THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Email: clin@uabmc.edu

Stroke Recovery:
If a patient falls in the woods…?

Chen Lin, MD
Associate Professor
Department of Neurology, UAB
Neurology, Birmingham VA Medical Center

Financial Disclosure

- No relevant financial conflicts of interest
- Grant support from VA IK2 CX002104 and VA I21 RX003612.

Learning Objectives

- Overview of stroke recovery timeline
- Discuss selected post-stroke symptoms
- Post-stroke care
- Review Health-Related QOL in stroke

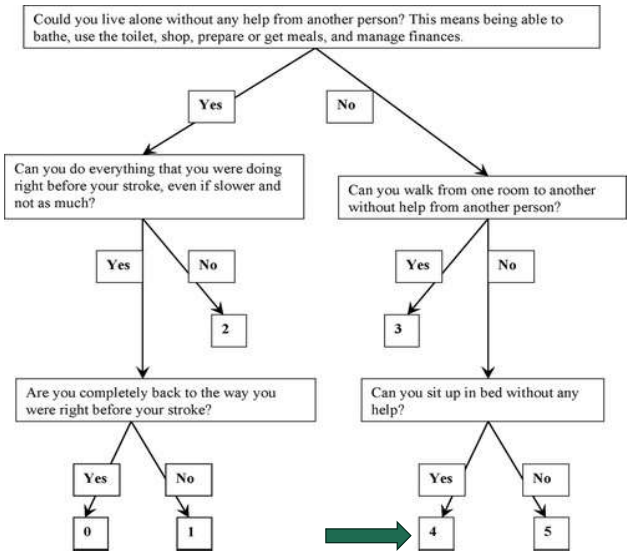
Case Presentation

- 72 yo M with recent stroke in last 3 months and received IV-alteplase. Completed inpatient rehabilitation. Residual deficits include mild L sided weakness- fine finger movements and mild foot drop. He walks without assistance.

The Joint Commission

Measure ID#	Measure Short Name	Measure Description
CSTK-10	Modified Rankin Score (mRS) at 90 Days: Favorable Outcome • IV t-PA Only – Independent • IV t-PA Only – Dependent • MER – Independent • MER - Dependent	This measure captures the proportion of ischemic stroke patients treated with intra-venous (IV) alteplase therapy or who undergo mechanical endovascular reperfusion therapy and have a mRS less than or equal to 2 at 90 days (≥75 days and ≤105 days).

Modified Rankin Score



Bruno, Akinwunta, & Lin. Stroke. 2010.

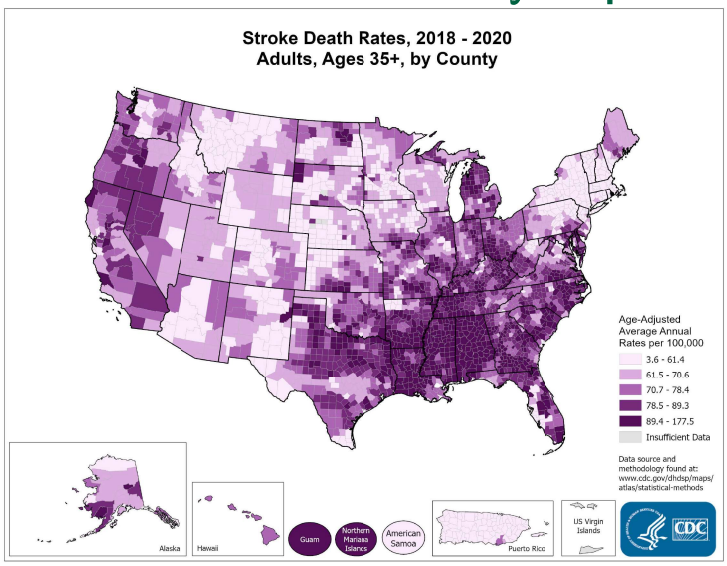
If a patient falls in the woods…

Is it a bad outcome?

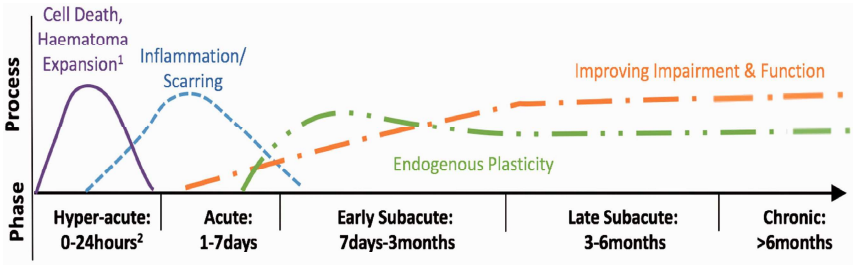
Stroke Statistics

- In the US, 5th leading cause of death.
- A leading cause of disability worldwide (CDC, 2015)
  - ~800,000 new stroke per year (AHA)
  - ~80% stroke patients will have motor deficits
  - NINDS estimates 7 million stroke survivors
- 45-60% of all stroke patients will need rehabilitation.
- At 6 months, 60% do clinically well but 40% are significantly disabled (Abrams).

