Ethyl Pyruvate Prevents Delayed Paralysis in a Murine Model of Spinal Cord Ischemic Injury


**Objectives:** Delayed paraplegia (DP) is a problem for patients undergoing complex repair of the thoracoabdominal aorta. These experiments were designed to determine whether Ethyl Pyruvate (EP), a potent anti-inflammatory agent and antioxidant known to provide protection against shock, sepsis and ischemia reperfusion injury, might ameliorate DP.

**Methods:** Two groups of C57BL/6 mice were subjected to 5 minutes of thoracic aortic ischemia followed by reperfusion for up to 48 hours (TAR). Mice received either 300 mg/kg EP (n = 12) or lactated ringers (LR, n = 10) at 30 min before ischemia and 3 hrs after reperfusion. Neurologic function was assessed using an established rodent scale. Spinal cord tissue was analyzed for markers of inflammation (KC, IL-6: ELISA), anti-apoptosis (BcL-2, immunoblotting). Nissl bodies stained motor neurons were counted in the anterior horns sections (cells/section). Statistical analysis utilized t-test and χ².

**Results:** All mice manifested mild transient paraplegia immediately after surgery which completely resolved within one hour. All mice manifested mild transient paraplegia immediately after surgery which completely resolved within one hour. All LR mice developed dense DP between 40-48 hrs reperfusion. In contrast 80% of EP mice had no DP (p < 0.005). The number of motor neurons were significantly higher in the EP treated mice compared to LR (29 ± 6 vs 18 ± 4 cells p = 0.04). BcL-2 expression was higher in the EP treated animals at 24 hrs reperfusion (370 ± 49 vs 32.3 ± 61.0 arbitrary units, p < 0.01). There was a significantly lower expression of KC and IL-6 at 48 hours reperfusion in the EP group (KC: 2 ± 0.8 vs 16 ± 3 pg/mg protein, p < 0.01), (IL-6: 1.4 ± 0.3 vs 32 ± 9 pg/mg protein, p < 0.001).

**Conclusions:** The protection provided by EP against DP correlated with preservation of motor neurons, higher anti-apoptotic molecule and decreased spinal cord inflammation. EP may be a promising treatment for humans at risk for delayed paralysis following graft placement of the thoracoabdominal aorta.

**Author Disclosures:** H. Albadawi: Nothing to disclose; R. P. Cambría: Nothing to disclose; M. F. Conrad: Nothing to disclose; R. S. Crawford: Nothing to disclose; B. H. Nguyen: Nothing to disclose; M. T. Watkins: Nothing to disclose; H. Yoo: Nothing to disclose; Y. Yoshioka: Nothing to disclose.

Long-term Results of Aorto-Arterial Surgery in Children With Renovascular Hypertension From Mid Aortic Syndrome With and Without Involvement of Renal and Mesenteric Arteries: Single-Center Experience in 44 Cases

Wilhelm Sandmann, Siamak Pourhassan, Kai M. Balzer, Phillip Dueppers, Dirk Klee, Klaus G. Schmidt, Adina Voiculescu. 1Dept. of Vascular Surgery, University Hospital Duesseldorf, Duesseldorf, Germany; 2University Hospital Tuesseldorf, Dept. of Radiology, Duesseldorf, Germany; 3University Hospital Duesseldorf, Dept. of Pediatric Cardiology, Duesseldorf, Germany; 4University Hospital Duesseldorf, Dept. of Nephrology, Duesseldorf, Germany

**Objectives:** Apart from case reports not much is known about very long-term durability of (re) construction performed in children for abdominal aortic coarctation (AAC).

**Methods:** From 1979 to 2009 44 children (21 m, 23 f, mean age 18, SD 5, 2 y, min1/max 18y) of which 10 had been attempted before elsewhere (PTA 9, surgery 2) underwent surgery (by W. S.) for AAC (aorto-aorta bypass n = 6; autogenous n = 28, homologous n = 7 reconstruction of renal arteries in 25 p; aorto-renal-mesenteric grafts in 12 p. in 2 small children replacement by paternal deep femoral vein) to achieve normalization of vascular anatomy for healing and/or improvement of hypertension (HBP), renal insufficiency and claudication.

**Results:** After mean 114 SD 81 months 42 (95%) patients (mean age 21, 5 y) were alive (2 deaths after 7 and 12 y, unknown cause). Ten patients had undergone a second and 8 a third operation. 39 patients were re-examined by duplex and MRA in 2009, 3 without reex. because in foreign country. Hypertension early/late after surgery was cured in 27%/53%, improved in 34%/33% and remained unchanged in 39%/14%. There were no problems at the anastomotic regions after thoraco-abdominal Dacron grafts, while PTFE and homologous grafts were prone to develop stenosis at the proximal anastomosis. None of the dilated vein grafts developed an aneurysm and none of the thoraco-abdominal long length bypass grafts prevented normal growth.

**Conclusions:** Reconstructive surgery for AAC in children yields good and durable results, even if performed in early childhood. The healing/improvement rate of HBP was almost 90%, which is better than results reported after PTA, but in 18% secondary/tertiary procedures became necessary. Graft-specific problems were less than expected. However these children should be followed closely into the adult age and in case of remaining/recurrent and de novo significant disease surgery should not be delayed, because HBP is the main risk factor for early cardiovascular disease in later life.

**Author Disclosures:** K. M. Balzer: Nothing to disclose; P. Dueppers: Nothing to disclose; D. Klee: Nothing to disclose; S. Pourhassan: Nothing to disclose; W. Sandmann: Nothing to disclose; K. G. Schmidt: Nothing to disclose; A. Voiculescu: Nothing to disclose.