Medical Committee
Meeting Minutes
April 4, 2016

Present	Representing
Chief Barry Cousino	Springfield Twp. Fire
Kristie Gallagher	ProMedica Air & Mobile
Chief Jeff Kowalski	Sylvania Twp. Fire
Julie DiCecco, R.N.	ProMedica – Toledo Hospital
Julie Goins Whitmire, R.N.	Mercy – Mobile Stroke Unit
Todd Brookens, M.D.	ProMedica – Toledo/Flower Emergency Centers
Julie Georgoff	Mercy
Debbie Graham, R.N.	Mercy – St. Anne
Toni Bratt	ProMedica – Toledo Hospital
Mary Britton	ProMedica – Toledo Hospital
Stephanie Hanna	Mercy Hospital
Renee Davis	Sylvania Mercy FEC
Martin Fuller	Whitehouse Fire & Life Flight
Josh Harberger	Whitehouse Fire
Debbie Graham	St. Anne Mercy Hospital
Jacob Jerdon	St. Vincent Mercy Hospital
Erich Pontasch, M.D.	St. Anne Mercy Hospital
Dr. Mouhammad Jumaa	UTMC/Toledo

Staff	
David Lindstrom, M.D.	Medical Director LCEMS
Dennis Cole	LCES Director
Brent Parquette	EMS QA/QI
Ralph Shearn	Communications Manager

Absent	
Cheryl Herr, R.N.	ProMedica - St. Luke's Hospital
Scott Levitt, M.D.	ProMedica Toledo Hospital
Pat Mattevi, M.D.	ProMedica - Bay Park Hospital
Paul Rega, M.D.	UTMC Hospital
Daniel Schwerin, M.D.	NWO EMS – St. Vincent Mercy Hospital

Call to Order

Chief Cousino called the meeting to order at 8:30 a.m.

Minute Approval

The minutes from the February 8, 2016 meeting were made available for review. The minutes were approved as written.

Old Business

Mobile Stroke Unit - Dennis reported we are looking at the on-scene times and how it affects the RACE patient in progress.

Julie Goins reported she met with Lucas County leadership regarding concerns and improvements. Julie said in reference to their times, the MSU hasn't developed any time bench marks. She said in weeks one through eight, decision to scan is at seven minutes and scan is complete pending reading at 17 minutes. In weeks nine through eleven, the decision to scan is at seven minutes plus nine minutes to complete the scan, with total scene time of MSU at 31 minutes.

Mary Britton inquired about patients that do not meet the time threshold for TPA, why the MSU is dispatched instead of Life Squad taking patient directly to an RACE interventional hospital. Dr Jumaa pointed out there is strong evidence that the extra 30 minutes delay to intervention is a detriment to the RACE category patients outside the TPA window.

Dr. Jumaa distributed and presented RACE/Stroke data from TTH and UTMC. More discussion occurred about the delay for Race patients and adding 30 minutes before arriving to an RACE center.

Dennis will set up a conference call between the interventional physicians and Lucas County to discuss consensus on eliminating the delay for patients outside the 4 hour window.

Sylvania-Mercy ER

Dr. Lindstrom reported the Sylvania Mercy ER is up and running with communications working and supplies in place. Dennis reported there have been no issues.

Active Shooter

Dr. Lindstrom reported the 4 hour Active Shooter training will be in June.

New Business

D10 – Brent reported he has started exploring the process of using this. Brent reported supply is currently unavailable. Brent noted in follow-up to Dr. Brookens question last month, that some

EMS systems are adopting the lower dosing dextrose protocols. LCEMS is keeping an eye on availability and trying to move in that direction.

Dr. Lindstrom reported the paramedics could use a ½ amp of D50. Depending of timing of pharmaceutical availability, either training on partial dosing or revision of protocol is planned.

DEA – Dr. Lindstrom reported a national escalating dialogue of the inconsistences of DEA regions regarding paramedics administering schedule 2 substances. Dr. Lindstrom requests sending emails of support to your federal legislators in support of clarifying DEA approval of protocol based paramedic administration of Schedule II drugs, and clarifying not needing On Line Medical Approval prior to administering anti-seizure or pain medication to patients. This issue gets confused with the opiate addiction epidemic that exists nationwide and in Ohio.

Adjournment - With no further business, the meeting was adjourned at 9:03 a.m. The next Medical Committee meeting will be June 6th at 8:30 a.m.