CDC stroke mortality map

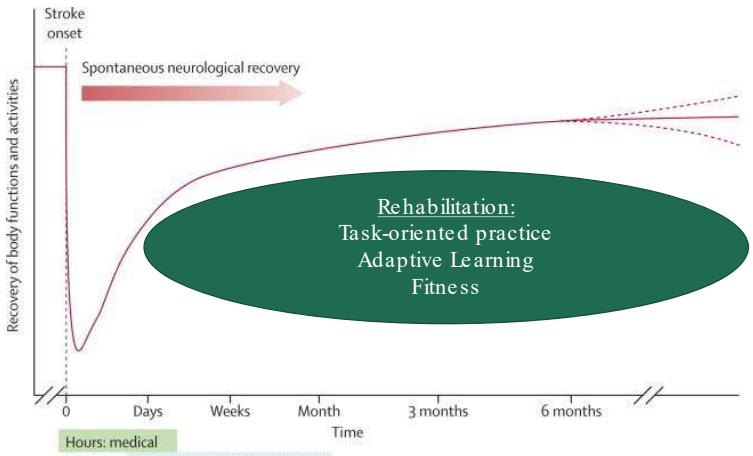


Neurobiology of motor recovery



[1] Haemorrhagic stroke specific. [2] Treatments extend to 24 hours to accommodate options for anterior and posterior circulation, as well as basilar occlusion.

Bernhardt J, Hayward KS, Kwakkel G, et al. Agreed definitions and a shared vision for new standards in stroke recovery research: The Stroke Recovery and Rehabilitation Roundtable taskforce. *International Journal of Stroke*. 2017;12(5):444-450. doi:10.1177/1747493017711816



Hours: medical

Hours–days: early mobilisation

Days–weeks: restoring impairments in order to regain activities

Days–months: task-oriented practice with adaptive learning and compensation strategies

Days–months: specific rehabilitation interventions (including physical fitness) to improve extended activities of daily living and social interaction

Weeks–months: environmental adaptations and services at home

Months–years: maintenance of physical condition and monitoring quality of life

Langhorne, P. Stroke Rehabilitation. Lancet Neurology, 2011.

Guidelines for Adult Stroke Rehabilitation and Recovery

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Endorsed by the American Academy of Physical Medicine and Rehabilitation and the American Society of Neurorehabilitation

The American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists and the American Congress of Rehabilitation Medicine also affirms the educational value of these guidelines for its members

Carolee J. Winstein, PhD, PT, Chair; Joel Stein, MD, Vice Chair; Ross Arena, PhD, PT, FAHA; Barbara Bates, MD, MBA; Leora R. Cherney, PhD; Steven C. Cramer, MD; Frank Deruyter, PhD; Janice J. Eng, PhD, BSc; Beth Fisher, PhD, PT; Richard L. Harvey, MD; Catherine E. Lang, PhD, PT; Marilyn MacKay-Lyons, BSc, MScPT, PhD; Kenneth J. Ottenbacher, PhD, OTR; Sue Pugh, MSN, RN, CNS-BC, CRRN, CNRN, FAHA; Mathew J. Reeves, PhD, DVM, FAHA; Lorie G. Richards, PhD, OTR/L; William Stiers, PhD, ABPP (RP); Richard D. Zorowitz, MD; on behalf of the American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, and Council on Quality of Care and Outcomes Research

Table 1. Applying Classification of Recommendations and Level of Evidence

ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	SIZE OF TREATMENT EFFECT: CLASS I *Benefit >>> Risk* Procedure/Treatment **SHOULD** be performed/ administered	CLASS IIa *Benefit >> Risk* *Additional studies with focused objectives needed* **IT IS REASONABLE** to perform procedure/administer treatment	CLASS IIb *Benefit ≥ Risk* *Additional studies with broad objectives needed; additional registry data would be helpful* Procedure/Treatment **MAY BE CONSIDERED**	CLASS III *No Benefit* or CLASS III *Harm* Procedure/Test: COR III: No benefit — Not Helpful; COR III: Harm — Excess Cost w/o Benefit or Harmful Treatment: No Proven Benefit; Harmful to Patients
LEVEL A Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses	■ Recommendation that procedure or treatment is useful/effective ■ Sufficient evidence from multiple randomized trials or meta-analyses	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Sufficient evidence from multiple randomized trials or meta-analyses
LEVEL B Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is useful/effective ■ Evidence from single randomized trial or nonrandomized studies	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Evidence from single randomized trial or nonrandomized studies
LEVEL C Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care	■ Recommendation that procedure or treatment is useful/effective ■ Only expert opinion, case studies, or standard of care	■ Recommendation in favor of treatment or procedure being useful/effective ■ Only diverging expert opinion, case studies, or standard of care	■ Recommendation's usefulness/efficacy less well established ■ Only diverging expert opinion, case studies, or standard of care	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Only expert opinion, case studies, or standard of care

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM. Email: clin@uabmc.edu © UAB. All Rights Reserved.

4.11. Rehabilitation

4.11. Rehabilitation	COR	LOE	New, Revised, or Unchanged
1. It is recommended that early rehabilitation for hospitalized stroke patients be provided in environments with organized, interprofessional stroke care.	I	A	Recommendation unchanged from 2016 Rehab Guidelines.
2. It is recommended that stroke survivors receive rehabilitation at an intensity commensurate with anticipated benefit and tolerance.	I	B-NR	Recommendation and Class unchanged from 2016 Rehab Guidelines. LOE amended to conform with ACC/AHA 2015 Recommendation Classification System.
3. High-dose, very early mobilization within 24 hours of stroke onset should not be performed because it can reduce the odds of a favorable outcome at 3 months.	III: Harm	B-R	Recommendation wording modified from 2016 Rehab Guidelines to match Class III stratifications. LOE revised. Class amended to conform with ACC/AHA 2015 Recommendation Classification System.
The AVERT RCT (A Very Early Rehabilitation Trial) compared high-dose, very early mobilization with standard-of-care mobility.[243] High-dose mobilization protocol interventions included the following: Mobilization was begun within 24 hours of stroke onset whereas usual care typically was 24 hours after the onset of stroke; there was a focus on sitting, standing, and walking activity; and there were at least 3 additional out-of-bed sessions compared with usual care. Favorable outcome at 3 months after stroke was defined as an mRS score of 0 to 2. A total of 2104 patients were randomly assigned (1:1). The results of the RCT showed that patients in the high-dose, very early mobilization group had less favorable outcomes (46% versus 50%) than those in the usual care group: 8% versus 7% of patients died in the very early mobilization group and 19% versus 20% had a nonfatal serious adverse event with high-dose, very early mobilization.			See Table LVIII in online Data Supplement 1.
4. It is recommended that all individuals with stroke be provided a formal assessment of their activities of daily living and instrumental activities of daily living, communication abilities, and functional mobility before discharge from acute care hospitalization and the findings be incorporated into the care transition and the discharge planning process.	I	B-NR	Recommendation and Class unchanged from 2016 Rehab Guidelines. LOE amended to conform with ACC/AHA 2015 Recommendation Classification System.
5. A functional assessment by a clinician with expertise in rehabilitation is recommended for patients with an acute stroke with residual functional deficits.	I	C-LD	Recommendation and Class unchanged from 2016 Rehab Guidelines. LOE amended to conform with ACC/AHA 2015 Recommendation Classification System.
6. The effectiveness of fluoxetine or other selective serotonin reuptake inhibitors to enhance motor recovery is not well established.	IIb	C-LD	Recommendation and Class unchanged from 2016 Rehab Guidelines. LOE revised from 2016 Rehab Guidelines.

