NEONATAL CENTRAL NERVOUS SYSTEM THROMBATIC EVENTS (STROKE) AND GENETIC RISK FACTORS AS THE DETERMINING CAUSE

Tamara Lynne Solomon
Supervisory Professor: Keith Hoots, Ph.D.

Neonatal thrombosis, also known as neonatal stroke is caused by an occlusive blood clot or a thrombus that is present in a systemic blood vessel that causes a downstream obstruction of a central nervous system blood vessel. The clot may have originated in situ or been embolized from a distal site. This obstruction leads to a diminished blood supply to the brain or to a particular part of the brain causing a stroke. The medical literature suggests that thrombotic events (TE’s) during childhood are increasing in both their frequency and severity. During childhood, newborns comprise the largest group (25%) at risk for developing these TE’s; however neonates remain the group in whom there is the least information derived from prospective research. Genetic defects of proteins that regulate blood coagulation have been discussed and investigated as possible risk factors for thrombotic events.

The present study was done to 1) determine whether or not these genetic prothrombotic risk factors are found more frequently in neonates who experience stroke, 2) to examine the number of neonatal strokes detected in comparison to the number of MRI’s performed, and 3) to attempt to stratify according to demographic diversity. In order to accomplish these goals, a retrospective search of the Radiology Information System at Memorial Hermann Hospital for the terms “infarction”, “thrombosis”, and “stroke” was conducted on all MRI scans performed from January 1, 2000-December 31, 2004. We identified two hundred and forty reports on neonates ages 0-6 months old. Of these initial two hundred and forty radiology reports, 52 individuals were found to have an MRI finding indicative of an infarction, thrombosis, or stroke. Clinical data for each of these individuals was than collected from the electronic medical record system (EMR), and paper charts.

This study identified a total of 2 neonates with an underlying genetic prothrombotic risk factor that likely increased their risk for a stroke. This study also
identified inconsistencies within the neonatal stroke population as to whether they underwent appropriate coagulation screening. Finally, we determined thrombotic events in the neonatal population are increasing proportionate to the increasing number of MRIs being performed. The results of this study provide a rationale for a coagulation evaluation on neonates who suffer from a thrombotic event or stroke. Such testing may help identify genetic risk factors early in life, permitting possible therapies which may confer a better outcome for these individuals.