Rapid Response Teams

January 17, 2017

Safe Table Webinar
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Alice Ferguson, BSN, RN, Project Manager for Sepsis and RRT at Virginia Mason Medical Center in Seattle, Washington.

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Partnership for Patients
Alaska, Oregon, Washington: Learning With Others
Partnership for Patients

20% reduction in all-cause harm

12% reduction readmissions

By September, 2019
Eleven Topics

1. Adverse drug events (ADE), opioid, anticoagulation, and glycemic management
2. Central line-associated blood stream infections (CLABSI)
3. Catheter-associated urinary tract infections (CAUTI)
4. Clostridium difficile (C. diff), including Antibiotic Stewardship
5. Falls
6. Pressure Ulcers
7. Sepsis and Septic Shock
8. Surgical Site Infections (SSI)
9. Venous thromboembolism (VTE)
10. Ventilator-Associated Events (VAE), to include Infection-related Ventilator-Associated Complication (IVAC) and Ventilator-Associated Condition (VAC)
11. Readmissions

\(^1\text{Linked to payment through CMS Value Based Purchasing}\)
### Measuring Results

**Comparison: Total number of Code Blue calls (as reference for RRT calls)**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerator:</strong> Number of calls to the RRT that month</td>
<td><strong>Number of hospitals where RRTs are in place</strong></td>
</tr>
<tr>
<td><strong>Denominator:</strong> Total number of discharges for same time period</td>
<td></td>
</tr>
</tbody>
</table>

**Exclusions:** Stillbirths, deaths in ED

Sample 1: 14 RRT calls in one month (December 1, 2016 through December 31, 2016) with 420 discharges (per 1000) in the same time period.

14 divided by .420 = 33.33

Sample 2: 10 RRT calls in one month (December 1, 2016 through December 31, 2016) with 150 discharges (per 1000) in the same time period.

10 divided by .150 = 66.66
Rapid Response at Virginia Mason
Empowering Nurses, Improving Outcomes

Christin Gordanier, RN MN, Inpatient Nursing Director
Alice Ferguson, RN BSN, RN Project Manager
Objectives

• Empowering nursing to identify and respond to changes in patient condition improves outcomes
• Look upstream for improvement opportunities
• Care protocols decrease variation and time to treatment
Rapid Response - Vision

Decrease Morbidity and Mortality by:

- Providing early assessment and intervention
- Facilitating transfers to higher level of care
- Supporting staff development through education
Rapid Response-Key Points

Key Points:

- Available for all hospitalized patients 24 hours per day
- No patients are ineligible for a Rapid Response
- Good, patient-focused process that needed improvement
2011-2014…Before Improvement

• 4 RRT calls per day (~120 per month)

• 44 minutes per call

• Many responders, including a hospitalist, (along with two residents) who had a full compliment of patients
RRT Outcomes 2011-2014

- Transferred to a Higher Level of Care: 51%
- Stabilized: 49%
A New Approach

Two-pronged approach

- Improving *upstream* care of patients
- Improving Rapid Response process

Primary methods

- Multidisciplinary quality improvement
- Nurse empowerment
How Nurse Empowerment Works at Virginia Mason

Increasing patient acuity

All hospital nurses

Subtle changes in patient condition?
- Place patient on Watch List

Worried about patient?

2 SIRS + possible infection?
- Sepsis Nurse Initiated Protocol

Critical Care nurse responders

Acute change in patient condition?
- Activate Rapid Response

Positive FAST exam?

Rapid Response Nurse Initiated Protocol

Loss of pulse
OR
Severe respiratory distress?
- Call Code Blue

Lead Rapid Response Team

Code Stroke Nurse Initiated Protocol

Respond as Code Blue team member
Nurse Empowerment

All hospital nurses

- Subtle changes in patient condition?
- Place patient on Watch List → Monitor Watch List

- Worried about patient?

