Abstracts: Poster Session

1. Discrepancy Between Physician Knowledge and Practices in the Evaluation of Coagulopathies in Ischemic Stroke Patients
   Cheryl Bushnell and Larry B. Goldstein; Durham, NC

   Coagulopathy is a rare cause of ischemic stroke. Prior studies demonstrate that testing for coagulopathies in ischemic stroke patients is not optimal. We sought to determine neurologists’ views regarding their use of specialized coagulation testing and the frequency with which they believed these tests influenced their patient management. Surveys (n = 79) with multiple-choice and open-ended questions were sent to 26 neurology faculty, 26 residents/fellows, and 29 practitioners; 56 (71%) were completed (faculty 69%, in-training 88%, and private practice 59%). The most commonly reported factors influencing test ordering were patient age (75%), history of thrombosis (48%) or miscarriages (37%), and few traditional stroke risk factors (33%). These tests were thought to infrequently influence stroke management (<25% of the time for 83%, and never for 12% of respondents). Most (88%) would order specialized coagulation tests for a hypothetical young patient with no known stroke risk factors, none for a patient with atrial fibrillation, and 14% for a patient with other stroke risk factors. These appropriate reported practices differ from studies in which more indiscriminant test ordering was observed. These data suggest that improved application of physician’s current knowledge to their test-ordering practices could optimize diagnostic testing for coagulopathies in ischemic stroke patients.

Supported by an Agency for Healthcare Research and Quality training grant.

2. Physician Attitudes About Risk Reduction: The Knowledge–Effectiveness Divide
   John Castaldo, Tamara Masiado, Jane Nester, Thomas Wasser, Janelle Thomas, and Lawrence Kleinman; Allentown, PA

   Reducing risk factors in patients with vascular disease can reduce the subsequent incidence of stroke. Studies indicate that little time is spent counseling patients about risk reduction. To identify whether physicians felt confident in their knowledge and effectiveness regarding counseling patients to reduce risk, we mailed surveys to 509 physicians affiliated with an academic community hospital. Nonrespondents were sent reminders and a second survey. Comparisons were made using χ² analysis. A total of 205 surveys were returned (41%). Results indicated that 36% of physicians felt knowledgeable about weight management techniques, compared with 3% who were confident that they succeeded in their practice (p < 0.001). Similar patterns were found for tobacco cessation (62% vs 14%; p = 0.001), alcohol reduction (46% vs 7%; p < 0.001), stress management (35% vs 5%; p < 0.001), exercise (53% vs 10%; p < 0.001), nutrition (36% vs 8%; p < 0.001), diabetes management (48% vs 23%; p < 0.001), blood pressure management (57% vs 43%; p < 0.001), and lipid management (59% vs 38%; p < 0.001). We identified a discordance between physician confidence in their knowledge about risk factor counseling and their effectiveness at providing counseling in their office. Alternate settings for risk factor reduction may be useful for stroke prevention.

3. Early Carotid Endarterectomy After Acute Ischemic Stroke
   Gary L. Bernardini, Antonio Sparano, Anthony J. Santiago, R. Clement Darling, and Dhiraj M. Shah; Albany, NY

   Carotid endarterectomy (CEA) is recommended for symptomatic high-grade carotid stenosis, but the timing of CEA after acute stroke remains controversial. We report outcome in patients with early CEA following acute stroke. Symptomatic patients with high-grade carotid stenosis may benefit from CEA. Appropriate timing of CEA after acute stroke remains unknown; a 4- to 6-week waiting period after stroke is often recommended before CEA. Risk of recurrent stroke may approach 9.5% during this waiting period. No studies have evaluated the outcome of early CEA after acute infarct. We retrospectively reviewed vascular surgery patients admitted from February 1996 to November 2000 with CEA and diagnosis of stroke. CEA was performed for symptomatic ipsilateral carotid stenosis of 60% or greater. Only patients with CEA performed within 10 days of infarct were studied. Time to CEA after stroke, preoperative and postoperative NIHSS score, stroke risk factors, and postoperative complications were assessed in each patient. Twenty-five patients (mean age, 64.9 ± 12.9 years) had CEA within 10 days of infarct. Mean time from stroke to CEA was 4.9 ± 3.1 days. There was no significant difference between preoperative versus postoperative NIHSS scores (5.2 ± 1.9 vs 5.8 ± 2.9, respectively; p = 0.19). No patient died in the immediate postoperative period. Postoperative neurological complications occurred in 6 of 25 (24%) patients with worsened pre-existing deficits but did not change the NIHSS score (4.8 ± 2.3 preoperative vs 6.2 ± 1.8 postoperative; p = 0.17). One patient had hemorrhagic conversion of bland infarct. Two patients required intravenous antihypertensive medication for elevated blood pressure after surgery. Disposition was to home (n = 15), acute rehabilitation (n = 7), nursing home (n = 1), or hospital transfer (n = 2). Selected patients with acute ischemic stroke and significant carotid artery disease can safely undergo early CEA. A 4- to 6-week waiting period prior to CEA may not necessarily ensure optimal patient care.