RACE Alerts July - DEC 2015

TABLE 1: Baseline demographics, diagnosis & treatment times

	RACE ALERTS (N109)	STROKE ALERTS (N142)	P
MEDIAN AGE (IQR)	72.5(61-81)	65(55-79)	0.02
GENDER [FEMALES(%)]	71(50)	61(55.9)	0.3
MEDIAN NIHSS (IQR)	12(7-18)	5(2-10)	<0.05
MEDIAN RACE SCORE (IQR)	6(5-8)	NA	
DIAGNOSIS [N(%)]			<0.05
Ischemic Stroke	57(52.3)	44(30.1)	
ICH	12(11)	8(5.6)	
Seizures	19(17.4)	14(9.8)	
TIA	7(6.4)	23(16.2)	
Encepahlopathy	6(5.5)	12(8.5)	
Others	8(7.3)	41(28.9)	
DISPOSITION FROM ER [N(%)]			
ICU	68(62.4)	56(39.5)	<0.05
STEP DOWN UNIT	37(33.9)	86(60.6)	
HOSPICE	4(3.7%)	0	
IV TPA [N(%)]	28 (25.6)	18(12.6)	<0.05
MEDIAN TIMES IN MINUTES (IQR)			
911 Dispatch to ER	31(22-38)	42(30-51)	0.06
Door to CT Completion	10(5-16)	28(20-41)	<0.05
Door to Tpa	46(28-55)	75(60-95)	<0.05
MECHANICAL THROMBECTOMY [N(%)]	22(20.2)	11(7.7)	0.03
MEDIAN TIMES [MINUTES(IQR)]			
Onset to Arrival	71(37-560)	128(91-207)	0.3
Arrival to CT	8.5(6-15)	15(7-17)	0.3
Arrival to Puncture	68(60-93)	128(101-142)	0.04
Arrival to Recanallzation	101(88-118)	205(131-218)	0.001
OCCLUSION SITE [N(%)]			
ICA TERMINUS	6(27.2)	3(27.2)	0.7
MCA	13(56.5)	6(54.5)	0.9
ONLY MCA M2	2(8.6)	2(18.2)	0.6
TANDEM	2(8.6)	0	
90 DAY OUTCOME [N(%)]			
mRS 0-2	11(50)	4(36.3)	0.3
Mortality	3(14.3)	3(27.2)	0.1

TTH RACE VS. MSU

	MSU	RACE
N	8	77
% Male	50.0%	39.0%
% Female	50.0%	61.0%
Average Age	72.6	71.5
Average NIHSS	5.8	12.9

Disposition	MSU		RACE	
Neuro ICU	3	37.5%	45	58.4%
Neuro Stepdown	5	62.5%	23	29.9%
AICU	0	0%	3	3.9%
Neuro Med Surg	0	0%	3	3.9%
Home	0	0%	1	1.3%
Hospice	0	0%	2	2.6%

Diagnosis	MSU		RACE	
CVA	6	75%	38	49.4%
ICH	0	0%	11	14.3%
TIA	0	0%	8	10.4%
Seizure	1	12.5%	14	18.2%
TME	1	12.5%	5	6.5%
Failure to Thrive	0	0%	1	1.3%

Intervention	MSU		RACE	
TPA Only	1	12.5%	8	10.4%
Embolectomy Only	2	12.5%	11	14.3%
TPA+Embolectomy	0	0%	6	7.8%
TOTAL INTERVENTION	3	37.5%	25	32.5%
Intubated	0	0%	15	19.5%

Median Times	MSU	RACE
EMS Dispatched to Arrival	64	31
EMS Dispatched to CT	30.5	38
MSU Arrival to CT	19	
Door to CT		8
EMS Dispatched to CTA	90	40
EMS Dispatched to TPA	61	56
EMS Dispatched to Puncture	129	104

Table 2. Baseline Characteristics of Enrolled Patients During the Run-In Phase

All patients (n=26)	
Age, y, mean	64
Sex, male/female, n	13/13
Hypertension, n	16
Diabetes mellitus, n	4
Hyperlipidemia, n	9
Atrial fibrillation, n	5
Baseline NIHSS, mean (range)	11 (3–25)
Baseline mRS, n (%)	
0	15 (57)
1	1 (4)
2	2 (8)
3	3 (11)
4	4 (15)
5	1 (4)
Final diagnosis, n	
Acute ischemic stroke	11
TIA	1
ICH	4
Seizure	4
Other	6

ICH indicates intracerebral hemorrhage; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; and TIA, transient ischemic attack.

