



The Virtual International Stroke Trials Archive



Annual Report April 2015

**VIRTUAL INTERNATIONAL STROKE TRIALS
ARCHIVE**

Update for the European Stroke Organisation Conference 2015

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VISTA-Acute

Update from the VISTA-Acute Chair



With 58 publications arising from VISTA-Acute analyses, this section of the archive has been highly successful.

These manuscripts are also attracting citations and have featured in clinical guidelines.

However, there have been limited changes in the data available to VISTA-Acute over the last year and I had anticipated a gradual decline in analytic activity as a result. It seems, though, that the size and quality of the dataset has supported a continued trickle of applications and a very occasional enquiry from industry. Our challenge is to encourage younger researchers to use the data but at the same time to maintain quality of output. Journals will increasingly look at the output to assess if there is genuinely new material being presented or whether we are starting to scrape the bottom of the barrel. The steering committee may need to offer leadership on this, perhaps by being more robust in review of applications, perhaps by attracting novel ideas and data. Student projects can still be supported readily, and in principle there is no reason why the data - or a subset - may not be used for training purposes, i.e. projects could be recycled to more than one student **if students and supervisors accept that publication is not an option.**

Some of the additional VISTA-Acute data that are being sought at present overlap with VICCTA, and are primarily being sought under VICCTA leadership. The AF detection trial data are a good example.

Future directions for the acute datasets should be discussed by the executive. Financial viability of the arm may be limited without fresh data and projects.

Kennedy R. Lees,
April 2015

Founding Members:



K. R. Lees



P. Bath



S. Davis



H-C Diener



G. Donnan



M. Fisher



W. Hacke



N.G. Wahlgren

Summary

30,320 Individual Anonymised Patient Records Available within VISTA-Acute

23 Ongoing Projects

58 Peer-Reviewed Publications based on novel analyses

72 Abstracts Presented at Conferences

2 European Stroke Conference Young Investigator Awards

Steering Committee

K.R. Lees (Chair)	Institutes of Cardiovascular and Medical Sciences, University of Glasgow, UK
E. Bluhmki	Boehringer Ingelheim, Biberach, Germany
B. Gregson	Dept. of Neurosurgery, Newcastle University, Newcastle General Hospital, UK
G. Donnan,	Neurology, University of Melbourne, Australia
H. C. Diener	Department of Neurology, University Duisburg-Essen, Hufelandstrasse, Essen, Germany
J. Grotta	Department of Neurology, University of Texas, Houston Medical School, USA
J. Marler	Food and Drug Administration , USA
P. Teal	Professor of Stroke Neurology, University of British Columbia, Vancouver
M.G. Hennerici	Department of Neurology, University of Heidelberg, Germany
N.G. Wahlgren	Karolinska Hospital, Stockholm, Sweden
P. Lyden	Cedars-Sinai Medical Center, Los Angeles, USA
P.W. Bath	Institute of Neuroscience, University of Nottingham, UK
R. Sacco	Miller School of Medicine, University of Miami, USA
S.M Davis	Department of Neurology, Royal Melbourne Hospital, University of Melbourne, Australia

W. Hacke	Department of Neurology, University of Heidelberg, Germany
S. Warach	Department of Neurology and Neurotherapeutics, UT Southwestern Medical Center, Austin, TX
M. Fisher	Dept of Neurology, University of Massachusetts Medical School, USA
M. Hommel	Joseph Fourier University, Grenoble, France
M. Kaste	Department of Neurology, Helsinki University Central Hospital, University of Helsinki, Finland
K. Muir	Division of Clinical Neurosciences, University of Glasgow, Glasgow, UK
A. Shuaib	Director, Stroke Program, University of Alberta, Canada
C. Weimar	Department of Neurology, University Hospital Essen, University of Duisburg-Essen, Essen, Germany
A. Alexandrov	University of Alabama Hospital, Birmingham, AL, USA
N Bornstein	Professor of Neurology at the Tel-Aviv University, Sackler Faculty of Medicine, Israel
M. Ginsberg	Department of Neurology, University of Miami Miller School of Medicine, Miami, USA

Ongoing Research Titles

1. Flint et al, "Examination of the THRIVE score in continuous form (THRIVE-c)."
2. BrainsGate Update, "Updated Prognostic Model Based on Historical Controls Matching BrainsGate's Study Population."
3. Ford et al, "Validation of DASH II decision making analytic model."
4. Hussein et al, "Effect of Cigarette Smoking on Outcomes of Acute Ischemic Stroke Treated with Intravenous or Intra-arterial Thrombolysis: Is There Any Paradox in The Brain?"
5. Dawson et al, "Antithrombotic Therapy after Stroke."
6. Dawson et al, "Medication burden and clinical outcomes early after acute stroke."
7. Lees et al, "Patient outcomes following stroke according to baseline level of renal function."
8. Scheitz et al, "Sulphonylurea use and infectious complications."
9. Scheitz et al, "Sulphonylurea use and haemorrhagic complications."
10. Endres et al, "Impact of Resting Heart Rate on Mortality and Morbidity After Acute Ischemic Stroke."
11. Ginsberg et al, "Controlled comparison of treatment groups from ALIAS-2 and VISTA."
12. Mazya et al, "SITS ICH Score."
13. Saini et al, "Effect of Blood Pressure Variations on Acute Ischemic Stroke Outcomes, in relation to specific patient populations."