4. Hypothesis Accounting for the Effect of Glucocorticoids in Closed-Head Trauma
   Mark K. Borsody and Michael Coco; Atlanta, GA, and Chicago, IL

   Because of disagreement between clinical studies, the American College of Neurological Surgeons’ (ACNS) most recent recommendation (Joint Section on Neurotrauma and Critical Care. Guidelines for the management of severe brain injury. J Neurotrauma 1996;13:641–734) is that glucocorticoids not be used in the treatment of closed head trauma (CHT). The current research reviews clinical studies of glucocorticoids and CHT in order to examine what factors might have accounted for the inconsistent results leading to the ACNS’s recommendation. A careful analyses of these studies reveals that, contrary to the ACNS’s sweeping conclusion, the available data support the use of glucocorticoids for patients with CHT but only in specific cases. Of the nine controlled studies that have examined the use of glucocorticoids in CHT patients, three studies with reported intracranial hemorrhage rates of less than 25% found a significant benefit of glucocorticoid treatment. Conversely, three other studies with reported intracranial hemorrhage rates greater than 30% found no benefit or a worsened outcome in glucocorticoid-treated CHT patients. Thus, glucocorticoids may be benefi-
5. The Impact of a Rapid Response Team on Tissue Plasminogen Activator Administration for Acute Stroke in a Community Hospital

J. Castaldo, D. Jenny, and C. Mathiesen; Allentown, PA

After a decade of thrombolytic use in stroke and treating less than 1% of patients, it was apparent that a process change was needed. We created a rapid response team (RRT) to build a systematic approach to stroke assessment, diagnosis, and intervention. The RRT was developed using recommendations from the American Stroke Association. Using a trauma center model, we built an acute stroke center by establishing clear internal communication, emergency department protocols, and emergency medical system/community education. Data on door-to-needle (DTN) time, door-to-CT scan (DTCT) time, and mean time to physician evaluation (MTPE) were collected and analyzed. During 1996–1999, 20 patients received tissue plasminogen activator; from 2000 to the present, 13 have been treated. MTPE improved from 20 minutes to 7 minutes, DTCT time improved from 25 to 20 minutes, DTN went from 47 to 140 minutes to 60 to 92 minutes, and length of stay improved by 2 days. Outcomes validate the effectiveness of a RRT in the community setting. Critical allocation of resources aimed toward brain recovery enhances ability to intervene. Continued efforts should focus on increasing public awareness on early access, improvements in stroke management, and ongoing evaluation of care processes.

Supported by the Dorothy Rider Pool Healthcare Trust.

6. White Blood Cell Count Predicts Outcome After Stroke: The Northern Manhattan Stroke Study

Mitchell S. Elkind, Jianfeng Cheng, Tanja Rundeke, Bernadette Boden-Albala, and Ralph L. Sacco; New York, NY

Atherosclerosis is an inflammatory condition. Leukocyte (WBC) count predicts prognosis after myocardial infarction, but few data are available on its relation to outcome after ischemic stroke. We hypothesized that WBC count at the time of incident ischemic stroke is associated with long-term prognosis. Data on demographics, medical history, and stroke were collected on incident stroke patients in northern Manhattan, and patients were prospectively followed up for 5 years for recurrent stroke, myocardial infarction, or death. Kaplan-Meier curves and Cox proportional hazard models were constructed to estimate hazard ratios and 95% CI after adjusting for other potential risk factors. Incident ischemic stroke patients (N = 655) were enrolled (mean age, 69.7 ± 12.7 years; 45% male; 51% Hispanic, 28% black, and 19% white). Seventy percent of WBC samples were drawn within 24 hours of stroke. Mean WBC count at admission was 9.1 ± 4.7 × 10^9/L (median, 8.0; interquartile range, 6.5–10.4). The rate of all outcome events at 30 days, and 1, 2, and 3 years was 7.2%, 21.8%, 29.8%, and 36.7%, respectively. Over 5 years, WBC count was a significant independent predictor of outcome in the multivariate model. Elevation in WBC count at the time of ischemic stroke is predictive of the 5-year risk of recurrent stroke, myocardial infarction, or death. Chronic infection or inflammation could account for this association, and modification of inflammatory pathways may provide a novel approach to improving prognosis after stroke.

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7. Variability in Stroke Outcome in the NSLIJ Health System

John J. Halperin, Sanjay Mittal, and the NSLIJHS Stroke Study Group; Manhasset, NY

The objective of this study was to refine our previously described statistical model of stroke outcome to improve stroke care. The NSLIJ Health System includes nine acute care hospitals and treats more than 2,000 patients with stroke annually. Previously presented analysis of data in the system’s administrative database identified seven independent risk factors that predicted outcome. Since our previous analysis demonstrated that outcomes differed from predicted at three hospitals, we reviewed a representative sample of medical records (1) by neurologists to verify discharge coding and assess stroke severity (Oxfordshire classification) and (2) by a research nurse to assess additional risk factors and treatment variation (61 variables). The sample consisted of all patients who died, plus 1 randomly selected surviving patient with stroke at each hospital. Rate of coding errors varied widely among hospitals (0–33%), as did stroke type and severity, but neither accounted for differences in outcome. On multiple exploratory univariate analyses, other variables associated with differences in outcome included days not fed, initiation of physical therapy, smoking, and initiation of treatment with warfarin, subcutaneous heparin, aspirin, and clopidogrel. A multivariate analysis is in progress. We have further refined our model of stroke outcome and will next adapt the conclusions for prospective study.

