



# Indices of cerebrovascular reactivity in neonates

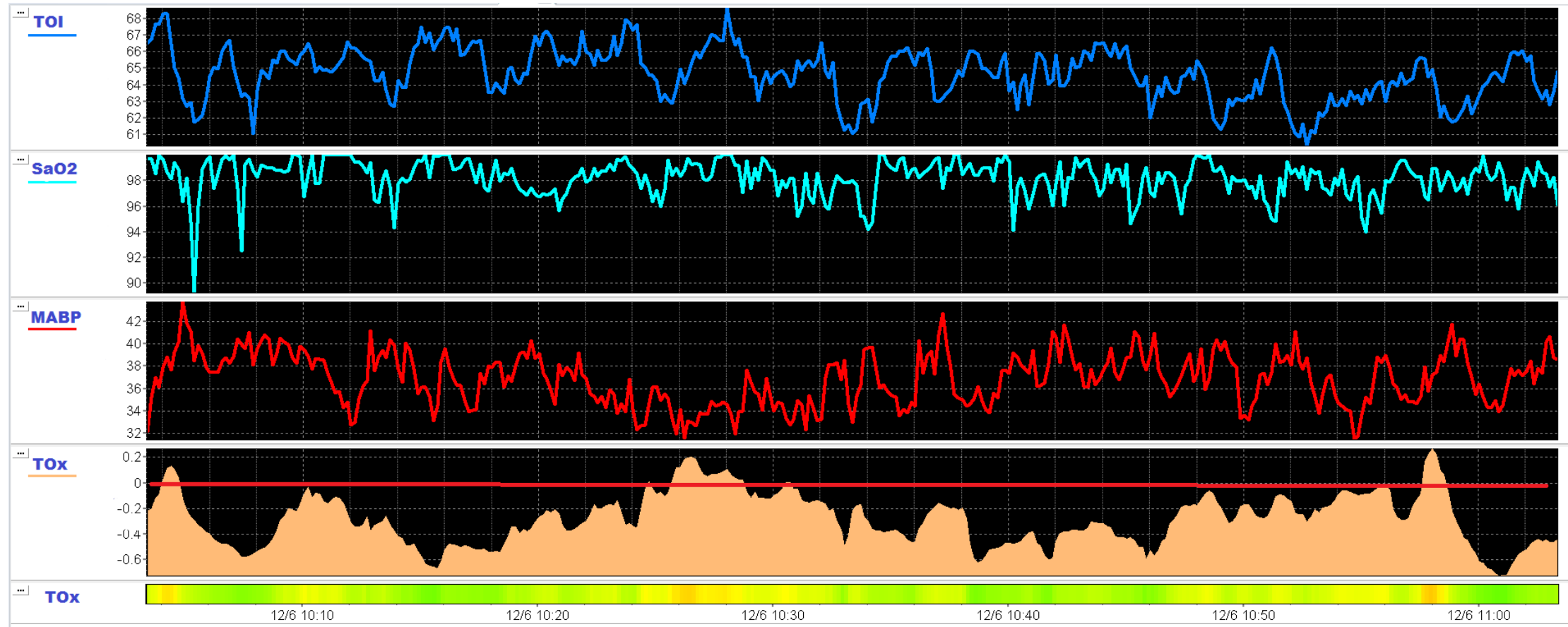
## TOHRx





# Cotside monitoring of cerebral and systemic signals – Preterm