14. Saini et al, "Study of effect of metabolic syndrome on ischaemic stroke outcomes."
15. Michel et al, "Extension and further validation of ASTRAL score's prognostic performance."
16. Fulton et al, "Exploration of case-control matching using historical controls for use in exploratory clinical trials: an evaluation using VISTA and SITS-East."
17. Kar et al, "A retrospective comparison between patients receiving autologous mononuclear bone marrow cells in stroke and matched VISTA controls."
18. Quinn et al, "Validation of SF-SIS."
19. Quinn et al, "Derivation and validation of a short form Barthel Index for ADLs."
20. Whiteley et al, "Validation of prognostic models for haemorrhagic and thrombotic events after stroke."
21. Saposnik et al, "Comparative models for estimating stroke outcomes."
22. Phan et al, "Application of stroke severity and comorbidity index to the prediction of 90 day outcome after ischemic stroke."
23. C. Hametner, "Relationship between sex and lesion side/site in acute ischemic stroke."

Publications based on Novel Analyses

1. Dawson J, Lees JS, Chang TP, Walters MR, Ali M, Davis SM, Diener HC, Lees KR, for the GAIN and VISTA Investigators. Association between disability measures and healthcare costs after initial treatment for acute stroke. *Stroke*.2007;38:1893-1898
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5. Quinn TJ, Dawson J, Lees JS, Chang TP, Walters MR, Lees KR; GAIN and VISTA Investigators. Time spent at home post-stroke: "home-time" a meaningful and robust outcome measure for stroke trials. *Stroke* 2008; 39: 231-3
6. Ovbiagele B; Starkman S; Teal P; Lyden P; Kaste M; Davis SM; Hacke W; Fierus M; Saver JL; on behalf of the VISTA Investigators, Serum Calcium as Prognosticator in Ischemic Stroke. *Stroke*. 2008;39:2231-2236
7. Hallevi H, Albright KC, Martin-Schild S, Barreto AD, Grotta JC, Savitz SI. The complications of cardioembolic stroke: lessons from the VISTA database. *Cerebrovasc Dis* 2008; 26:38-40.
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13. Sare GM, Ali M, Shuaib A, Bath PMW, for the VISTA Collaboration. Relationship Between Hyperacute Blood Pressure and Outcome After Ischemic Stroke. *Stroke* 2009; 40:2098-2103.
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15. Kamel H, Lees KR, Lyden P, Teal PA, Shuaib A, Ali M and Johnston SC, on behalf of the VISTA Investigators. Delayed detection of atrial fibrillation after ischaemic stroke. *Journal of Stroke and Cerebrovascular Diseases*, 2009; 18: (6):453-457
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20. Ovbiagele B, Lyden PD, Saver JL, for the VISTA Collaboration. Disability status at one month is a reliable proxy for final ischaemic stroke outcome. *Neurology* 2010;24;75(8):688-92.
21. Mishra NK, Lyden PL, Grotta J, Lees KR, for the VISTA collaborators. Thrombolysis Is Associated With Consistent Functional Improvement Across Baseline Stroke Severity: A Comparison of Outcomes in Patients From the Virtual International Stroke Trials Archive (VISTA), *Stroke* 2010; 41:2612-2617.
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23. Mishra N.K, Ahmed N, Andersen G, Herrero JE, Lindsberg P, Wahlgren N, Lees KR, for SITS and VISTA. Thrombolysis in very elderly people: controlled comparison of SITS International Stroke Thrombolysis Registry and Virtual International Stroke Trials Archive. *BMJ* 2010, 341:c6046.

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- Alteplase Treatment Based on a Prognostic Score, *International Journal of Stroke* 2013; doi: 10.1111/j.1747-4949.2012.00943.x.
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 51. Ali M, Lyden P, Brady M, on Behalf of the VISTA Collaboration. Aphasia and Dysarthria in Acute Stroke: Recovery and Functional Outcome. *International Journal of Stroke* 2013 DOI: 10.1111/ij.s.12067

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54. Abdul-Rahim A H, Fulton RL, Frank B, McMurray JJV, and Lees KR, Associations of Chronic Heart Failure with Outcome in Acute Ischaemic Stroke Patients who received Systemic Thrombolysis: Analysis from VISTA. *European Journal of Neurology* 2014, (DOI: 10.1111/ene.12548).
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57. Abdul-Rahim, AH, Fulton RL, Sucharew H, Kleindorfer D, Khatri P, Broderick JP, Lees KR, for the VISTA Collaborators, National Institutes of Health Stroke Scale Item Profiles as Predictor of Patient Outcome: External validation on independent trial data. *Stroke* 2014 DOI: 10.1161/STROKEAHA.114.006837
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VISTA-Rehab

Update from the VISTA-Rehab Chair



Since its inception in 2008, the profile of VISTA-Rehab's data archive has been distinct from that of other members of the VISTA family. Despite the generous contribution of 44 randomised controlled rehabilitation trials to the archive, the limited overlap in datasets constrained our original plans for utilizing these data.