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM. Email: clin@uabmc.edu © UAB. All Rights Reserved.

4.11. Rehabilitation

4.11. Rehabilitation	COR	LOE
1. It is recommended that early rehabilitation for hospitalized stroke patients be provided in environments with organized, interprofessional stroke care.	I	A
2. It is recommended that stroke survivors receive rehabilitation at an intensity commensurate with anticipated benefit and tolerance.	I	B-NR

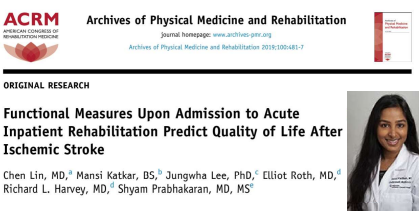
Is rehab important?

- Meta-analysis of 10 trials: 1586 pts randomized to multidisciplinary team rehab vs general medicine care:
  - 28% reduction in mortality at 4 month
  - 21% reduction in mortality at 1 year
  - Less need for SNF, fewer deaths, and less disability

- An extra 5 patients return home independent for every 100 patients receiving stroke rehab.

Langhorne et al, Lancet 1993
Duncan, Stroke 2001

Inpatient Rehabilitation


ACRM
Archives of Physical Medicine and Rehabilitation
journal homepage: www.archives-pmr.org
Archives of Physical Medicine and Rehabilitation 2019;100:481-7

ORIGINAL RESEARCH

Functional Measures Upon Admission to Acute Inpatient Rehabilitation Predict Quality of Life After Ischemic Stroke

Chen Lin, MD,[a] Mansi Katkar, DS,[b] Jungwha Lee, PhD,[c] Elliot Roth, MD,[d] Richard L. Harvey, MD,[d] Shyam Prabhakaran, MD, MS[e]


PM&R


PM&R
Transcranial doppler ultrasonography can predict inpatient rehabilitation functional outcome in patients with stroke.
DOI: 10.1002/pmrj.13161


NEUROLOGICAL RESEARCH
2023, VOL. 45, NO. 6, 578–582
https://doi.org/10.1080/01616412.2023.2167534

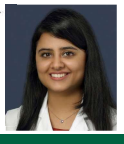
Taylor & Francis
Taylor & Francis Group

Check for updates

Association of inpatient rehabilitation with functional outcome in patients with stroke receiving mechanical thrombectomy

Chen Lin[a], Andrea Arevalo[a] and Hely D. Nanavati[b,c]

ORIGINAL RESEARCH ARTICLE



African Americans and Women Have Lower Functional Gains During Acute Inpatient Rehabilitation After Hemorrhagic Stroke

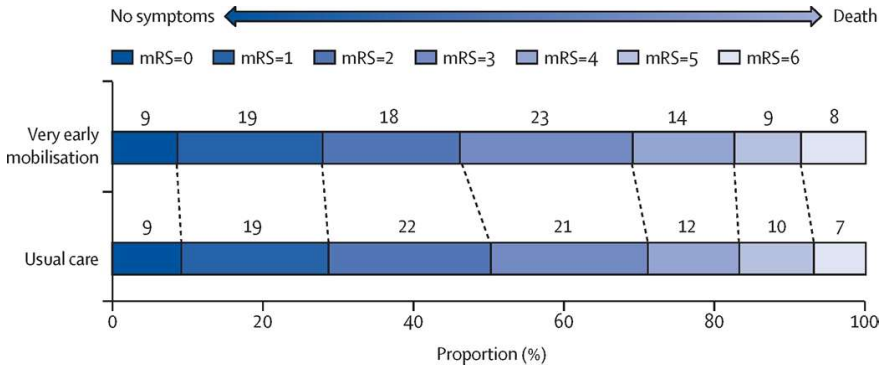
Sana Somani, MD, Hely Nanavati, MBBS, MPH, Xiaohua Zhou, MD, and Chen Lin, MD

3. High-dose, very early mobilization within 24 hours of stroke onset should not be performed because it can reduce the odds of a favorable outcome at 3 months.	III: Harm	B-R

AVERT: A Very Early Rehabilitation Trial

- Phase 3, Parallel-group, single-blind, RCT at 56 acute stroke units in five countries
- 2104 pts between 7/2006-10/2014
- Compared high-dose, very early mobilization with standard-of-care
- High-dose mobilization protocol: Mobilization was begun within 24 hours of stroke onset, focus on out of bed activities, and at least 3 additional out-of-bed sessions.
- Primary outcome: favorable mRS 0-2 at 3 months