- 2 SIRS + possible infection?
  - Sepsis Nurse Initiated Protocol

Critical Care nurse responders

- Acute change in patient condition?
  - Activate Rapid Response → Lead Rapid Response Team

- Positive FAST exam?

- Loss of pulse
  - Call Code Blue → Respond as Code Blue team member

- OR

- Severe respiratory distress?
Nurse Empowerment

Increasing patient acuity

All hospital nurses

- Subtle changes in patient condition?
  - Place patient on Watch List
  - Monitor Watch List

- Worried about patient?

- 2 SIRS + possible infection?
  - Sepsis Nurse Initiated Protocol

- Acute change in patient condition?
  - Activate Rapid Response
  - Lead Rapid Response Team

- Positive FAST exam?

- Loss of pulse
  - Call Code Blue
  - Respond as Code Blue team member

- Severe respiratory distress?

Critical Care nurse responders

- Rapid Response Nurse Initiated Protocol

- Code Stroke Nurse Initiated Protocol

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Three major groups of work

- Intake Huddle—Getting the patient into the right bed the first time
- Watch List—Extra eyes on high risk patients
- Early Recognition and Treatment of Sepsis (ED and hospital)
The Right Level of Care…Every Time

- Designed in an improvement event that targeted early transfers (within 24 hours of admission) to Critical Care (CCU)

- Patients with unclear trajectories are flagged and reviewed upon arrival in the Emergency Department (ED) by a multidisciplinary team

- The huddle takes less than 5 minutes and focuses on getting the patient to the right level of care in a timely manner
Operationalizing the nurse’s sixth sense

Is anyone else seeing what I’m seeing?
Watch List - Before

I'm worried about my patient

Stable Changes
- Vitals
- Weight
- O2 needs
- I/O
- Consider Sepsis Power Hour if 2 SIRS+ Possibility of infection present

Unstable Changes
- Worried about patient
- Sudden decompensation
- Acute change in clinical condition
- Concern for stroke

Notify
- Charge RN

RRT/Code Blue

Black Hole of Invisibility

Remain on Unit
Transfer to Higher Level of Care
Watch List - After

I'm worried about my patient

Stable Changes
- Vitals
- Weight
- O2 needs
- I/O
- Consider Sepsis Power Hour if 2 SIRS+ Possibility of infection present

Unstable Changes
- Worried about patient
- Sudden decompensation
- Acute change in clinical condition
- Concern for stroke

Notify
- Charge RN
- Primary Provider Team
- RT

Concern addressed/resolved
Patient stable

Concern continues
Patient stable

Concern continues
Patient unstable

Huddle & determine next best step
- Primary RN
- Charge RN
- RRN/CSRN

Watch List

No Watch List
Continue to monitor per provider orders as appropriate for patient condition

RRT/Code Blue

Remain on Unit
Transfer to Higher Level of Care

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Watch List - After

- Patient seen by CCU RN and RT within 45 minutes
- Provider aware of RN concerns
- Multidisciplinary team comes to the patient BEFORE an RRT is needed
Watch List Case Example

Elderly Patient with gradual increase in work of breathing
• Admitted for UTI
• Allergic to albuterol

Primary RN placed patient on Watch List
• Notified provider of concerns

CCU RN and RT assessed patient with primary RN and provider
• Plan was developed for symptom management
Post RRT Outcomes/Diagnoses 2011-2014

- Stroke Activation
- STEMI
- Sepsis Bundle
- Code 4
Sepsis Power Hour: Nurse Leads

RN Work: < 30mins
- Identify Sepsis
- Check Lactate within 10 min
- Check Blood Cultures
- Start 500cc fluid bolus

MD Work: < 60mins
- Confirm Sepsis
- Start Antibiotics
- Complete 2L fluid bolus

Pharmacy Work:
- Prioritize Antibiotics
- Dose and Prepare STAT
- Hand-Deliver to patient’s location
## Sepsis Power Hour Huddle Card