8. Predictors of Nursing Home Admission After Stroke: Results from a Nationally Representative Sample of US Elderly

Susan L. Hickenbottom, Kenneth M. Lange, Mohammed U. Kabeto, A. Regula Herzog, Mary Beth Ofstedal, and A. Mark Fendrick; Ann Arbor, MI

As the population ages, the prevalence of stroke and hence the need for long-term care will increase. We sought to identify independent predictors of nursing home admission (NHA) after stroke. We used data from the first three waves (1993, 1995, 1998) of the Asset and Health Dynamics Study, a longitudinal, nationally representative survey of US elderly born before 1923 (N = 7,443). Respondents were classified as having “no stroke,” “stroke without stroke-related health problems” (SRHPs), or “stroke with SRHP.” A Cox proportional hazards model was used to determine the effect of stroke on NHA during 6 years of follow-up, adjusting for sociodemographic variables, disability with activities of daily living (ADLs), and other chronic health conditions. Of 7,443 respondents, 1,798 (24%) died after 6 years of follow-up, and 232 (3%) were excluded for missing data. The proportional hazards model showed that NHA was 1.58 times more likely for those with stroke and SRHPs (95% CI, 1.05–2.39; p < 0.05), adjusting for all covariates except disability with ADLs. When disability was included in the model, the hazard for those with stroke and SRHPs...
dropped to 1.04 (95% CI, 0.67–1.6). These data suggest SRHPs are an important predictor of NHA; disability with ADLs drives NHA after stroke.

9. Can the Mini-Mental State Examination and the Alzheimer’s Disease Assessment Scale (Cognitive) Be Converted Directly? Evidence Based on Predictions of Patient Disability
K. J. Ishak, A. Ward, K. Migliaccio-Walle, J. Caro, and K. Torfs; Dorval, Quebec, Canada, Concord, MA, and Beere, Belgium

While the Mini-Mental State Examination (MMSE) is commonly used in clinical practice, research the cognitive part of the Alzheimer’s Disease Assessment Scale (ADAS-cog) predominates. Despite wide variation in patient scores, direct conversions of one to the other have been proposed. The objective of this study was to examine how well MMSE values converted to ADAS-cog to predict disability with activities of daily living (ADLs) compared to actual MMSE values. Data were obtained from patients with mild to moderate Alzheimer’s disease (N = 1,286) on the two scales and Disability Assessment for Dementia (DAD). The DAD measures the proportion of 46 ADLs attempted and successfully completed in the preceding 2 weeks. Disability predicted directly using the MMSE and other patient characteristics was compared with prediction based on ADAS-cog scores converted from MMSE scores. We found close agreement between the two. For example, a patient with an MMSE of 20 was predicted to complete 86.4% of activities whereas the converted ADAS-cog score of 23 yields a prediction of 85.9%. Within the mild to moderate range, the maximum discrepancy was no more than three percentage points, equivalent to less than a single activity on the DAD. It was concluded that conversion of MMSE to ADAS-cog values appears to yield reasonably accurate estimates of disability.

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10. The Effect of Pneumonia on 30-Day Mortality for Medicare Patients Hospitalized for Acute Stroke
Irene L. Katzman, Randall D. Cebul, Scott S. Husek, Neal V. Dawon, and David W. Baker; Cleveland, OH

Pneumonia is an important and often avoidable complication of acute stroke. The purpose of this study was to determine the effect of pneumonia on 30-day mortality rate in patients hospitalized for acute stroke. Subjects were 11,286 Medicare patients admitted for ischemic or hemorrhagic stroke to 27 greater Cleveland hospitals between 1991 and 1997. Clinical data were obtained from chart abstraction and merged with MEDPAR files to obtain 30-day mortality rates. A predicted mortality model (C statistic = 0.73) and propensity score for pneumonia (C statistic = 0.832) were used to adjust for severity and selection bias, respectively, in logistic regression analyses. Pneumonia occurred in 5.6% (n = 635) patients and was more frequent in patients with greater admission severity (predicted mortality, 13.2% vs 6.0%; p < 0.001) and in men (7.6% vs 4.1%; p < 0.001). Crude 30-day mortality rates were 26.9% for patients with pneumonia and 4.4% for those without (p < 0.001). Risk-adjusted odds ratio for 30-day death in pneumonia patients was 3.3 (2.6–4.2). After adjustment, 11.4% of 30-day deaths were attributable to pneumonia. In this large community-wide risk-adjusted study of stroke patients, pneumonia accounted for a significant proportion of deaths occurring within 30 days of admission. Measures to reduce pneumonia incidence following stroke are warranted. Supported by Aging for Healthcare Research and Quality.

11. Diabetes, Blood Glucose, and Outcome After Ischemic Stroke
Brett Kissela, Jane Khoury, Daniel Woo, Rosie Miller, Kathleen Alwell, Jerzy Szafarski, James Gobel, Charles Moomaw, and Joseph Bruderick; Cincinnati, OH, and Pittsburgh, PA

We investigated the influence of diabetes, blood glucose, and other factors on ischemic stroke outcome in our population-based stroke study in greater Cincinnati and Northern Kentucky from January 1993 and June 1994. Ischemic strokes and transient ischemic attacks were identified by ICD-9 codes and medical records abstracted by study nurses. Cases were included if admission glucose value was measured within 24 hours of symptom onset. In total, 2,385 of 3,714 cases were analyzed. A multivariable logistic regression analysis was performed, including age, prestroke modified Rankin score, and stroke severity as measured by level of consciousness (alert vs not) and weakness (normal strength vs abnormal in any limb). The model predicts discharge outcome: good (modified Rankin score, 0–1) versus poor (modified Rankin score, ≥2). Outcome was related to age, pre-stroke modified Rankin score, and stroke severity. After controlling for these factors, admission glucose (<120, 120–140, 141–180, 181–200, or >200) and history of hypertension, but not diabetes, were significantly associated with poor outcome. We conclude that hypertension and blood glucose levels on admission, but not diabetes, are associated with outcome after ischemic stroke. It is possible that diabetes is undiagnosed in many patients with elevated glucose, that glucose may be a surrogate for stroke severity, or that high glucose causes increased brain injury during stroke.

