Original Contributions

Clinical Sciences

Adults With Late Stage 3 Chronic Kidney Disease Are at High Risk for Prevalent Silent Brain Infarction: A Population-Based Study
Chia-Chi Chou, MD; Li-Ming Lien, MD, PhD; Wei-Hung Chen, MD; Mai-Szu Wu, MD; Shiue-Ming Lin, MS; Hou-Chang Chiu, MD; Hung-Yi Chio, PhD; Chyi-Huey Bai, PhD

The Decline in Stroke Mortality: Exploration of Future Trends in 7 Western European Countries
Anton E. Kunst, PhD; Masoud Amiri, PhD; Fanny Janssen, PhD

Atherogenic Dyslipidemia in Patients With Transient Ischemic Attack
Gaia Sirimarco, MD; Dominique Deplagne, MD, PhD; Philippa C. Lavallée, MD; Julien Labreuche, BS; Elena Meseguer, MD; Lucie Cabrejo, MD; Céline Guidoux, MD; Jean-Marc Olivot, MD, PhD; Halim Abboud, MD; Bertrand Lapergue, MD; Isabelle F. Klein, MD, PhD; Mikael Mazighi, MD, PhD; Pierre-Jean Touboul, MD; Eric Buckert, MD; Pierre Amarenco, MD

Age-Related Macular Degeneration and the Risk of Stroke: The Rotterdam Study
Renske G. Wieberdink, MD; Lintje Ho, MD; M. Kamran Ikram, MD, PhD; Peter J. Koudstaal, MD, PhD; Albert Hofman, MD, PhD; Paulus T.V.M. de Jong, MD, PhD; Johannes R. Vingerling, MD, PhD; Monique M.B. Breteler, MD, PhD

Oxfordshire Community Stroke Project Classification Poorly Differentiates Small Cortical and Subcortical Infarcts
Negar Asdagh, MD, MSc; Thomas Jeerakathil, MD, MSc; Bilal Hameed, MD, MSc; Kenneth Butcher, MD, PhD

The von Willebrand Inhibitor ARC1779 Reduces Cerebral Embolization After Carotid Endarterectomy: A Randomized Trial
Hugh S. Markus, FRCP; Charles McCollum, MD, FRCS; Chris Imray, FRCS; Michael A. Goulder, BSc; Jim Gilbert, MD; Alice King, BSc

Stroke Public Awareness Campaigns Have Increased Ambulance Dispatches for Stroke in Melbourne, Australia
Janet E. Bray, PhD(C); Ian Mosley, PhD; Michael Bailey, PhD; Bill Barger, ADHS; Chris Bladin, MD

Blood–Brain Barrier Permeability Abnormalities in Vascular Cognitive Impairment
Saeid Taheri, PhD; Charles Gasparovic, PhD; Branko N. Huisa, MD; John C. Adair, MD; Elaine Edmonds, MD, PhD; Jillian Prestopnik, PhD; Mark Grossetete, PhD; N. Jon Shah, PhD; John Wills, MD; Clifford Qualls, PhD; Gary A. Rosenberg, MD

Local Brain Temperature Reduction Through Intranasal Cooling With the RhinoChill Device: Preliminary Safety Data in Brain-Injured Patients
Alex Abou-Chebl, MD; Gene Sung, MD; Denise Barbut, MD, MRCP; Michel Torbey, MD
Iodinated Contrast Media and Cerebral Hemorrhage After Intravenous Thrombolysis
Niall J.J. MacDougall, MRCP; Fergal McVerry, MRCP; Sally Baird; Tracey Baird, MRCP; Evelyn Teasdale, FRCR; Keith W. Muir, MD, FRCP .......................................................... 2170

