

SUPPLEMENTAL MATERIAL:

eTable 1: Behavior Checklist for the Three Cases:

Case 1 (R MCA Ischemic Stroke Case)	Case 2 (Status Epilepticus Case)	Case 3 (Coma and Hemorrhage Case)
<ul style="list-style-type: none"> <input type="checkbox"/> Interview patient (include asking about head strike) <input type="checkbox"/> Confirm LSW time <input type="checkbox"/> Review PMH <input type="checkbox"/> Review medications (specifically for anticoagulation) <input type="checkbox"/> Examine the patient for signs of trauma <input type="checkbox"/> Ask for vital signs <input type="checkbox"/> Ask for fingerstick glucose <input type="checkbox"/> Recognize an acute R-MCA syndrome <input type="checkbox"/> Use NIHSS cards to document a full NIHSS scale (totals 8) <ul style="list-style-type: none"> o 1 - partial gaze palsy o 1- partial hemianopia o 1- minor facial weakness o 1- left arm drift o 1- left leg drift o 1- mild sensory loss o 2- neglect to visual and tactile sensation <input type="checkbox"/> Activate an “ED2CT” by alerting the ED personnel <input type="checkbox"/> Ask that the patient be hooked up to the monitor <input type="checkbox"/> Note that BP > 185/110 <input type="checkbox"/> Start antihypertensive for goal BP< 185/110 <input type="checkbox"/> Note irregular HR if not noted before <input type="checkbox"/> Order CBC, Coagulation studies, BMP, troponins STAT <input type="checkbox"/> Review contraindications for tPA with daughter, making sure to include signs/symptoms of infections that might be indicative of endocarditis <input type="checkbox"/> Transport patient to the “ED Scanner” and request both a NCHCT and CTA H&N <input type="checkbox"/> Recognize there is no bleed on CT scan <input type="checkbox"/> Recognize acute R M1 cut off <input type="checkbox"/> Consult Neuro-interventional for LVO <input type="checkbox"/> Obtain weight <input type="checkbox"/> Given history of coagulopathy, review lab data and confirm that INR <1.7 and plts >100,000 	<p>Prior to seizure:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Interview the patient <input type="checkbox"/> Complete a focused neurologic exam focusing on attention and executive function <input type="checkbox"/> Ask that the patient be hooked up to the monitor <input type="checkbox"/> Send labs to screen for toxic/metabolic causes of AMS: CBC, BMP, TSH, LFTs/ammonia, UA, Urine and Serum toxicology screen <p>Once Seizing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Get an oxygen mask and roll the patient to the side. <input type="checkbox"/> Make sure that pulse ox is hooked up. <input type="checkbox"/> Ask for a benzodiazepine (residents may fulfill this if lower than what is recommended for status) --- >5 mins of no return to baseline --- <input type="checkbox"/> Given persistent gaze deviation and concern for NCSE, resident should give a second bolus of a benzodiazepine for a total of 0.1mg/kg up to 4mg x2 doses <ul style="list-style-type: none"> <input type="checkbox"/> <i>If second bolus of lorazepam (or another benzodiazepine) is not given the patient will remain in NCSE, and sats will drop. Levetiracetam (or another AED) still will not have come up from the pharmacy → intubation is necessary</i> <input type="checkbox"/> <i>If a second bolus of lorazepam is given, gaze will normalize, the patient will grimace with attempt to be awakened, can say name when asked name, vitals remain stable → patient should not be intubated</i> <input type="checkbox"/> Administer a Phase II agent to be loaded: levetiracetam 60mg/kg, valproaic acid 30mg/kg or fosphenytoin 20 PE/Kg 	<ul style="list-style-type: none"> <input type="checkbox"/> Request that sedation be held, even if the RN gives push back <input type="checkbox"/> Request workup for new coma, possible seizure: BMP, CBC, LFT, Urine and seum toxicology screen, blood cultures, UA, ABG, capillary glucose, coagulation studies <input type="checkbox"/> Check for nuchal rigidity <input type="checkbox"/> Uncover the patient and look for any evidence of trauma, track marks, other findings <input type="checkbox"/> Mental status: Neuro residents speaks loudly, escalates to sternal rub / nasal irritation / nailbed pressure / supra-orbital ridge pressure <input type="checkbox"/> Pupillary reflex <input type="checkbox"/> Oculomotor exam <input type="checkbox"/> Corneal reflex <input type="checkbox"/> Cough, gag <input type="checkbox"/> Motor exam in all four extremities <input type="checkbox"/> Communicate that focal findings and AMS are highly concerning for a structural etiology of coma <input type="checkbox"/> Request stat neuro-imaging – NCHCT AND CTA <input type="checkbox"/> Requests propofol be restarted <input type="checkbox"/> Ask to transport to the ED Scanner for stat imaging <p>Once ICH discovered:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Request Nicardipine (or alternate BP med) STAT, avoid labetalol given bradycardia <input type="checkbox"/> Note need for arterial line for real-time BP monitoring <input type="checkbox"/> Ask if coagulation studies have resulted <ul style="list-style-type: none"> o If coagulation studies were requested, the INR is 2.3 o If coagulation factors were not requested, review prior INRs <input type="checkbox"/> Recognize need for anticoagulant reversal <ul style="list-style-type: none"> o Correctly order Vitamin K 10mg IV o Give 4F PCC 20-30 units/kg <input type="checkbox"/> Recognize features of obstructive hydrocephalus (bradycardia, hypertension)