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12. The Effect of Stroke on Outcome of Acute Aortic Dissection: Results from the International Registry of Aortic Dissection
J. S. Kucher, S. L. Hickenbottom, R. H. Mehta, J. V. Cooper, D. E. Smith, E. M. Kline-Rogers, K. A. Eagle, and L. A. Pape, for the IRAD Investigators; Ann Arbor, MI

Acute aortic dissection occurs with an incidence of approximately 2,000 cases per year in the United States. Stroke is one possible presenting clinical sign of aortic dissection and is also a known complication of aortic dissection or its surgical treatment. We sought to describe the rate of stroke as a presenting feature of acute aortic dissection, as well as the rate of stroke as a complication of the dissection itself or its treatment. We used data from the prospective International Registry of Aortic Dissection (N = 878). At the time of presentation, 43 (4.9%) of patients had an acute clinical stroke. Of these, 20 (46.5%) had an aortic root dissection (p = 0.001). Stroke was found to be significantly associated with in-hospital mortality (37.2% mortality with stroke compared with 22.8% without stroke, p = 0.045). In-hospital complication rates were reported for 783 patients. Of these patients, 33 (4.2%) had preoperative stroke and an additional 39 (5.0%) had postoperative stroke. These prospective data demonstrate an increased risk of mortality in aortic dissection patients presenting with stroke and illustrate the significance of stroke as a complication of aortic dissection and its surgical treatment.
Although childhood lead poisoning impairs cognitive development, the long-term prognosis is not clear. The present research, describing 7 case histories, indicates that at least some lead-poisoned children exhibit considerable cognitive deterioration as they grow older. The subjects, currently 16 to 21 years of age, had been poisoned by lead between the ages of 2 and 3 years (mean blood lead, 18–29 μg/dL). An IQ battery was administered to each subject as well as a comprehensive evaluation of neuropsychological functioning. General level of cognitive functioning before the age of 9 years was determined from school records and from previous evaluations. Each of the subjects were impaired in three domains: visual memory, attention, and fine motor functioning. Individual subjects had additional impairments in other cognitive domains as well. However, 3 of the subjects were distinctive in showing very severe impairments in virtually all of the tested neuropsychological domains and in exhibiting clear evidence that their level of cognitive functioning had significantly deteriorated since they were evaluated as children. Recent evidence indicates that there are genetic influences associated with the toxicokinetics of lead as well as differential outcome after brain injury. It remains to be determined if these, or other variables, contributed to the findings reported here.

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14. Risk Factors Associated With Symptomatic Hemorrhagic Conversion in Acute Ischemic Stroke
M. Moonis, N. Selsaraj, S. Nanjundasuamy, A. Ahmed, T. Kovats, and S. Baker; Worcester, MA, and Budapest, Hungary

Although the overall risk of early recurrent stroke (RS) in acute ischemic stroke is low (2–2.2%), patients with cardioembolic stroke may be at higher risk (4.5–8%). In this subgroup, early anticoagulation with unfractionated intravenous heparin (UFIH) may reduce the risk of RS. Use of UFIH is limited by projected high risk of symptomatic hemorrhagic conversion (SHC). In the absence of any single large study of UFIH, this inference is based on small retrospective studies with variable results. To address this issue, we performed a large retrospective study using our stroke database. During the past 12 years (1988–2000), we identified 2,543 patients with acute ischemic stroke. The overall incidence of SHC was 1.84%. Almost 18% had received UFIH without an initial bolus. Stepwise logistic regression with correction for multiple comparisons revealed UFIH to be correlated with early radiological signs of infarction (within 24 hours of onset) on CT scan (p = 0.024). Patients with histories of cardiac disorders were more likely to have SHC (p = 0.043). UFIH was not a significant association. Based on our results, the risk of SHC with UFIH seem to be overstated. A comparative analysis with other studies of UFIH is in progress and will be discussed.

15. Validation of the 11-Point Pain Scale in the Measurement of Migraine Headache Pain
Dev S. Pathak, W. Jackie Kwong, and Alice S. Batenhorst; Columbus, OH, and Research Triangle Park, NC

Although the 11-point pain scale is commonly used to evaluate pain, the 4-point pain scale (none, mild, moderate, severe) is considered the gold standard in assessing migraine pain. The objectives of this study were to validate the 11-point pain scale using the 4-point pain scale, and to compare the responsiveness of the two scales in detecting clinically meaningful change. Migraine clinic patients (N = 179) were sent home with a questionnaire to be completed during the next migraine attack. Patients rated migraine pain intensity before treatment and at 2 and 4 hours after treatment using both pain scales. Functional and emotional disability were also assessed using 4- and 5-point categorical scales. Four hours after taking medication, patients were asked whether their migraine condition had improved, remained the same, or deteriorated. At each time point, correlations between the 4-point and 11-point scales (r = 0.75–0.94) were significantly higher than with functional/emotional disability ratings (r = 0.14–0.32; p < 0.05), supporting the construct validity of the 11-point scale. Although both pain scales detected statistically significant differences between patients reported to be “improved/deteriorated” and “remained the same,” effect size of the 11-point scale was larger than the 4-point scale (1.748 vs 1.127). The 11-point scale demonstrated validity in measuring migraine pain intensity and was 55% more responsive than the 4-point scale in detecting clinically meaningful change.