However, bringing so many trials together into a single archive served to highlight the extent of these limitations. In turn this has generated papers which have communicated these methodological and reporting challenges. This has informed funding applications to encourage consistency across rehabilitation datasets and reporting criteria; this will in turn improve the relevance, reliability and transparency of stroke rehabilitation research.

We have continued to build the archive focusing our efforts and research funding applications on specific topic areas. Some of our topic-specific efforts have involved utilizing VISTA-Acute data sets. The European Cooperation in Science and Technology (COST) has also supported the development of an international network of aphasia trialists over the next four years. It currently supports members from across 25 countries, many of whom have completed aphasia trials in the past.

Other methodological research led by Dr Chris Weir (University of Edinburgh), and funded by the Stroke Association (UK) will investigate approaches to meta-analyzing naturally skewed stroke rehabilitation data. Using VISTA-Rehab data he plans to investigate and evaluate different approaches to dealing with these statistically complex outcome variables.

Marian C. Brady

April 2015

Founding Members:



M. C. Brady



K. R. Lees



M. Walker



P. Langhorne



A. Pollock

Summary

10,768 Individual Anonymised Patient Records Available within VISTA-Rehab

44 Trials Contributed

11 Commitments to Contribute Data

5 Ongoing Projects

4 Peer-Reviewed Publications & Commentary Articles

21 Abstracts Presented at Conferences

Steering Committee

M.C. Brady (Chair)	NMAHP Research Unit, Glasgow Caledonian University, UK
M. Ali	NMAHP Research Unit, Glasgow Caledonian University, UK
A. Ashburn	School of Health Sciences, University of Southampton, UK
D. Barer	Stroke Research Team, Queen Elizabeth Hospital, Gateshead, UK
J. Bernhardt	The Florey Institute of Neuroscience and Mental Health, Heidelberg, Australia
A. Bowen	School of Psychological Sciences, University of Manchester, UK
E. Brodie	Department of Psychology, Glasgow Caledonian University, UK
S. Corr	Division of Occupational Therapy, University of Northampton, Northampton, UK
A. Drummond	Faculty of Medicine and Health Sciences, University of Nottingham, UK
J. Edmans	School of Community Health Sciences, University of Nottingham, UK
C. English	School of Health Sciences, University of South Australia, Australia.
J. Gladman	School of Community Health Sciences, University of Nottingham, UK
T. Hoffmann	Faculty of Health Sciences and Medicine, Bond University, Australia
L. Kalra	King's College London, London, UK

S. Kuys	Allied Health Research Collaborative, The Prince Charles Hospital, Queensland, Australia
P. Langhorne	Academic Section of Geriatric Medicine, Glasgow Royal Infirmary and Faculty of Medicine, University of Glasgow, UK
A.C. Laska	Danderyd Hospital, Stockholm, Sweden
K.R. Lees	Institutes of Cardiovascular and Medical Sciences, Faculty of Medicine, University of Glasgow, UK
N. Lincoln	Institute of Work, Health and Organisations, University of Nottingham, UK
P. Logan	School of Community Health Sciences, University of Nottingham, UK
L. Jongbloed	University of British Columbia, Canada
G. Mead	Clinical Sciences & Community Health, University of Edinburgh, UK
A. Pollock	NMAHP Research Unit, Glasgow Caledonian University, UK
V. Pomeroy	Health and Social Sciences Research Institute, University of East Anglia
H. Rodgers	Institute for Ageing and Health, Newcastle University, UK
C. Sackley	University of Birmingham, UK
L. Shaw	Institute for Ageing and Health, Newcastle University, UK
D.J. Stott	Academic Section of Geriatric Medicine, Glasgow Royal Infirmary, Glasgow UK.
K.S. Sunnerhagen	Section for Clinical Neuroscience and Rehabilitation, University of Gothenburg, Sweden
S. Tyson	Stroke & Vascular Research Centre, School of Nursing, Midwifery & Social Work, University of Manchester, UK
P. van Vliet	Division of Physiotherapy Education, School of Nursing, Midwifery and Physiotherapy, University of Nottingham
M. Walker	School of Community Health Sciences, University of Nottingham, UK
W. Whiteley	Department of Clinical Neurosciences, Western General Hospital, Edinburgh, UK

Ongoing Research Titles

1. Ali et al, Epidemiology, risk factors and natural history of UI after stroke

2. Quinn et al, Development and Validation of a Short Form for the Stroke Impact Scale.
3. Quinn et al, The derivation and validation of a short form Barthel Index (BI) of Activities of Daily Living scale.
4. Ali et al, Quality of Life after Acute Ischemic Stroke: Analysis of Utility Data from the Virtual International Stroke Trials Archive (VISTA)
5. Weir et al, Practical methods for meta-analysis of continuous outcomes, with examples in stroke rehabilitation.