<table>
<thead>
<tr>
<th>What information led me to initiate the Power Hour?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The patient met criteria with elevated T and HR.</td>
</tr>
<tr>
<td>Lactic acid was 1.48 and the patient received antibiotics...Great Catch!!!</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What went well?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What could have gone better?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What (if anything) would I do different next time?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Suspected sepsis in patient with tachycardia and fever
- Immunocompromised
- Admitted for fever of unknown origin

Primary RN initiated the Sepsis Power Hour
- Fluid Bolus, Blood Cultures, Lactate

Patient found to have a lactate of 3.58
- Provider ordered additional fluid resuscitation and antibiotics
- Patient diagnosed with pneumonia
Power Hour Data (n=375)

Element and Bundle Compliance

<table>
<thead>
<tr>
<th></th>
<th>Power Hour</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolus</td>
<td>90%</td>
<td>36%</td>
</tr>
<tr>
<td>Lactate</td>
<td>92%</td>
<td>48%</td>
</tr>
</tbody>
</table>
Rapid Response Process - Before
Rapid Response Process - Before

Six initial responders

Waiting!

Waiting!

Waiting!

Repeating work!

Repeating work!

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Where we were

Rapid Response Team Structure

Primary RN
- Initiate RRT
- Notify primary team
- Give history

Primary team
- Arrive to bedside
- Assess patient
- Modify plan of care based on knowledge of the patient

Wrap Up
- Patient stays on unit
- Rapid Response RN and Primary RN
- Discuss plan of care

Patient goes to higher level of care
- Primary RN give handoff to incoming RN
- CCU RN/Resource RN Transport patient

Waiting!
Waiting!
Waiting!
Repeating work!
Repeating work!

44 minutes
Where We Were

44 minutes

4 times per day

Waiting!

Repeating work!
What we did

Refining the RRT Process

- June 2015 week-long improvement event
- Multidisciplinary team
- Executive sponsorship
Rapid Response Process - After

Rapid Response Team Structure

Phase One
- RT
  - Respond to call
  - Assess patient

- CCU RN Team Leader
  - Respond to call
  - Assess/Improve patient
  - Document

- Primary RN
  - Initiate RRT
  - Notify primary team
  - Give history
  - Update patient/family

Phase Two
- Rapid Response RN and Primary RN
  - Assess for immediate support as appropriate
  - Assess for additional support as appropriate
  - Passes RT as appropriate
  - Follow paging escalation algorithm as needed

- Hospital Medicine Consult/ Team/MD
  - Assess patient
  - Develop ongoing plan of care with RN and primary team

- PRN

- Primary Team
  - Arrive within 30 minutes
  - Assess patient
  - Develop ongoing plan of care with RN

Wrap Up
- PATIENT STAYS ON UNIT
  - Rapid Response RN and Primary RN
  - Discuss plan of care
  - Develop plan for check back as appropriate
  - Debrief

- PATIENT GOES TO HIGHER LEVEL OF CARE
  - Primary RN
  - Give Handoff to receiving RN
  - CCU RN/Resource RN Transport Patient
  - Rapid Response RN and Primary RN
  - Debrief

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Rapid Response Process - After

Treatment begins via the RRT Nurse Initiated Protocol BEFORE provider arrival.

Three initial responders:
- CCU RN leads
- Hospitalist only comes if additional support needed

Primary Providers respond because they know the patient best.
RRT Protocol Development

- Data-driven
- Evidence-based
- Separate protocol for stroke to facilitate timely treatment
- Multi-disciplinary development
- Multi-disciplinary approval

