Inpatient Stroke Alerts: Assessing the Need for Inpatient Stroke Education

Karan Topiwala MBBS, Karan Tarasaria MBBS, Dawn Beland RN, SCRN, Erica Schuyler MD, Amre Nouh MD, FAHA.
Hartford Hospital – University of Connecticut – Department of Neurology – Hartford CT, USA

BACKGROUND

- In-patient stroke alerts vary among patient-care settings, with an abundance of stroke mimics. [1]
- Low treatment rates with (IV) thrombolytics (tPA) or mechanical thrombectomy (MT) are observed typically due to contraindications related to acute illness. [2]
- The true treatment gap however has not been identified.

OBJECTIVE

- To evaluate inpatient stroke alerts and direct education to improve accuracy and appropriate call frequency

METHODS

- A Retrospective study was performed identifying all inpatient stroke alerts from March 2017 to March 2018. Clinical, radiographic and demographic patient data were collected.
- Data was analyzed to determine the clinical or radiographic trigger for the stroke alert, prevalence of true stroke, stroke mimics, reperfusion rates (IV tPA and/or MT) and barriers to treatment (Table 1)

RESULTS

- Out of 211 codes, 36% (n=76) of patients had an acute stroke.
- Common admission diagnosis: cardiovascular 40.7% (n=86), followed by neurologic 14.2% (n=30) and sepsis 12.8% (n=27).
- Treatment rates: IV tPA [3.4% (n=3) among 87 tPA-eligible patients] and EVT [2.4% (n=5) among 9 large vessel occlusion (LVO) IS.
- > 80% of tPA eligible patients were found to be stroke mimics, however < 5% within this cohort, received reperfusion therapy.

Table: 1 Patient demographic

Parameter	*Acute Stroke*	*Stroke mimic*	*Total*	*P Value (OR, 95% CI)*
Age	Median: 76 (Min/Max: 28/93)	Median: 69 (Min/Max: 19/91)		0.007
Sex (M/F)	42/34	65/70	211	0.321 (0.75; 1.32-0.43)
Co-morbidities: n (%)				
Diabetes	29 (34.9)	54 (65.1)	83	0.793 (0.96; 1.65-0.52)
Atrial Fibrillation	30 (53.6)	26 (46.4)	56	0.001 (2.73; 5.12-1.46)
EF<30%	16 (66.7)	8 (33.3)	24	0.001 (4.23;10.44-1.72)
Clinical scenario: n (%)				
Within 6 Hr. of HD	1 (12.5)	7 (87.5)	8	0.263 (0.24; 2.02-0.29)
Sedation	11 (22)	39 (78)	50	0.018 (0.42; 0.87-0.19)
Anti-coagulation	27 (50)	27 (50)	54	0.013 (2.20; 4.14-1.17)
Anti-platelets	32 (39.5)	49 (60.5)	81	0.405 (1.28; 2.27-0.72)
Peri-Operative	35 (47.3)	39 (52.7)	74	0.249 (2.10; 3.77-1.17)
Elevated level of care	29 (41.4)	41 (58.6)	70	0.012 (1.42; 2.55-0.78)
Witnessed Seizure	1 (4.7)	20 (95.3)	21	0.002 (0.77; 0.58-0.01)
Symptoms: n (%)				
Altered consciousness	44 (32.8)	90 (67.2)	134	0.204 (0.68; 1.23-0.38)
Loss of consciousness	10 (28.6)	25 (71.4)	35	0.315 (0.67; 1.47-0.30)
Field cut	17 (60.7)	11 (39.3)	28	0.003 (3.25; 7.37-1.43)
Gaze deviation	6 (35.3)	11 (64.7)	17	0.948 (0.96; 2.72-0.34)
Aphasia	38 (38.4)	61 (61.6)	99	0.501 (1.21; 2.13-0.69)
Neglect	10 (66.7)	5 (33.3)	15	0.010 (3.94; 11.9-1.29)
Dysarthria	39 (37.9)	64 (62.1)	103	0.586 (1.17; 2.05-0.66)
Motor weakness	45 (36.3)	79 (63.7)	124	0.922 (1.03; 1.82-0.58)
Sensory deficits	33 (44.6)	41 (55.4)	74	0.057 (1.76; 3.15-0.98)
Ataxia	5 (71.4)	2 (28.6)	7	0.101 (4.68; 24.7-0.88)
Facial droop	32 (53.3)	28 (46.7)	60	0.001 (2.78; 5.15-1.50)
Dizziness	5 (38.5)	8 (61.5)	13	1.000 (1.12; 3.56-0.35)
NIHSS	Median: 6 (Min/Max: 0/33)	Median:4 (Min/Max 0/34)	NA	0.062
LSN	Median: 60 (Min/Max:1/1440)	Median: 45 (Min/Max: 1/1380)	NA	0.092

- Common reasons for withholding treatment: NIHSS ≤4 (40%, n=62), suspected metabolic encephalopathy (23%, n=47) and abnormal blood pressure or blood sugar (6.3%, n=13)

CONCLUSION

- ~ 1 in 3 inpatient stroke alerts were found to have a true stroke.
- Treatment Gap = tPA-eligible-but-untreated patients who had an IS = 18% (n=15/84) = missed treatment opportunity of 1 in 6 patients
- Dedicated education for teams managing these patient populations is needed to improve stroke alert accuracy and call appropriateness to balance resources and improve care.

Action Plan

- Treatment gap
- Causes for gap
- identified predictors
- Meeting with primary teams

Research Council Meeting:
- Stroke Director
- Stroke rapid response team
- Neurology residents
- Stroke nurse coordinator

Educational Seminars

Cardiology / Medicine
- Recognize predictors of true stroke
- Discuss the changing treatment windows for IS
- Obtain rapid Anti Xa level

Neurology
- Reinforce predictors of true stroke
- Discuss utility of treating patients with low NIHSS

Incorporate a LSN, in end-shift nursing note

Biannual CQI : tracking treatment gap and compliance

REFERENCES

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1. Cumbler et al. Code Stroke: Multicenter Experience With In-Hospital Stroke Alerts. Journal of Hospital Medicine 2015;10:179–183.