Publications

1. Ali M, Ashburn A, Bowen A, Brodie E, Corr S, Drummond A, Edmans J, Gladman J, Kalra L, Langhorne P, Lees KR, Lincoln N, Logan P, Mead G, Patchick E, Pollock A, Pomeroy V, Sackley C, Sunnerhagen KS, van Vliet P, Walker M, Brady M, On behalf of the VISTA-Rehab Investigators, VISTA-Rehab: A Resource for Stroke Rehabilitation Trials, International Journal of Stroke, 2010;5: 447–452.
2. Brady M, Reduce, Reuse, Recycle. International Journal of Stroke, 2010;5:421-2
3. Ali M, Hazelton C, Lyden P, Pollock A, Brady M, on behalf of the VISTA Collaboration, Recovery from Post-Stroke Visual Impairment: Evidence from a Clinical Trials Resource, JNNR 2013;27: 133-141
4. Ali M, English C, Bernhardt J, Sunnerhagen KS and Brady M on behalf of the VISTA-Rehab Collaboration. More Outcomes than Trials: A Call for Consistent Data Collection across Stroke Rehabilitation Trials. International Journal of Stroke, 2013; 8:18-24.
5. Ali M, More Outcomes than Trials: A Call for Consistent Data Collection across Stroke Rehabilitation Trials. International Journal of Stroke Podcast 2013, <https://itunes.apple.com/ua/podcast/rehabilitation-edition-international/id610378155>.

Future Directions

VISTA-Protocols

Our experiences with VISTA-Rehab have highlighted a lack of detail in the descriptions of interventions in stroke rehabilitation trials in published papers. This hampers the replication and implementation of interventions that have been shown to be effective. As a result, many clinicians are unsure how to deliver interventions that are recommended in clinical guidelines.

Although some peer-reviewed journals now offer more space online to describe interventions, there is no single repository where interventions associated with peer-reviewed publications, are archived and accessible. We are now exploring the possibility of including such an archive under VISTA-Rehab. Initial preparatory work is underway. This includes an inventory of available protocols, CRFs, assessment guidelines and intervention descriptions within VISTA-Rehab. We will shortly begin contacting VISTA-Rehab trialists to encourage the contribution of more descriptive information on their trials, where required.

VISTA-ICH

Update from the VISTA-ICH Chair



VISTA-ICH has collated data from 3,232 individual patients.

We currently have 13 ongoing research projects using data in VISTA-ICH and look forward to publication of at least 2 new papers based on these analyses in the coming months.

We have expanded our focus to include the collation of individual scan images which correspond to clinical data currently held within VISTA. To this end, we have collated scans from 4 trials, totaling 2,416 patients with intracerebral haemorrhage. Images are available for analysis through our collaborations with VISTA-Imaging. To date, we have facilitated one project using these ICH scans and look forward to many more.

Daniel F. Hanley

April 2015

Founding Members:



D. F. Hanley



S. Davis



K. R. Lees

Summary

3,232 Individual Anonymised Patient Records Available within VISTA-ICH

13 Ongoing Projects

7 Peer-Reviewed Publications based on novel analyses

14 Abstracts Presented at Conferences

Steering Committee

K.R. Lees	Institutes of Cardiovascular and Medical Sciences, Faculty of Medicine, University of Glasgow, UK
D. Hanley	Division of Brain Injury Outcomes, The Johns Hopkins Medical Institutions, Baltimore, MD, USA
B. Gregson	Dept. of Neurosurgery, Newcastle University, Newcastle General Hospital, UK
P. Lyden	Cedars-Sinai Medical Center, Los Angeles, USA
K. Muir	Division of Clinical Neurosciences, University of Glasgow, Glasgow, UK
S. Mayer	Departments of Neurology and Neurosurgery, Columbia University College of Physicians and Surgeons, New York, USA
T. Steiner	Department of Neurology, University of Heidelberg, Germany
S. Davis	Department of Neurology, Royal Melbourne Hospital, University of Melbourne, Australia
K. Butcher	WMC Health Sciences Center, Edmonton, Alberta, Canada

Ongoing Research Titles

1. Zanieh et al, "Antiepileptic drugs in patients with spontaneous intracerebral hemorrhages."
2. Kellner et al "Edema volume as a predictor of neurological outcome following intracerebral hemorrhage."
3. D. Parson-Rich et al, "Natural history, variability in outcomes and variation in standard of care of the ICH population."
4. McKinney et al "Statin use on ICH outcomes."

5. Hajjar et al, "ICH Prediction Modelling."
6. Krishnan et al, "Comparison of baseline characteristics and outcomes of patients with spontaneous intracerebral haemorrhage from different ethnic backgrounds."
7. Florczak-Rzepka et al, "Biomarkers in ICH."
8. T. Tuthill et al, "Stroke Lesion Pattern Analysis to Predict Growth."
9. Salman et al, "Risk of acute sICH growth over time and its determinants: individual patient data meta-analysis."
10. Yip et al, "Perihaematoma oedema: a predictor of poor functional outcome on day 90 in ICH patients."
11. Phan et al, "An ordinal decision tree model for predicting outcome following ICH."
12. Wu et al, "Sulphonylureas and ICH."
13. W. Ziai et al, "Comparison of clinical outcomes following warfarin and antiplatelet associated intracerebral hemorrhage."

