



## Evaluating Use of Stroke Alerts at the University of Colorado Hospital

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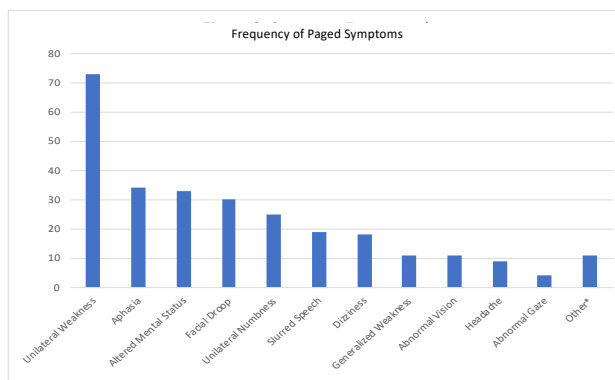
### Background

- Stroke Alert (SA) protocols are being implemented across the country in order to establish an expedited means of evaluation for patients presenting with possible acute ischemic stroke (AIS)
- SA protocols often include some combination of: IV access, blood glucose and other basic labs, telehealth or in person evaluation by a neurologist, and clearance of and transport to the CT scanner with subsequent decision making about initiation of thrombolytic therapy
- These protocols have been successful in improving time to diagnosis, and therefore have improved access to thrombolytic therapies within the necessary window of treatment (1).
- Reports of SA specificity and sensitivity are widely variable between institutions and between activation settings (prehospital, ED, inpatient) with SA positive predictive value ranging from 41 to 80% (2, 3)
- Efforts to clarify, standardize, and create more specific SA activation criteria can improve specificity of SA without sacrificing sensitivity
- Given that SA protocols are a use of hospital resources and may lead to unnecessary diagnostic tests or treatments, we aim to evaluate trends among SAs in order to identify predictors of stroke mimics and other characteristics that might further inform decisions to activate an alert.

### Methods

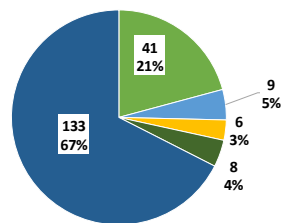
- This is a retrospective observational study of adult Stroke Alert activations at the University of Colorado Hospital in 2019
- Data collected includes patient demographics, symptoms triggering a SA, stroke risk factors, initial neurologic evaluation data, final diagnosis and clinical outcome
- Further data collection will be completed, N to date is 200

### Results



\*any report of symptom in SA page, alone or in combination with other symptoms. \*\*symptoms with frequency < 4 were grouped into other (abnormal pupils, unspecified numbness, dysphagia, ataxia, abnormal movements, neck pain\_

Final Diagnoses



- Definite Stroke
- Stroke Improved with tPA
- Stroke Mimic
- Probable Stroke
- TIA

### Discussion

- This study found that the positive predictive value (PPV) of the SA system at UCH is only 33%, which is possibly attributed to a relatively low-threshold qualification protocol at this institution as well as to suboptimal staff understanding of protocol
- Older age was significantly associated with true stroke and female sex was associated with stroke mimics. While neither of these can be used as hard criteria for SA activation, this information can contribute to the complex decision of SA activation
- Patients presenting with unilateral weakness or with 2 or more neurologic symptoms were more likely to have a true stroke, indicating that these presentations should have a relatively lower threshold for SA activations

### Conclusions & The Future

- Studies have shown higher SA PPV and improved adherence to protocol when institutions implement SA education for physicians and nurses (4)
- Certain patient characteristics and presenting symptoms such as those studied here can be used to improve SA activation protocol
- Data collection for this study will be continued with a goal of N = 1,000 and will have additional data points including patient tPA candidacy and specific mimic diagnoses

### References

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- Stecker, Mark M., et al. "Characteristics of the stroke alert process in a general Hospital." *Surgical neurology international* 6 (2015).
- Merino, José G et al. "Predictors of acute stroke mimics in 8187 patients referred to a stroke service." *Journal of stroke and cerebrovascular diseases: the official journal of National Stroke Association* vol. 22.8 (2013): e397-403. doi:10.1016/j.jstrokecerebrovasdis.2013.04.018
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| Factors with Significant Positive or Negative Associations with Stroke Diagnosis |                    |              |       |       |               |
|--|--------------------|--------------|-------|-------|---------------|
|  | Diagnosis          |              | p     | OR    | 95% CI        |
|  | Stroke or TIA*     | Stroke Mimic |       |       |               |
|  | mean (SD) or n (%) |              |       |       |               |
| Age (at time of SA)  | 63 (+/- 11)        | 57 (+/- 18)  | 0.029 |       |               |
| Sex (female)   | 24 (38)            | 76 (57%)     | 0.01  | 2.222 | 1.206 - 4.096 |
| Symptom on SA page*  |                    |              |       |       |               |
| Unilateral Weakness  | 32 (50)            | 39 (29)      | 0.005 | 2.41  | 1.302 - 4.463 |
| Facial Droop   | 14 (22)            | 16 (12)      | 0.072 | 2.047 | 0.929 - 4.512 |
| 2+ symptoms  | 35 (55)            | 42 (32)      | 0.002 | 2.615 | 1.416 - 4.828 |