infant

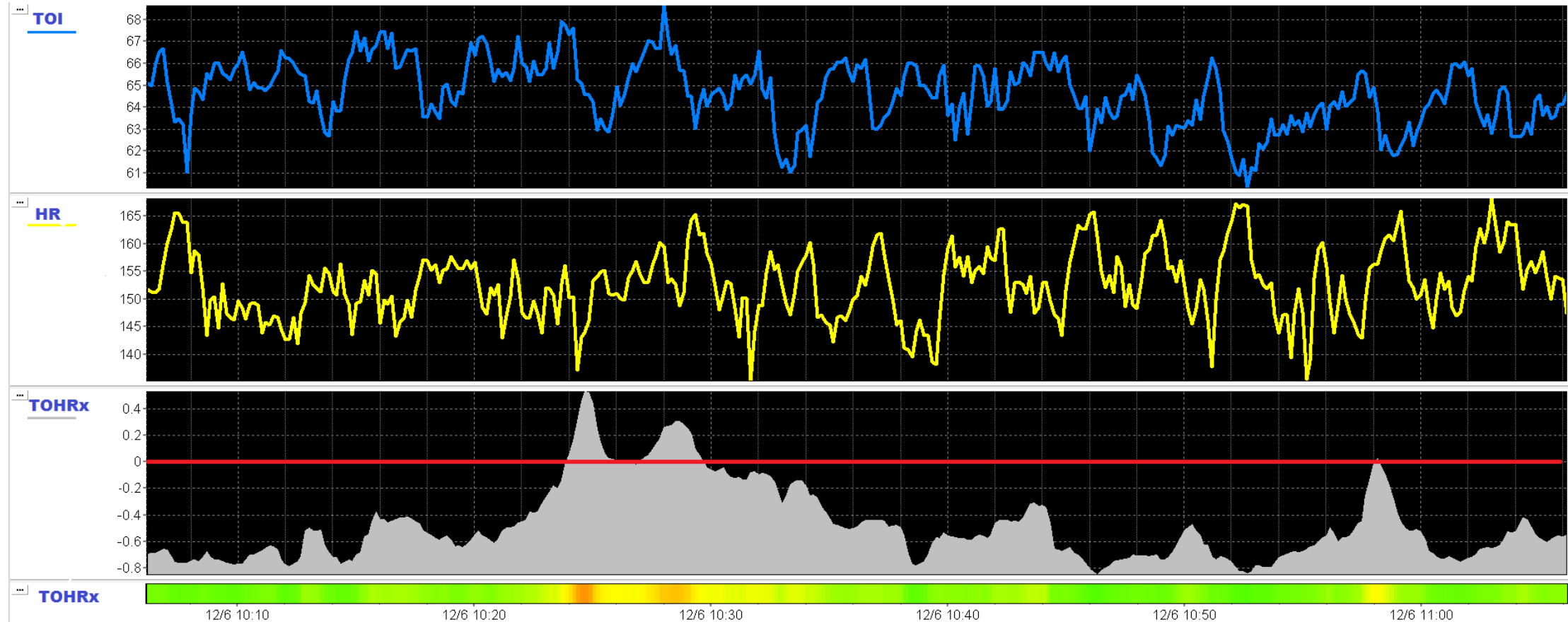
Stable  
Infant





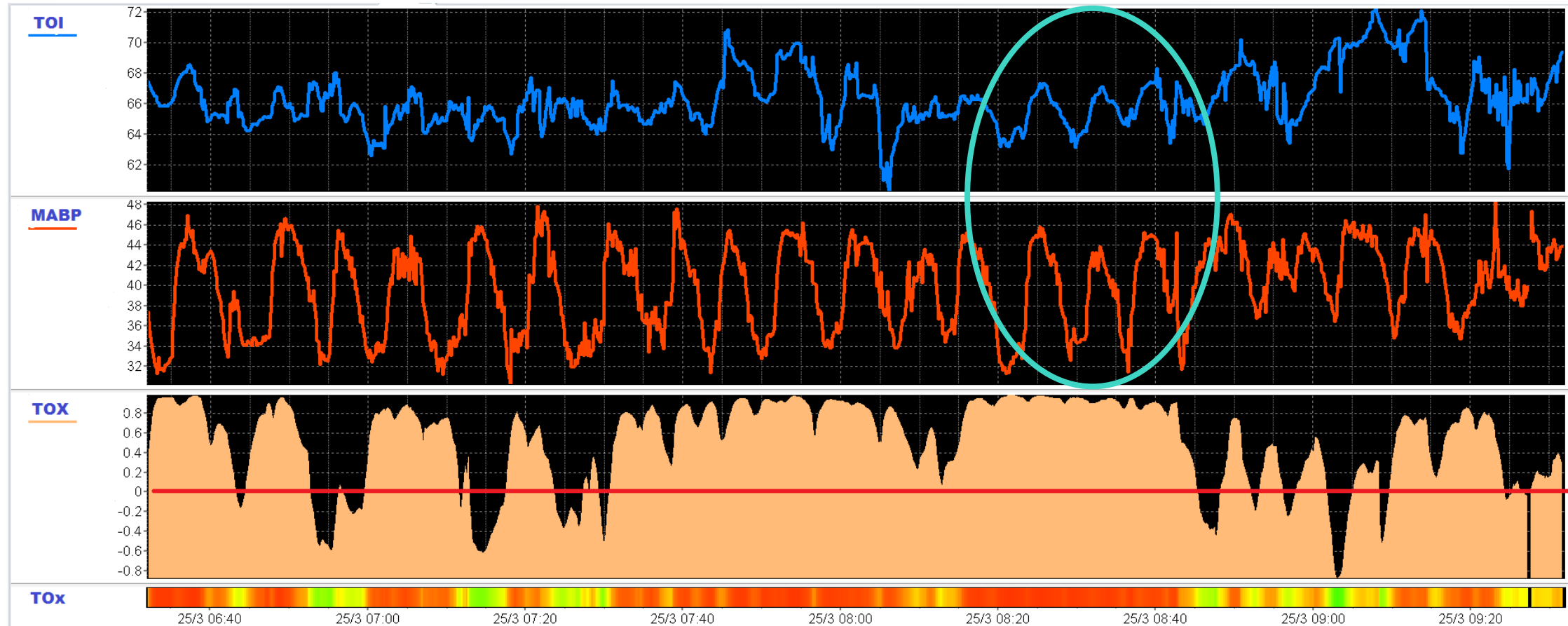
# Cotside monitoring of cerebral and systemic signals – Preterm Infant

