WorldCare Clinical
A PreScan Imaging Company

The WCC Note™

Presented by Stephen J. Pomeranz, M.D.

www.wcclinical.com / +1 617-250-5143

A Weekly Guide To Harmonizing Clinical Trial Imaging

Volume 2, Number 20 – August 1, 2008

MRI LYMPHOMA

Imaging of pH Change in Cancer Accomplished in Mice

A change in the acid/base milieu accompanies a variety of pathologic conditions, including cancer, ischemia, and inflammation. Cancer commonly has an acidic pH and will turn bicarbonate into carbon dioxide. By harnessing this reaction, lead researchers at Cambridge Research Institute and University of Cambridge accomplished *in vivo* imaging of the pH alteration in lymphoma. In a study published in the June 12 issue of *Nature,* the authors report that they were able to create nontoxic, labeled bicarbonate by utilizing dynamic nuclear polarization (DNP).The ratio of signal intensities in hyperpolarized bicarbonate and $^{13}CO2$ after injection of hyperpolarized bicarbonate into mice with subcutaneous lymphoma revealed that the average interstitial pH in the lymphoma was significantly lower than in the surrounding tissue. The authors present MRI images of this signal difference.[1] **Conclusion: *In vivo* imaging of pH alteration in lymphoma has been achieved in a mouse model using labeled bicarbonate.**

MRI CARDIAC

Late MRI Gadolinium Enhancement Portends Higher Risk of Cardiac Event in Patients with Nonischemic Cardiomyopathy

Patients with nonischemic cardiomyopathy (NICM) underwent gadolinium-enhanced cardiovascular MRI to assess whether the presence and extent of late enhancement correlated with adverse outcomes. As published in the *Journal of the American College of Cardiology,* authors from Johns Hopkins prospectively assessed 65 NICM patients with left ventricular ejection fractions of less than 35%. The cohort had the MRI examinations prior to receiving implantable cardioverter-defibrillators (ICD). The results showed that 42% of the group had late gadolinium enhancement. Of these, 44% had either hospitalization for heart failure, appropriate ICD firing, or cardiac death, compared to 8% of those patients who did not have late enhancement.[2] **Conclusion: Late gadolinium enhancement correlates with increased risk of cardiac events in patients with nonischemic cardiomyopathy.**

MRI LEAD EXPOSURE

Childhood Lead Exposure Associated with Decreased Brain Volume in Adults

The Centers for Disease Control (CDC) report that approximately 310,000 U.S. children between the ages one and five have current elevated blood lead levels greater than the level at which action is recommended – 10 micrograms of lead per deciliter of blood.[3] Lead causes a variety of toxicities, central nervous system injury being dominant among them.

A recent study led by researchers at Cincinnati Children's Hospital examined young adults who had experienced elevated childhood lead levels and enrolled in a long-term follow-up study.[4] The cohort had detailed pre- and postnatal low to moderate lead exposure, with behavioral outcomes monitored over 25 years. The group underwent whole-brain, high-resolution MRI imaging with assessment of global and regional brain changes using voxel-based morphometry.

The results showed significant reductions in gray-matter volume for several cortical regions in

individuals with higher mean childhood lead levels. As published online at *PLoS Medicine*, the greatest areas affected included the frontal gray matter, specifically the anterior cingulate cortex. The lead-associated brain volume loss proved much larger in men than women. Fine-motor scores correlated positively with the gray-matter volume.

Conclusion: Childhood lead toxicity is associated with region-specific diminished adult brain volume in areas responsible for mood and decision making, and adversely affects males worse more than females.

SOURCES:

1. Gallagher FA, Kettuned MI, Day Se, *et al.* "Magnetic Resonance Imaging of pH *in vivo* Using Hyperpolarized 13C-Labeled Bicarbonate." *Nature* 2008; 453:940-943.
2. Wu KC, Weiss RG, Thiemann DR, *et al.* "Late Gadolinium Enhancement by Cardiovascular Magnetic Resonance Heralds an Adverse Prognosis in Nonischemic Cardiomyopathy." *Journal of the American College of Cardiology* 2008; 51:2414-2421.
3. http://www.cdc.gov/nceh/lead/faq/about.htm
4. Cecil KM, Brubaker CJ, Adler CM, Dietrich KN, Altaye M, *et al.* "Decreased Brain Volume in Adults with Childhood Lead Exposure." *PLoS Med* 2008;5:e112.

NEXT ISSUE: MORE CLINICAL TRIAL IMAGING NEWS AND STUDIES

THE WCC NOTE™: Volume 2, Number 20 – August 1, 2008

- *Contributing Editors:* Margaret D. Phillips, M.D. (newsletter@wcclinical.com) and Stephen J. Pomeranz, M.D. (newsletter@wcclinical.com)
- *Managing Editor:* Rod Willis (newsletter@wcclinical.com)
- *Graphic Designer:* Tom Anneken (newsletter@wcclinical.com)
- *Distribution Manager:* Shannon Roeper (newsletter@wcclinical.com)

Contents of this electronic newsletter are copyright © 2008 by WorldCare Clinical, LLC, 7 Bulfinch Place, P.O. Box 8908, Boston, MA 02114. All article summaries are compiled from public sources. For more information on WorldCare Clinical, please go to www.wcclinical.com.