Intravenous Thrombolysis of Basilar Artery Occlusion: Predictors of Recanalization and Outcome
Tiina Sairanen, MD, PhD; Daniel Strbian, MD, PhD; Lauri Soime, MD, PhD; Heli Silvennoinen, MD, PhD; Olli Salonen, MD, PhD; Ville Arito, MD, PhD; Ilkka Koskela, MSc; Olli Häppölä, MD, PhD; Markku Kaste, MD, PhD; Perttu J. Lindsberg, MD, PhD; for the Helsinki Stroke Thrombolysis Registry (HSTR) Group .......................................................... 2175

Insulin-Like Growth Factor I Serum Levels Influence Ischemic Stroke Outcome
Ann De Smidt, MD; Raf Brouns, MD, PhD; Maarten Uyttenboogaart, MD, PhD; Sylvie De Raedt, MD; Maarten Moens, MD; Nadine Wilczak, PhD; Gert-Jan Luijckx, MD, PhD; Jacques De Keyser, MD, PhD ................................. 2180

Prediction of Early Stroke Risk in Transient Symptoms With Infarction: Relevance to the New Tissue-Based Definition
E. Murat Arsava, MD; Karen L. Furie, MD; Lee H. Schwamm, MD; A. Gregory Sorensen, MD; Hakan Ay, MD ................................. 2186

Acute Perfusion and Diffusion Abnormalities Predict Early New MRI Lesions 1 Week After Minor Stroke and Transient Ischemic Attack
Negar Asadghi, MD, MSc; Bilal Hameed, MD; Monica Saini, MD; Thomas Jeerakathil, MD, MSc; Derek Emery, MD, MSc; Kenneth Butcher, MD, PhD .......................................................... 2191

Early Ischemic Change on CT Versus Diffusion-Weighted Imaging for Patients With Stroke Receiving Intravenous Recombinant Tissue-Type Plasminogen Activator Therapy: Stroke Acute Management With Urgent Risk-factor Assessment and Improvement (SAMURAI) rt-PA Registry
Tomohisa Nezu, MD; Masatoshi Koga, MD; Iyoji Nakagawa, MD; Yoshiaki Shiokawa, MD; Hiroshi Yamagami, MD; EiSuKe Furui, MD; Kazumi Kimura, MD; Yasuhiro Hasegawa, MD; Yasushi Okada, MD; Satoshi Okuda, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Kazuo Minematsu, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Hiroshi Yamagami, MD; Eisuke Furui, MD; Kazumi Kimura, MD; Yasuhiro Hasegawa, MD; Yasushi Okada, MD; Satoshi Okuda, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Kazuo Minematsu, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Hiroshi Yamagami, MD; Eric Furui, MD; Kazumi Kimura, MD; Yasuhiro Hasegawa, MD; Yasushi Okada, MD; Satoshi Okuda, MD; Kauzumi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Kazuo Minematsu, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Hiroshi Yamagami, MD; Eisuke Furui, MD; Kazumi Kimura, MD; Yasuhiro Hasegawa, MD; Yasushi Okada, MD; Satoshi Okuda, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Kazuo Minematsu, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Hiroshi Yamagami, MD; Eisuke Furui, MD; Kazumi Kimura, MD; Yasuhiro Hasegawa, MD; Yasushi Okada, MD; Satoshi Okuda, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Kazuo Minematsu, MD; Kazuomi Kario, MD; Masaki Naganuma, MD; Koichi Maeda, MD; Hiroshi Yamagami, MD; E. Murat Arsava, MD; Karen L. Furie, MD; Lee H. Schwamm, MD; A. Gregory Sorensen, MD; Hakan Ay, MD ................................. 2196

Effects of Posture on Right-to-Left Shunt Detection by Contrast Transcranial Doppler
Sherwin Joy U. Aquistin, MD; Maricar P. Yumul, MD; Angelito Jonas L. Kalaw, MD; Boon Choon Teo, DipBiotech; Johnny Eng, DipBiotech; Ziqun Phua, BSc; Rajinder Singh, MD; Robert N. Gan, MD; Narayananswamy Venkatasubramanian, MD .......................................................... 2201