Stable  
Infant



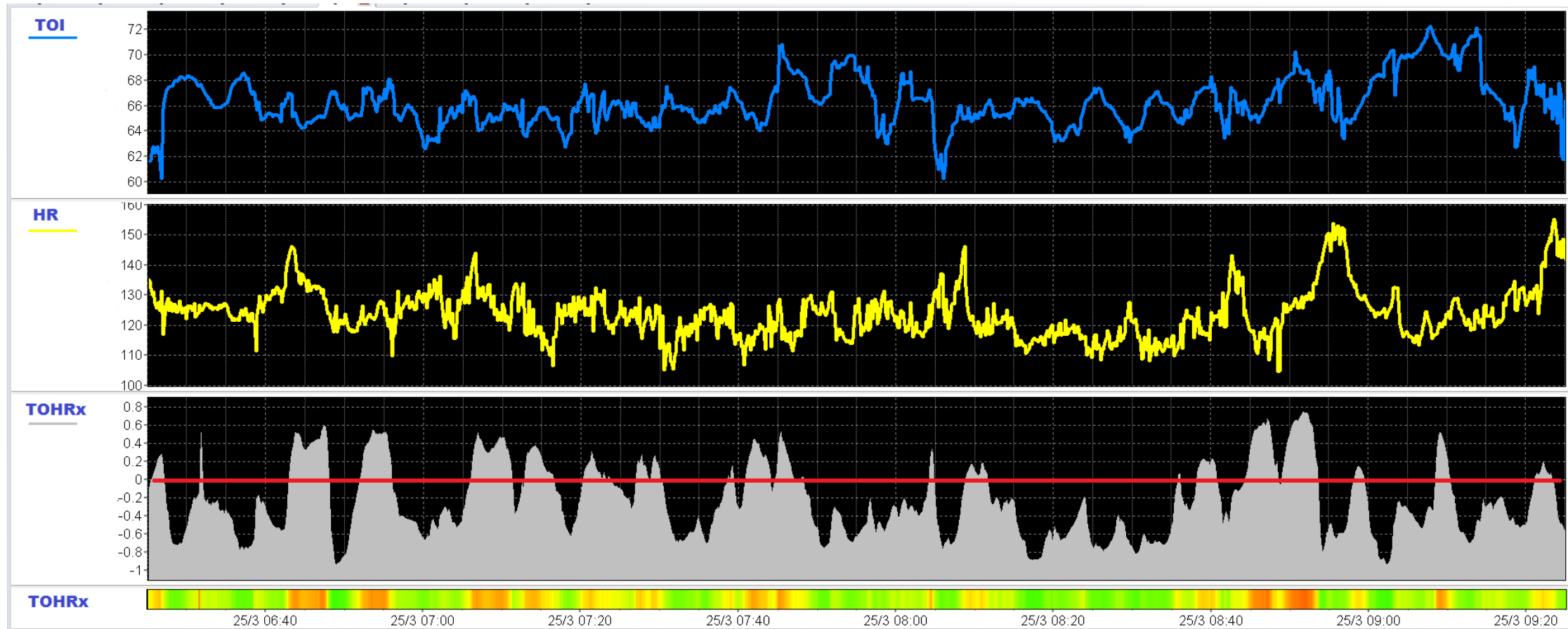
# Cotside monitoring of cerebral and systemic signals – Preterm Infant

PVL



# Cotside monitoring of cerebral and systemic signals – Preterm Infant

PVL



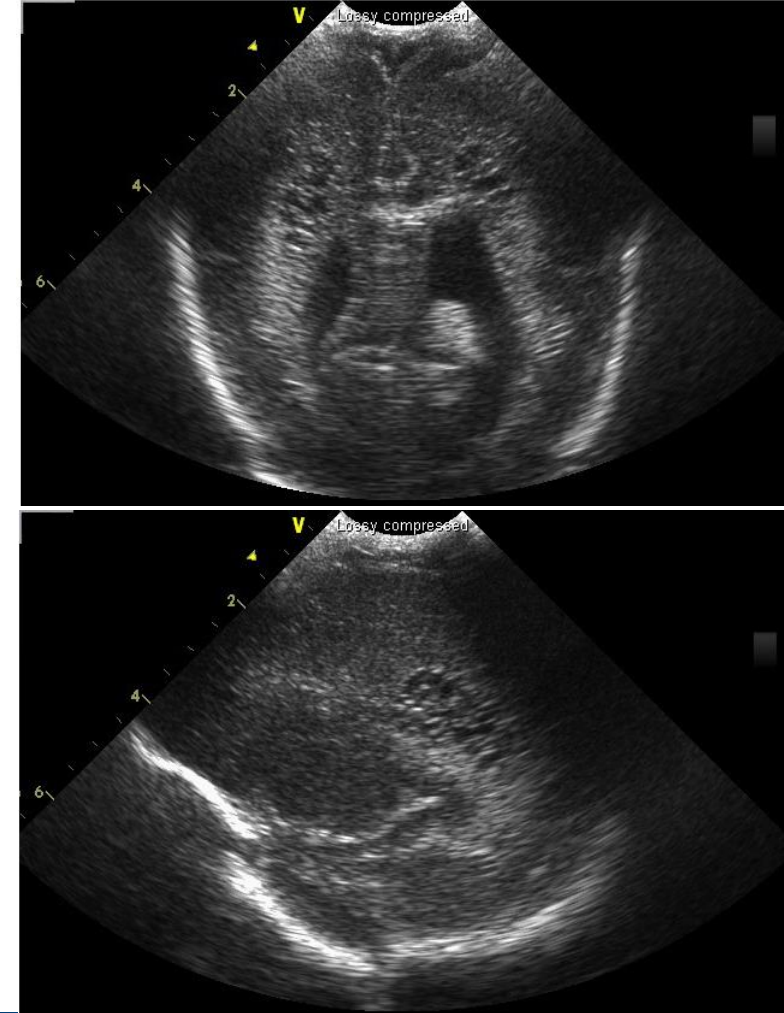
# Potential tool to predict outcome and guide clinical care