Primary Outcome



46% VEM vs 50% UC in favorable (mRS0-2) outcome (adjusted odds ratio 0·73, 95% CI 0·59-0·90; p=0·004).
8% VEM vs 7% (OR 1·34, 95% CI 0·93-1·93, p=0·113) death

Table 2: Intervention Summary

	Very early mobilisation (n=1054)	Usual care (n=1050)	p value	Median shift (95% CI)
Time to first mobilisation (h)	18·5 (12·8–22·3; n=1042*)	22·4 (16·5–29·3; n=1036*)	<0·0001	4·8 (4·1–5·7)
Frequency per person†	6·5 (4·0–9·5)	3 (2·0–4·5)	<0·0001	3 (3–3·5)
Daily amount per person (min)‡	31 (16·5–50·5)	10 (0–18)	<0·0001	21·0 (20–22·5)
Total amount per person (min)§	201·5 (108–340)	70 (32–130)	<0·0001	117 (107–128)

- Most Usual Care still within 24 hours
- No difference in complication rates
- Did not record LVOs (Used Oxfordshire class system)
- Focus on intensive out of bed therapy, and very early initiation
- We know intensive therapy trials have not been successful

Approaches to therapy

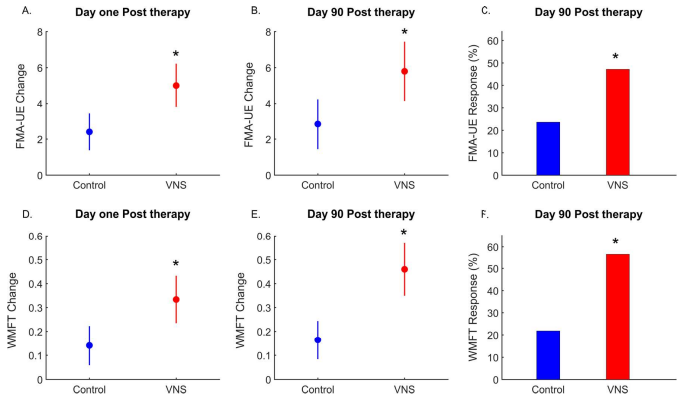
- Constraint- Induced Movement Therapy (CIMT)- started in 1993 but used in multiple therapy trials including EXCITE by Wolf et al (IIa, A).
- Robotics- generally Class II recommendations. Shown to have some benefit. Largest US study VA Robotics Trial did not show significant difference with therapy (IIa, A).
- Neuromodulation: neuromuscular E-stim, sensory stimulation, VNS, and tDCS (IIa-III).

TRANSPORT2

THE LANCET

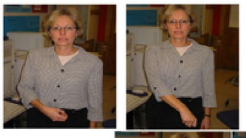
ARTICLES | VOLUME 397, ISSUE 10284, P1545-1553, APRIL 24, 2021

Vagus nerve stimulation paired with rehabilitation for upper limb motor function after ischaemic stroke (VNS-REHAB): a randomised, blinded, pivotal, device trial



What does a 3 Point Change on Fugl-Meyer mean?
Severe-Moderate Impairment

Severe:
Lift paretic arm to wash axilla
Fugl-Meyer 11 to 14



Place arm into sleeve
Fugl-Meyer 19 to 22

Moderate:
Tuck shirt, hike pants
Fugl-Meyer 25 to 28

FDA NEWS RELEASE

FDA Approves First-of-Its-Kind Stroke Rehabilitation System

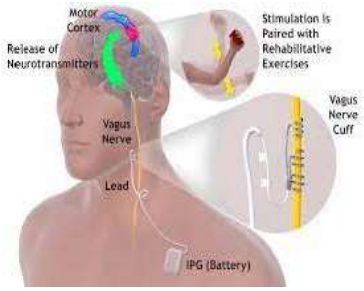
Share Tweet LinkedIn Email Print

For Immediate Release: August 27, 2021

Español

The U.S. Food and Drug Administration today approved the MicroTransponder Vivistim Paired VNS System (Vivistim System), a first-of-its-kind, drug-free rehabilitation system intended to treat moderate to severe upper extremity motor deficits associated with chronic ischemic stroke—a stroke caused by a blockage of blood flow to the brain with long-lasting symptoms—using vagus nerve stimulation (VNS).

"People who have lost mobility in their hands and arms due to ischemic stroke are often limited in their treatment options for regaining motor function" said Christopher M. Loftus, M.D., acting director of the FDA's Center for Devices and Radiological Health's Office of Neurological and Physical Medicine Devices. "Today's approval of the Vivistim Paired VNS System offers the first stroke rehabilitation option using vagus nerve stimulation. Used alongside rehabilitative exercise, this device may offer benefit to those who have lost function in their upper limbs due to ischemic stroke."



Other specific deficits

- Cognition
- Communication disorders (aphasia, etc.)
- Vision impairment
- Hearing loss and dizziness
- Post-stroke activities: exercise, driving, return to work

Post-stroke care

Recommendations: Organization of Poststroke Rehabilitation Care (Levels of Care)	Class	Level of Evidence
It is recommended that stroke patients who are candidates for postacute rehabilitation receive organized, coordinated, interprofessional care.	I	A
It is recommended that stroke survivors who qualify for and have access to IRF care receive treatment in an IRF in preference to a SNF.	I	B
Organized community-based and coordinated interprofessional rehabilitation care is recommended in the outpatient or home-based settings.	I	C
ESD services may be reasonable for people with mild to moderate disability.	IIb	B

Multidisciplinary Clinics

HEALTH SYSTEMS
2020, VOL. 9, NO. 2, 95–118
https://doi.org/10.1080/20476965.2018.1436909

