

Mobile Stroke Unit? No Thanks!

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Reasons?

Evidence Analysis
Cost Benefit Analysis

Dr. Persse, from a presentation:

Conclusions

1. Endovascular therapy for acute stroke is more costly
2. The first row effective treatment for stroke since tPA
3. Mobile Stroke Units may help speed and triage patients for IAT

Benefits of Stroke Treatment Using a Mobile Stroke Unit Compared With Standard Management The BEST-MSU Study Run-In Phase

Ritvij Bowry, MD; Stephanie Parker, RN; Suja S. Rajan, PhD; Jose-Miguel Yamal, PhD; Tzu-Ching Wu, MD; Laura Richardson, BS; Elizabeth Noser, MD; David Pesse, MD; Kamilah Jackson, RT; James C. Grotta, MD

Benefits of Stroke Treatment Using a Mobile Stroke Unit Compared With Standard Management The BEST-MSU Study Run-In Phase

130 Alerts

- 12 patients received tPA
- 4 later received IAT

Conclusions—The run-in phase provided a tPA treatment rate of 1.5 patients per week, assured us that treatment within 60 minutes of onset is possible, and enabled enrollment of patients on SM weeks. We also recognized the opportunity to assess the effect of the MSU on endovascular treatment and intracerebral hemorrhage. Challenges include the need to control biased patient selection on MSU versus SM weeks and establish inter-rater agreement for tPA treatment using telemedicine. (*Stroke*. 2015;46:3370-3374. DOI: 10.1161/STROKEAHA.115.011093.)

Performance of CT Angiography on a Mobile Stroke Treatment Unit: Implications for Triage

Seby John, Sarah Stock, Thomas Masaryk, Andrew Bauer, Russell Corzja, Ken Uchino, Stacey Winners, Peter Rasmussen, Muhammad S. Hussain

From the Department of Critical Care Medicine, Rush Medical College, Chicago, Ill. (Seby John, Sarah Stock, Thomas Masaryk, Andrew Bauer, Russell Corzja, Ken Uchino, Stacey Winners, Peter Rasmussen, Muhammad S. Hussain); and Department of Radiology, Rush Medical College, Chicago, Ill. (Seby John, Sarah Stock, Thomas Masaryk, Andrew Bauer, Russell Corzja, Ken Uchino, Stacey Winners, Peter Rasmussen, Muhammad S. Hussain).

Performance of CT Angiography on a Mobile Stroke Treatment Unit: Implications for Triage

- Screened patient for possible LVO:
- Telemedicine evaluation NIHSS =14
 - CT with hypoattenuation
- Performed CTA
Transported to CSC

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- Screened patient for possible LVO:
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- Performed CTA
Transported to CSC
- 47 minutes from MSTU arrival to CSC
19 minute transport (28 minute delay to obtain CT/CTA!)

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CONCLUSION: CTA is possible on an MSTU, enabling rapid detection and triage of ELVO cases directly to thrombectomy-capable centers, which significantly reduces time to endovascular treatment.

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Triage of ELVO cases to CSC may be accomplished quicker and cheaper without the MSTU!
Urban areas, where MSTUs are being deployed are ideal setting for direct triage to CSCs!

... which may permit the use of separate scanners at different locations.

While MSTU holds significant promise for improving outcomes in AIS patients eligible for IAT by decreasing time to IV thrombolysis and time to IAT, the associated operational costs may pose additional considerations to this strategy. The Stroke Emergency Mobile unit (STEMO) consortium from Berlin, Germany, recently reported improved outcomes

A Mobile Stroke Treatment Unit for Field Triage of Patients for Intraarterial Revascularization Therapy

Russell Cerejo, Seby John, Andrew B. Buletko, Ather Taqui, Ahmed Ibrat, Natalie Organek, Sung-min Cho, Lila Sheikh, Ken Uchino, Farren Briggs, Andrew P. Reimer, Stacey Winners, Gabor Toth, Peter Rasmussen, Muhammad S. Hussain

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Compared prospective performance to retrospective performance
N=5 !

A Mobile Stroke Treatment Unit for Field Triage of Patients for Intraarterial Revascularization Therapy

- 164 days
- 539 dispatches
- 155 patient transports
- 5 underwent IAT!
- ONE IAT every 33 days!
- ONE IAT for every 100 dispatches!

A Mobile Stroke Treatment Unit for Field Triage of Patients for Intraarterial Revascularization Therapy

What data is presented?

