is still not known the present results show that PACAP treatment can ameliorate the vascular changes in the animal model of ROP.

ABS 41

DOPAMINE INFUSION IMPROVES CEREBRAL AUTOREGUALTION IN NEWBORN PIGLETS

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INTRODUCTION

Hypotensive neonates who have been treated with dopamine have poorer neurodevelopmental outcome than those who have not been treated with dopamine. We speculate that dopamine therapy might stimulate adrenergic receptors on cerebral arteries and thereby inhibit vasodilation and limit autoregulation at low levels of blood pressures. We tested our hypothesis in a piglet model.

PATIENTS AND METHODS

Cerebral autoregulation (CA) capacity was estimated at different mean arterial blood pressure (MAP) levels in 18 piglets with and without dopamine infusion. Piglets were randomised to start with or without dopamine and to infusion rates of 10, 25 or 40 µg/kg/min. Stable levels of hypotension were induced by gradually inflating a balloon catheter placed in vena cava. At each MAP level small fluctuations in MAP were induced by repeated inflating a balloon catheter in aorta for 30 sec. Cerebral perfusion was monitored by laser doppler flowmetry through a craniotomy. The ratio between the % change of estimated cerebrovascular resistance and the % change of MAP was used to estimate CA capacity. Non-linear regression analysis was used to describe the relation between CA capacity and MAP.

RESULTS

Eighteen piglets aging 4-66 hrs were examined. During measurements $PaCO_2$ (4-6 kPa) and arterial saturation (> 95%) were stable. MAP ranged between 14 and 82 mmHg. Overall, CA capacity improved with increasing MAP until a breakpoint. After that breakpoint the CA capacity was stationary (**Fig. 1**). The breakpoint was 40.5 mmHg (95% range 36.8-42.6) for the piglets when they did not receive dopamine. Below the breakpoint CA capacity increased with the rate of dopamine infusion (+0.7%/[µg/kg/min], 95% CI 0.3-1.1, $p < 0.01$).

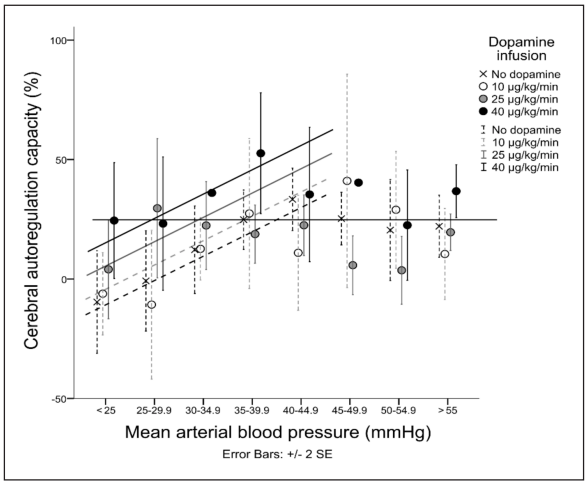

Figure 1 (ABS 41). Cerebral autoregulation capacity and mean arterial blood pressure.

CONCLUSIONS

Surprisingly, dopamine infusion improved rather than impaired the CA capacity in 'hypovolemic', hypotensive newborn piglets.

We speculate that this unexpected finding might be caused by the fact that dopamine reduces the endogenous sympathetic response to comparable low levels of cardiac output. Compared to high endogenous sympathetic tone dopamine might be more 'brain-protective' as dopamine only has minor effect on cerebral arteries.

ABS 42

OPTIMAL MEAN ARTERIAL BLOOD PRESSURE IN PRETERM INFANTS WITH LESS THAN 24 HOURS OF AGE

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INTRODUCTION

Fluctuations in mean arterial blood pressure (MABP) and cerebral blood flow have been

associated with the pathophysiology of brain injury in preterm infants. Using near-infrared spectroscopy, a non-invasive technique to assess cerebral haemodynamics, it is possible to define levels of MABP where cerebral vascular reactivity is strongest ($MABP_{opt}$). We have demonstrated that infants with higher deviations from $MABP_{opt}$ had worse outcome. Our aim is to confirm these findings in preterm infants, using longer monitoring period and changing the protocol from intermittent to continuous brain and systemic monitoring within first 24 hours of life.

PATIENTS AND METHODS

A total of 46 preterm infants born at median gestational age 26^{+4} weeks (23^{+3} to 31) with indwelling arterial catheter were studied for a median of 17 hours. Tissue Oxygenation Heart Rate Reactivity Index (TOHRx), which estimates cerebrovascular reactivity, was calculated as the moving correlation coefficient between slow waves of tissue oxygenation index, measured with NIRS and HR. $MABP_{opt}$ was defined by dividing MABP into 2 mmHg bins and averaging the tissue oxygenation HR reactivity index within those bins. A measurement of divergence from $MABP_{opt}$ was calculated as the absolute difference between mean MABP and mean $MABP_{opt}$.