17–42 minutes). There were no hemorrhagic or other clinical complications and no technical malfunctions of the CT scanner or the MSU ambulance. The intravenous infusion pump malfunctioned on 1 patient, and the i-STAT device malfunctioned on 1 occasion when it was exposed to temperatures above 85°F outside the MSU. Telemedicine assessment of the patient was attempted in 9 cases. There were no telemedicine malfunctions and 90% agreement (ie, 8 of 9 patients) between the remote and on-site VN for tPA eligibility and disagreement in 1 case. Four of the 12 MSU tPA patients had endovascular treatment with an average symptom onset to groin puncture time of 175 minutes (range, 140–224 minutes). Ninety-day mRS score was 0 or 1 in 4 of the 12 tPA-treated MSU patients and was within 1 point of baseline mRS in 3 who had baseline mRS score of >1. Of the 12 patients, 1 patient died because of causes unrelated to cerebrovascular pathology and 1 was lost to follow-up.

Discussion

The run-in phase of the BEST-MSU study provided us with the following important information. First, we treated about 1 patient with tPA for every 10 alerts of the MSU, averaging ≈1.5 treatments per week, with 33% treated within the first hour. These data have helped us plan how long we will have to carry out the randomized phase of the BEST-MSU study to reach our desired sample size and also suggested that our hypothesis (that we could treat relatively large numbers of patients more quickly than with SM) was worth pursuing in a larger trial. Our average door-to-needle time of 25 minutes on the MSU where all diagnostic equipment, medications, and skilled treatment team are located in 1 dedicated space and immediately available is comparable with the fastest ED door-to-needle times reported in the literature.[12]

Second, we learned that we were able to enroll patients into the study and determine tPA eligibility on SM weeks. This was not surprising because SM management did not require any change in current management pathways other than alerting the MSU team and meeting EMS and the patient on site or at the ED. However, we also found that enrollment was slower on SM weeks than on weeks when the MSU is deployed, which will affect our power calculations. One reason is that first responders were more reluctant to notify us once they found that the MSU would not be responding. This has prompted us to institute a second level of MSU team alert from the central telemetry center. It is a Houston Fire Department requirement that EMS squads notify this center when en route to an ED with a stroke or any other major emergency on either MSU or SM weeks. We also realized that because allocation of MSU versus SM weeks is not blinded, we would have to adjudicate all treatments by another investigator blinded to MSU versus SM group allocation to assure comparability of the groups.

Third, we realized that in the real world, ≈30% of patients who qualify for treatment with tPA have pre-existing disability. These patients have been excluded from most randomized trials to date because the most common outcome used to measure success has been the mRS dichotomized to achieving a

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Table 3. Characteristics of Patients Receiving tPA on the MSU (n=12)

Distance from base station, miles, mean	6.7
MSU on scene to tPA time, min, mean (range)	25 (18–42)
LSN to tPA time, min, mean (range)	98 (47–265)
Baseline NIHSS, mean (range)	10 (3–19)
Baseline mRS, n (%)	
0	7 (58)
1	1 (8)
2	0 (0)
3	2 (17)
4	2 (17)
5	0 (0)
90-day mRS, n (%)	
0	2 (18)
1	2 (18)
2	1 (9)
3	1 (9)
4	2 (18)
5	2 (18)
6	1 (9)
Total endovascular interventions	4
LSN to groin puncture time, min, mean (range)	175 (140–224)
Door to groin puncture time, min, mean (range)	101 (77–124)

LSN indicates last seen normal; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; MSU, mobile stroke unit; and tPA, tissue-type plasminogen activator.

