



NORTH SHORE MAGNETIC IMAGING CENTER

A joint venture of Addison Gilbert, Beverly, Salem and Union Hospitals
WINTER 2003

PRE-ECLAMPSIA, ECLAMPSIA, HYPERTENSIVE ENCEPHALOPATHY

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A 28 year old female was admitted 6 days post partum for new onset of grand mal seizures. Her baseline BP was 106/60 and her post partum blood pressures were labile and elevated up to 160/100. An MRI scan of the brain performed after admission demonstrated increased T2 signal intensity primarily in the cortical and subcortical regions of the occipital lobes. The abnormalities are transient and resolve when the hypertension is reversed.

The brain is normally protected from extremes of blood pressure by an auto-regulation system that ensures constant perfusion over a wide range of systemic pressures. Cerebral arterioles dilate in response to systemic hypotension and constrict in response to high pressures. Above the limit of autoregulation, cerebral hyperperfusion and hypertensive encephalopathy occur. This leads to focal areas of disruption of the blood-brain barrier, increased vascular permeability and cerebral edema. The vertebrobasilar system and posterior cerebral arteries are sparsely innervated by sympathetic nerves, so that the occipital lobes and other posterior brain regions are particularly susceptible to breakthrough of autoregulation.

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PET Imaging

North Shore Magnetic Imaging Center, Inc. recently received a Determination of Need (DoN) approval from the Massachusetts Department of Public Health to provide PET (*positron emission tomography*) imaging services on the North Shore. The Center will be making available this imaging modality as a mobile service named ***North Shore PET Imaging***. The mobile service will begin on the grounds of Beverly Hospital by the end of first quarter of 2003. Plans are also underway to provide mobile service at the North Shore Cancer Center in Peabody.

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**Visit the Center's
web site
at
nsmic.org**

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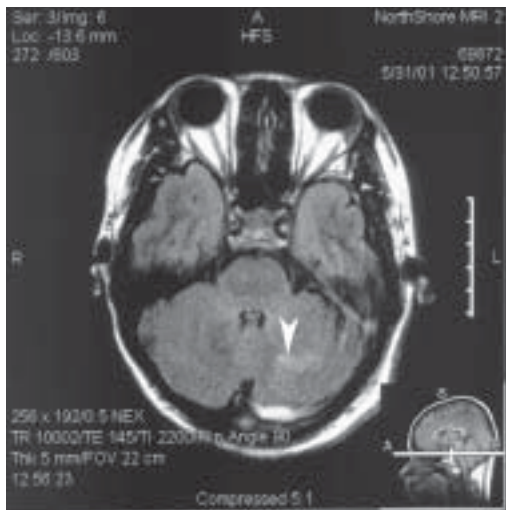


Figure 1

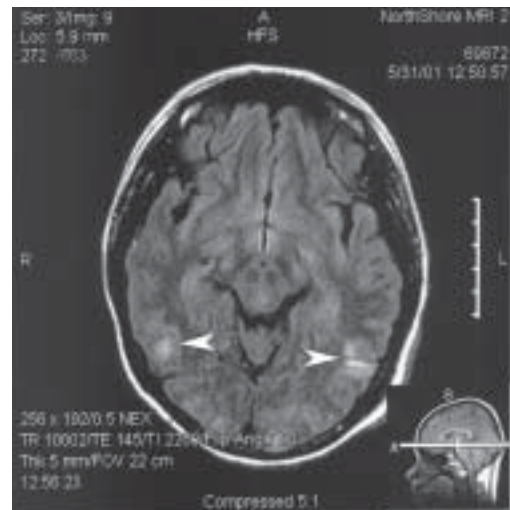


Figure 2

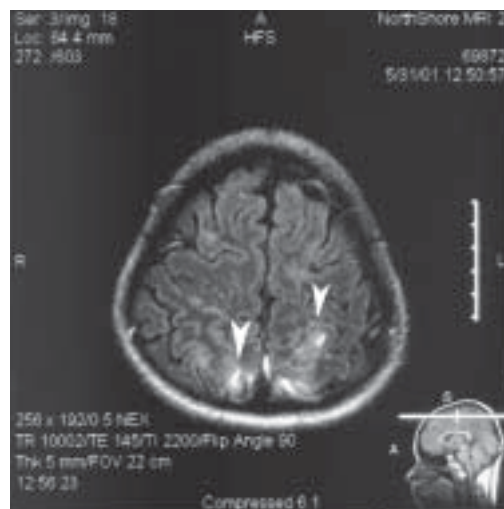


Figure 3

Figures 1 - 3:

FLAIR axial scans of the brain demonstrate findings typical of hypertensive encephalopathy. There is increased FLAIR signal in the occipital lobes, posterior temporal and posterior parietal lobes. The increased FLAIR signal is due to cerebral edema.