REASON FOR RRT ACTIVATION

- Hypotension/Tachycardia: 34%
- Chest Pain: 6%
- SOB: 24%
- AMS: 22%
- Other: 6%
<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Response Team Resources (Ref Text Only)</td>
<td>Start T+J, Note: Reference Manual link. Right click to view and print &quot;Rapid Response Team Algorithm&quot;</td>
</tr>
<tr>
<td><strong>STATUS</strong></td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Start T+J, Diagnosis: Rapid Response Team Workup</td>
</tr>
<tr>
<td>SEPSIS Nurse Initiated Protocol Reference.</td>
<td>Start T+J</td>
</tr>
<tr>
<td><strong>CLINICAL ORDERS</strong></td>
<td></td>
</tr>
<tr>
<td>Oxygen order</td>
<td>Start T+J, Note: Administer O2 to keep SpO2 &gt;90%</td>
</tr>
<tr>
<td>Consult to Secretion Clearance/Pulmonary Hygiene</td>
<td>Start T+J, Reason: Respiratory Therapy; Secretion Clearance</td>
</tr>
<tr>
<td>Peripheral IV Care</td>
<td>Start T+J, Note: IV therapy to place 2nd peripheral line, ensure 2 large bore IV</td>
</tr>
<tr>
<td>IV FLUID BOLUS</td>
<td></td>
</tr>
<tr>
<td>Sodium Chloride 0.9% (Sodium Chloride 0.9%-IV Bolus)</td>
<td>Bolus with 250 ml. Infuse bolus over 15 Minutes, IV, Q15 Minutes, PRN, For: Blood Pressure Control</td>
</tr>
<tr>
<td><strong>MEDICATIONS</strong></td>
<td></td>
</tr>
<tr>
<td>glucose (Dextrose 50% intravenous solution)</td>
<td>12.5 g, inj soln, IV, ONCE, NOW, Note: Administer 12.5 g (1/2 amp) for hypoglycemia</td>
</tr>
<tr>
<td>albuterol (albuterol 0.083% inhalation solution)</td>
<td>2.5 mg, soln, NEB, ONCE, STAT, Note: For wheezing and/or Shortness of breath</td>
</tr>
<tr>
<td>naloxone</td>
<td>0.2 mg, inj soln, IV, Q2 Minutes, PRN, For: Respiratory Rate &lt;8 and Unarousable, Routine, Note: For F</td>
</tr>
<tr>
<td><strong>LABORATORY</strong></td>
<td></td>
</tr>
<tr>
<td>Lactic Acid Whole Blood</td>
<td>STAT, Start T+N Nurse Collect, ONCE</td>
</tr>
<tr>
<td>For Hypotension</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>STAT, Start T+N Nurse Collect, ONCE</td>
</tr>
<tr>
<td>For Hypotension or tachycardia and suspicion of bleeding.</td>
<td></td>
</tr>
<tr>
<td>Complete Blood Count w/ Differential, Manual if Indicated</td>
<td>STAT, Start T+N Nurse Collect, ONCE</td>
</tr>
<tr>
<td>For concern for sepsis</td>
<td></td>
</tr>
<tr>
<td>Blood Gas Arterial</td>
<td>STAT, Start T+N</td>
</tr>
<tr>
<td>Blood Gas Arterial and Lactic Acid</td>
<td>STAT, Start T+N</td>
</tr>
<tr>
<td>For Respiratory Distress</td>
<td></td>
</tr>
<tr>
<td>Troponin I</td>
<td>STAT, Start T+N Nurse Collect, ONCE</td>
</tr>
<tr>
<td>For chest pain</td>
<td></td>
</tr>
<tr>
<td>Lytes, BUN, Creat, Glucose Random</td>
<td>STAT, Start T+N Nurse Collect, ONCE</td>
</tr>
<tr>
<td>For Tachycardia</td>
<td></td>
</tr>
<tr>
<td>Hold Blood Bank Sample</td>
<td>STAT, Start T+N Nurse Collect</td>
</tr>
<tr>
<td>For Hypotension or Tachycardia and suspicion of bleeding.</td>
<td></td>
</tr>
<tr>
<td>POC Blood Glucose by Nursing</td>
<td>STAT</td>
</tr>
<tr>
<td>For Altered Mental Status</td>
<td></td>
</tr>
<tr>
<td><strong>DIAGNOSTIC TESTS</strong></td>
<td></td>
</tr>
<tr>
<td>CAR Electrocardiogram (EKG)</td>
<td>Start T+N, STAT, Do Shortness of breath</td>
</tr>
<tr>
<td>CAR Electrocardiogram (EKG)</td>
<td>Start T+N, STAT, Do Chest pain, unspecified</td>
</tr>
<tr>
<td>CAR Electrocardiogram (EKG)</td>
<td>Start T+N, STAT, Do Tachycardia, unspecified</td>
</tr>
<tr>
<td><strong>RADIOLOGY</strong></td>
<td></td>
</tr>
<tr>
<td>Chest 1 View</td>
<td>Start T+N, Reason for Exam: Respiratory distress, assess fluid overload and/or pneumonia</td>
</tr>
<tr>
<td><strong>END OF ORDERSET - owner and CIS tracking information only below</strong></td>
<td>Original Release Date: December 2015, Note: Order Set Owner: Rapid Response Team Committee</td>
</tr>
<tr>
<td><strong>Order Set Information</strong></td>
<td></td>
</tr>
</tbody>
</table>
RRT Protocol—Clinical Algorithm