Standard cotside monitor would not show the slow variability in MABP



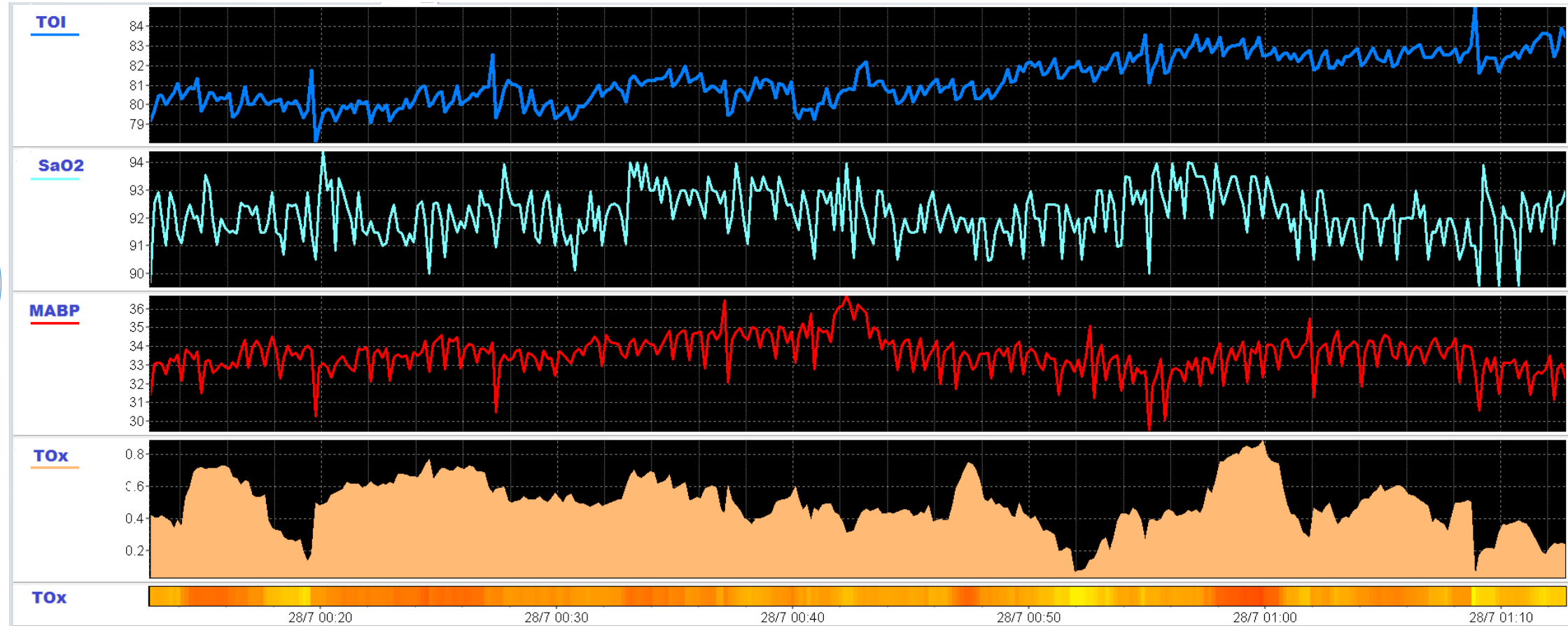
Periventricular leukomalacia

Appearance on CrUss  
on day 15 of life



