Stroke Code : An Attempt To Improve Stroke Care And Outcome

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Reason for choice

- **TIME LOST IS BRAIN LOST**
- **Theme to start the audit was 'Time Lost is Brain Lost’.**
- **Stroke is one of the leading cause of death and disability all over the world and numbers are increasing particularly in low income countries**
- **Without effective prevention strategies and urgent treatment, stroke burden and disability due to stroke is going to rise.**
- **With every minute delay in the treatment millions of neurons are lost and patient loses > 3years per hour delay in treatment.**
- **Thrombolysis treatment is available to dissolve the culprit clot but there are time limits to get benefit vs. adverse effects from this treatment.**
- **Thus earlier the treatment, better are the outcomes and less is the disability.**
- **So , by improving the timelines of stroke, we can help patient to have better outcome.**

Criteria

- Standard stroke timelines are set by American Heart Association and American Stroke Association get with guidelines.
- Patient data from past years was assessed and compared with standard timeline.
- Brain attack coalition sets

a standard of 80% door to

Needle time(DTN) to achieve

within less than 60 minutes.

Table 5. ED-Based Care

Action	Time
Door to physician	≤10 minutes
Door to stroke team	≤15 minutes
Door to CT initiation	≤25 minutes
Door to CT interpretation	≤45 minutes
Door to drug (≥80% compliance)	≤60 minutes
Door to stroke unit admission	≤3 hours

CT indicates computed tomography; and ED, emergency department.

Source: Bock.[96]

Standards set and rationale

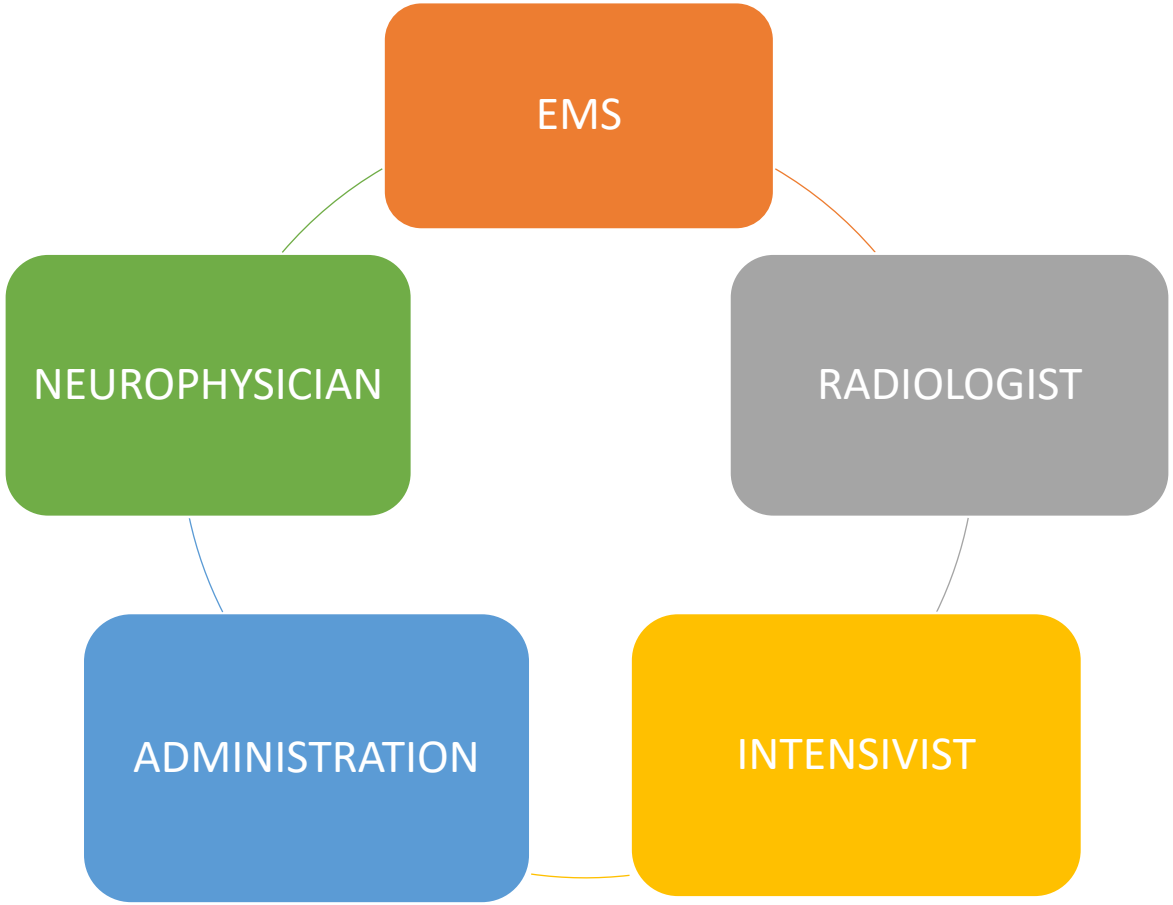
- Timelines that are set by AHA/ASA are considered as standards for comparison.
- These guidelines are set in 2013 by AHA/ASA in view to create effective systems for optimising strike patients care.

	Recommended time
Door to Physician time	10 mins
Door to Imaging time	45mins
Door to Needle time	<60mins

Preparation and planning

- Retrospective data of stroke patients from previous 2 years was compared with standard timelines and and reasons that could be responsible for delays are searched for.
- Planned to make a team of the members involved in stroke management
- We planned to set protocols for timely and systematic management of stroke patients presenting to hospital withing time window of 4.5 hours.