Publications based on Novel Analyses

1. Weimar C, Ziegler A, Sacco RL, Diener HC, Ziegler A, Koenig IR on behalf of the VISTA Investigators. Predicting recovery after intracerebral hemorrhage – an external validation in patients from controlled clinical trials. *J Neurol.* 2009; 256:464–469
2. Dowlathshahi D, Demchuk A, Flaherty ML, Ali M, Lyden P, and Smith EE, on behalf of the VISTA Collaboration. Defining hematoma expansion in intracerebral hemorrhage: relationship with patient outcomes. *Neurology* 2011 (in Press).
3. Ali M, Hazelton C, Lyden P, Pollock A, Brady M, on behalf of the VISTA Collaboration, Recovery from Post-Stroke Visual Impairment: Evidence from a Clinical Trials Resource, *JNNR* 2013 Feb;27(2):133-141
4. Ali M, Lyden P, Sacco RL, Shuaib A, Lees KR, for the VISTA investigators. Natural History of Complications after Intracerebral Haemorrhage. *European Journal of Neurology*; 2009: 16:624-630
5. Rincon F, Lyden P, and Mayer SA, on Behalf of VISTA Collaboration. Relationship Between Temperature, Hematoma Growth, and Functional Outcome After Intracerebral Hemorrhage. *Neurocritical Care* 2012 (In Press).
6. Morgan TC, Dawson J, Spengler D, Lees KR, Aldrich C, Mishra NK, Lane L, Quinn TJ, Diener-West M, Weir CJ, Higgins P, Rafferty M, Kinsley K, Ziai W, Awad I, Walters MR, Hanley DF, for the CLEAR and VISTA Investigators. The Modified Graeb Score. An Enhanced Tool for Intraventricular Hemorrhage Measurement and Prediction of Functional Outcome. *Stroke* 2013; 44: 635-641.
7. Lord AS, Gilmore E, Choi HA, Mayer SA, on behalf of VISTA-ICH Collaboration, Time Course and Predictors of Neurological Deterioration after Intracerebral Hemorrhage, *Stroke* 2015 (in Press).

VISTA-Prevention

Update from the VISTA-Prevention Chair



The contribution of trial data to VISTA-Preventions is contingent on the PIs and commercial sponsors completing secondary analyses before formal contribution to VISTA.

Data contribution was secured from Boehringer Ingelheim and Sanofi Aventis for CAPRIE, CHARISMA, & MATCH. Planned meta-analyses of data from anti-platelet trials are almost complete and we hope to have initial results in the coming months. A design paper was submitted to the International Journal of Stroke and is currently under review.

In the past 18 months we have welcomed data from the PRISM and VITATOPS trials, as well as scan data from a subsection of patients from the VITATOPS trial. We are in ongoing negotiations to secure the contribution of data from VISP.

We have started to utilize compiled data, with one project currently underway. This will make use of clinical datasets and patient scans.

Hans-Christoph Diener

April 2015

Founding Members:



H-C Diener



A. Algra



K. R. Lees

Summary

- 10,116** Individual Anonymised Patient Records Available within VISTA-Prevention
 - 6** Commitments to Contribute Data
 - 2** Ongoing Project
 - 4** Expressions of Interest in Collaboration
 - 7** Abstracts Presented at Conferences
-

Steering Committee

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B. Ovbiagele	Department of Neurosciences, Medical University of South Carolina, USA
A. Algra	Utrecht Stroke Center, Department of Neurology, Rudolf Magnus Institute of Neuroscience and Julius Center for General Health Sciences and Primary Care, University Medical Center, Utrecht, Netherlands
G. Hankey	Stroke Unit, Department of Neurology, Royal Perth Hospital, Australia
C. Weir	Edinburgh Health Services Research Unit, Edinburgh University, UK

Ongoing Projects

1. F. Arba et al, "Predictors of cognitive impairment after stroke."
2. F. Arba et al, "Natural history of cognitive impairment after stroke."

VISTA-Plus

Update from the VISTA-Plus Chairs



Since 2013, we have welcomed the contribution of trial data from SITS-MOST and IST-1. The latter comprises data from 19,435 patients with acute ischaemic stroke. We welcomed Prof. Peter Sandercock and Dr. Maciej Niewada to the VISTA-Plus Steering Committee as the representatives of this trial and look forward to the development of new research proposals to make use of these data.



Our focus is now shifting towards facilitating novel exploratory analyses of VISTA-Plus data. We currently have 2 projects ongoing and we look forward to the publication of their findings.

In 2014, we welcomed our first VISTA-Plus publication based on data from this resource (Flint et al) and look forward to the completion and publication of Patrik Michel's findings on the validation of the ASTRAL score.

As always, we continue to look for opportunities to expand the archive with the contribution of further data.

Nils-Gunnar Wahlgren & Christian Weimar

April 2015

Founding Members:



N.G Wahlgren K.R. Lees C. Weimar

Summary

35,884 Individual Anonymised Patient Records Available within VISTA-Plus

1 Completed Project

2 Ongoing Projects

2 Expressions of Interest in Collaboration

7 Abstracts Presented at Conferences

Steering Committee

K.R. Lees	Institutes of Cardiovascular and Medical Sciences, Faculty of Medicine, University of Glasgow, UK
H. Numinnen	Department of Clinical Neuroscience, Helsinki University Central Hospital, Helsinki, Finland
G. Tsivgoulis	School of Medicine, Democritus University of Thrace, Greece
C. Molina	Department of Neuroscience, Hospital Universitari Vall d'Hebron, Barcelona, Spain
N.G. Wahlgren	Karolinska Hospital, Stockholm, Sweden
S. Warach	Department of Neurology and Neurotherapeutics, UT Southwestern Medical Center, Austin, TX
C. Weimar	Department of Neurology, University Hospital Essen, University of Duisburg-Essen, Essen, Germany
P. Sandercock	Department of Clinical Neurosciences, University of Edinburgh, Department of Clinical Neurosciences, Western General Hospital, Edinburgh, UK
M. Niewada	Department of Clinical and Experimental Pharmacology, Warsaw Medical University, Poland Department of Neurology, Institute of Psychiatry and Neurology, Warsaw, Poland

Ongoing Research Titles

1. Michel et al, "Extension and further validation of ASTRAL score's prognostic performance."
2. Flint et al, "The THRIVE Score and SITS-MOST."