Hypotension

Assess for:
- Acute blood loss
- Hematemesis
- Blood in stool
- Recent surgery

Severe:
- Fever/chills/ Rigors
- J, I, S, T
- Tachycardia
- ↑ WBC

Medications:
- IV narcotics
- Epinephrine
- HTN meds
- Diuretics
- Anaphylaxis

Initial Orders:
- Hgb
- Lactate
- Hold Blood Bank Samples
- 2 large IVs
- 500 cc NS IV bolus

Tachycardia

Is it new?
Is the patient symptomatic? Light-headed, chest pain, SOB

ECG

Sinus Tach

ECG

New ST elevation
(Compare to old ECG)

No ST elevation

Discuss IV metoprolol or atenolol with MD

Fever, chills, tachycardia

Respiratory Distress

Initial Assessment
- Hypoxia
- Chest pain
- Wheeze or crackles on lung exam
- Lower extremity edema
- ANS and recent narcotics or benzos
- Signs of sepsis (fever, chills, tachycardia)

Diagnostic Considerations:
- Pulmonary edema / CHF
- COPD / asthma
- Pneumonia
- MI
- Pulmonary embolism
- Dehydration
- OSA

Initial orders for workup:
- STAT portable 1-view CXR
- ECG
- ABG, troponin, CBC, lactate

Initial treatment options:
- Titrate O2 to SpO2 > 92%
- Albuterol nebul
- RT pulmonary hygiene order
- Consider naloxone 0.4 mg IV x 1 for somnolence and recent narcotics
- Discuss IV fentanyl with MD, if patient overloaded on O2 and on exam
- Discuss CPAP/BiPAP with MD

Chest pain

ECG

Signs of sepsis
Volume / blood loss
Chest pain, SOB

Lactate → Sepsis power hour
Hgb, hold blood sample, Discuss IV NS bolus with MD
Troxapin, consider CRX

Altered Mental Status

FAST Assessment

Negative

Check POC glucose

If < 50, give 1/2 amp D50

Review meds for recent narcotics or benzos

Naloxone 0.2 mg IV x 1

Consider septic shock metabolic problem:

Order Troxapin, consider CRX

Check lactate

Sepsis power hour

Initial Workup

Signs of Sepsis (fever, tachy, ↑ WBC)

Check lactate

Sepsis Power Hour

Active seizure activity

Extracorporeal 2 mg IV x 1

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RRT Case Example

RRT called for Elderly Patient with Acute Tachypnea
• Multiple co-morbidities

CCU RN initiated the RRT Protocol
• Oxygen, fluid bolus, albuterol, ABG, and Chest X-Ray