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16. Development and Independent Validation of Prospective Mortality Risk-Adjustment Models for Alzheimer’s Disease and Related Dementias Based on Automated Pharmacy and Medical Claims Data
Jean-François Ricci, Marc D. Silverstein, and Bradley C. Martin; Research Triangle Park, NC, Charleston, SC, and Athens, GA

Risk-adjusted survival using administrative data is needed for outcomes research. Incident cases of Alzheimer’s dementia from Georgia and North Carolina Medicaid data from 1990 to 1997 were studied. ICD-9-CM diagnoses and drug exposure in the year prior to the Alzheimer’s dementia diagnosis were used to predict 6-month and 1- and 2-year survival rates. Logistic regression models using drug data, ICD-9-CM codes, and both drug and ICD-9-CM codes were tested. Risk factors were reviewed by a panel of clinicians and then validated in the North Carolina sample. A total of 4,986 Georgia and 5,000 North Carolina Medicaid Alzheimer’s dementia patients were studied. Mortality rates were 14%, 21%, and 34% at 6 months and 1 and 2 years, respectively. Opiates, cardiac and respiratory drugs, tumors/cancers, cardiac diseases, and weight loss were each associated with increased odds of death of at least 25% (p < 0.05). Conversely, nonorganic psychotic disorders and alcohol abuse reduced the odds of death (p < 0.05). The Georgia prospective models were valid when tested on the North Carolina sample (C statistics, 0.65–0.67). Drug models performed as well as ICD-9-CM models. We conclude that prospective risk-adjusted models using Medicaid claims and drug data are valid predictors of post-Alzheimer’s dementia diagnosis survival and can be readily used in quality improvement programs and outcomes research.

Supported by University of Georgia Research Assistantship.
17. Comparison of Adverse Reaction Reports for Rivastigmine and Donepezil Using the FDA’s Adverse Event Reporting System

John A. Rizzo, Sobin Chang, and Aaryn Cohen; Columbus, OH, and East Hanover, NJ

Clinical trials have shown similar types yet differing frequencies of adverse reactions for Alzheimer’s patients taking cholinesterase inhibitors. This study is the first to compare the adverse reaction reports of cholinesterase inhibitors using real-world data (2000 FDA Quarterly Data from the Adverse Event Reporting System [AERS]). Total prescription and sales data for rivastigmine and donepezil were used to determine the number of patients taking each drug. Adverse drug reaction measurements as a proportion of users of each drug were then obtained. Analyses tested differences in proportions. The most frequent common adverse reactions were nausea and malaise for rivastigmine and drug interactions and convulsions for donepezil. Results show no statistically significant differences in total rate of adverse reactions and serious adverse drug reactions (as defined by FDA) between rivastigmine and donepezil. In contrast, the rate of common serious adverse drug reactions (as defined by FDA) between rivastigmine and donepezil was significantly higher compared with its product labeling ($p < 0.05$). Adverse events from drug interactions were significantly higher for donepezil ($p < 0.05$). As indicated from the FDA’s AERS, similar rates of adverse events and serious adverse events for rivastigmine and donepezil were found. Efficacy and concomitant medication usage should be considerations when selecting therapies for Alzheimer’s disease.

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18. Correlation Between Stroke Severity and Early Ischemic Lesion Volume on Diffusion-Weighted Imaging: Comparison of Japan Stroke Scale and NIH Stroke Scale

Yasuo Terayama, Fumio Gotoh, Takahiro Amano, and Masahiro Yamamoto; Tokyo and Yokohama, Japan

A novel weighted stroke scale (Japan Stroke Scale [JSS]) has been developed by the Japan Stroke Society for quantification of the severity of stroke. The aim of the present study is to examine its validity by applying this scale to correlate with early ischemic lesion volume on diffusion-weighted imaging (DWI) and T2-weighted imaging (T2WI). The result was compared with the assessment using the NIH Stroke Scale (NIHSS). A total of 45 patients with nonlacunar ischemic stroke in the anterior circulation composed the subject population. A DWI MRI was performed on admission (mean, 6.7 ± 2.3 hours after onset) and T2WI MRI was performed 3 days (mean 74.5 ± 7.2 hours) after onset. The stroke severity of each of the patients was scored both by JSS and NIHSS on admission and 3 days after admission. Volume of lesion assessed with both DWI and T2WI was compared with each of the stroke scale scores. JSS score is a weighted stroke severity scale, which varies from 26.5 (worst) to 0.38 (best). The correlation between JSS score and volume of lesion assessed with DWI on admission was not significant, where correlation between JSS score and volume of lesion assessed by T2WI performed 3 days after onset was significant ($p = 0.002$). Among the patients with no remarkable difference of lesion volume between DWI and T2WI, JSS score showed significant correlation with volume of lesion. Correlation between NIHSS score and lesion volume showed the same pattern as the JSS study, but correlation between NIHSS score and lesion volume assessed 3 days after onset were poor. The present study demonstrates a significant correlation between stroke severity measured by JSS and lesion volume assessed by T2WI 3 days after onset, indicating the tissue viability of the lesion detected by DWI MRI. JSS is proved to be a reliable and quantitative scale to assess the severity among patients with acute cerebral infarction compared with NIHSS.

