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Note: Today’s presentation is being recorded and will be provided within 48 hours.
Endovascular Therapy: Deep Dive into the New Metrics & Recent Updates to the Patient Management Tool

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Jeffrey L. Saver, MD, FAHA, FAAN, FANA

August 16, 2017
Presenter Disclosure Information:

**L.H. Schwamm:** Clinical trials consultant to Medtronic (Steering Committee VICTORY AF, REACT AF; Co-PI Stroke AF). DSMB member for Novo-Nordisk DeVOTE trial, Penumbra Separator 3D trial. Executive Vice Chairman, Department of Neurology at Harvard Medical School. Chair, Stroke Clinical Workgroup AHA GWTG® - Stroke

**J. Saver:** Clinical trial design and conduct consultant to: Medtronic, Stryker, Neuravia, Boehringer Ingelheim (prevention only); Employee of the University of California, which holds a patent on coil retriever devices for stroke. Member, Stroke Clinical Workgroup AHA GWTG® - Stroke
Objectives:

By the end of the presentation, you will be able to:

• Understand the rationale behind the Endovascular Therapy (EVT) metrics
• Recognize when a patient is included or excluded from the EVT measure(s)
• Differentiate between the Get With the Guidelines® and The Joint Commission measures for thrombectomy
• Explain the recent changes made in the Patient Management Tool (PMT)
Background

Endovascular Recommendations for Eligibility:

1. Patients eligible for intravenous r-tPA should receive intravenous r-tPA even if endovascular treatments are being considered (Class I; Level of Evidence B-R)

2. Patients should receive endovascular therapy with a stent retriever if they meet the following criteria (Class I; Level of Evidence A)
   a. Pre-stroke mRS score 0 to 1
   b. Acute ischemic stroke receiving intravenous r-tPA within 4.5 hours of onset according to guidelines from professional medical societies
   c. Causative occlusion of the ICA or proximal MCA (M1)
   d. Age ≥18 yearC
   e. NIHSS score of ≥ 6
   f. ASPECTS of ≥ 6
   g. Treatment can be initiated (groin puncture) within 6 hours of symptom onset

3. Treatment of patients ineligible for IV r-tPA, but meeting other criteria above, with endovascular therapy with stent retrievers is reasonable (Class IIa; Level of Evidence C)

New Measures: Endovascular Therapy (EVT)
# EVT Measure Set:

<table>
<thead>
<tr>
<th>#</th>
<th>Measure Name</th>
<th>TJC CSTK</th>
<th>GWTG® - Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mechanical Endovascular Reperfusion Therapy for Eligible Patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Median Door to Puncture (DTP) Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Door to Puncture Time within 90 minutes</td>
<td></td>
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<tr>
<td>4</td>
<td>Median Door to Start of Revascularization (DTSR)</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Door to Start of Revascularization within 120 minutes</td>
<td></td>
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<tr>
<td>6</td>
<td>Door to Recanalization/Reperfusion (DTRp) within 120 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Picture to Puncture (PTP) Time within 60 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Median Puncture to Recanalization/Reperfusion (PTRp) Times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>TICI Post-Treatment Reperfusion Grade (0,1,2a, 2b, 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Rate of Substantial Reperfusion (TICI 2b or 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Thrombolysis in Cerebral Infarction (TICI) Post-Treatment Reperfusion Grade (2b vs. 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Discharge Disposition following MER (EVT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>90-Day Modified Rankin Scores (mRS) following MER (EVT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## General Measure Inclusions and Exclusions:

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
<th>Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients age 18 years and old admitted to the hospital who have a diagnosis of acute ischemic stroke <strong>AND</strong></td>
<td>Stroke occurred after hospital arrival</td>
<td>Documented reason for delay in performing Mechanical Endovascular Reperfusion <strong>AND</strong></td>
</tr>
<tr>
<td>Patient received endovascular thrombectomy therapy</td>
<td>Missing or Unknown date/time fields for the following:</td>
<td>Specific reason for delay:</td>
</tr>
<tr>
<td></td>
<td>– Arrival time</td>
<td>– Initial refusal</td>
</tr>
<tr>
<td></td>
<td>– Time Last Known Well</td>
<td>– Care team unable to determine eligibility</td>
</tr>
<tr>
<td></td>
<td>– Brain Imaging</td>
<td>– Management of concomitant emergent</td>
</tr>
<tr>
<td></td>
<td>– Arterial Puncture</td>
<td>– Investigational or experimental protocol for thrombolysis</td>
</tr>
<tr>
<td></td>
<td>Negative time calculations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patients with length of stay &gt; 120 days</td>
<td></td>
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<tr>
<td></td>
<td>Enrolled in a clinical trial as part of their treatment for stroke</td>
<td></td>
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<tr>
<td></td>
<td>Elective carotid intervention</td>
<td></td>
</tr>
</tbody>
</table>
Acceptable Reasons for Not Performing Endovascular Therapy:

1. Pre-stroke mRS >1
2. No evidence of proximal occlusion
3. NIHSS < 6
4. Brain imaging not favorable/hemorrhagic transformation (ASPECTS score < 6)
5. Groin puncture could not be initiated within 6 hours of symptom onset
6. Anatomical reason-unfavorable vascular anatomy that limits access to the occluded artery
7. Patient/family refusal
8. MER performed at outside hospital

Unique to Patient Eligibility:
1. Patients Eligible for Endovascular Therapy

Percentage of eligible patients with ischemic stroke due to large vessel occlusion who received endovascular therapy

**Inclusions:**

1. All patients age 18 years and older admitted to the hospital who have a diagnosis of acute ischemic stroke

2. Patients with a clinical impression of stroke due to occlusion of the distal intracranial carotid artery (ICA) or the proximal middle cerebral artery (MCA/M1)

3. NIHSS closest to the start of the procedure is greater than or equal to 6

4. Whose time last known well is ≤ 4.5 hours prior to arrival

**Exclusions:** Same as general exclusions

**Exception:** Patients who had a contraindication or documented reason for not performing MER

2. Median and Distribution of DTP Times

Histogram of all times from hospital arrival to arterial puncture for patients with acute ischemic stroke who receive endovascular therapy

### Door to Puncture (DTP) Times

<table>
<thead>
<tr>
<th>Time Period</th>
<th>My Hospital Q1 2017</th>
<th>My Hospital Q2 2017</th>
<th>All Hospitals Q1 2017</th>
<th>All Hospitals Q2 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-20 min</td>
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<tr>
<td>21-30 min</td>
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<td>31-40 min</td>
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<td>41-50 min</td>
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<td>51-60 min</td>
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<td>61-70 min</td>
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<tr>
<td>71-80 min</td>
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<tr>
<td>81-90 min</td>
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<tr>
<td>91-100 min</td>
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<tr>
<td>101-110 min</td>
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<tr>
<td>111-120 min</td>
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<tr>
<td>121-130 min</td>
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<tr>
<td>131-140 min</td>
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<tr>
<td>141-150 min</td>
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<tr>
<td>151-160 min</td>
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<tr>
<td>161-170 min</td>
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<td></td>
</tr>
<tr>
<td>171-180 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;180 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Period</th>
<th>My Hospital Q1 2017</th>
<th>My Hospital Q2 2017</th>
<th>All Hospitals Q1 2017</th>
<th>All Hospitals Q2 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median DTP Times (minutes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 2017</td>
<td>106</td>
<td>86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 2017</td>
<td>95</td>
<td>85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The median DTP rate for this one hospital decreased by 11 minutes from Q1 2017 to Q2 2017. However, its median DTP times remained higher against all the hospitals.

3. DTP Time within 90 minutes

Percentage of patients with acute ischemic stroke who receive endovascular therapy and for whom arterial puncture time is ≤ 90 minutes after hospital arrival.

Inclusions:
1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Received mechanical endovascular reperfusion therapy during the hospital admission

Exclusions:
Same as general exclusions

Exceptions:
Patients whose arterial puncture time is > 90 minutes after arrival
AND
Patients who had a documented reason for delay in performing mechanical endovascular reperfusion

Comparison of one hospital against all hospitals for DTP time within 90 minutes.
No data available for “My hospital” in Q1 2017. Performance for “My hospital” in Q2 2017 was higher than all other hospitals participating in GWTG ©.