Patient found to have pneumonia
• Provider ordered antibiotics and placed patient on BiPAP
RRT called for Post-Operative Patient with hypotension and tachycardia
- Otherwise healthy

CCU RN initiated the RRT Protocol
- Oxygen, fluid bolus

Patient found to be volume depleted
- Provider ordered additional fluid resuscitation
RRT Protocol - Clinical Algorithm

**Hypotension**

**Assess for:**
- Acute blood loss
- Hematogenesis
- Blood in stool
- Recent surgery
- Sepsis
  - Fever/chills/hypers
  - J-RO's
  - Tachycardia
  - ↑ WBC
- Medications
  - IV narcotics
  - Epinephrine
  - HTN meds
  - Diuretics
  - Anaphylaxis

**Initial Orders:**
- Hgb
- Lactate
- Hold Blood Bank Samples
- 2 large bore IV's
- 500 cc NS IV bolus

**Tachycardia**

- Is it new?
- Is the patient symptomatic? Light headed, chest pain, SOB

**Respiratory Distress**

**Initial Assessment**
- Hypoxia
- Chest pain
- Wheezes or crackles on lung exam
- Lower extremity edema
- Amn and recent narcotics or benzos
- Signs of sepsis (fever, chills, tachycardia)

**Initial orders for workup**
- STAT portable 1-view CXR
- ECG
- ABG, troponin, CBC, lactate

**Initial treatment options**
- Titrate O₂ to SpO₂ > 95%
- Administer nasal 
- RT pulmonary hygiene order
- Consider naloxone 0.4 mg IV x 1 for unresponsiveness and recent narcotics
- Discuss IV fosfomycin with MD, if patient overloaded on CRI and on exam
- Discuss CAFÉ/RAP with MD

**Diagnostic Considerations:**
- Pulmonary edema / CHF
- COPD / asthma
- Pneumonia
- All
- Pulmonary embolism
- Diaphragm
- Q&A

**Chest Pain**

**ECG**

- Pain, review meds
- Signs of sepsis
- Volume / blood loss
- Chest pain, SOB

**ECG**

- New ST elevation (Compare to old ECG)

**STMR**

- Order Troponin
- Consider CRI 1-view
- Discuss morphine, nmo, G3, and ASA with MD

**Altered Mental Status**

**FAST Assessment**

- (Positive)
- Code Stroke
- (Negative)

**Initial Workup**

- Check PUG glucose
- Review meds for recent narcotics or benzos
- Signs of Sepsis (fever, tachy, ↑ WBC)

**Consider other metabolic problem**
- Check lactate
- Sepsis Power Hour

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Post RRT Outcomes/Diagnoses 2011-2014

- Stroke Activation
- STEMI
- Sepsis Bundle
- Code 4
**Initiate if patient not seen by a provider within 10 minutes**