Stroke code team



Methodology

- All patients presenting to ER with with stroke symptoms were screened.
- Patients presenting within window of 4.5 hours are followed further.
- Stroke code announced for such patients by calling a dedicated number. After stroke code announcement,a doctor from the team accompanied the patient to streamline and hasten the further process of imaging and thrombolysis when indicated.
- Patients within window period with ischemic stroke received thrombolytic drug after discussion and advice by neurologist.
- Patient then shifted to stroke unit.
- Different timelines i.e. Door to Physician(DTPt), Door to Imaging(DTIt), Door to Needle(DTNt) are noted.
- Other parameters as diagnosis, problems during the process, etc are also noted down.
- All records are entered in Excel sheet for further analysis.
- Regular audits of the data entered are conducted every 6 months for further analysis of the progress and any modifications required.

Inclusion and exclusion criteria

- Inclusion criteria:

  All patients presenting to ER with stroke symptoms are included.

Exclusion criteria:

Patients less than 18 years are not included.

Data collection

- Demographic data of all patients including age, gender, co-morbidities, diagnosis are entered in excel sheet for analysis.
- Patients presenting within window period of 4.5 hours are followed further for the timelines untill the diagnosis on imaging and thrombolysis till patient getting shifted to stroke unit.
- Patients who were thrombolysed are further assessed and timelines are noted down with door to needle time and divided into patients who were thrombolysed within and after 60 minutes.
- Timelines are compared with standard timelines by AHA/ASA every 6 monthly and yearly data calculated at end of each year.

Findings

- We reviewed prior 2 years data before stroke code implementation and found that, without disciplined management, the timelines for stroke management were way beyond the standard International timelines.

	Recommended time	Study time intervals Mean(median);SD mins
DTPt Door to Physician	10 mins	32 (15);SD34
DTIt Door to Imaging	45mins	58 (50); SD-50
DTNt Door to needle	<60mins	104 (100);SD-41

Contd

- We designed stroke code system and implemented in 2014. Since then the timelines slowly improved.
- 70.16% patients got thrombolysed within 60 minutes in 2018 with average of 5 years is 57.94% patients with thrombolysis within 60 minutes as compared to 15.9% patients in pre stroke code era.
- Thus if a hospital has basic pre-requisites to give stroke care, then this simple, cost effective protocol of stroke code can help to improve the thrombolysis rates and timelines and help stroke patients for better outcome.

Year wise findings over a period of 5 years

Parameter	Pre code era N =659	Post code era (2015) N=573	Post SC (2016) N=243	Post SC (2017) N=276	2018 N=351	2019 N = 426	Average
Percentage of patient thrombolysed	**6.3% (44)**	11.51% (65)	**11.52 % (28)**	**9.4 % (26)**	**7.5% (26)**	**12.91% (55)**	
Thrombolysis rate <60 mins	**15.90 %**	53%	**53.51%**	**67.51%**	**70.1%**	**45.56%**	**57.94%**
Door to physician time(min)	32.93	8.94	5	7.15	4.8	4.6	
Door to imaging time(min)	58.88	26.84	23	21.3	20.5	23.7	
Door to needle time (min)	**104.95**	67.77	**84**	**48.1**	**56.5**	**60.67**	

Follow up and evaluation of change

- Progress of the audit is evaluated every 6 months and timeline comparison done.
- During initial stages of implementation we faced problems with training and protocolising the system.
- Repeated training sessions of the personale involved were done to overcome this problem.
- Being a private hospital, financially challenged patients were requiring more time for thrombolysis. This was sorted out with management help and three vials were made available for such patients in ER and radiology dept.
- Regular follow ups helped to overcome the hurdles and to go ahead.
- Stroke code has become a concept well known to everyone at hospital now.

Challenges faced & Solutions given

ADMINISTRATIVE

- Execution and training session for all 4 departments (Emergency, Radiology, Neurology and Critical Care department) were arranged regularly.
- Periodic audits
- Thrombolytic drug made available at Emergency department, at radiology department and in Neuro trauma unit to avoid delay in drug delivery

CLINICAL

- Case to case follow up of every stroke patient.
- Introduction of stroke code team to channelize overall process of thrombolysis.
- Dedicated special number given on stroke code activation.

SOCIAL

- Measures for awareness of early symptoms of stroke (FAST) to common people through various social media platforms like TV, newspapers, short films, advertisement, radio as well as public meetings.
- In certain odd situations (financial issues) we have made 3 vials available round the clock for non affordable patients.

Impact of audit

- The aim of this audit was to reduce the door to needle time to < 60 minutes for maximum stroke patients and to reach to standard guidelines for better outcome of ischemic stroke patients.
- With continuous efforts the timelines improved significantly.

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cont

- The stroke code impact did not remain restricted with us but we spread the word through presentations in jounals and different conferences to make stroke code concept familiar to all the medical fraternity and to have benefit in all stroke patients presenting to different hospitals.
- Also, awareness programs were carried out to have impact in reducing the time lapse from onset of symptoms to door. Media like radio, TV, newspaper are used for this purpose. We observed increased number of stroke patients coming to ER with having information regarding the drug that can cure the stroke.

Recommendations

- The rapid response system can help reduce the inhospital treatment delay in stroke management
- We recommend implementation of such stroke code system in hospitals where stroke care is possible.
- Timely increasing awareness among society and gearing up for the management of stroke is the requirement of todays era where stroke is one of the leading cause of morbidity.

Conclusion

- This tailor made step by step approach in stroke care that suits Indian conditions especially in areas with poor resources would be beneficial to public in large.