REVIEW ARTICLE

OPEN ACCESS

Multi-disciplinary planning in health care: a review

A. G. Leeftink[a], I. A. Bikker[a,b], I. M. H. Vliegen[c] and R. J. Boucherie[a]

[a]Center for Healthcare Operations Improvement and Research, University of Twente, Enschede, Netherlands; [b]Department of Healthcare Logistics, Sint Maartenskliniek, Nijmegen, Netherlands; [c]Department of Industrial Engineering & Innovation Sciences, Eindhoven University of Technology, Eindhoven, Netherlands

Open Access Research

BMJ Open

Elements of integrated care approaches for older people: a review of reviews

Andrew M Briggs,[1,2] Pim P Valentijn,[3,4,5] Jotheeswaran A Thiyagarajan,[1] Islene Araujo de Carvalho[1]

- Benefits:
  - Standardization
  - Teamwork
  - Communication
  - Access
  - Satisfaction
  - Outcomes/QOL
  - Cost-effectiveness

Stroke Multidisciplinary Care

Journal of Multidisciplinary Healthcare

Dovepress
open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

A multidisciplinary stroke clinic for outpatient care of veterans with cerebrovascular disease

- Stroke mortality improving; patients living longer with disability and risk of further stroke
- Integrated care in other countries
- Pilot clinics in the US i.e. VA

Disability and Rehabilitation

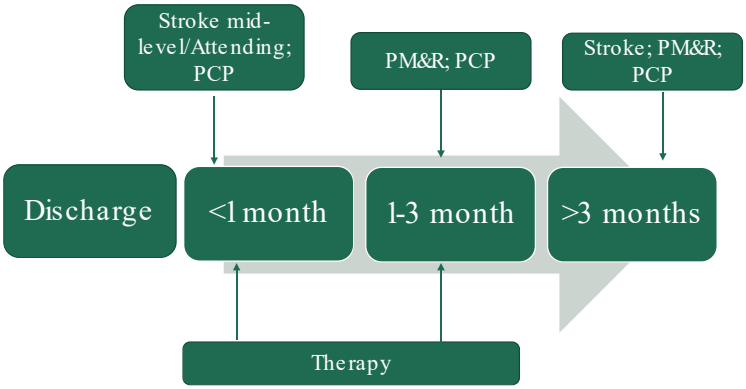
ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/idre20

Benefits of an interdisciplinary stroke clinic: addressing a gap in physical therapy at post-stroke neurology follow-up

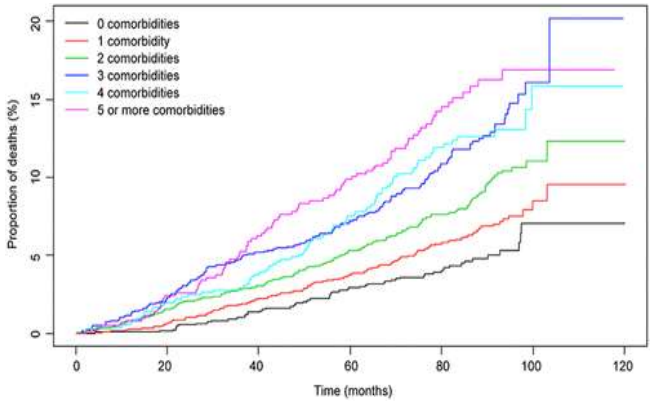
Nandakumar Nagaraja, Alison R. Kraus, Dorian K. Rose, Esther B. Olasoji, Anna Y. Khanna, Alexis N. Simpkins, Christina A. Wilson, Rondalyn R. Dickens, Vishnumurthy Shushrutha Hedna, Carolyn Geis, Teddy Youn & Michelle M. Musalo

- Vascular Neurologist + Physical Therapy
- 148 pts, with a significant number >6 months found to be appropriate for additional rehabilitation
- Worse walking performance and QOL associated with new referral for additional therapy

Traditional outpatient models



Why focus on the post-acute period?



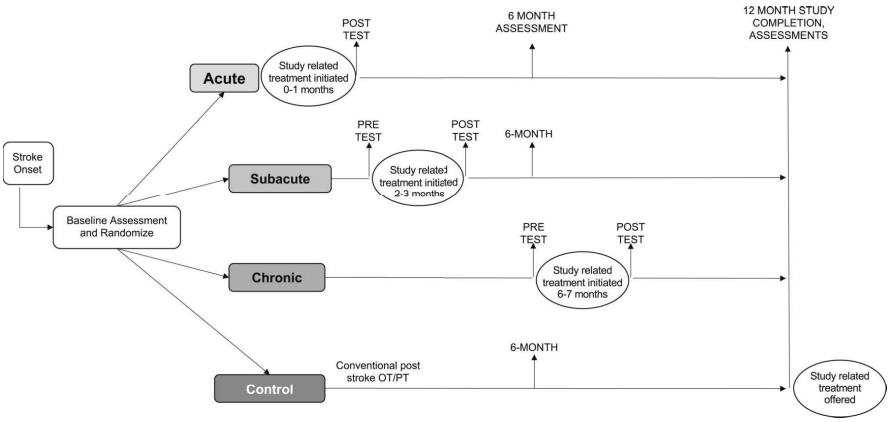
Katie I. Gallacher. Stroke. Multimorbidity in Stroke, Volume: 50, Issue: 7, Pages: 1919-1926, DOI: (10.1161/STROKEAHA.118.020376)