Publications based on Novel Analyses

1. Flint AC, Gupta R, Smith WS, Kamel H, Faigeles BS, Cullen SP, Rao VA, Bath PM, Wahlgren N, Ahmed N, Donnan GA; SITS International and VISTA-plus investigators. The THRIVE score predicts symptomatic intracerebral hemorrhage after intravenous tPA administration in SITS-MOST. *Int J Stroke*. 2014 Aug;9(6):705-10.

VISTA-Imaging

Update from the VISTA-Imaging Chair



VISTA-Imaging continues to expand and facilitate new research projects. The transfer of storage and coordination activities to Seton University Medical Centre has been completed.

Steven J. Warach

April 2015

Founding Members:



S.J. Warach



M. Wintermark

Summary

524 Individual Anonymised Patients Available within VISTA-Imaging

14 Ongoing Projects

10 Completed Projects

11 Peer-Reviewed Publications based on novel analyses

10 Abstracts Presented at Conferences

Steering Committee

G. W. Albers	Department of Neurology, Stanford University School of Medicine, Stanford, CA, USA
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J. C. Grotta	Department of Neurology, University of Texas Health Science Center, Houston, TX, USA
W. Hacke	Department of Neurology, University of Heidelberg, Heidelberg, Germany
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C. Kidwell	Department of Neurology and the Stroke Center, Georgetown University, Washington, DC, USA
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M. H. Lev	Department of Radiology, Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA
D. S. Liebeskind	Department of Neurology, UCLA Stroke Center, Los Angeles, CA, USA
A. G. Sorensen	Department of Radiology, Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA

V. N. Thijs	Laboratory of Neurobiology, Vesalius Research Center, VIB, Experimental Neurology and Leuven Research Institute for Neuroscience and Disease (LIND), University of Leuven (KU Leuven), Department of Neurology, University Hospital Leuven, Leuven, Belgium
G. Thomalla	University Medical Center Hamburg, Eppendorf, Hamburg, Germany
S. J. Warach	Seton/UT Southwestern Clinical Research Institute of Austin, Department of Neurology and Neurotherapeutics, UT Southwestern Medical Center, Austin, TX, USA
J. M. Wardlaw	Department of Clinical Neurosciences, Brain Research Imaging Centre, Division of Neuroimaging Sciences, Centre for Clinical Brain Sciences, University of Edinburgh, Edinburgh, UK
M. Wintermark	Department of Radiology, Neuroradiology, University of Virginia, Charlottesville, VA & Department of Radiology, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland

Ongoing Research Titles

1. 4D modeling of the evolution of acute ischemic stroke lesions (Rekik et al)
2. Prediction Neural Net (Bagher-Ebadian et al)
3. ACA digital map (Phan et al)
4. GLM (Wu et al)
5. IMAGER (Yoo et al)
6. PREDICT-A Natural History Study (Vagal et al)
7. Predicting malignant edema in large MCA infarct (Shang et al)
8. Timing Stroke Onset using ADC, FLAIR, and PWI (Ford et al)
9. Development of Image Processing Tools (Warach et al)
10. Timing Stroke Onset using ADC, FLAIR, and PWI (Ford et al)
11. Association of Cerebral Blood Volume with Early FLAIR Hyper-intensity in Acute Ischemic Stroke (Nagaraja et al)
12. Small vessel disease and stroke outcomes (Arba et al)
13. The effect of small vessel disease on radiological features after acute ischaemic stroke (Arba et al)
14. Small vessel disease and baseline Blood Brain Barrier permeability in acute ischaemic stroke before intravenous thrombolysis (Arba et al)

Publications

1. Thomalla G, Cheng B, Ebinger M, Hao Q, Tourdias T, Wu O, Kim JS, Breuer L, Singer OC, Warach S, Christensen S, Treszl A, Forkert ND, Galinovic I, Rosenkranz M, Engelhorn T, Köhrmann M, Endres M, Kang DW, Dousset V, Sorensen AG, Liebeskind DS, Fiebach JB, Fiehler J, Gerloff C; STIR and VISTA Imaging Investigators. DWI-FLAIR mismatch for the identification of patients with acute ischaemic stroke within 4·5 h of symptom onset (PRE-FLAIR): a multicentre observational study. *Lancet Neurol.* 2011 Nov;10(11):978-86.
2. Cheng B, Ebinger M, Kufner A, Köhrmann M, Wu O, Kang DW, Liebeskind D, Tourdias T, Singer OC, Christensen S, Warach S, Luby M, Fiebach JB, Fiehler J, Gerloff C, Thomalla G;