RESULTS

Results are presented in **Fig. 1**. TOHRx demonstrated a significant correlation with CRIB II ($R= 0.36$, $p < 0.013$). Individual $MABP_{opt}$ was defined in all studied patients, 20% more than in our previous study. Divergence of MABP above $MABP_{opt}$ ($MABP_{above}$) was positively related to intraventricular hemorrhage grade in 17 newborns ($R = 0.55$; $p = 0.033$) in whom haemorrhage was confirmed. Divergence of MABP below optimal value ($MABP_{below}$) was associated with mortality ($R = 0.437$; $p = 0.0027$).

CONCLUSIONS

It has been demonstrated that HR has influence on cerebral haemodynamics in preterm infants. Defining $MABP_{opt}$ based on a index of cerebrovascular reactivity is feasible, safe and non-invasive. This study confirmed that deviations from $MABP_{opt}$ are significantly associated with bad outcome. Moreover, these associations can be seen by monitoring just the first 24 hours of age.

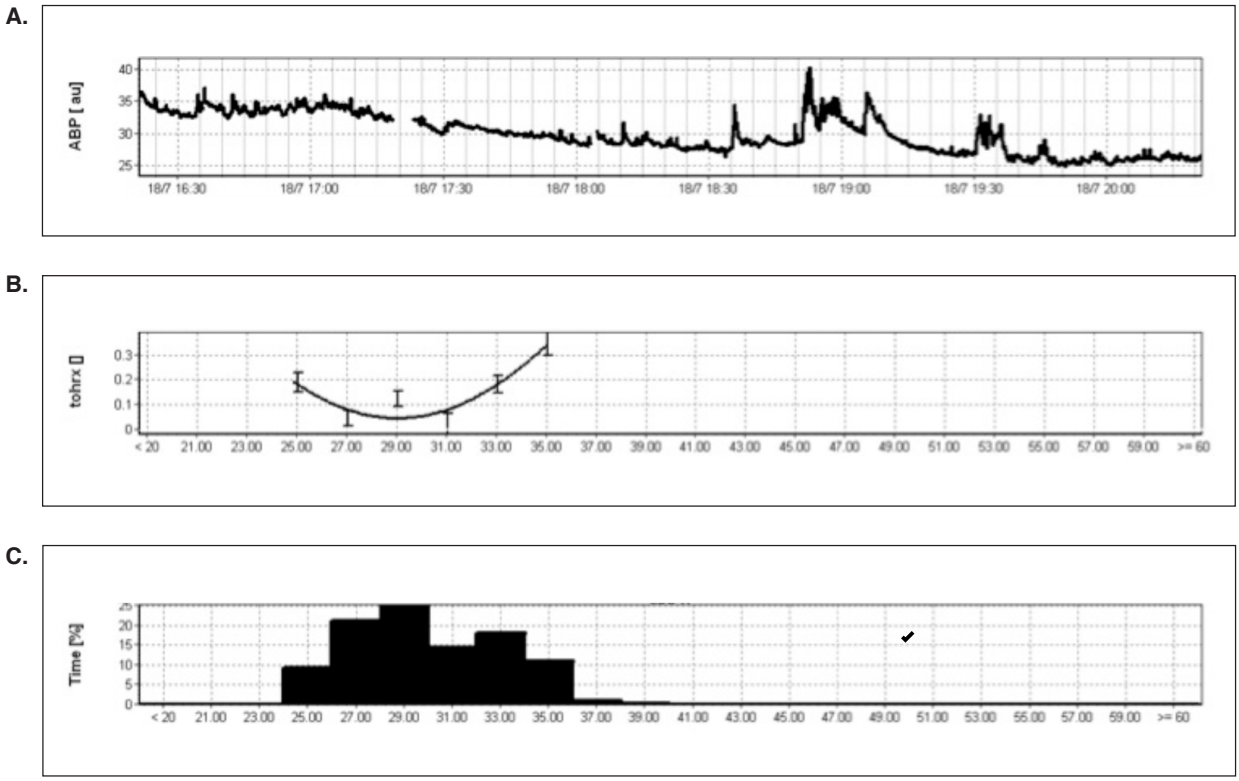

Figure 1 (ABS 42). Arterial blood pressure (ABP) (**A**), tissue oxygenation hearth rate reactivity index (TOHRx) (**B**), and time (**C**).