**Medications MUST be approved by provider**

<table>
<thead>
<tr>
<th>STATUS</th>
<th>Clinical Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis</td>
<td>Start T;N, Diagnosis: Rule out stroke</td>
</tr>
<tr>
<td><strong>CLINICAL ORDER(S)</strong></td>
<td></td>
</tr>
<tr>
<td>Oxygen order</td>
<td>Start T;N, STAT, O2 per Delivery Route per RT/RN</td>
</tr>
<tr>
<td>NPO (now)</td>
<td>NURSEING Instructions: Patient to remain NPO until RN Swallow Screen is done.</td>
</tr>
<tr>
<td>Swallow Screen by Nursing</td>
<td>Start T;N, ONCE, Note: Patient to remain NPO until RN Swallow Screen is done.</td>
</tr>
<tr>
<td>POC Blood Glucose by Nursing</td>
<td>Start T;N, STAT, ONCE, Note: if not a current creatinine in past 12 hours</td>
</tr>
<tr>
<td>POC Creatinine by Nursing</td>
<td></td>
</tr>
<tr>
<td>Cardiac Monitor</td>
<td>Start T;N, STAT</td>
</tr>
<tr>
<td>Neurological Assessment (Neuro Checks)</td>
<td>Start T;N, Q1 HR, Note: May decrease to Q2 HR after 24 hours if stable.</td>
</tr>
<tr>
<td>Neuro Status Check w/ Shift Handoff</td>
<td>Start T;N, Q8 HR, Note: Document double check of neuro status, done at</td>
</tr>
<tr>
<td>NIH Stroke Scale Assessment - by RN</td>
<td></td>
</tr>
<tr>
<td><strong>IV ACCESS</strong></td>
<td></td>
</tr>
<tr>
<td>Peripheral IV Insertion</td>
<td>Start T;N, ONCE, Note: (20 gauge or larger)</td>
</tr>
<tr>
<td><strong>LABORATORY</strong></td>
<td></td>
</tr>
<tr>
<td>Complete Blood Count w/ Differential, Manual if Indicated</td>
<td>STAT, Start T;N Lab Collect</td>
</tr>
<tr>
<td>Comprehensive Metabolic Panel Random</td>
<td>STAT, Start T;N Lab Collect</td>
</tr>
<tr>
<td>Prothrombin Time</td>
<td>STAT, Start T;N Lab Collect</td>
</tr>
<tr>
<td>Partial Thromboplastin Time</td>
<td>STAT, Start T;N Lab Collect</td>
</tr>
<tr>
<td><strong>RADIOLoGY</strong></td>
<td></td>
</tr>
<tr>
<td>CT Head WITHOUT IV Contrast</td>
<td>Start T;N, Reason for Exam: Rule out bleed/mass, STAT Read? Yes</td>
</tr>
<tr>
<td>CT Angio Head &amp; Neck</td>
<td>Reason for Exam: Rule out stroke/mass, Hc Creatinine done within 24 h</td>
</tr>
</tbody>
</table>
# Stroke Protocol - Clinical Algorithm

## In House Code Stroke Check List (Version 07.7.2016)

Use back of this form to keep track of vital signs and neuro checks, pass it off RN to RN, not an official part of patient's record.

### Initial Eval < 5 min

**FAST Exam**

- Face weakness? □
- Arm weakness? □
- Speech abnormal? □

Time last seen well: ________

<table>
<thead>
<tr>
<th>Unit RN</th>
<th>Unit PCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vital Signs</td>
<td>POC Blood Glucose</td>
</tr>
<tr>
<td>O2 at 2L NC</td>
<td>Portable O2 tank</td>
</tr>
<tr>
<td>Patent IV</td>
<td>FAST positive, Call Response 5555</td>
</tr>
<tr>
<td>Page primary MD “possible stroke”</td>
<td></td>
</tr>
</tbody>
</table>

RR - RN/Level 17 charge

- FAST+ confirmed = Page ‘Code Stroke’
- Establish last known well ________
- POC glucose ________
- NIH stroke scale ________
- Transport patient to Jones 9 Scanner - Vocera CT tech
- Need order
- Anticipate neuro/IR call regarding patient
- Enter Code Stroke order set in 10 minutes if primary MD doesn’t arrive to assess patient and fast positive (not time yet)

**Primary MD**

- Order Head CT/CTA head and neck
- Primary M.D. Name: _______________________
- Phone #: _______________________

Proceed directly to Jones 9 CT scanner

DO NOT STOP THE FLOW OF THE PATIENTS TO THE CT SCAN FOR INCOMPLETE ITEMS

### CT Process

**Transport and CT scan**

- MD + RR-RN + RT+ RX+ IV team +L17 charge
- Remain with patient through disposition
- Pharmacist arrives in CT Jones with TPA kit follows standard work
- Turn on Telestroke device if after 1700
- NIH Stroke Scale confirmed

CT

Bleed?