Downloaded from http://stroke.ahajournals.org/ at Mulford Library Medical University of Ohio on April 3, 2016

Table 1. Patient Characteristics and Evaluation Process Times

Variable	MSTU (n = 100)	Controls (n = 56)	P Value
Age, median (IQR), y	62 (53-76)	64 (57-79)	.22
Female sex, No. (%)	54 (54.0)	32 (57.1)	.70
Race/ethnicity, No. (%)			
African American	63 (63.0)	38 (67.9)	
Non-Hispanic white	29 (29.0)	9 (16.1)	.12
Other	8 (8.0)	7 (12.5)	
Initial National Institutes of Health Stroke Scale score, median (IQR)[a]	6.0 (2-12)	6.5 (2-13)	.70
IV-tPA, No. (%)	16 (16.0)	13 (23.2)	.30
Process time, median (IQR), min			
MSTU activation to scene arrival	12 (8-14)	NA	NA
On-scene time until entry into the MSTU[b]	8 (5-11)	NA	NA
Door to CT completion	13 (9-21)	18 (12-26)	.003
Door to CT read	25 (20-29)	25 (19-35)	.59
Door to international normalized ratio result	13 (7-18)	44 (36-61)	<.001
Door to IV-tPA	32 (24-47)	58 (53-68)	<.001
Door to video log-in	11 (7-17)	NA	NA
Video duration	20 (14-27)	NA	NA
Total MSTU use from activation until arrival at destination hospital per episode	86 (78-93)	NA	NA

Abbreviations: CT, computed tomography; IQR, interquartile range; IV-tPA, intravenous tissue plasminogen activator; MSTU, mobile stroke treatment unit; NA, not applicable.

[a] Measured in the MSTU via telemedicine.

[b] Defined as the time spent by the crew at the site before transfer into the MSTU.

diac life support. There were 5 instances of CT delays, including patient agitation (n = 3) and network delays in image transfer (n = 2). Sixteen patients (16.0%) received IV-tPA in the MSTU (Table 1). One additional patient who underwent CT was a candidate for IV-tPA on the MSTU but could not be evaluated because of video failure. This patient was brought to the nearest ED and was administered IV-tPA conventionally after review of the portable CT images.

Process Time on the MSTU

One hundred patients on the MSTU and 56 comparison patients evaluated in the EDs were similar in age and stroke severity (Table 1). On the MSTU, the median door to CT completion time was 13 minutes (IQR, 9-21 minutes), the median door to CT read time was 25 minutes (IQR, 20-29 minutes), the median door to international normalized ratio result time was 13 minutes (IQR, 7-18 minutes), and the median door to intravenous thrombolysis time was 32 minutes (IQR, 24-47 minutes). The median door to CT completion time, door to international normalized ratio result time, and time to IV-tPA administration were shorter in the MSTU group. For the 16 patients who received intravenous thrombolysis, the time to thrombolysis was reduced by 26 minutes compared with ED controls (32 vs 58 minutes, $P < .001$). The median times from the door to CT read were similar in both groups at 25 minutes ($P = .59$). Table 1 also lists various transport times associated with MSTU activation and dispatch.

Discussion

We present our initial field experience using a dedicated prehospital stroke ambulance and treatment delivery system equipped with telemedicine. The usefulness of mobile stroke unit care in shortening the time to thrombolysis has been demonstrated recently in Europe; however, these studies[5,6,19] were designed with the need for an on-site neurologist. We demonstrate successful incorporation of telemedicine into the MSTU in Cleveland, rendering the presence of a physician on the mobile unit unnecessary. During the first 3½ months of service, the MSTU managed and transported 100 patients who had initial symptoms suspicious of stroke based on the emergency call intake. The MSTU was able to approach all neighborhoods of Cleveland, and patient race/ethnicity characteristics matched closely with the city statistics.[16] Most assessments by the city EMS before transferring the patient into the MSTU were short. Using telecommunication, we were able to ensure safe and timely transfer of patients based on their geographic location.

The use of telemedicine in stroke care is not new,[8] and its usefulness in prehospital stroke evaluation and triage has been explored in several feasibility studies,[20-23] more so since the concept of mobile stroke units was introduced in 2003 by Fassbender et al.[20] However, most of these investigations were conceptual studies and used simulated scenarios. A pilot study[24] assessing telemedicine feasibility in a prehospital setting in Aachen, Germany, showed that such a system is feasible but faced connectivity telemedicine issues and delayed door to imaging times. Improvement of wireless network communication over the last few years has allowed transmission of high-quality video data over cellular networks. In our initial phase, telemedicine in the MSTU was highly successful. The VN was available via video at the time of the patient's entry into the MSTU but per our protocol waited for the CT to be completed before logging in by video. This wait was reflected in the median door to video log-in time of 11 minutes. This time was also spent constructively by the physician using the medical record to check for any pertinent history if available. Only 6.0% (6

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