REFERENCES

Schwarz RB, Feske SK, et al, Preeclampsia – eclampsia: clinical and neuroradiologic correlates and insights into the pathogenesis of hypertensive encephalopathy. *Radiology* 2000;371-376.

Schwarz RB, Jones KM et al, Hypertensive encephalopathy: findings on CT, MR imaging and SPECT imaging in 14 cases. *AJR* 159:379-383 Aug 1992.

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PET (Positron Emission Tomography) Imaging is rapidly becoming a major diagnostic imaging tool used predominantly in determining the presence and severity of cancers, neurological conditions, and cardiovascular disease. Currently, it is the most effective way to assess for cancer recurrences. In the year 2001, more than 200,000 PET scans were performed at more than 700 sites around the country.

PET images demonstrate the chemistry of organs and other tissues such as tumors. A radiopharmaceutical, such as FDG (flurodeoxyglucose), is injected into the patient and its emissions are measured by the PET scanner.

The PET scanner consists of an array of detectors surrounding the patient. Using gamma ray signals which are emitted by the injected radionuclide, PET measures the amount of metabolic activity at a site within the body and then a computer reassembles the signals into images. Cancer cells have a higher metabolic rate than normal cells and show up as denser areas on a PET scan. PET is also useful in aiding in the diagnosis of certain cardiovascular and neurological diseases as it highlights areas with increased, diminished or no metabolic activity, thereby pinpointing problems. PET is often used in conjunction with an MRI or CT scan through “fusion” which gives a full three dimensional view of an organ and the location of the cancer within that organ.

HISTORY OF PET IMAGING

PET scanning was formally introduced to the medical community in the 1970's. However, it was during the 1980's that PET technology advanced greatly. Commercial PET scanners were developed with more precise resolution and images. A major concern in the development of PET was the manufacture and distribution of the radiopharmaceutical, FDG. This has since been resolved with the development of smaller self-shielded cyclotrons. It is now possible to install cyclotrons at more locations which then distribute the radiopharmaceutical to numerous PET imaging services.

CANCER & PET

PET is considered particularly effective in identifying whether cancer is present or not, if it has spread, if it is responding to treatment, and if a person is cancer-free after treatment. Cancers for which PET is considered particularly effective include: lung, head & neck, colorectal, esophageal, lymphoma, melanoma, breast, thyroid, cervical, pancreatic, and brain.

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NEUROLOGICAL DISEASE & PET

PET's ability to measure metabolism has significant implications in diagnosing Alzheimer's disease, Parkinson's disease, epilepsy and other neurological conditions. PET scans can vividly illustrate areas where brain activity differs from the norm. Recent studies indicate that PET scans can supply important diagnostic information and confirm an Alzheimer's diagnosis (*Journal of Nuclear Medicine, November 2000*). PET is useful in differentiating Alzheimer's disease from other forms of neurological disorders such as vascular dementia, Huntington's disease or Parkinson's disease.

CARDIOVASCULAR DISEASE & PET

When measuring blood flow (perfusion) and the metabolic rate within the heart, physicians using PET can pinpoint areas of decreased blood flow such as that caused by blockages, and differentiate muscle damage from living muscle, which has inadequate blood flow (myocardial viability).

CONCLUSION

North Shore Magnetic Imaging Center is very excited about bringing this technology to North Shore physicians and patients. More information regarding the scheduling of PET scans at North Shore PET Imaging will be forthcoming. In the meantime, if you have any questions about this service, please direct them to Mary Ellen Tobey at 978-573-3119 or e-mail at metobey@nsmic.org.

INCREASED MRI SERVICES AT BEVERLY HOSPITAL

North Shore Magnetic Imaging Center is pleased to announce the expansion of MRI services at the Beverly Hospital satellite location. Starting the first week of March 2003, MRI services will be available five days per week for the convenience of patients and physicians. The additional appointments will allow us to provide more flexibility when scheduling your patients, as well as an increased ability to accommodate more urgent requests for MRI scans. Appointments for MRI scans at any of our locations... *the Peabody site, Salem Hospital or Beverly Hospital...* can be made by dialing the **main number of 978-532-8960 or the direct scheduling line of 978-573-3020.**



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www.nsmic.org

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