



**KANSAS INITIATIVE FOR
STROKE SURVIVAL**
A PROJECT BY AND FOR KANSANS

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COVID-19 and Stroke (Part II)

“First Tuesdays” Lecture Series
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Introduction and Goal of “First Tuesdays”

- Didactic lecture series as part of the Kansas Initiative for Stroke Survival (KISS)
- Updates in Practice and FAQ’s on Acute Stroke Care
- 20 minute didactic, 10 minutes for questions/discussion

Review of previous month's lecture on COVID-19 and stroke

- Patients with history of stroke and acute COVID-19 appear to have an increased risk of hospitalization, ICU needs, and mortality.
- 6 patients (2.8%) in one study out of China with COVID-19 also had concurrent acute stroke. Out of severe group of 88 patients, 5 (5.7%) had acute stroke.
- Need extra precautions during stroke interventions in all patients to prevent exposure and limit PPE use.

Protected Code Stroke

+ Positive Screen for COVID-19



Pre-notification screening: communication with paramedics or sending facility prior to arrival - Positive infection screen:

patient is exhibiting or has close contacts with infectious symptoms and/or travel history



Unclear or unable to obtain history: patient is obtunded or not able to communicate. History or exam features suggestive of an alternate diagnosis

INSIDE Room



MD1



RN1



Mask
On Patient



RN2/RT
(Optional)

DO NOT use stethoscope (contamination)

OUTSIDE Room



MD2



Safety
Lead

- Safety Lead to monitor PPE
- All charting OUTSIDE ROOM



EXPERIENCED STAFF — MD1 (ATTENDING OR SR. TRAINEE)

Required PPE (use donning/doffing checklist):

1. Full-sleeve gown
2. Surgical Mask
3. +/- Head covering (optional)
4. Face Shield
5. Gloves

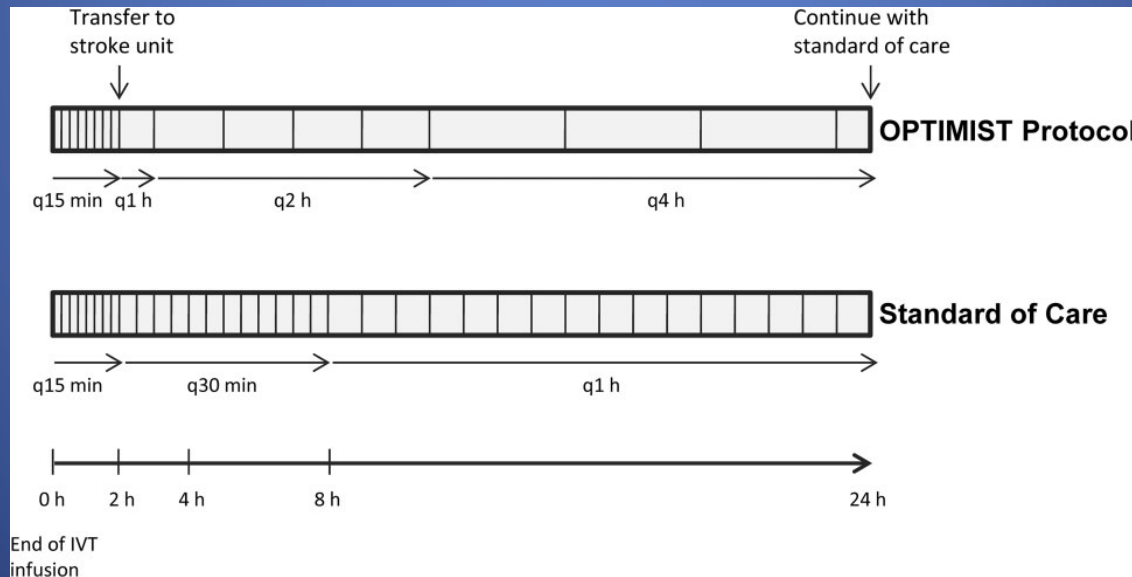


Intubate EARLY for increasing O₂ requirements

Airway management for deteriorating patients OR increasing oxygen requirements $FiO_2 > 0.5$ - Preoxygenate with facemask, with filter, BVM WITHOUT MANUAL VENTILATIONS. AVOID BiPAP, CPAP, Nasal High Flow Therapy

Low-intensity monitoring after IV tPA

- Safety trial in 35 post-tPA stroke patients with low risk of complications (NIHSS < 10; no critical care needs; no EVT) found no incidences of ICU transfer or critical care intervention in first 24 hours.



New case series out of NYC

- Five young patients less than 50 years of age with COVID-19 and LVO in one health system over a two week period
- Normal stroke admits younger than 50 over 2 weeks is 0.73.