19. To What Degree Does Cognitive Impairment in Alzheimer’s Disease Predict Dependence of Patients on Caregivers?

A. J. Ward, K. Ishak, J. Caro, and K. Torfi; Concord, MA, Montreal, Quebec, Canada, and Beerse, Belgium

Patients with Alzheimer’s disease experience a progressive cognitive loss leading to progressively shorter periods when they can be safely left alone. To investigate the relationship of cognitive function to dependence on caregivers, data were obtained on 1,286 patients diagnosed with mild to moderate Alzheimer’s disease studied in clinical trials. Cognition was assessed using the cognitive part of the Alzheimer’s Disease Assessment Scale (ADAS-cog). Patients were considered to have become dependent on caregivers if they required at least 12 hours of supervision each day. The odds ratio of dependence was significantly higher with worse cognitive impairment, increasing with each ADAS-cog point, adjusting for age, sex, and use of antipsychotic medication. For example, a 4-point worsening of the ADAS-cog score was associated with an increase in the adjusted odds for dependence of 15% (95% CI, 10–19) and of 27% (95% CI, 19–44) for an 8-point increase. An important marker of disease progression for both patients and their families is a patient’s ability to independently perform daily activities. Patients with mild to moderate Alzheimer’s disease who experience relatively small reductions in their cognitive function are at increased risk of becoming dependent.

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20. Results of Percutaneous Patent Foramen Ovale Closure With Prospective Neurologist Follow-Up

Quanwei Zhang, Huifang Zhai, Seemant Chaturvedi, Thomas Forbes, Bradley S. Jacobs, and Steven R. Levine; Detroit, MI

A patent foramen ovale (PFO) is found in up to 50% of patients with cryptogenic stroke. Percutaneous PFO closure may be useful to prevent recurrent stroke. Our objective was to define the outcomes in patients seen before and after percutaneous PFO closure by stroke neurologists. Consecutive case series of 12 patients from a university medical center were examined. A single interventional cardiologist implanted 11 Cardioseal devices and one angel wing occluder following transesophageal echocardiography. Patients were referred over a 37-month period. The median age of the patients was 43.5 years (range, 16–69 years). Acquired or hereditary hypercoagulable states were present in 50% of patients. Before PFO closure, 58% of patients were taking antplatelet agents and 42% were receiving anticoagulation. One patient with cancer-related hypercoagulability had multiple strokes after PFO closure but all of the remaining patients were free of stroke/death at 30 days. Over a mean follow-up of 10.7 months, 1 patient died, but the remaining patients were stroke-free. Two patients required chronic anticoagulation. We conclude that in patients without fulminant hypercoagulability, percutaneous PFO closure can be achieved with low morbidity, although larger studies are needed to confirm this finding. Percutaneous PFO closure...
The objective of this study was to assess the efficacy and safety of quetiapine in the treatment of psychosis in patients with Lewy body disease (LBD) and Parkinson’s disease. We enrolled 10 patients (5 male) with dementia and parkinsonism who met the LBD criteria in a 52-week trial of open-label, dose-flexible quetiapine (25–300 mg/d). All patients had significant psychosis and required treatment. PET perfusion scan of the brain showed bitemporoparietal hypometabolism in the patients. Psychotic symptoms were measured by Brief Psychiatric Rating Scale (BPRS). Motor function was assessed by the Unified Parkinson’s Disease Rating Scale, Simpson-Angus Scale, and Abnormal Involuntary Movement Scale. Mini-Mental State Examination evaluated cognitive status. All patients showed a marked improvement in psychosis as measured by the BPRS, with no significant worsening in motor function or cognitive status. Quetiapine is an effective treatment for psychosis associated with LBD. Quetiapine is well tolerated by patients with LBD, despite their extreme sensitivity to extrapyramidal and anticholinergic side effects associated with other antipsychotic agents. Further studies are needed to confirm these pilot data.

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Little research has examined the impact of brain tumors and their treatment on patients’ and spouses’ quality of life (QOL) or on the marital relationship. We investigated psychosocial effects of the disease, including illness intrusiveness (disruptions to QOL), cognitive self-efficacy (beliefs about one’s cognitive abilities), and memory self-efficacy (beliefs about one’s memory abilities) in 25 patients and their spouses. Hierarchical regression analyses (p < 0.01) tested the hypothesis that the psychosocial effects of the disease on marital satisfaction, emotional distress, and psychological well-being would be significant for both partners but greater for patients than spouses. Cognitive self-efficacy and illness intrusiveness into marital life predicted marital satisfaction similarly for patients and their spouses, but memory self-efficacy predicted only patients’ marital satisfaction. Cognitive self-efficacy and illness intrusiveness into nonmarital life predicted emotional distress similarly for patients and spouses. Illness intrusiveness into nonmarital life predicted psychological well-being similarly for patients and spouses. Other recent life strains and social support did not significantly modify these relationships. Hence, the psychosocial effects of brain tumors impose shared and unique influences on marital and nonmarital well-being, and these are remarkably similar for both patients and spouses. That fact that memory self-efficacy has a unique impact on patients’ marital happiness highlights the importance of memory rehabilitation in neurooncology.

