



KANSAS INITIATIVE FOR
STROKE SURVIVAL
A PROJECT BY AND FOR KANSANS

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Stroke recrudescence

“First Tuesdays” Lecture Series

Introduction and Goal of “First Tuesdays”

- Sabreena Slavin MD – Vascular Neurologist and Neurohospitalist at KU School of Medicine
- Didactic lecture series as part of the Kansas Initiative for Stroke Survival
- Updates in Practice and FAQ’s on Acute Stroke Care
- 30 minutes for didactics and questions/discussion.

Stroke mimic examples

- Seizures with postictal hemiplegia (Todd's paralysis)
- Peripheral vestibular syndromes (acute labyrinthitis, BPPV, etc.)
- Encephalopathy due to toxic or metabolic causes
- Conversion disorder/psychogenic
- Complicated migraines with neurological deficits
- **Recrudescence of previous stroke**

Stroke recrudescence or “unmasking”

- Transient worsening or reemergence of previous stroke deficits in the setting of toxic metabolic factors
- Should not exceed previous deficits
- Criteria for diagnosis used in a large retrospective cohort study¹
 - Transient worsening of residual poststroke focal neurological deficits or transient recurrence of previous stroke-related focal deficits
 - Chronic stroke on brain imaging
 - No acute lesion on DWI
 - TIA considered unlikely (eg: longer symptom duration)
 - No evidence of seizure around time of event

Possible pathophysiology of recrudescence

- Infection triggers cytokine mediated pathways
- Sodium-water imbalances affect neuronal excitability and transmission
- Activation of GABA neurotransmitter pathways

Features of recrudescence

- 131 documented timeline on episodes of recrudescence showed mean duration of deficits 18.4 hours
 - Most cases were with abrupt onset and gradual resolution correlated with treatment of trigger within 1-2 days
 - Less often waxing/waning
- Mean interval between initial stroke and recrudescence was 86 days
- Mental status normal in 75.6% of patients, otherwise confused
- Mean NIHSS before episode 2.8 → maximum mean NHSS during episode 5.2
 - Wide variability in neurological symptoms without specific pattern of deficits

Comparison of Potential Triggers of Poststroke Recrudescence Among 65 Patients

Potential Trigger	Recrudescence Episode	Control Episode	<i>P</i> Value ^a
Fever, No. (%)	7 (10.8)	3 (4.6)	.06
Infection, No. (%)	34 (52.3)	5 (7.7)	<.001
WBC count, mean (SD)	8800 (2928)	7911 (3107)	.04
WBC count >10 000 cells/mm ³ , No. (%)	17 (26.2)	10 (15.4)	.12
Urinary tract infection, No. (%)	20 (30.8)	1 (1.5)	<.001
Pneumonia, No. (%)	14 (21.5)	1 (1.5)	<.001
Gastroenteritis, No. (%)	5 (7.7)	0	.06
Metabolic factors, No. (%)	24 (36.9)	6 (9.2)	<.001
Glucose level, mean (SD), mg/dL	139.4 (58.7)	140.4 (58.1)	.49
Hyperglycemia, No. (%)	10 (15.4)	4 (6.2)	.15
Hypoglycemia, No. (%)	3 (4.6)	0	.25
Serum sodium level, mean (SD), mEq/L	138.5 (3.3)	139.0 (2.3)	.29
Hypernatremia, No. (%)	1 (1.5)	0	>.99
Hyponatremia, No. (%)	12 (18.5)	2 (3.1)	.01
Potassium level, mean (SD), mEq/L	4.0 (0.5)	4.1 (0.3)	.90
Hyperkalemia, No. (%)	3 (4.6)	0	.25
Hypokalemia, No. (%)	4 (6.2)	0	.12
Serum urea nitrogen level, mean (SD), mg/dL	20.4 (14.3)	19.4 (11.4)	.27
Creatinine level, mean (SD), mg/dL	1.07 (1.04)	1.16 (1.22)	.22
Acute renal failure, No. (%)	4 (6.2)	0	.12
Hypertension, No. (%)	5 (7.7)	0	.06
Hypotension, No. (%)	9 (13.8)	2 (3.1)	.04
Dehydration, No. (%)	3 (4.6)	1 (1.5)	.62

