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Cortisol and Neuropeptide Y Release during Paediatric Cardiac Surgery; the Effect of Perfusion TemperatureS. Bays¹, M. Caputo¹, N. Humphreys², A. Wolf² and M. Suleiman¹¹Bristol Heart Institute, Bristol, UK and ²Department of Paediatric Intensive Care, Bristol Royal Hospital for Children, Bristol, UK

Paediatric open-heart surgery is usually performed using hypothermic systemic perfusion during cardiopulmonary bypass (CPB), primarily for organ protection from the damaging effects of CPB. Catecholamines and cortisol are released as part of the stress response to CPB [1], resulting in increased vasomotor tone, hypermetabolism and raised blood glucose. Our aim was to assess the effect of CPB temperature on the sympathoadrenal (Neuropeptide Y) and neuroendocrine (cortisol) response in paediatric cardiac surgery. Having gained local ethical committee approval and informed consent, 40 children, matched for pathology and age, were randomly allocated to either Normothermic (35-37°C) or Hypothermic (28°C) CPB during corrective cardiac surgery. Anaesthesia was induced with midazolam (200 to 500 µ/kg) or sevoflourane and pancuronium (200µ/kg) and then maintained using a fentanyl infusion of 15 µ/kg/hr. Blood was sampled preoperatively, on removal of the aortic cross clamp, and 30 minutes, 6 and 24 hours thereafter. This was then assayed for

Neuropeptide Y (NPY), a noncatecholamine marker for sympathetic neural activity, and cortisol (RIA and ACCESS immunoassay respectively). Data was analysed using repeated measures ANOVA, and Mann-Whitney tests, expressed as mean ± s.e.m. (Statview for IBM PC). Levels of NPY in both groups fell significantly on release of the aortic cross clamp ($p=0.009$) and again at 24 hours later ($p<0.0001$), with no difference in levels of NPY between the two groups. There was no significant difference in cortisol levels up to 6 hours postoperatively. However at 24 hours after the end of ischaemia there was a significant rise in cortisol levels in the normothermic group ($p<0.0001$) that was significantly higher than in the hypothermic group ($347.28 \pm 56.85\text{nmol/l}$ v $552.56 \pm 75.64\text{nmol/l}$, $p=0.02$). In summary, we have shown NPY release is not affected by CPB temperature. In contrast late cortisol release was significantly higher in the normothermic group. The reason for the late fall in NPY is not clear [2], but a decrease in sympathetic activity may be explained in part by the increase in neuroendocrine activity seen in the normothermic group. This may have important implications for the development of future CPB and anaesthetic strategies in paediatric cardiac surgery.

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Sun et al. Plasma neuropeptide Y and catecholamines in pediatric patients undergoing cardiac operations. (1997) *J Thorac Cardiovasc Surg* 113, 278-84

Where applicable, the experiments described here conform with Physiological Society ethical requirements.