Clinical trials and cohort studies are the typical methods used to gather data on stroke outcomes. In contrast, this study used qualitative methodological strategies (in-depth interviews) to investigate quality of life (QOL) after stroke. Subjects were selected from community-dwelling stroke survivors age over 60 years with various levels of residual impairment and disability. Eight cognitively intact stroke survivors were interviewed (3 males; age, 60–81 years; 7 infarctions, 1 hemorrhage). Time since stroke ranged from 7 months to 9 years. Throughout the interviews, survivors indicated the considerable effect of a stroke on their QOL, particularly if residual disabilities constrained their participation in self-defining activities. However, socioeconomic resources (social supports and finances) and health services (rehabilitation programs) facilitated adaptation strategies that enabled people to find a way to return to valued life activities, even in a modified form, to improve their QOL. In comparison with quantitative data from the Canadian Study of Health and Aging, the greater nuances and complexities revealed in these qualitative patient accounts generate information that help to inform the provision of care to stroke survivors. By identifying the patient’s self-defining activities and supporting adaptation strategies that result in a return to such activities, QOL can be enhanced after stroke.
25. Effect of Botulinum Toxin Type A on Health-Related Quality of Life in Stroke Patients With Spasticity

Chris M. Kozma, Steven P. Burch, Martin K. Childers, and Rich Barron; Research Triangle Park, NC, Columbia, MO, and Irvine, CA

The objective of this study was to compare the effect of botulinum toxin type A (Botox) and placebo on health-related quality of life (HRQOL) in stroke patients with spasticity. We assessed four phase II randomized, dose-ranging clinical trials comparing the safety, efficacy, and HRQOL of botulinum toxin type A to placebo. Although these studies were not specifically designed or powered to detect improvements in HRQOL, these exploratory data were useful for identification of HRQOL domains that warrant further investigation. HRQOL data were evaluated from 111 stroke patients with upper and lower limb spasticity. The SF-36 was administered at baseline and 6 weeks after treatment. Treatment and placebo groups were compared using analysis of covariance with baseline score, age, sex, and race as covariates. Improvements of greater than 5 points, generally considered to be clinically meaningful on the SF-36, were reported for vitality (5.31 points; p = 0.0176) and social functioning (8.74 points; p = 0.0048). We concluded that botulinum toxin type A use in the treatment of spasticity following stroke may result in improved social functioning and vitality at clinically significant levels.

Allergan, Inc, funded this study: C. M. Kozma and S. P. Burch are currently employees of Strategic Outcomes Services of CareScience Inc (SOS), which provides statistical analysis and reporting services for Allergan, Inc; M. K. Childers served as an author-consultant for Allergan, Inc, on this study; and R. Barron is currently an employee of Allergan, Inc.

26. Aggressive Case Management in the Lowering of Vascular Atherosclerotic Risk Study Improves Quality of Life for Patients Who Have Suffered Ischemic Events

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It is well known that quality of life (QOL) deteriorates in patients at risk for stroke and myocardial infarction, especially after an ischemic event. We set out to determine whether aggressive case management can positively affect QOL. Lowering of Vascular Atherosclerotic Risk Study (LOVAR) is a prospective cohort study providing intensive case management, a multidisciplinary risk factor reduction/behavior modification program, discussions with primary care physicians, and alternating telephone and office follow-up every 3 months (or every 6 months for controls). QOL was assessed using the Medical Outcome Study Short Form-36 (SF-36). Of 379 subjects enrolled in the first 2 years, 34 control patients and 56 intervention patients have reached the first year of follow-up for evaluation. SF-36 scores were nearly identical at baseline. Year 1 scores for the intervention group significantly improved in general health (p = 0.007); physical functioning, physical role, emotional role (all p = 0.000); social functioning (p = 0.001); and vitality (p = 0.006); and showed trends in bodily pain (p = 0.066) and mental health (p = 0.409). The control group showed deterioration in physical functioning, bodily pain, and vitality, and showed a significant improvement only in social functioning (p = 0.033). SF-36 provides evidence that aggressive case management in LOVAR improves the QOL for patients after a vascular event.

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27. Cognitive Dysfunction and Quality of Life After Subarachnoid Hemorrhage

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The impact of cognitive dysfunction on quality of life (QOL) among survivors of subarachnoid hemorrhage (SAH) is poorly defined. To evaluate the relationship between cognitive dysfunction and QOL after SAH, we prospectively examined a multiethnic cohort of 113 patients 3 months after SAH (mean age, 49 years; 68% female). We assessed global cognitive function (GCF) with the Telephone Interview of Cognitive Status (TICS) and administered neuropsychological tests (two per domain) to assess visual memory, verbal memory, motor function, reaction time, executive function, visuospatial function, and language. Domains were coded as “impaired” if any test score fell 2 or more SD below normative reference values. Outcome measures included the extended GOS (global outcome), the Lawton IADL scale (disability), and the Sickness Impact Profile (SIP) and Medical Outcomes Study-Short Form 36 (SF-36) (QOL). We used t tests to evaluate differences in outcome measures between impaired and unimpaired patients within each cognitive domain. Significance was set at p < 0.0055, with Bonferroni correction within each domain. Cognitive dysfunction was associated with significantly reduced SIP scores in all but one of the domains tested. By contrast, the relationship between cognitive dysfunction and reduced SF-36 scores was weak and inconsistent. Impaired GCF was the only domain associated with significantly reduced scores in every outcome measure, and the strength of association between impaired GCF and QOL exceeded that of the more specific cognitive domains. We conclude that cognitive dysfunction is associated with significantly impaired QOL after SAH. The SIP is superior to the SF-36 for assessing QOL after SAH because it is more sensitive to these effects. The TICS is particularly well suited to assess cognitive status after SAH, because it is broadly applicable, easy to use, and better correlated with QOL than more detailed neuropsychological tests.

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28. Are Proxy Ratings Valid for Assessing Quality of Life After Subarachnoid Hemorrhage?