<ul style="list-style-type: none"> <input type="checkbox"/> Continue to give anti-hypertensives until BP<185/110 <input type="checkbox"/> Dose tPA (0.9mg/kg with 10% of the dose given over 1 min and the rest infused over an hour) <input type="checkbox"/> Correctly instruct the nurse on how frequently to measure BP (every 15mins for the first 2 hours) <input type="checkbox"/> Correctly instruct the nurse for the target BP (<180/105) <input type="checkbox"/> Consider the differential for a rapidly worsening neurologic exam after tPA – tPA associated hemorrhage vs. blood pressure dependent exam <input type="checkbox"/> Halt tPA infusion while cause of neurologic worsening is being evaluated <input type="checkbox"/> Resident preforms repeat Neuro exam <input type="checkbox"/> Requests repeat head CT <input type="checkbox"/> Request or review CBC, PT (INR), aPTT, fibrinogen level, and type and crossmatch for possible tPA related bleed <input type="checkbox"/> Recognize low BP (Turn off nicardipine or give 1L bolus of fluid; Should NOT give a pressor until a bleed is exonerated) <input type="checkbox"/> Sign case out to the endovascular team 	<ul style="list-style-type: none"> <input type="checkbox"/> Request lab workup of first seizure: capillary glucose, CBC, BMP, LFTs, Urine tox screen /Serum Tox screen, CXR, UA <input type="checkbox"/> Request STAT non-con HCT <input type="checkbox"/> Confirm that AED has been given prior to transport <input type="checkbox"/> Transport patient to “ED Scanner” while continuing to assess vitals <ul style="list-style-type: none"> <input type="checkbox"/> <i>If AED is not given, the patient will have another seizure in the scanner</i> <input type="checkbox"/> Neuro resident will be asked to describe what they are seeing. (Should note the mixed density mass in the R frontal lobe with surrounding edema) <input type="checkbox"/> Discuss risk/benefit to giving Dexamethasone 10mg IV x1 <input type="checkbox"/> Discuss risk/benefit of mannitol <input type="checkbox"/> Re-examine the patient to confirm improving post-ictal state <input type="checkbox"/> Sign out the case to the neuro-oncology team. 	<ul style="list-style-type: none"> <input type="checkbox"/> Review labs to review sodium <input type="checkbox"/> Discuss appropriateness of a hyperosmolar agent <input type="checkbox"/> Request NSGY consult <input type="checkbox"/> Recognize need for placement in the neuroICU <input type="checkbox"/> Resident should page neuroICU fellow to sign out case
<p>NIHSS = National Institute for Health Stroke Score; LSW = last seen well; tPA = tissue plasminogen activator, BP = blood pressure; ED = emergency department; CBC = complete blood count; PT = prothrombin time; PTT = partial thrombin time; INR = international normalized ratio; NCHCT = non-contrast head computed tomography; CTA = computed tomography angiogram; LFT = liver function test; CXR = chest X-ray; UA = urinalysis; AED = anti-epileptic drug; VPA = valproic acid; PCC = prothrombin complex concentrate ICP = intracranial pressure; NSGY = neurosurgery</p>		

eTable 2: A Thematic Analysis of Knowledge Quiz Questions and Percentage of Correct Answers Pre- and Post-Simulation