Imaging-Based Endovascular Therapy for Acute Ischemic Stroke due to Proximal Intracranial Anterior Circulation Occlusion Treated Beyond 8 Hours From Time Last Seen Well: Retrospective Multicenter Analysis of 237 Consecutive Patients
Tudor G. Jovin, MD; David S. Liebeskind, MD; Rishi Gupta, MD; Marilyn Rymer, MD; Ansaar Rai, MD; Osama O. Zaidat, MD, MS; Alex Abou-Chebl, MD; Blaise Baxter, MD; Elad I. Levy, MD; Andrew Barreto, MD; Raoul G. Nogueira, MD ................................. 2206

A Systematic Review of Stenting and Angioplasty of Symptomatic Extracranial Vertebral Artery Stenosis
Aaron N. Stayman, MD; Raoul G. Nogueira, MD; Rishi Gupta, MD ................................. 2212

Racial Disparities in Tissue Plasminogen Activator Treatment Rate for Stroke: A Population-Based Study
Amie W. Hsia, MD; Dorothy F. Edwards, PhD; Lewis B. Morgenstern, MD; Jeffrey J. Wing, MPH; Nina C. Brown, MPH; Regina Coles, MS; Sarah Loftin, BA; Andrea Wein, BA; Sara S. Koslosky, MPH; Sabina Fatima, MD; Brisa N. Sa ´nchez, PhD; Ali Fokar, MPH; M. Chris Gibbons, MD, MPH; Nawar Shara, Ph.D; Annapurni Jayam-Trouth, MD; Chelsea S. Kidwell, MD ................................. 2217

Comparison of Plasin With Recombinant Tissue-Type Plasminogen Activator in Lysis of Cerebral Thromboemboli Retrieved From Patients With Acute Ischemic Stroke
Victor J. Marder, MD; Ales Blinc, MD; Theresa Gruber, MS; Gregor Tratar, MD; Miso Sabovic, MD; Sidney Starkman, MD; Reza Jahan, MD; Gary Duckwiler, MD; Fernando Vinuela, MD; Satoshi Tateshima, MD; David Liebeskind, MD; Bruce Ovbiagele, MD; Letisha Ali, MD; Doojin Kim, MD; Nestor Gonzalez, MD; Paul M. Vespa, MD; Jeffrey L. Saver, MD ................................. 2222

Efficacy of Intravenous Tissue Plasminogen Activator in Central Retinal Artery Occlusion: Report From a Randomized, Controlled Trial
Celia S. Chen, MBBS, PhD, FRANZCO; Andrew W. Lee, MBBS, MPH, FRACP; Bruce Campbell, MBBS, FRACP; Tien Lee, MBBS; Mark Paine, MBBS, FRACP; Clare Fraser, MBBS; John Grigg, MBBS, FRANZCO; Romesh Markus, MBBS, PhD, FRACP .......................................................... 2229

Collateral Flow Averts Hemorrhagic Transformation After Endovascular Therapy for Acute Ischemic Stroke
Oh Young Bang, MD; Jeffrey L. Saver, MD; Suk Jae Kim, MD; Gyeong-Moon Kim, MD; Chin-Sang Chung, MD; Bruce Ovbiagele, MD; Kwang Ho Lee, MD; David S. Liebeskind, MD; for the UCLA-Samsung Stroke Collaborators ................................. 2235
Vitamin D Deficiency Is Associated With Subclinical Carotid Atherosclerosis: The Northern Manhattan Study
Angela L. Carrelli, MD; Marcella D. Walker, MD; Hyesoo Lowe, MD; Don J. McMahon, MS; Tatjana Rundek, MD, PhD; Ralph L. Sacco, MD, MS; Shonni J. Silverberg, MD ................................. 2240

Reliability and Validity of Bilateral Ankle Accelerometer Algorithms for Activity Recognition and Walking Speed After Stroke
Bruce H. Dobkin, MD; Xiaoyu Xu, BS; Maxim Batalin, PhD; Seth Thomas, BS; William Kaiser, PhD .......................... 2246