- Yes Bleed
  - Page Neuro/IR/Neuroradiology
  - Do Call
  - CT
  - Neuro MD
  - Disposition determined
  - Call Neuro MD
  - Call Neuro MD
  - Discharge CT

- No Bleed
  - TPA
  - CT
  - Neuro MD
  - Discharge CT

### CT Negative / Consider tPA

Prior to thrombolytic therapy:

- Review of inclusion/exclusion criteria
- Start 2nd IV Access Line
- If BP remains > 185/110 medicate as ordered

Post thrombolytic therapy administration:

- No IM injections
- No additional anticoagulation/antiplatelet therapy
- Automatic BP cuff use with caution. Cuff site check and rotated every 2 hours
- Seizure precautions as indicated

- if tPA given refer to standard process for ordering and administering IV TPA for Acute Stroke

- Start time: __________ Stop time: __________

- transfer to IR or CCU

**All Stroke Patients must have warm hand-off RN/RN (neuro checks and VS)**

**Warm Handoffs:**

- RN (giving report): _______________________
- RN (receiving report): _______________________

**Goal:** Response RN to CT Read ≤ 25 min.

PATIENT LABEL GOES HERE

*Vital Sign and Neuro Check Frequency – see back
Inpatient Code Stroke Huddle Card

There was an in house code stroke called on our unit on: 12/29/2016
Admit diagnosis: Traumatic SAH s/p fall
The patient was FAST+ with symptoms of:
- left arm drift/weakness
Patient was last known well at: 0950
Patient taken to J9 CT scanner:
CT= negative for bleed or acute infarct
CTA= negative for LVO
MRI= right posterior frontal infarct

RRT called for pt with new onset of left arm weakness,
code stroke activated at 0957 and pt to CT at 1008 (11 minutes!). CT and CTA both negative for anything acute. Pt returned to L17 PNCU for closer neuro monitoring. MRI confirmed a new stroke in the right posterior frontal region. Great catch team!
What led me to initiate a rapid response?
Left arm drift and weakness
What went well?
Able to get the patient quickly to CT and to be evaluated by the neuro hospitalist
What could have gone better?
Ask primary RN or CCU RN about any issues.
What (if anything) would I do different next time?
Nothing, great job team!

Don't wait! Call a Rapid Response if your patient is FAST+!

Don't wait! Call a Rapid Response if your patient is FAST+!

- Face: Ask the patient to smile. Show me your teeth. Raise your eyebrows.
- Arm: Hold up your arms. Can you hold them for me?
- Speech: Ask him to say something. Can you say 'hi'?
- Time: Test him on time. What time is this? (If he can't say, don't delay. INITIATE A RAPID RESPONSE!)
Code Stroke Outcomes
3/1/2016-11/1/2016

- New or Worsening Stroke: 42%
- New non-stroke neuro diagnosis: 36%
- Ruled out: 22%
Stroke Case-Example

Elderly patient with new confusion and a positive FAST exam
  • Admitted for urosepsis

CCU RN initiated the Code Stroke Protocol
  • CT scan completed
  • Stroke Team activated

Patient found to have a right sided infarct
  • Received IV TPA in 27 minutes
Implementation

Making the Work Happen

- Education
- Feedback
- Detailed data-tracking
- Sharing successes
- Drills
In-House Code Stroke Drill
Outcomes

2016 Data...After Improvement

• 1 RRT call per day (~35 per month)
• 25 minutes per call
• **No** increase in the number of Code Blues
Outcomes

RRT Outcomes 2011-2014

- Stabilized with RRT Interventions, 49%
- Transferred to a Higher Level of Care

RRT OUTCOMES-2016

- Stabilized with RRT Interventions, 67%
Reduction in RRTs

RRTs and Code Blues (outside CCU)
03/2011-12/2016

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