- Stroke Imaging Repository (STIR) Investigators. Hyperintense vessels on acute stroke fluid-attenuated inversion recovery imaging: associations with clinical and other MRI findings. *Stroke*. 2012 Nov;43(11):2957-61.
3. Kudo K, Christensen S, Sasaki M, Ostergaard L, Shirato H, Ogasawara K, Wintermark M, Warach S; For the Stroke Imaging Repository (STIR) Investigators, Accuracy and Reliability Assessment of CT and MR Perfusion Analysis Software Using a Digital Phantom. *Radiology*. 2012 267(1):201-11.
 4. Cheng B, Brinkmann M, Forkert ND, Treszl A, Ebinger M, Köhrmann M, Wu O, Kang DW, Liebeskind DS, Tourdias T, Singer OC, Christensen S, Luby M, Warach S, Fiehler J, Fiebach JB, Gerloff C, Thomalla G, on behalf of the STIR and VISTA Imaging Investigators. Quantitative measurements of relative fluid-attenuated inversion recovery (FLAIR) signal intensities in acute stroke for the prediction of time from symptom onset. *J Cereb Blood Flow Metab*. 2013 Jan;33(1):76-84.
 5. Scalzo F, Alger JR, Saver JL, Dani KA, Muir KW, Demchuk AM, Coutts SB, Luby M, Liebeskind DS, on behalf of the STIR and VISTA Imaging Investigators. Multi-center prediction of hemorrhagic transformation in acute ischemic stroke using permeability imaging features. *Magn Reson Imaging*. 2013 Jul;31(6):961-9.
 6. Wintermark M, Warach SJ, on behalf of the STIR and VISTA Imaging Investigators. Acute stroke imaging research roadmap II and international survey of acute stroke imaging capabilities: we need your help! *AJNR* 2013 Sep;34(9):1671.
 7. Wintermark M, Albers GW, Broderick JP, Demchuk AM, Fiebach JB, Fiehler J, Grotta JC, Houser G, Jovin TG, Lees KR, Lev MH, Liebeskind DS, Luby M, Muir KW, Parsons MW, von Kummer R, Wardlaw JM, Wu O, Yoo AJ, Alexandrov AV, Alger JR, Aviv RI, Bammer R, Baron JC, Calamante F, Campbell BC, Carpenter TC, Christensen S, Copen WA, Derdeyn CP, Haley EC Jr, Khatri P, Kudo K, Lansberg MG, Latour LL, Lee TY, Leigh R, Lin W, Lyden P, Mair G, Menon BK, Michel P, Mikulik R, Nogueira RG, Ostergaard L, Pedraza S, Riedel CH, Rowley HA, Sanelli PC, Sasaki M, Saver JL, Schaefer PW, Schellinger PD, Tsivgoulis G, Wechsler LR, White PM, Zaharchuk G, Zaidat OO, Davis SM, Donnan GA, Furlan AJ, Hacke W, Kang DW, Kidwell C, Thijs VN, Thomalla G, Warach SJ, on behalf of the STIR and VISTA Imaging Investigators. Acute Stroke Imaging Research Roadmap II. *Stroke*. 2013 Sep;44(9):2628-39.
 8. Wintermark M, Albers GW, Broderick JP, Demchuk AM, Fiebach JB, Fiehler J, Grotta JC, Houser G, Jovin TG, Lees KR, Lev MH, Liebeskind DS, Luby M, Muir KW, Parsons MW, von Kummer R, Wardlaw JM, Wu O, Yoo AJ, Alexandrov AV, Alger JR, Aviv RI, Bammer R, Baron JC, Calamante F, Campbell BC, Carpenter TC, Christensen S, Copen WA, Derdeyn CP, Haley EC Jr, Khatri P, Kudo K, Lansberg MG, Latour LL, Lee TY, Leigh R, Lin W, Lyden P, Mair G, Menon BK, Michel P, Mikulik R, Nogueira RG, Ostergaard L, Pedraza S, Riedel CH, Rowley HA, Sanelli PC, Sasaki M, Saver JL, Schaefer PW, Schellinger PD, Tsivgoulis G, Wechsler LR, White PM, Zaharchuk G, Zaidat OO, Davis SM, Donnan GA, Furlan AJ, Hacke W, Kang DW, Kidwell C, Thijs VN, Thomalla G, Warach SJ, on behalf of the STIR and VISTA Imaging Investigators. Acute Stroke Imaging Research Roadmap II. *AJNR*. 2013 Sep;34(9):e113.
 9. Artzi M, Aizenstein O, Jonas-Kimchi T, Bornstein N, Shopin L, Hallevi H, Ben Bashat D, on behalf of the STIR and VISTA Imaging Investigators Classification of Lesion Area in Stroke Patients During the Subacute Phase: A Multiparametric MRI Study. *Magn Reson Med*. 2013 Nov 14. DOI: 10.1002/mrm.25031.
 10. Leigh R, Jen SS, Hillis AE, Krakauer JW, Barker PB, on behalf of the STIR and VISTA Imaging Investigators. Pretreatment Blood Brain Barrier Damage and Post Treatment Intracranial Hemorrhage in Patients Receiving IV tPA. *Stroke*. 2014 Jul;45:2030-2035.
 11. Schröder J, Cheng B, Ebinger M, Köhrmann M, Wu O, Kang DW, Liebeskind DS, Tourdias T, Singer OC, Christensen S, Campbell B, Luby M, Warach S, Fiehler JB, Gerloff C, Thomalla G, STIR and VISTA Imaging Investigators. Validity of acute stroke lesion volume estimation by diffusion-weighted imaging-Alberta Stroke Program Early Computed Tomographic Score depends on lesion location in 496 patients with middle cerebral artery stroke. *Stroke*. 2014 Dec;45:3583-8.