Impairment of Speech Production Predicted by Lesion Load of the Left Arcuate Fasciculus
Sarah Marchina, PhD; Lin L. Zhu, BA; Andrea Norton, BM; Lauryn Zipse, PhD; Catherine Y. Wan, PhD; Gottfried Schlaug, MD, PhD .......................... 2251

Cost-Effectiveness of Tissue-Type Plasminogen Activator in the 3- to 4.5-Hour Time Window for Acute Ischemic Stroke
Christie E. Tung, MD; Sandra S. Win, MD; Maarten G. Lansberg, MD, PhD ................................. 2257

Prehospital Notification by Emergency Medical Services Reduces Delays in Stroke Evaluation: Findings From the North Carolina Stroke Care Collaborative
Mehul D. Patel, MSPH; Kathryn M. Rose, PhD; Emily C. O’Brien, MSPH; Wayne D. Rosamond, PhD .......................... 2263

Correlation of Inpatient and Outpatient Measures of Stroke Care Quality Within Veterans Health Administration Hospitals
Joseph S. Ross, MD, MHS; Greg Arling, PhD; Susan Ofter, MS; Christianne L. Roumaine, MPH; Salomeh Keyhani, MD; Linda S. Williams, MD; Diana L. Ordin, MD, MPH; Dawn M. Bravata, MD .......................... 2269

Simplified Modified Rankin Scale Questionnaire: Reproducibility Over the Telephone and Validation With Quality of Life
Askiel Bruno, MD; Abiodun E. Akinwuntan, PhD; Chen Lin, BS; Brian Close, BS; Kristin Davis, MD; Vanessa Baute, MD; Tia Aryal, MD; Desiree Brooks, BS; David C. Hess, MD; Jeffrey A. Switzer, DO; Fenwick T. Nichols, MD ................................. 2276

Basic Sciences
Successful Microbubble Sonothrombolysis Without Tissue-Type Plasminogen Activator in a Rabbit Model of Acute Ischemic Stroke
William C. Culp, MD; Rene Flores, PhD; Aliza T. Brown, PhD; John D. Lowery, DVM; Paula K. Roberson, PhD; Leah J. Hennings, DVM; Scan D. Woods, BS; Jeff H. Hatton, BS; Benjamin C. Culp, MD; Robert D. Skinner, PhD; Michael J. Borrelli, PhD .......................... 2280

Statins Promote the Growth of Experimentally Induced Cerebral Aneurysms in Estrogen-Deficient Rats
Yoshiteru Tada, MD, PhD; Keiko T. Kitazato, BS; Kenji Yagi, MD, PhD; Kenji Shimada, MD; Nobuhisa Matsushita, MD; Tomoya Kinouchi, MD; Yasuhsita Kanematsu, MD, PhD; Junichiro Satomi, MD, PhD; Teruyoshi Kageji, MD, PhD; Shinji Nagahiro, MD, PhD .......................... 2286

Osteopontin Enhances Endogenous Repair After Neonatal Hypoxic–Ischemic Brain Injury
Cindy T.J. van Velthoven, PhD; Cobi J. Heijn, PhD; Frank van Bel, MD; Annemieke Kavelaars, PhD .......................... 2294

Delayed Paraplegia After Spinal Cord Ischemic Injury Requires Caspase-3 Activation in Mice
Manabu Kakinohana, MD, PhD; Kotaro Kida, MD, PhD; Shizuka Minamishima, MD; Dmitriy N. Atochin, MD, PhD; Paul L. Huang, MD, PhD; Masao Kaneki, MD, PhD; Fumito Ichinose, MD, PhD; Junichiro Satomi, MD, PhD; Teruyoshi Kageji, MD, PhD; Shinji Nagahiro, MD, PhD .......................... 2302