4. Median and Distribution of DTSR Times

Histogram of all times from hospital arrival to first pass (i.e. deployment) of device for patients with acute ischemic stroke who receive endovascular therapy

The median DTR rate for this one hospital decreased by 11 minutes from Q1 2017 to Q2 2017. However, its median DTR times remained higher against all the hospitals.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>My Hospital</th>
<th>All Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>106</td>
<td>86</td>
</tr>
<tr>
<td>Q2</td>
<td>95</td>
<td>85</td>
</tr>
</tbody>
</table>


The median DTR rate for this one hospital decreased by 11 minutes from Q1 2017 to Q2 2017. However, its median DTR times remained higher against all the hospitals.
5. DTSR within 120 minutes

Percentage of patients with acute ischemic stroke who receive endovascular therapy and for whom the first pass (i.e. deployment) of the device is ≤ 120 minutes after hospital arrival.

**Inclusions:**
1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Received mechanical endovascular reperfusion therapy during the hospital admission

**Exclusions:**
Same as general exclusions

**Exception:**
Patients for whom first pass time is > 120 minutes

Comparison of the Door to Start of Revascularization (DTR) within 120 minutes after hospital arrival for one hospital benchmarked against all hospitals.

6. Door to Reperfusion within 120 minutes

Percentage of patients with acute ischemic stroke who receive endovascular therapy and for whom the time from hospital arrival to reperfusion with TICI grade 2b/3 is ≤ 120 minutes.

**Inclusions:**
1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Received mechanical endovascular reperfusion therapy during the hospital admission

**Exclusions:**
Same as general exclusions

**Exceptions:**
Patients for whom first pass time is > 120 minutes
AND
Patients who had a documented reason for delay in performing mechanical endovascular reperfusion

7. PTP Time within 60 minutes

Percentage of patients with acute ischemic stroke who receive endovascular therapy and for whom arterial puncture time is ≤ 60 minutes after brain imaging time.

Inclusions:
1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Received mechanical endovascular reperfusion therapy during the hospital admission

Exclusions: Same as general exclusions

Exception: Patients for whom arterial puncture time was > 60 minutes
AND Patients who had a documented reason for delay in performing mechanical endovascular reperfusion

Comparison of one hospital against all hospitals. In Q2 2017, hospital A had a higher number of their patients within PTP times under 60 minutes.

8. Median and Distribution of Puncture to Reperfusion Times

Histogram of all times from arterial puncture to reperfusion with TICI grade 2b or 3 for patients with acute ischemic stroke who receive endovascular therapy.

| Inclusions: | 1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Received mechanical endovascular reperfusion therapy during the hospital admission.
3. Had a post-treatment TICI grade of 2b or 3 |

| Exclusions: | Same as general exclusions |
| Exception: | None |

Comparison of the distribution of reperfusion times with TICI grade 2b or 3 for Q1 2017 and Q2 2017 for all hospitals.

9. Rate of Substantial Reperfusion

Percentage of patients with acute ischemic stroke who receive endovascular therapy and have post-reperfusion TICI grade 2b or 3.

Inclusions:
1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Received mechanical endovascular reperfusion therapy during the hospital admission

Exclusions: Same as general exclusions

Exception: None


Comparison of the Rate of Substantial Reperfusion for all patients who had TICI grade 2b or 3 for one hospital benchmarked against all hospitals for Q1 2017 and Q2 2017.
10. TICI Post-Treatment Reperfusion Grades for Successful Endovascular Therapy (2b versus 3)

Patients with acute ischemic stroke who undergo successful endovascular therapy grouped by post-treatment TICI Grade (2b versus 3).

Inclusions:
1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke.
2. Received mechanical endovascular reperfusion therapy during the hospital admission.
3. Patients who had a post-treatment TICI grade of 2b or 3.

Exclusions: Same as general exclusions

Exception: None


Comparison of the post-treatment TICI grade 2b and 3 against the benchmark (All hospitals) in Q2 2017. In the graph above, the individual hospital had higher % of patients with post-treatment TICI grade 2b and a lower percentage of patients with TICI grade 3 in comparison to the benchmark.
11. Discharge Disposition following Endovascular Therapy

Patients with acute ischemic stroke who receive endovascular therapy grouped by Discharge Disposition

Inclusions:
1. All patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Received mechanical endovascular reperfusion therapy during the hospital admission

Exclusions:
Same as general exclusions

Exceptions:
None

12. 90-Day mRS following Endovascular Therapy

Patients with acute ischemic stroke who received endovascular therapy grouped by modified Rankin Score at 90 days post-discharge

Inclusions:

1. Patients age 18 and older admitted to the hospital who have a diagnosis of acute ischemic stroke
2. Patient received mechanical endovascular reperfusion therapy during the hospital admission.
3. Patient had a 90 day (≥75 days and ≤105 days) mRS obtained via telephone or in-person and documented

Exclusions: Same as general exclusions

Exceptions: None

PMT Updates:
Hospitalization Tab
Brain Imaging Section:

Data Element: Was a target lesion identified?