“Door” to CT times	MSTU 12 mins	PSC 32 mins
CT to IAT times	MSTU 82 mins	PSC 165 mins

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We need to transport patients with ELVO to CSCs

A Mobile Stroke Treatment Unit for Field Triage of Patients for Intraarterial Revascularization Therapy

What data is NOT presented?

Comparison of MSTU vs GOFEMS transport to CSC?

MSTU vs GOFEMS

	MSTU		GOFEMS
Disp to MSTU arrival	19 min	Disp to EMS arrival	10 min
Arrival to departure	37 min	Arrival to departure	15 min
Transport time	14 min	Transport time	14 min
<u>Door to IAT</u>	<u>52 min</u>	<u>Door to IAT</u>	<u>139 min</u>
Dispatch to IAT	122 min	Dispatch to IAT	178 min

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ABSTRACT

INTRODUCTION: Favorable outcomes in intraarterial therapy (IAT) for acute ischemic stroke (AIS) are related to early vessel recanalization. The mobile stroke treatment unit (MSTU) is an on-site, prehospital, treatment team, laboratory, and CT scanner that reduces time to treatment for intravenous thrombolytics and may also shorten time to IAT.

METHODS: Using our MSTU database, we identified patients that underwent IAT for AIS. We compared the key time metrics to historical controls, which included patients that underwent IAT at our institution six months prior to implementation of the MSTU. We further divided the controls into two groups: (1) transferred to our institution for IAT and (2) directly presented to our emergency room and underwent IAT.

RESULTS: After 164 days of service, the MSTU transported 155 patients of which 5 underwent IAT. We identified 5 historical controls that were transferred to our center for IAT. Substantial reduction in times including median door to initial CT (12 minute vs. 32 minute), CT to IAT (82 minute vs. 165 minute), and door to MSTU/primary stroke center departure (37 minute vs. 106 minute) were noted among the two groups. Compared to the 6 patients who presented to our institution directly, the MSTU process times were also shorter.

CONCLUSION: Our initial experience shows that MSTU may help to early triage and shorten the time to IAT for AIS.

Prehospital Reversal of Warfarin-Related Coagulopathy in Intracerebral Hemorrhage in a Mobile Stroke Treatment Unit

João A. Gomes, MD; Christine L. Ahrens, PharmD; Muhammad Shazam Hussain, MD; Slacey Winans, MS; Peter A. Rasmussen, MD; Ken Uchino, MD; on behalf of the Cleveland Pre-Hospital Acute Stroke Treatment Study Group¹

Result of Initial Pilot Implementation

Three patients with ICH were among the 54 subjects evaluated by the MSTU during this period of time. One of them had a warfarin-induced coagulopathy. A 93-year-old woman on warfarin with history of cardioembolic strokes secondary to atrial fibrillation was found by family members in bed with right hemiparesis and decreased fluency, leading to activation of EMS services.

...tion at I.I. Follow-up head CT scans done at 6 and 24 hours after presentation showed stable hematoma size and she was eventually discharged to a skilled nursing facility in stable condition.


Cost analysis

Steps in Establishing the MSU
March 2013-Feb 2014

- ~~1. Obtain Federal approval and receive the capital construction~~
- ~~2. Identify need for MSU~~
- ~~3. Obtain state agreement with the construction firm (I.I. cost= \$25.5M)~~
- ~~4. Obtain state approval to proceed with construction~~
- ~~5. Obtain state approval for bonding~~
- ~~6. Obtain state approval for construction~~
- ~~7. Obtain state approval for construction~~
- ~~8. Obtain state approval for construction~~
- ~~9. Obtain state approval for construction~~
- ~~10. Obtain state approval for construction~~
- ~~11. Obtain state approval for construction~~
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Cost Benefit Analysis




Cost of CT Scanner	\$ 375,000
Ambulance Retrofit	\$ 60,000
TM equipment	\$ 30,000
Cost. of added paramedic and TM coverage X 5 yrs	\$1,000,000
Total fixed and continuing costs for 1 MSU X 5 yrs	\$1,465,000



Less than the cost to sustain an endovascular program!

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Reasons?

Cost Benefit Analysis

Detailed Cost Analysis of MSU versus additional ambulance unit:

Mobile Stroke Unit \$\$\$

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Cost Benefit Analysis

Detailed Cost Analysis of MSU versus additional ambulance unit:

Mobile Stroke Unit \$\$\$

ALS unit \$

EMS for Dummies: Pick 2 of the 3!

 GOOD	 FAST	 CHEAP
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