# Cotside monitoring of cerebral and systemic signals – Preterm Infant

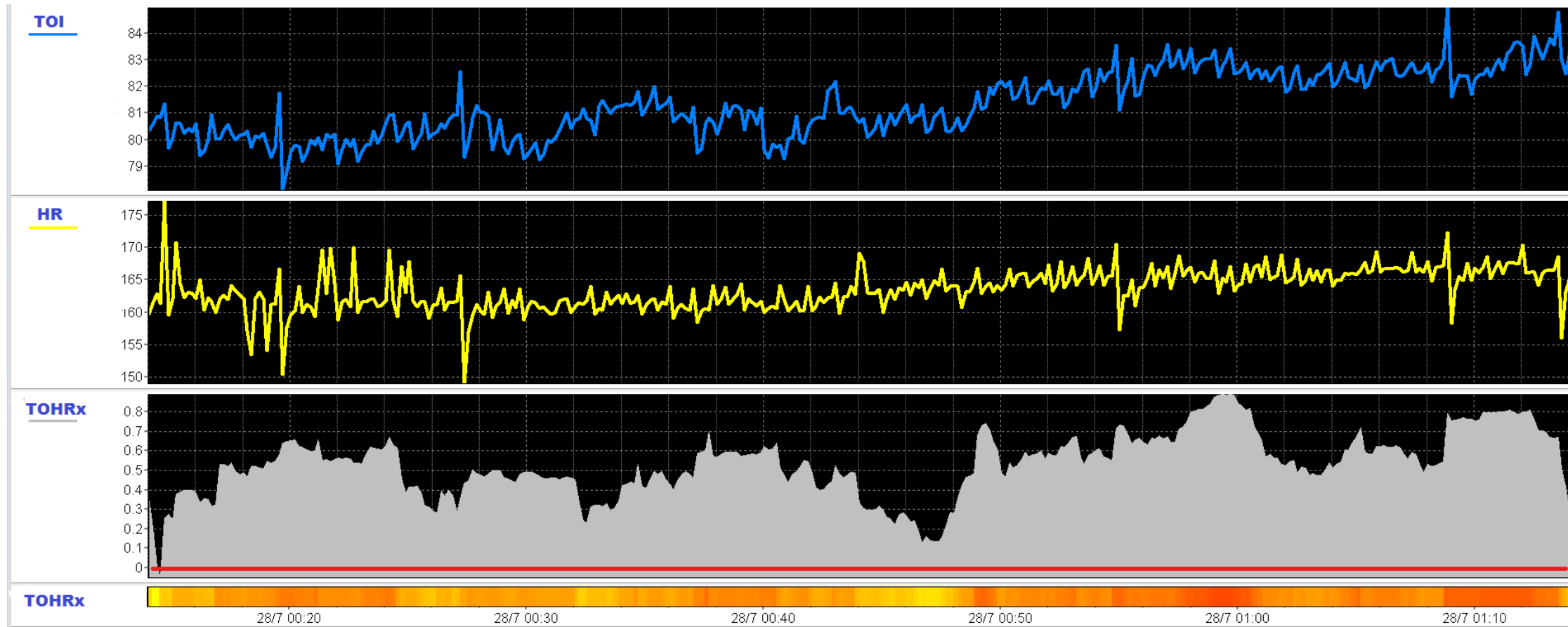
Severely Sick





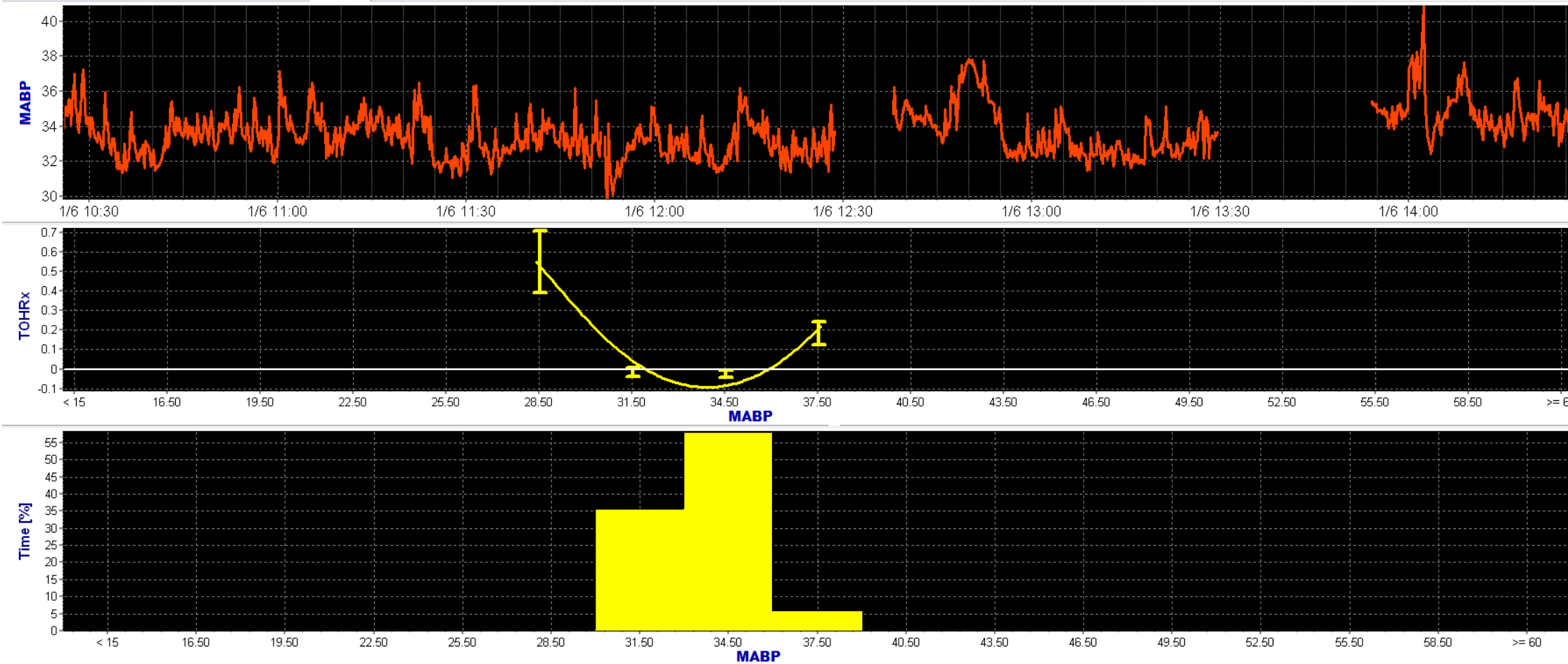
# Cotside monitoring of cerebral and systemic signals – Preterm Infant