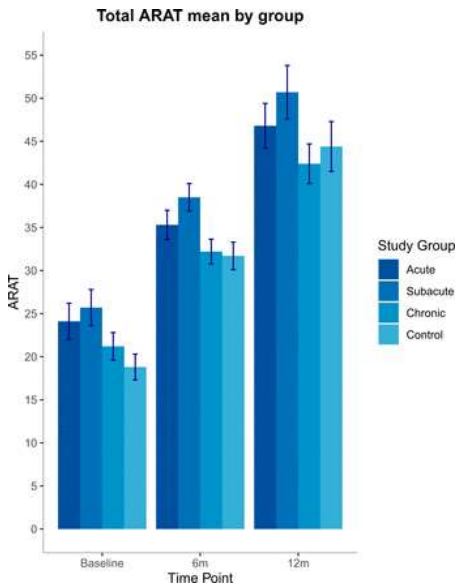
PNAS Proceedings of the National Academy of Sciences of the United States of America

RESEARCH ARTICLE

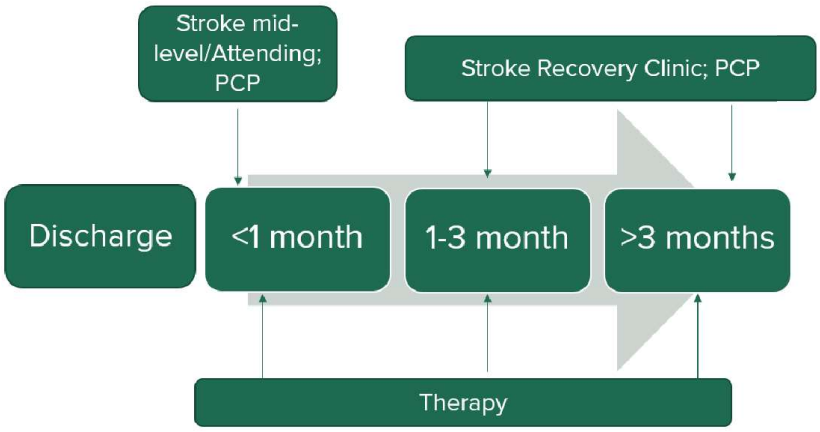
Critical Period After Stroke Study (CPASS): A phase II clinical trial testing an optimal time for motor recovery after stroke in humans

Alexander W. Dromerick, Shashwati Geed, Jessica Barth, Kathaleen Brady, Margot L. Giannetti, Abigail Mitchell, Matthew A. Edwardson, Ming T. Tan, Yizhao Zhou, Elissa L. Newport, and Dorothy F. Edwards

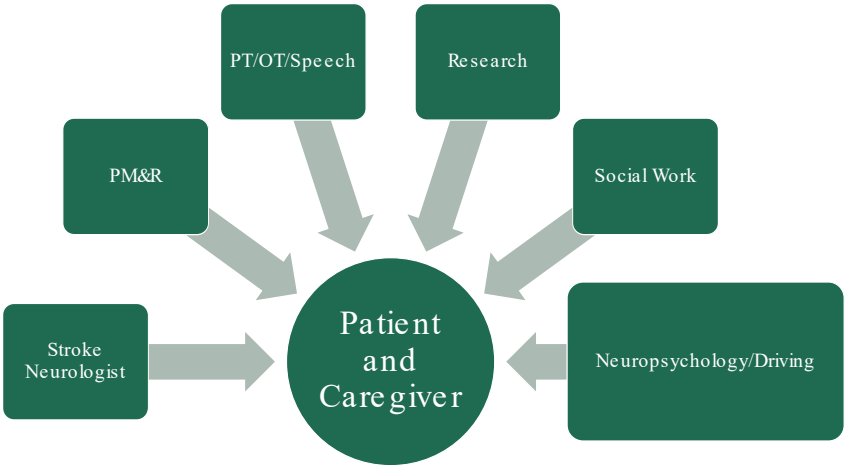




With Stroke Recovery Clinic



UAB Stroke Recovery Clinic



UAB Stroke Recovery Clinic

HEALTH & MEDICINE

New UAB Medicine stroke rehab clinic offers unique one-stop shopping

by Bob Shepard

January 30, 2019 | Print | Email

The new UAB Medicine Stroke Recovery Clinic at the University of Alabama at Birmingham will provide a unique opportunity for those recovering from a stroke to wrap the entire outpatient experience into one package. The multidisciplinary clinic offers the combined expertise of stroke neurologists with rehabilitation physicians and therapists so patients can have all their medical and rehabilitation needs met at one time in one place. The combination clinic is one of only a very few across the country and the only one of its type in the Southeast.

Xiaohua Zhou, M.D., and Chen Lin, M.D.

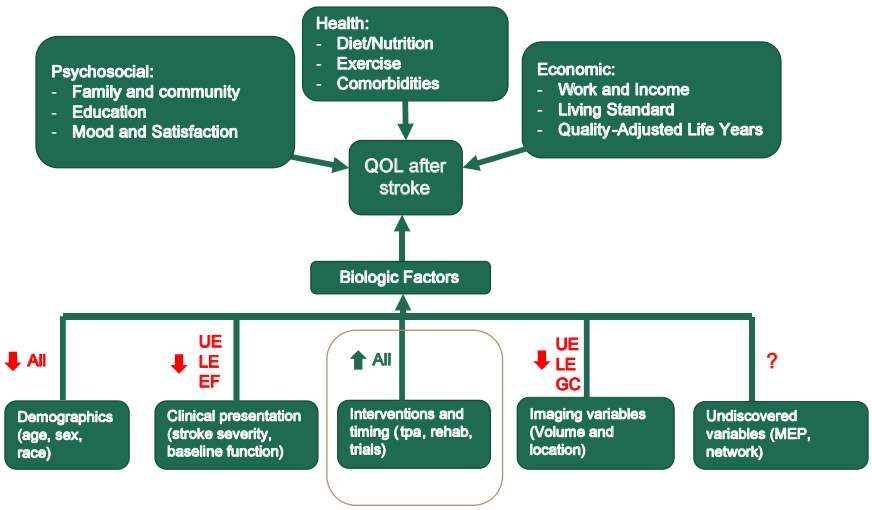
"Alabama is in the heart of the stroke belt, the region throughout the Southeast with the highest incidence of stroke in the nation," said Chen Lin, M.D., assistant professor in the UAB Department of Neurology in the School of Medicine. "Only a fraction of stroke survivors receive any rehabilitation after leaving the hospital. The Stroke Recovery Clinic encompasses the two medical disciplines most involved with treating stroke: the Department of Neurology and the Department of Physical Medicine and Rehabilitation."