Natural Vitamin E α-Tocotrienol Protects Against Ischemic Stroke by Induction of Multidrug Resistance-Associated Protein 1
Han-A Park, Ph.D; Natalia Kubicki, BS; Surya Gnyawali, Ph.D; Yuk Cheung Chan, Ph.D; Sashwati Roy, Ph.D; Savita Khanna, Ph.D; Chandan K. Sen, Ph.D .......................... 2308

Antibodies Preventing the Interaction of Tissue-Type Plasminogen Activator With N-Methyl-D-Aspartate Receptors Reduce Stroke Damages and Extend the Therapeutic Window of Thrombolysis
Richard Macrez, PhD; Pauline Oubrig, MSC; Maxime Gauberti, MSC; Benoit Roussel, Ph.D; Amandine Baron, Ph.D; Jérome Parcq, Ph.D; Frédéric Cassé, MSC; Yannick Hommet; Cyril Orset, PhD; Véronique Agin, Ph.D; Laurent Bezin, PhD; Teresa Garcia Berrocoso, PhD; Karl Uwe Petersen, MD, PhD; Joan Montaner, MD, PhD; Eric Maubert, Ph.D; Denis Vivien, Ph.D; Caroline Alt, Ph.D .......................... 2315

Brief Reports
Right–Left Propensity and Lesion Patterns Between Cardiogenic and Aortogenic Cerebral Embolisms
Hye-Jin Kim, MD; Jong-Min Song, MD, PhD; Sun U. Kwon, MD, PhD; Bum-Joon Kim, MD; Duk-Hyun Kang, MD, PhD; Jae-Kwan Song, MD, PhD; Jong S. Kim, MD, PhD; Dong-Wha Kang, MD, PhD .......................... 2323
Oxidative Damage in Ischemic Stroke Revealed Using Multiple Biomarkers
Raymond C.S. Seet, MRCP; Chung-Yung J. Lee, PhD; Bernard P.L. Chan, MRCP; Vijay K. Sharma, MRCP; Hock-Luen Teoh, MRCP; Narayanaswamy Venkatasubramanian, FRCP; Erle C.H. Lim, FRCP; Wan-Ling Chong, RN; Woan-Foon Looi, BSc; Shan-Hong Huang, MSc; Benjamin K.C. Ong, FRCP; Barry Halliwell, DSc

Impact of Obesity on Stroke Outcome After Intravenous Thrombolysis
Hakan Sarikaya, MD; Firat Elmas; Marcel Arnold, MD; Dimitrios Georgiadis, MD; Ralf W. Baumgartner, MD

Subtherapeutic International Normalized Ratio in Warfarin-Treated Patients Increases the Risk for Symptomatic Intracerebral Hemorrhage After Intravenous Thrombolysis
Raymond C.S. Seet, MD; Yi Zhang, MD; S. Arthur Moore, MD; Eelco F. Wijdicks, MD, PhD; Alejandro A. Rabinstein, MD

Acute Physiology of Stroke Score
Karen C. Johnston, MD, MSc; Guofen Yan, PhD

Effects of Blood Pressure Lowering on Major Vascular Events Among Patients With Isolated Diastolic Hypertension: The Perindopril Protection Against Recurrent Stroke Study (PROGRESS) Trial
Hisatomi Arima, MD; Craig Anderson, MD; Teruo Omae, MD; Mark Woodward, PhD; Jun Hata, MD; Yoshitaka Murakami, PhD; Stephen MacMahon, PhD; Bruce Neal, MD; John Chalmers, MD; for the PROGRESS Collaborative Group

Comments and Opinions

Restoring Neuronal Function After Stroke by Cell Replacement: Anatomic and Functional Considerations
Marcel Dihne, MD; Hans-Peter Hartung, MD; Rüdiger J. Seitz, MD

Stroke Declines From Third to Fourth Leading Cause of Death in the United States: Historical Perspective and Challenges Ahead
Amytis Towfighi, MD; Jeffrey L. Saver, MD