Severely Sick



# Combining cerebral and systemic signals – MABP<sub>OPT</sub> in preterm infants

Stable  
Infant

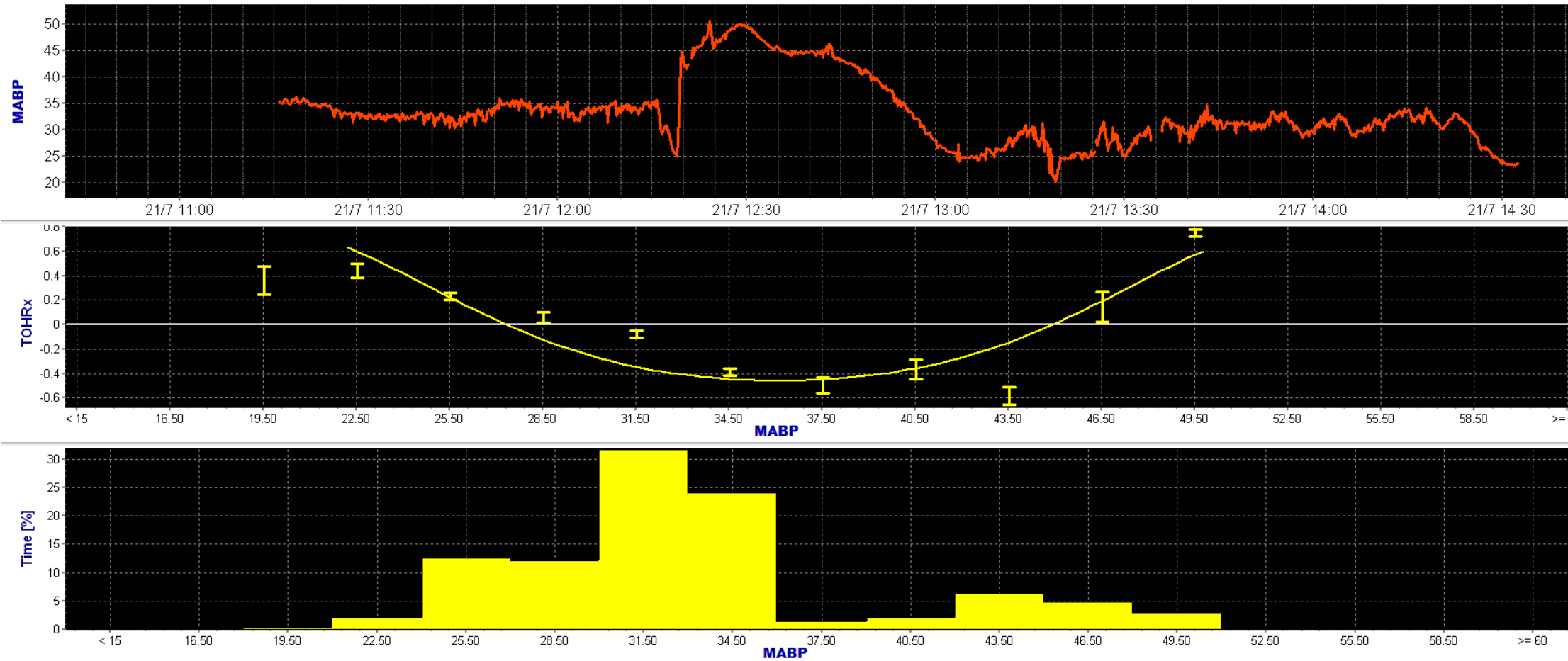


Monitoring of cerebrovascular reactivity for determination of optimal blood pressure in preterm infants . *The Journal of Pediatrics*, July 2015



