DOOR TO NEEDLE TIME FOR THROMBOLYSIS IN ACUTE ISCHEMIC STROKE

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8th Edition
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REASON FOR CHOICE OF AUDIT

- Stroke is the fourth leading cause of mortality and the most common cause of disability and suffering globally.
- The concept **of Door to Needle (DTN)** time in Neurology is used in management of Acute Ischemic Stroke (AIS).
- It is the time from the arrival of stroke patient in Emergency department to initiation of recombinant tissue plasminogen activator (rt-PA) drug therapy.
- Thrombolysis with rt-PA drug within 4.5 hours of symptom onset is the only approved therapy for Acute Ischemic Stroke (AIS) with a class I evidence-based recommendation from the American Stroke Association .
- The benefit of rt-PA therapy is extremely time sensitive
- The DTN time has become even more important since the introduction of "**Time is Brain**" concept, wherein research has shown that each minute in which a stroke remains untreated, as many as 1.9 million neurons and 14 billion synapses die.

PREPARATION AND PLANNING

- **AIM** : To audit the door to needle for thrombolysis in acute ischemic stroke.
- **OBJECTIVES :**
  - To measure the percentage of patients receiving rt-PA within the recommended time frame.
  - To analyse the median time of receiving rt-PA.
  - To check the completeness of the documentation of time of arrival of patient/symptoms and time of giving rt-PA.
  - To suggest measures to reduce the door to needle time in stroke patients.
- **METHODOLOGY**
  - Type of Study: Retrospective audit
  - Period : 01 JANUARY 2023 TO 30 JUNE 2023
  - Sample size : 82
- **INCLUSION CRITERIA**
  - All patients arriving at ED with symptoms of stroke who have history of stroke , history of hypertension
- **DATA COLLECTION**
  - Medical records – Of Patients received thrombolysis in neurology department.
  - Pharmacy medicine wise sales list for Alteplase.
  - Progress note of patients.

FINDINGS

- 82 cases of acute ischemic stroke were identified and audited.
- And only 37 patients had received Alteplase within 60 minutes of arrival.
- 20 of the cases were outside the window period in which majority failed to recognize that they had symptoms of acute ischemic stroke. Among 25 cases there were delay in administration upto 2 hours due to issues as mentioned below

ANALYSIS OF PROBLEMS CAUSING DELAY	
PATIENT RELATED REASONS:	**IN-HOSPITAL RELATED REASONS:**
Uncertainty about time of symptom onset	Incorrect triage
Unknown medical history	Insufficient emergency room staff or untrained staff in stroke recognition
Uncertainty about anticoagulation status	CT Scanner preoccupied
Financial issues with family	Delay in transfer from another hospital / institute
Delaying in giving consent by family	

RECOMMENDATIONS

- Streamlined triage process
- Pre-notification by emergency medical services : angels ambulance service
- Developed standardized protocols for the evaluation and management of acute stroke patients, including rapid assessment, neuroimaging (such as CT scans), and laboratory tests (POC).
- Stroke code activation: emergency physician, neurologist and radiologist
- NIH stroke scale was introduced
- Education and training: training given to all concerned in ED and ICU 2 display of clinical pathway
- Monitor door to needle time performance: KPI
- Patient and family education: :financial counselling process
- Rt PA drugs were made available
- Stroke awareness session was organized by department of neurology

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CRITERIA

Eligibility

Class I (strong) :
If within 3 hours of onset

* greater than or equal to 18 years of age
* Severe stroke
* Mild but disabling stroke

If 3 -4.5 hours from onset,
18-80 of age

* Without a history of both diabetes mellitus and prior stroke
* NIHSS score less than or equal to 25
* Not taking any OACs
* Without imaging evidence of ischemic injury involving more than 1/3 rd of MCA territory

hours
Class II A and II B
(Moderate to weak) : If 3-4.5 hours from onset

* >80 years of age (COR II a)
* Mild but disabling stroke (COR II b)
* NIHSS > 25(COR II b)

Contraindication

Class III (Harm) :

*CT reveals an acute intracranial haemorrhage
*CT brain imaging exhibits extensive regions of clear hypoattenuation
* Prior ischemic stroke within 3 months
* Recent severe head trauma within 3 months
* Acute head trauma
* Intracranial/ spinal surgery within the prior 3 months
* Symptoms and signs most consistent with subarachnoid haemorrhage, History of ICH
* Structural GI malignancy
* Platelets <100000/ mm3
* INR >1.7, APTT >40s, PT> 15 s
* Treatment dose of LMWH within 24 hours
* Taking direct thrombin inhibitors or direct factor Xa
* Inhibitors unless laboratory tests are normal, or patient has not received a dose of these agents for > 48
* Symptoms consistent with infective endocarditis, known or suspected to be associated with aortic arch dissection
* Intra-axial intracranial neoplasm
* Gastrointestinal bleeding event within 21 days.