Progress Review

Optimal End Points for Acute Stroke Therapy Trials: Best Ways to Measure Treatment Effects of Drugs and Devices
Jeffrey L. Saver, MD

Topical Review

Flow Diversion for Intracranial Aneurysms: A Review
Pietro I. D’Urso, MD; Giuseppe Lanzino, MD; Harry J. Cloft, MD, PhD; David F. Kallmes, MD CME

Basic Science Advances for Clinicians

Stem Cell Research in Stroke: How Far From the Clinic?
Olle Lindvall, MD, PhD; Zaal Kokaia, PhD

Emerging Therapy Critiques

Apixaban in Atrial Fibrillation: From Bleeding Cows to 21st Century Medicinal Chemistry
Brett L. Cucchiara, MD; Scott E. Kasner, MD

Letters to the Editor

Michel Romanens, MD Web Site Feature
Ellisiv B. Mathiesen, MD, PhD; Tom Wilskaard, PhD [Web Site Feature] ....................................................... ★ e415

Letter by McColl et al Regarding Article, “Influenza Virus Infection Aggravates Stroke Outcome”
Barry W. McColl, PhD; Stuart M. Allan, PhD; Adam Denes, PhD; Catherine B. Lawrence, PhD [Web Site Feature] ....................................................... ★ e416

Response to Letter by McColl et al Regarding Article, “Influenza Virus Infection Aggravates Stroke Outcome”
Saijad Muhammad, MD; Oliver Planz, PhD; Markus Schwanninger, MD [Web Site Feature] ....................................................... ★ e417

Letter by Pristipino and Hamon Regarding Article, “Cerebral Microembolism During Coronary Angiography: A Randomized Comparison Between Femoral and Radial Arterial Access”
Christian Pristipino, MD; Martial Hamon, MD [Web Site Feature] ....................................................... ★ e418

Response to Letter by Pristipino and Hamon Regarding Article, “Cerebral Microembolism During Coronary Angiography: A Randomized Comparison Between Femoral and Radial Arterial Access”
Juliane Jurga, MD; Jesper Nyman, MD; Nondita Sarkar, MD [Web Site Feature] ....................................................... ★ e419

ASA/ACCF/AHA/AANN/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS
Guideline

Thomas G. Brott, MD, Co-Chair; Jonathan L. Halperin, MD, Co-Chair; Suhny Abbara, MD; J. Michael Bacharach, MD; John D. Barr, MD; Ruth L. Bush, MD, MPH; Christopher U. Cates, MD; Mark A. Creager, MD; Susan B. Fowler, PhD; Gary Friday, MD; Vicki S. Hertzberg, PhD; E. Bruce McIff, MD; Wesley S. Moore, MD; Peter D. Panagos, MD; Thomas S. Riles, MD; Robert H. Rosenwasser, MD; Allen J. Taylor, MD [Web Site Feature] ....................................................... ★ e420–e463

Thomas G. Brott, MD, Co-Chair; Jonathan L. Halperin, MD, Co-Chair; Suhny Abbara, MD; J. Michael Bacharach, MD; John D. Barr, MD; Ruth L. Bush, MD, MPH; Christopher U. Cates, MD; Mark A. Creager, MD; Susan B. Fowler, PhD; Gary Friday, MD; Vicki S. Hertzberg, PhD; E. Bruce McIff, MD; Wesley S. Moore, MD; Peter D. Panagos, MD; Thomas S. Riles, MD; Robert H. Rosenwasser, MD; Allen J. Taylor, MD [Web Site Feature] ....................................................... ★ 464–e540

Corrections [Web Site Feature] ....................................................... ★ e541–e542

On the cover: The illustration is taken from an article in this issue “Impairment of Speech Production Predicted by Lesion Load of the Left Arcuate Fasciculus” by Marchina et al (Stroke. 2011;42:2251–2256). The illustration is Figure 1A, from the article.