Patient characteristics (n=29)	
Age, mean ± SD	62.7 ± 12.2
Sex	
Male	62.5%
Female	37.5%
Race	
White	45.8%
Black	50.0%
Unknown	4.2%
Impacted side	
Right	45.8%
Left	33.3%
Bilateral	4 (16.7%)
NIHSS, mean ± SD	6.9 ± 5.5
mRS, mean ± SD	3.1 ± 1.2
PHQ-9, mean ± SD	7.0 ± 4.6
Depression (PHQ-9 ≥5)	62.5%
Motricity index, mean ± SD	
Arm	65.3 ± 34.6
Leg	70.9 ± 30.3
Side	68.0 ± 29.8
MOCA, mean ± SD	17.8 ± 7.6
Hypertension	85.7%
Diabetes	53.3%

Health-Related Quality of Life

- Stroke outcomes have focused on functional status using disability scales ie mRS.
- HRQOL provide direct measure of patients' perspective on a given domain (depression, pain, function, etc.), without clinician interpretation (FDA)
- Patients' perspective of illness impacting their life's quality or function
- Ischemic stroke leads to impairment in QOL (REGARDS study Haley, 2011; Tengs, 2001; Chang, 2016; SPS3 Dhamoon, 2014)
- Deficits in QOL exist despite having minimal or no functional post-stroke disability. (Lai, 2002)
- Even in mild stroke and TIA, impaired QOL can be seen in 36% of patients (Sangha, 2015)
- Women had worse QOL in multiple domains up to 12 mo after stroke (Bushnell, 2014).

HRQOL Model in the hospital



2015 Major Thrombectomy Trials

Table 5: Quality of Life (EQ-5D) in Included RCTs

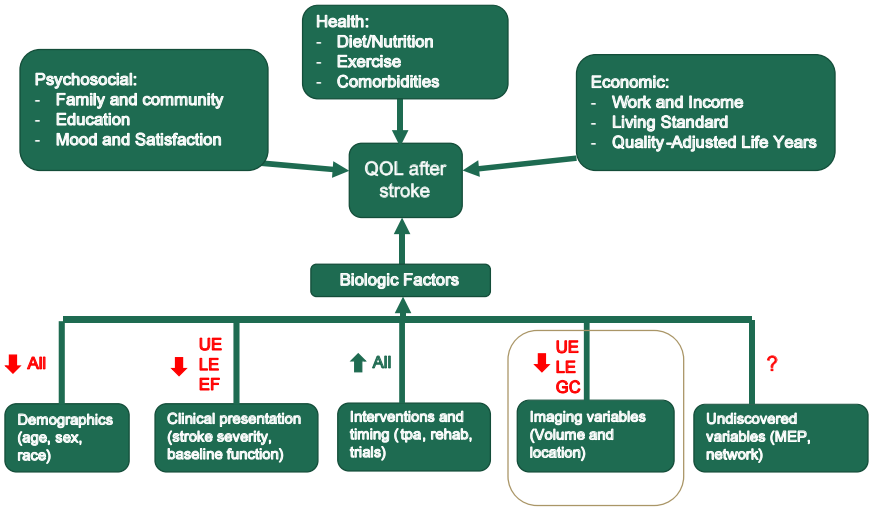
Author, Year	Intervention	Control	Effect Variable	Unadjusted Value (95% CI)	Adjusted Value (95% CI)
Berkhemer et al, 2015[27]	0.69 (0.33–0.85)[a]	0.66 (0.30–0.81)	Beta[b]	0.08 (0.00–0.15)	0.06 (–-0.01 to 0.13)
Goyal et al, 2015[29]	80 (60–90)[c]	65 (50–80)	Beta[b]	9.4 (3.5–15.2)	9.9 (3.8–16.0)
Jovin et al, 2015[30]	0.65 (0.21–0.79)[a]	0.32 (0.13–0.70)	Beta[b]	0.13 (0.03–0.23)	0.11 (0.02–0.21)

Abbreviations: CI, confidence interval; EQ-5D, EuroQoL Group 5-Dimension Self-Report Questionnaire; IQR, interquartile range; RCT, randomized controlled trial.
[a]EQ-5D index score presented as median (IQR).
[b]Regression was used analyze the effect.
[c]EQ-5D visual-analogue scale score presented as median (IQR).

- MR Clean, ESCAPE, and REVASCAT ASSed QOL as 2ndary endpoint
- All 3 showed higher QOL after thrombectomy, including ESCAPE reporting visual-analogue score
- Cannot pool outcomes as scores different and likely skewed

Health Quality Ontario. 2016

HRQOL Model



Stroke
Volume 48, Issue 7, July 2017; Pages 1925-1931
https://doi.org/10.1161/STROKEAHA.117.017094

ORIGINAL CONTRIBUTIONS

Predicting Domain-Specific Health-Related Quality of Life Using Acute Infarct Volume

Chen Lin, MD, Jungwha Lee, PhD, Neil Chatterjee, BS, Carlos Corado, BS, Timothy Carroll, PhD, Andrew Naidech, MD, MS, and Shyam Prabhakaran, MD, MS