# Combining cerebral and systemic signals – $\text{MABP}_{\text{OPT}}$ in preterm infants

IVH

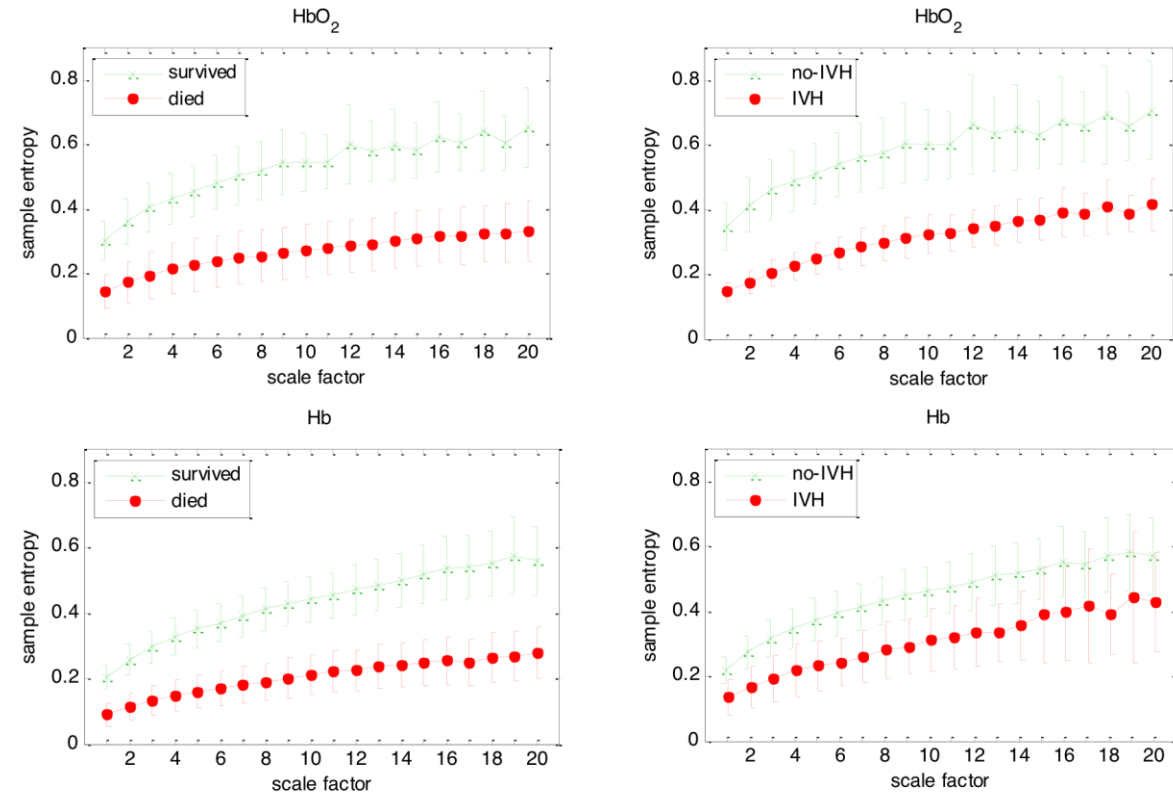


Optimal mean arterial blood pressure in extremely preterm infants within the first 24 hours of life. *The Journal of Pediatrics*, 2018



# Entropy of cerebral signals as predictor of bad outcome

Preterm infants who developed IVH or died had lower mean complex index (Multi-scale entropy) of brain signals (NIRS) within the first 24 hours of life

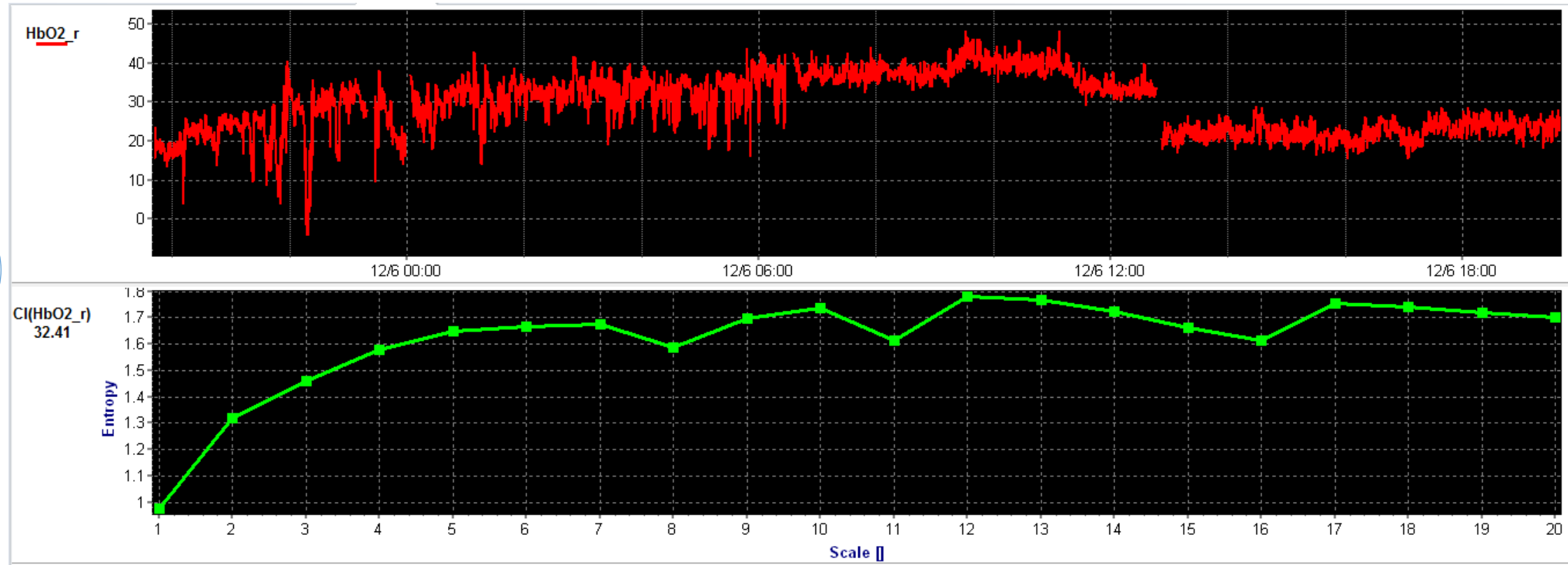


Complexity of brain signals is associated with outcome on preterm infants, *JCBFM*, 2017