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The Sickness Impact Profile (SIP) is a widely used instrument for assessing health-related quality of life (QOL). In severely ill patients, the assessment can be obtained from a surrogate. However, the validity of substituting a surrogate assessment needs to be established. The objective of this study was to evaluate the agreement between patient and surrogate SIP scores among survivors of subarachnoid hemorrhage (SAH). We prospectively enrolled 326 consecutive patients (mean age, 54 years; 64% female). Three months after SAH, patients and families were independently given the SIP. Using the SIP physical and psychosocial aggregate and overall scores stratified by outcome (Rankin 0–1 vs. Rankin 2–4) the percentage variation between scores was calculated. A total of 248 patients were alive at 3-month follow-up. SIP scores were obtained from 158 patients, 119 surrogates, and
85 pairs. Surrogates rated better health-related QOL of the patient in all three areas. The overall amount of disagreement is relatively small and the extent of bias is no greater in the poorer outcome patients compared with the good outcome patients. Percentage variation for psychosocial scores is 0.36 (Rankin 0–1) compared with 0.43. Similarly, for physical scores, percentage variation is 0.40 (Rankin 0–1) compared with 0.17 (Rankin 2–4). Our results indicate good agreement for the two SIP subscales between patients and surrogates even in severely impaired patients. Surrogate evaluations of health-related QOL using the SIP is an acceptable substitute if the subject is unavailable.

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29. Health and Economic Outcomes for Drugs That Slow Multiple Sclerosis Disability Progression: Improvement in Prevalence Cohorts With More Years Since Onset
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Treatment efficacy for drugs that slow multiple sclerosis (MS) progression is demonstrated by increased time to progression—measured by units of time, percent increased time to progression, or reduced probability of progression. Health and economic outcomes improve in treated prevalence cohorts with more years-since-onset (YSO). Health outcomes and (net) treatment costs (intention to treat) are simulated for “scenarios” using Multiple Sclerosis Pharmaco Economic Evaluation Tool (MS PEET). Outcomes are measured by disability years avoided (DYA), quality adjusted life years (QALY) gained, and percentage of disability burden avoided (DBA). Variables included disability (EDSS) progression by MS subtype, analytic perspective (onset or prevalence), efficacy, compliance, treatment start by YSO, treatment duration, within disability stage progression, posttreatment progression, cost perspective (public, private, societal), discount rate, and treatment eligibility/termination criteria. Data included disability progression in relapsing-remitting and primary-progressive MS onset cohorts, by sex, over 25 years; efficacy; drug costs; and health-related quality of life and MS health costs (public, private, societal) by disability stage. Simulated health outcomes (DYA, QALY, DBA) and economic outcomes (C/DYA, C/QALY) improve in treated MS prevalence cohorts with more years since onset. Models are efficient tools for simulating health and economic outcomes for treatment scenarios when direct evidence is not, and may never be, available. Results suggest refinements to treatment eligibility and termination criteria.

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30. Economic Impact of Galantamine in Mild to Moderate Alzheimer’s Disease
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We evaluated the long-term economic impact of galantamine in patients with mild to moderate Alzheimer’s disease (AD) in the United States. A model (Assessment of Health Economics in AD [AHEAD]) was developed with two components: an initial module based on randomized galantamine/placebo clinical trials and a subsequent module that uses regression equations to predict time until fulltime care (FTC) is needed or death occurs. Analyses of mild (MMSE ≥18) and moderate (MMSE <18) patients over a decade evaluated number needed to treat (NNT) for 1-year delay in FTC, time in FTC, and costs from a payer perspective in 2000 US dollars. We found that 3.8 to 4.6 patients need to start treatment with galantamine to avoid 1 year of FTC. Savings are $2,374 to $3,575 per treated patient. In mild AD, the NNT is 4.3, with savings of $2,181 per treated patient, compared with 3.4 in moderate AD, with greater savings ($5,298). While time before FTC is longer in mild disease, the delay achieved is smaller. In addition to the proven clinical benefits of galantamine, its use in the management of AD in the United States is expected to lead to a delay in FTC and savings for both mild and moderate AD patients.

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31. Neurocysticercosis: 469 Cases From Los Angeles County Medical Center
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Here we report the largest series of neurocysticercosis (NC) cases in United States affecting only a selective population. Caused by Taenia solium, NC is one of the most common parasitic diseases of human brain. When symptomatic, NC can have severe and long-term affects on morbidity and increase health care cost. This was a retrospective chart review of patients with the diagnosis of NC from 1995 to 1998 at Los Angeles County and the USC Medical Center. There were 469 cases of NC that were identified using neuroimaging as the main diagnostic criteria. Only inpatients with a primary diagnosis of NC were included. Of 469 patients, 264 (56%) were males. Mean age was 35 years. Two thirds of the patients were in the second or third decade of life. Nearly all the patients were Hispanic. Most common clinical presentations included seizures (192 patients, 40%) and signs of increased intracranial pressure (126 patients, 26.8%), with 16% requiring surgical intervention. Other common presentations were headaches (65 patients, 13.8%), meningitis (27 patients, 5.7%), stroke (15 patients, 3.1%), and psychosis (8 patients, 1.7%). NC is one of the most known causes of seizures in our institution. As compared with previous studies, the common presenting signs are similar, but more patients with increased intracranial pressure required surgical intervention with shunt placement. Previous publications from our institution reported 127 cases of NC during 1970–1980 (12.7 per year) and 238 cases during 1981–1986 (39.6 per year). This study of 469 cases from 1995 to 1998 (117.25 per year) indicates nearly a 10-fold increase of NC in Southern California in the past 30 years. NC is prevalent mostly in the Hispanic population that has emigrated from endemic areas. The numbers of new cases within Los Angeles County are rising without exposure to these endemic areas, suggesting spread within the United States.