Table 1. Clinical Characteristics of Five Young Patients Presenting with Large-Vessel Stroke.*

Variable	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Age — yr	33	37	39	44	49
Sex	Female	Male	Male	Male	Male
Medical history and risk factors for stroke†	None	None	Hyperlipidemia, hypertension	Undiagnosed diabetes	Mild stroke, diabetes
Medications	None	None	None	None	Aspirin (81 mg), atorvastatin (80 mg)
NIHSS score‡					
On admission	19	13	16	23	13
At 24 hr	17	11	4	19	11
At last follow-up	13 (on day 14)	5 (on day 10)	NA; intubated and sedated, with multiorgan failure	19 (on day 12)	7 (on day 4)
Outcome status	Discharged to rehabilitation facility	Discharged home	Intensive care unit	Stroke unit	Discharged to rehabilitation facility
Time to presentation — hr	28	16	8	2	8
Signs and symptoms of stroke	Hemiplegia on left side, facial droop, gaze preference, homonymous hemianopia, dysarthria, sensory deficit	Reduced level of consciousness, dysphasia, hemiplegia on right side, dysarthria, sensory deficit	Reduced level of consciousness, gaze preference to the right, left homonymous hemianopia, hemiplegia on left side, ataxia	Reduced level of consciousness, global dysphasia, hemiplegia on right side, gaze preference	Reduced level of consciousness, hemiplegia on left side, dysarthria, facial weakness
Vascular territory	Right internal carotid artery	Left middle cerebral artery	Right posterior cerebral artery	Left middle cerebral artery	Right middle cerebral artery
Imaging for diagnosis	CT, CTA, CTP, MRI	CT, CTA, MRI	CT, CTA, CTP, MRI	CT, CTA, MRI	CT, CTA, CTP
Treatment for stroke	Apixaban (5 mg twice daily)	Clot retrieval, apixaban (5 mg twice daily)	Clot retrieval, aspirin (81 mg daily)	Intravenous t-PA, clot retrieval, hemicraniectomy, aspirin (81 mg daily)	Clot retrieval, stent, aspirin (325 mg daily), clopidogrel (75 mg daily)
Covid-19 symptoms	Cough, headache, chills	No symptoms; recently exposed to family member with PCR-positive Covid-19	None	Lethargy	Fever, cough, lethargy
White-cell count — per mm ³	7800	9900	5500	9000	4900
Platelet count — per mm ³	427,000	299,000	135,000	372,000	255,000
Prothrombin time — sec	13.3	13.4	14.4	12.8	15.2
Activated partial-thromboplastin time — sec	25.0	42.7	27.7	26.9	37.0
Fibrinogen — mg/dl	501	370	739	443	531
D-dimer — ng/ml	460	52	2230	13,800	1750
Ferritin — ng/ml	7	136	1564	987	596

* Reference ranges are as follows: platelet count, 150,000 to 450,000 per cubic millimeter; prothrombin time, 12.3 to 14.9 seconds; activated partial-thromboplastin time, 25.4 to 34.9 seconds; fibrinogen, 175 to 450 mg per deciliter; D-dimer, 0 to 500 ng per milliliter; and ferritin, 30 to 400 ng per milliliter. CT denotes computed tomography, CTA CT angiography, CTP CT perfusion, MRI magnetic resonance imaging, NA not applicable, PCR polymerase chain reaction, and t-PA tissue plasminogen activator.

† The patients were screened for smoking, hypertension, hyperlipidemia, diabetes, atrial fibrillation, congestive heart failure, illicit drug use, and neck trauma.

‡ Scores on the National Institutes of Health Stroke Scale (NIHSS) range from 0 to 42, with higher numbers indicating more severe stroke.

Results of case series

- Only 1 patient had fever. 2 out of 5 had no COVID-19 symptoms otherwise.
- 3 out of 5 received antiplatelet therapy; 2 out of 5 received anticoagulation.
- Likely due to hypercoagulability known to occur in COVID-19.

Hypercoagulability

- Studies reporting about 25% VTE and 3.7% arterial vascular events despite use of VTE prophylaxis.
- There have been microvascular thrombosis and inflammatory changes found during autopsy.
- Prothrombotic state likely a result of pro-inflammatory effects (release of cytokines) and disruption of normal vascular endothelial cell function.

Hypercoagulability

- COVID-19 has been associated with increase in fibrinogen and D-dimer, which in turn have been associated with higher mortality.
- Prophylactic treatment anticoagulation has been used if D-dimer > 3 mg/L or sepsis-induced coagulopathy score > 4

Category	Parameter	0 point	1 point	2 points
Prothrombin time	PT-INR	≤ 1.2	> 1.2	> 1.4
Coagulation	Platelet count ($\times 10^9/L$)	≥ 150	< 150	< 100
Total SOFA	SOFA four items	0	1	≥ 2

Conclusions

- Many stroke patients may not be able to be screened for COVID-19. Can use “protected stroke” protocol and lower intensity post-tPA monitoring to limit exposure/PPE use.
- Younger patients with otherwise little or no symptoms are presenting with LVO’s.
- Consider treatment dose anticoagulation in patients who are at higher risk and in patients post stroke.

Questions?

- Call for help anytime!
- <http://www.kissnetwork.us/>
- email at sslavin2@kumc.edu