STANDARDS SET AND RATIONALE

STROKE PROTOCOL

Patient arrives ED with symptoms of Stroke(swaying, facial deviation, slurring of speech, visual impairment, diplopia, limb weakness)
B - Balance
E - Eyes
F - Face
A - Arm
S - Speech
T - Time

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Immediate general assessment and stabilization
Assess ABC, vital signs
Support airway- Maintain an oxygen saturation >94%
Collect history- Last seen normal(for wake up), time of onset
Progressing/stable/recovering
Access eligibility for thrombolysis
* Prior intracranial haemorrhage
* Prior ischemic stroke within 3 months
* Recent severe head trauma within 3 months
* Intracranial/ spinal injury within 3 months
* Structural GI malignancy
* Treatment dose of LMWH within 24 hours
* Taking direct thrombin inhibitors or direct factor Xa inhibitors unless laboratory tests are normal, or patient has not received a dose of these agents for > 48 hours.

Perform neurologic screening- NIHSS assessment (NIHSS form attached)
Obtain IV access and perform laboratory assessment- CBC, LFT, RFT, Blood glucose, S.Electrolytes
Obtain 12 lead ECG
Inform Neurologist on call

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Perform CT/MRI (individualize based on patient)
Inform medicine on call resident and radiology on call resident

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Does CT/MRI show acute infarct

Thrombotic | Haemorrhagic

Consult with neurosurgeon (refer to other if not available)
Begin stroke/ haemorrhage management

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Inform Neurologist

Assess eligibility for IV alteplase

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If advised for thrombolization
Shift to ICU
Take consent
Manage BP, if > 185/110 mm Hg
If BP < 185/110 administer Inj. Alteplase 50 mg (5 mg as bolus and then 45 mg as IV infusion over 45 minutes)

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During rt- PA therapy
Perform neurologic assessment : Repeat every 15 minutes during and after infusion for 2 hours
Check for major and /or minor bleeding :
Major bleeding – Intracranial, retroperitoneal, gastrointestinal or genitourinary
Minor bleeding – Gums, hematuria, hemoptysis, skin hematomas or ecchymosis

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Post rt-PA care
* Monitor for neurologic deterioration
*Check for major and/or minor bleeding
*Monitor and control blood pressure
*Obtain a follow up CT scan or MRI
*Monitor for signs of orolingual angioedema
*Avoid arterial punctures or insertion of catheters in the first 24 hours
*Avoid anticoagulation, antiplatelet therapy in the first 24 hours

* Blood routine, Na, K,Mg, LFT, RFT, TSH, PT, APTT, Viral markers, HS Troponin
*** If BP >180/100 mm Hg, administer Inj. Labetolol 20 mg IV stat → If the BP remains high (180/100 mm Hg) start NTG infusion initiate with 10 max then titrate based on patient value

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STROKE AWARENESS SESSION

Department of Neurology

Dr. Soumya V C, Consultant, Neurology **Dr. Kevin Reji,** Consultant, Neurology

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STROKE DAY

HEALTH CHECKUP

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FOLLOW UP AND EVALUATION OF CHANGE

- To address the problems causing delay in door to needle time and rectify them.
- To conduct an audit after 3 months (Oct 2023-Jan 2024) to assess whether the above measures have reduced the door to needle time

IMPACT OF AUDIT

- 46 cases of acute ischemic stroke were identified and audited.
- Only 37 cases met the eligibility criteria for Alteplase and all of them had received Alteplase within 50 minutes of arrival.
- Rest of the cases were outside the window period in which majority failed to recognize that they had symptoms of acute ischemic stroke.

CONCLUSION

- Though the Door to Needle time was within 50 minutes in all the post audits, all the patients were thrombolysed within the 4.5 hrs of onset of symptoms as per the protocol . All the patients were under 80 years of age .

REFERENCES

- https://www.stroke.org/-/media/Stroke-Files/Ischemic-Stroke-Professional-Materials/AIS-Toolkit/AIS-Professional-Education-Presentation-ucm_485538
- https://www.nhs.uk/conditions/stroke/treatment/
- https:// www.ohsu.edu/sites/default/files/2019-06/OHSU%20Acute%20Stroke%20Practice%20Guidelines%20for%20the%20Emergency%20Department%202018.pdf

Stroke : Time lost is brain lost

THANK YOU