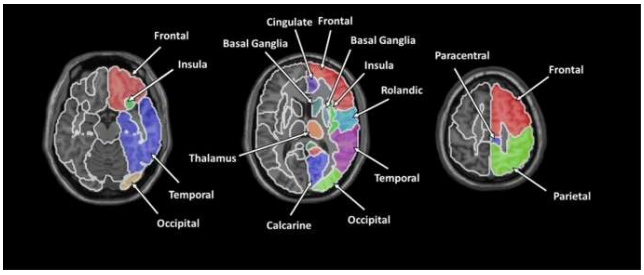
Research
International Journal of Stroke WSO

Infarct location is associated with quality of life after mild ischemic stroke

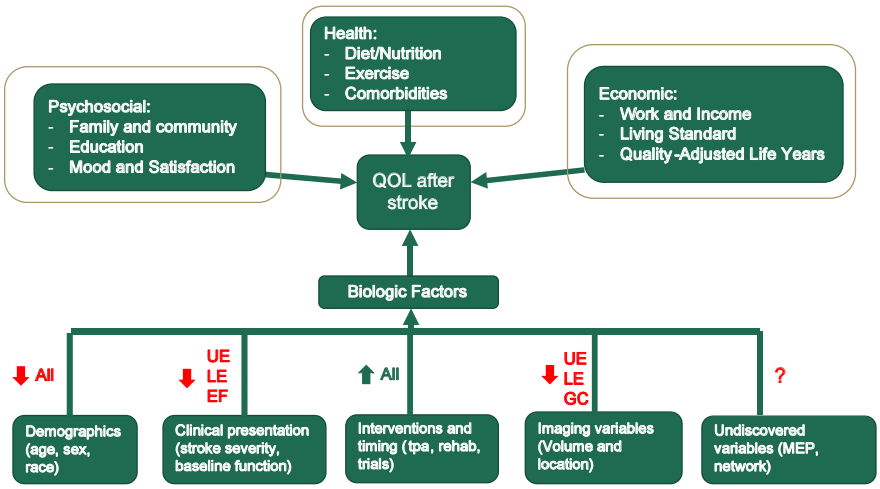
Chen Lin[1], Rajbeer Sangha[1], Jungwha Lee[5], Carlos Corado[1], Anvesh Jalasutram[2], Neil Chatterjee[1], Carson Ingo[1,4], Timothy Carroll[3] and Shyam Prabhakaran[1]

International Journal of Stroke 2018, Vol. 13(8) 824–831

DOI: 10.1177/1747493018783760
journals.sagepub.com/home/wso
SAGE



HRQOL Model in Clinic

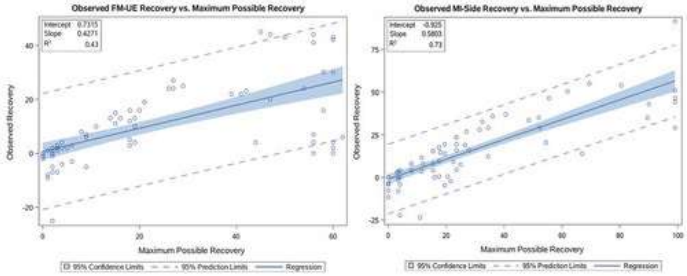


Stroke
Volume 52, Issue 9, September 2021; Pages 2968-2971
https://doi.org/10.1161/STROKEAHA.120.033672

BRIEF REPORTS

Association of Proportional Recovery After Stroke With Health-Related Quality of Life

Chen Lin, MD, Kimberly Martin, PhD, Yurany A. Arevalo, MD, Richard L. Harvey, MD, and Shyam Prabhakaran, MD, MS



Failure to meet the proportional recovery thresholds for the Fugl-Meyer Upper Extremity and Motricity Index measures were not associated with impairment in health-related quality of life. Patients can maintain un-impaired quality of life despite not meeting expected proportional recovery thresholds.

If a patient falls in the woods…

Is it a bad outcome?

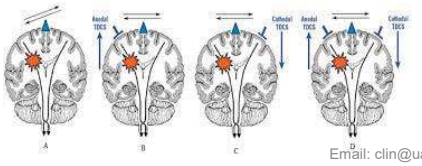
-What is a good outcome?

Research and new findings

NIH StrokeNet
PREVENTION | TREATMENT | RECOVERY
Funded by a Grant from the National Institutes of Health

Home | Clinical Trials | Education | The Network | Contact Us

TRANSPORT2



VERIFY

Future Directions

- Better Integration of telehealth
- Continued longitudinal understanding of stroke recovery and HRQOL
- Multimodal intervention studies with the clinic:
  - repetitive reinforcement
  - focusing on appropriate outcome measure
  - neuromodulation
- Treating comordities to improve stroke outcomes:
  - pain, mental health, cognition, sleep, etc.

Acknowledgements

Shyam Prabhakaran, MD
Elliot Roth, MD, PhD
Richard L Harvey MD
Julius Dewald, PhD
Peter King, MD
Lori Davis, MD
Joshua Richman, MD, PhD
Jerzy Szaflaski, MD, PhD
Xiaohua Zhou, MD

Students and Research Assistants:
Hely Nanavati
Nina Navalkar
Neil Chatterjee
Andrea Arevalo
Muhammad Mansour
…and many others

Research presented supported by:

U.S. Department of Veterans Affairs
Shirley Ryan Abilitylab
CCTS Center for Clinical and Translational Science
VISN 7 VA SOUTHEAST NETWORK

Contact us

Stroke Recovery Clinic at UAB:

Stroke as a chronic condition

205.975.8569

RWUH M226

CLIN@UABMC.EDU

Lab: https://sites.uab.edu/clin/

LinkedIn: https://www.linkedin.com/in/chen-lin-11a8731b5

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM.

Email: clin@uabmc.edu

Thank you!