Future Directions

Transition of STIR\VISTA-Imaging to Seton (Austin, TX) from NIH\NINDS is completed. The new website is <https://stir.seton.org>. We welcome the contribution of new trials and datasets to the resource. The DEFUSE investigators have contributed DEFUSE1 to VISTA Imaging. The manuscript formed from the TTST meeting in October 2014 involving the consensus statement, “How much imaging is needed for thrombolysis and thrombectomy, and for which patient?” has been completed and is in the submission process to Stroke. Discussions on the integration of VISTA-Imaging and VISTA-ICH are underway. The set fee structure was finalized at the last VISTA steering committee meeting. The fee structure has been implemented for all new projects.

VISTA-Endovascular

Update from the VISTA-Endovascular Chair



VISTA-Endovascular was launched in early 2013 as a repository for trials involving endovascular approaches to stroke treatment. Our collaborators in academia and industry have indicated a willingness to contribute data. To date, we have secured commitments from the IMS-3, EXTEND-IA, BASICS, SWIFT, SWIFT Prime, ESCAPE, REVASCAT, RELIENT, DAWN and MR RESCUE trialists.

Dr. David Liebeskind was appointed as the liaison between VISTA-Imaging and VISTA-Endovascular.

The last 6 months have been extremely successful for endovascular treatment of acute stroke. We have already received positive results from 4 trials, and we expect to see the results of three more trials at the ESOC in Glasgow.

The activities of VISTA-Endovascular will increase massively thereafter. Approaches to receive data from both active treatment and control arms of trials have been made. Some statistical analysis plans were made before the presentation of the first positive results.

We hope that the joint analyses will increase our understanding of currently unanswered questions, for example on subgroups that were not well represented in the individual trials.

Our first paper is has already accepted for publication in Stroke: Khatri P et al (2015) The State of Acute Endovascular Therapy: A Report from the 12th TTST Conference Stroke (in press).

Werner Hacke

April 2015

Founding Members:



W. Hacke



J. Broderick



H.C. Diener



J. Saver



P. Khatri



K.R. Lees

VISTA-Cognition

Introducing a new archive



We are pleased to announce the development of a new archive within VISTA to collate data on cognition in the stroke population. We are primarily interested in stroke cohorts with a minimum dataset of 50 patients, where multi-domain cognitive assessments and/or data describing clinical diagnosis of a recognized psychological syndrome were recorded.



Our initial requests for data have been met with enthusiasm; we have received data from 4 trials, totaling 562 individual patient data. We have secured a commitment to contribute data from a further study and 4 international studies are currently double checking their data sharing agreements.

We welcome the contribution of further datasets to VISTA-Cognition and look forward to the expansion of this section of the archive.

Martin Dichgans & Terry Quinn

April 2015

VISTA-StemCells

Introducing a new archive



We are pleased to announce the development of VISTA-StemCells. We aim for this archive to be inclusive. Target studies could include RCTs of exogenous stem cell transplantation, RCTs of cultured MSCs, RCTs of mobilisation of endogenous stem cells and natural history/observational studies that include patients likely to be in the target group for stem cells studies. Further details on this archive will be made available as and when development plans are solidified.

Philip Bath

April 2015

General VISTA Publications

1. Ali M, Bath PMW, Curram J, Davis SM, Diener HC, Donnan GA, Fisher M, Gregson BA, Grotta JC, Hacke W, Hennerici MG, Hommel M, Kaste M, Marler JR, Sacco R, Teal P, Wahlgren NG, Warach S, Weir CJ and Lees KR. The Virtual International Stroke Trials Archive. *Stroke* 2007;38:1905-1910.
2. Diener HC, Weimar C, Ali M, Lees KR, Die virtuelle internationale Schlaganfallstudien-Archiv (VISTA) – Bedeutung für die Schlaganfallforschung, *Akt Neurol* 2009;36:174-179 Weimar C, Ali M, Lees KR, Donnan GA, Diener HC, for the VISTA Steering Committee. The Virtual International Stroke Trials Archive (VISTA) – Results and impact on future stroke trials and management of stroke patients. *International Journal of Stroke* 2010; 5: 103-109.
3. Weimar C, Ali M, Lees KR, Donnan GA, Diener HC, for the VISTA Steering Committee. The Virtual International Stroke Trials Archive (VISTA) – Results and impact on future stroke trials and management of stroke patients. *International Journal of Stroke* 2010; 5: 103-109.
4. Ali M, Bath P, Brady M, Davis S, Diener H-C, Donnan G, Fisher M, Hacke W, Hanley DF, Luby M, Tsivgoulis G, Wahlgren N, Warach S, Lees KR, on behalf of the VISTA Steering Committees, Development, Expansion and Use of a Stroke Clinical Trials Resource for Novel Exploratory Analyses, *International Journal of Stroke* 2012;7: 133-138.

Contact Details

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