Clarification to coding instructions: Indicate if a target lesion (large vessel occlusion) is visualized in the advanced imaging.
Brain Imaging Section Continued:

Data Element: If yes, select vessel(s) identified:
1. Updated the display label for a response option
2. Added two additional options for “Other/UTD”

Used to determine patient eligibility for EVT based on the vessel identified

Indicate site(s) of occlusion visualized in the advanced brain imaging?

Select when ‘other cerebral artery branch’ is not listed (e.g. vertebral artery)

Previously labeled as “ICA Terminus”

Select “Other/UTD” when not able to determine which vessel segment or artery not listed (e.g. ACA, M3, etc.)
PMT Updates:
Advanced Stroke Care Tab
Endovascular Stroke Treatment Section

1st section: 7 GWTG® Data Elements Display

Yes: Patient taken to the procedure suite with the intent of performing endovascular thrombectomy and at minimum arterial puncture was performed.

No: Patient was taken to the procedure suite, but did not proceed with endovascular thrombectomy (e.g. improvement in patient condition or clot dissolved, thus procedure aborted).

Yes: There is a documented reason by a physician/ANP/PA for not initiating mechanical endovascular reperfusion therapy during this episode of care.

No: There is no documented reason in the medical record by a physician/ANP/PA for why mechanical endovascular reperfusion therapy was not initiated during this episode of care.
Inferences for the following three reasons can be made:
1. No evidence of proximal occlusion
2. NIHSS <6
3. Brain imaging not favorable/hemorrhage transformation (ASPECTS score < 6)

All other reasons require documentation by a physician/APN/PA.
• Examples of a Retrievable stent: Solitaire and Trevo
• Example of Other Mechanical Clot Retriever: Merci Retrieval System
• Example of a Clot Suction Device: Penumbra Stroke System
Yes: There is a documented reason for delay in initiating mechanical endovascular reperfusion therapy when it’s greater than 120 minutes after hospital arrival.

No: There is no documented reason in the medical record for why there was a delay in initiating mechanical endovascular reperfusion therapy during this episode of care.

The response options in December 2017 will expand to include the following 2 reasons:
  * Need for additional imaging
  * Endovascular suite not available
The technical goal of the thrombectomy procedure should be a TICI grade 2b/3 angiographic result to maximize the probability of a good functional clinical outcome (Class I; Level of Evidence A).

**Update to form logic:**
When user selects TICI Post Treatment grade = 0, 1, 2a, or ND THEN this question is automatically checked by the system.

If a TICI reperfusion grade was not done post treatment or cannot be determined from medical record, select “ND.” TICI grade must be documented by Physician/APN/PA.
Complications

2nd Section: New addition only appears for those sites submitting data to The Joint Commission.

Note: ^ (1 carat) indicates TJC element. ^^ (2 carats) indicates GWTG® - Stroke

2 Options:
1. Leverage the auto-population feature
2. Manually enter NIHSS score
Summary

• Patients should receive endovascular therapy with a stent retriever if they meet all of the eligibility criteria.*

• Reduced time from symptom onset to reperfusion with endovascular therapies is strongly associated with better clinical outcomes.**

• EVT measures capture the various time intervals prior to initiation of treatment. This may identify areas for improvement.

• Updates reflected in the PMT aim to harmonize TJC and GWTG® data elements.

Note: * Class 1; Level of Evidence A. AHA/ASA recommended criteria includes the following: Age ≥ 18, pre-stroke mRs score 0-1, IV tPA within 4.5 hours of LKW, causative occlusion of the ICA or MCA, NIHSS score ≥ 6, ASPECTS ≥ 6, and if treatment can be initiated (groin puncture) within 6 hours of symptom onset. ** Class 1' Level of Evidence B-R.
Questions
Thank you for your participation in Get With the Guidelines® - Stroke