# Entropy of cerebral signals as predictor of bad outcome

Survived



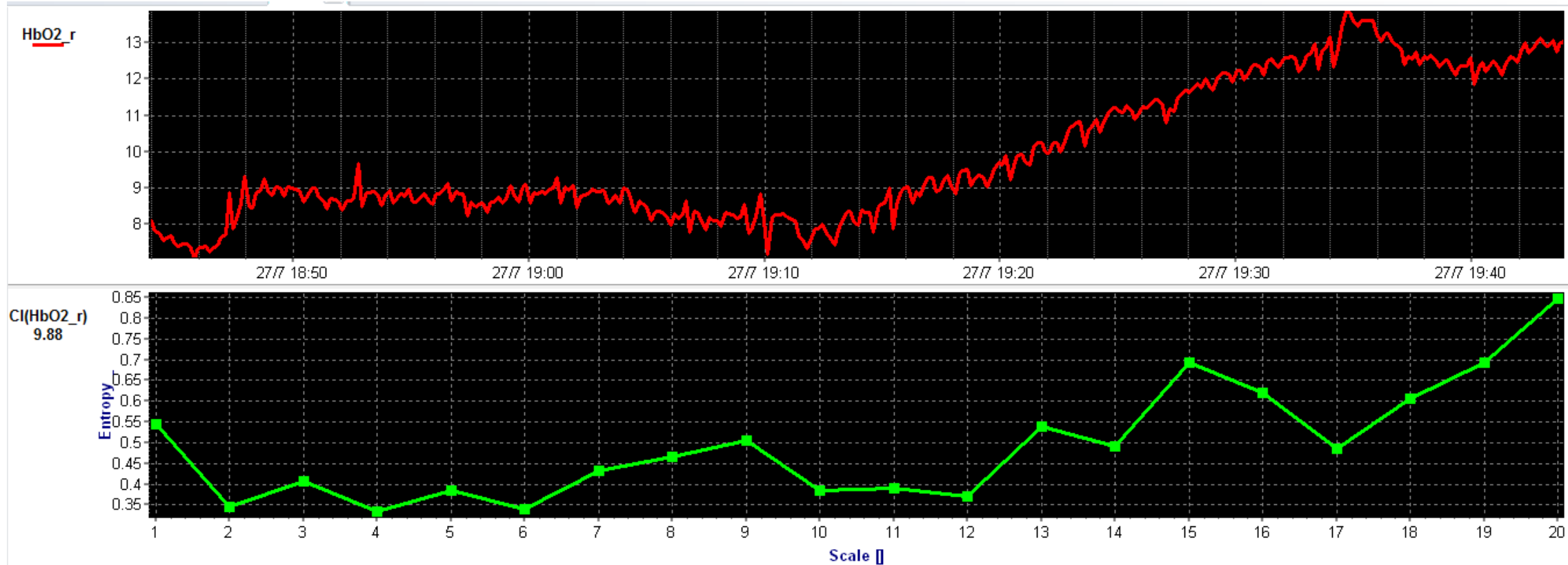
Complexity of brain signals is associated with outcome on preterm infants, *JCBFM*, 2017





# Entropy of cerebral signals as predictor of bad outcome

Died

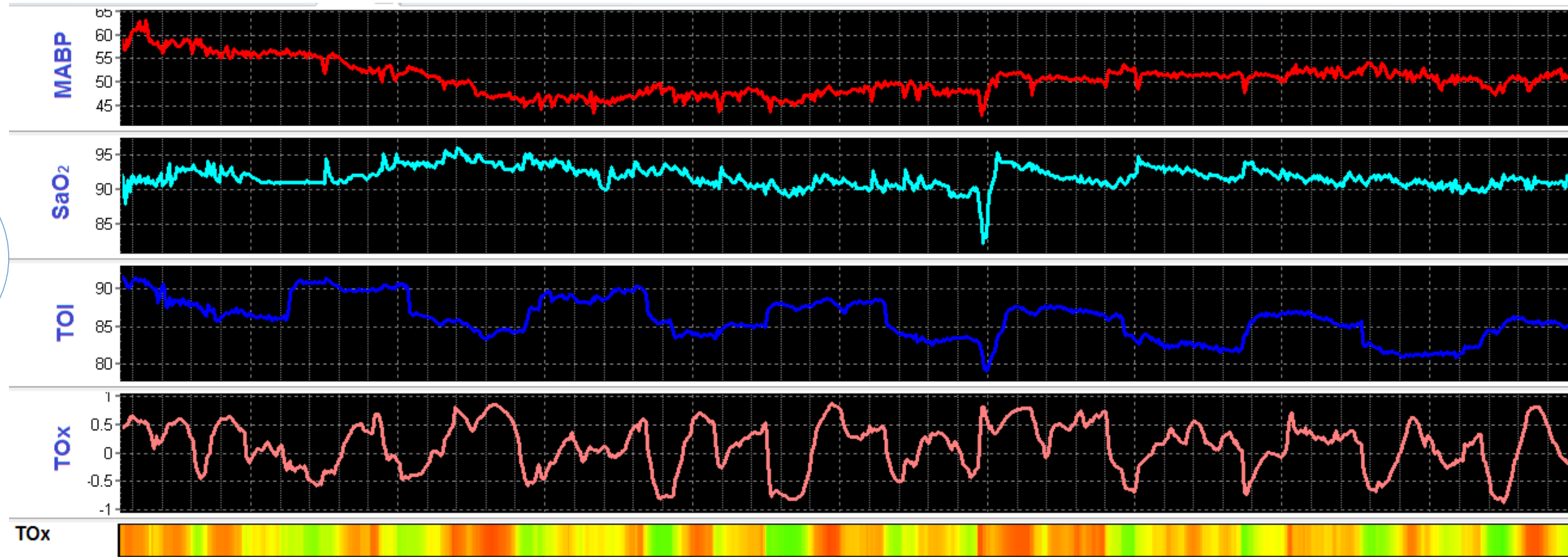


Complexity of brain signals is associated with outcome on preterm infants, *JCBFM*, 2017



# Cotside monitoring of cerebral and systemic signals – Term infant with HIE

HIE



# Acknowledgements



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