Content of Question	Percent Correct – Pre-Course	Percent Correct - Post-Course
1. Status Epilepticus – Dosing of initial therapy	40%	50%
2. Status Epilepticus – Dosing of second line therapy	10%	35%
3. Status Epilepticus – Side effect valproate acid	85%	100%
4. Status Epilepticus – side effect fosphenytoin	20%	80%
5. Status Epilepticus – side effect levetiracetam	35%	70%
6. Status Epilepticus – target level valproic acid	65%	70%
7. Status Epilepticus – target level phenytoin	80%	85%
8. Intracranial Hemorrhage – Reversal of anticoagulation (Warfarin)	65%	95%
9. Intracranial Hemorrhage – Components of Prothrombin Complex Concentrate	80%	85%
10. Intracranial Hemorrhage – Components of Prothrombin Complex Concentrate (Heparin)	40%	75%
11. Intracranial Hemorrhage – Reversal of DOACs	40%	50%
12. Intracranial Hemorrhage – Blood pressure target	60%	95%
13. Intracranial Hemorrhage – FUNC score	55%	70%
14. Intracranial Hemorrhage – Workup of cortical hemorrhage	60%	80%
15. Coma – Duration of action of intubation medications	30%	80%
16. Coma – GCS to Intubate	60%	65%
17. Coma – Management of posterior fossa hemorrhage	75%	25%
18. Coma – Contraindication to hypertonic saline	60%	95%
19. Coma – Monitoring Labs for Mannitol	50%	60%
20. Coma – Calculation of cerebral perfusion pressure	95%	100%
21. NIHSS – “Best Gaze” in Coma	40%	40%
22. NIHSS – “Visual” testing for patient with neglect	25%	80%
23. NIHSS – “Ataxia” in hemiplegic patient	35%	90%
24. NIHSS – “Sensory” testing in comatose patient	50%	65%
25. NIHSS – “Aphasia” testing in mute patient	40%	85%
26. NIHSS – “Dysarthria” testing in mute patient	20%	95%
27. NIHSS – “Neglect” testing for patient with prominent sensory loss	65%	90%
28. Acute Ischemic stroke – Goal Time (DTN)	45%	70%
29. Acute Ischemic stroke – Goal Time (door to CT)	25%	60%
30. Acute ischemic stroke – angiography in kidney disease	45%	70%
31. Acute ischemic stroke – lab data prior to tPA	30%	100%
32. Acute ischemic stroke – BP cutoff for tPA	50%	95%
33. Acute ischemic stroke -blood pressure monitoring	35%	55%
34. Acute ischemic stroke – blood pressure after tPA	65%	75%
35. Acute ischemic stroke – tPA dosing	15%	50%
36. Acute ischemic stroke – tPA contraindications (anticoagulation use)	80%	85%
37. Acute ischemic stroke – tPA contraindication (extended window)	25%	45%
38. Acute ischemic stroke – tPA contraindications (brain tumor, endocarditis, recent stroke, dissection)	50%	50%
39. Acute ischemic stroke – endovascular treatment indications	60%	79%
40. Acute ischemic stroke – Post-tPA hemorrhage	45%	35%

eTable 3: Survey of Confidence

Items that would be taught	Items that would not be taught
<ol style="list-style-type: none">1. Coma of unknown etiology2. Acute stroke requiring tPA3. Acute stroke requiring endovascular therapy4. Neurologic worsening after tPA5. Blood pressure dependent exam6. Intraparenchymal cerebral hemorrhage7. New brain mass8. Elevated intracranial pressure9. Recognition of herniation clinically	<ol style="list-style-type: none">1. Management of traumatic brain injury2. Recognition of herniation radiographically3. Neuromuscular respiratory crisis4. Encephalitis/meningitis5. Intensive care unit delirium6. Brain Death