Hematocrit, mean (SD)	37.8 (4.5)	37.2 (4.9)	.38
Insomnia or stress, No. (%)	5 (7.7)	0	.06
Congestive heart failure, No. (%)	9 (13.8)	6 (9.2)	.37
Alcohol intoxication, No. (%)	3 (4.6)	0	.25
Recent general anesthesia, No. (%)	2 (3.1)	0	.50
Admission medications, No. (%)			
Antiplatelet agents	48 (73.8)	48 (73.8)	>.99
Anticoagulants	23 (35.4)	26 (40.0)	>.99
Statins	48 (73.8)	41 (63.1)	.09
Antihypertensive agents	47 (72.3)	52 (80.0)	.12
Oral antidiabetic agents	16 (24.6)	18 (27.7)	.70
Insulin	17 (26.2)	19 (29.2)	.50
Benzodiazepines	18 (27.7)	10 (15.4)	.02
Opiates	12 (18.5)	11 (16.9)	>.99
Serotonergic antidepressants	23 (35.4)	21 (32.3)	.82
Other antidepressants	10 (15.4)	7 (10.8)	.45
Thyroid replacement therapy	9 (13.8)	10 (15.4)	>.99
Antiepileptic agents	21 (32.3)	22 (33.8)	>.99

Incident Stroke Profile and Vascular Risk Factors of the Poststroke Recrudescence Group and the MGH Stroke Registry Group

Feature	Recrudescence (n = 145)	MGH Stroke Registry (n = 1861)	P Value
Age, mean (SD), y	67 (16)	69 (15)	.06
Female, No. (%)	90 (62.1)	859 (46.2)	<.001
Race, No. (%)			
White	101 (69.7)	1691 (90.9)	<.001
African American	25 (17.2)	76 (4.1)	<.001
Other	19 (13.1)	94 (5.1)	<.001
Hispanic ethnicity	9 (6.2)	118 (6.3)	.99
Dementia	7 (4.8)	89 (4.8)	.88
Traditional vascular risk factors, No. (%)			
Hypertension	112 (77.2)	1318 (70.8)	.14
Diabetes	61 (42.1)	459 (24.7)	<.001
Dyslipidemia	85 (58.6)	836 (44.9)	.001
Atrial fibrillation	36 (24.8)	415 (22.3)	.48
Coronary artery disease	41 (28.3)	437 (23.5)	.19
Smoking	33 (22.8)	315 (16.9)	.03
Admission NIHSS score, mean (SD)	10.2 (5.9)	7.3 (7.5)	<.001
Stroke cause (TOAST), No. (%)			
Large-artery disease	30 (20.7)	412 (22.1)	.67
Cardioembolism	35 (24.1)	766 (41.2)	<.001
Small-vessel disease	23 (15.9)	145 (7.8)	.001
Other definite	20 (13.8)	167 (9.0)	.03
Cryptogenic	36 (24.8)	371 (19.9)	.14

Abbreviations: MGH, Massachusetts General Hospital; NIHSS, National Institutes of Health Stroke Scale; TOAST, Trial of Org 10172 in Acute Stroke.

Deterioration after small vessel stroke

- Small vessel stroke etiology = 2-20 mm located in deep white matter, basal ganglia, or pons due to microthrombi or lipohyalinosis of deep penetrating arteries
- "Lacunar fluctuation" or "stuttering lacune" commonly seen after small strokes
- One study¹ reported that more than 40% of patients with subcortical stroke deteriorated with 1/3 of those patients spontaneously reversing
- Possibly similar mechanism in post stroke recrudescence occurring more frequently in small vessel strokes

Emergency room diagnosis

- History: Previous stroke? What were previous stroke symptoms, and how do they compare to current symptoms? History of seizures/recent seizure-like activity? Recent insomnia/stress or benzo use?
- CT brain: May see previous stroke in location responsible for current symptoms, or may not see previous stroke on CT if smaller. Compare with any previous MRI in system.
- CTA head/neck: Compare with any previous vessel imaging in system. Should not see a new vessel occlusion or stenosis.
- Labs, CXR, UA, Utox, etc

IV tPA in stroke mimics

- In patients who were given IV tPA after cardiac MI, there was a rate of ICH in 0.72%¹
- Stroke studies have found similar rates of ICH after tPA in patients who were not having acute stroke – in a meta-analysis of 9 studies which included **392 patients with stroke mimics, symptomatic ICH occurred in 0.5%**²
- On a study on only recrudescence patients, 6 out of 164 received tPA without any hemorrhagic complications³

Conclusions

- Think of recrudescence in setting of chronic stroke and triggers of infection, hypotension, hyponatremia and other metabolic abnormalities, benzodiazepine use, and insomnia/stress
- Occurs more frequently in female gender, African American race, and strokes caused by small vessel disease
- Diagnostic pathway is similar if suspecting acute stroke or recrudescence. Can still consider tPA but will need risk/benefit discussion

Questions?

- Call for help anytime!
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