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Retrospective Review of Stroke Alerts at San Antonio Military Medical Center

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Introduction
With the FDA approval of intravenous (IV) tissue-type plasminogen activator (tPA) in 1996 for the treatment of acute ischemic stroke, there suddenly became the need to expediently evaluate and treat patients who were eligible for this therapy. As a result, many hospitals assembled "stroke alert" teams, specifically designed to promptly respond and obtain a focused history, exam with NIH stroke scale (NIHSS), and any necessary diagnostics. After the initial assessment, a decision can then be made whether to treat with IV tPA or not. Across several publications, stroke mictics have accounted for 20-40% of patients referred for acute stroke evaluation.1,2 To date, the stroke alert system at San Antonio Military Medical Center has not been explored.

Methods
This project was conducted under the BAMC IRB protocol #C-2017.094e. Code stroke alerts were retrospectively reviewed from April 2012 – 28 March 2017. Our goals were to describe the characteristics of patients in whom code stroke alerts were initiated, the final diagnoses of these patients, the percentage of patients administered IV thrombolytic therapy and/or endovascular therapies for presumed acute ischemic stroke, and rates of complications with these therapies. Data gathered included age, sex, beneficiary status (Active Duty, dependents, etc.), location of stroke alert activation, initial NIHSS, final diagnosis, whether IV tPA was administered, whether the patient underwent endovascular therapies, reasons for not administering IV tPA, and final disposition.

In the patients who were diagnosed with acute ischemic stroke, we subdivided their ischemic stroke as being in the anterior or posterior circulation, and by mechanism according the TOAST criteria including cardioembolic, large vessel embolic, small vessel (lacunar), stroke of other determined etiology, and stroke of undetermined etiology (cryptogenic).

For stroke mictics (SM), we used several predefined categories to better consolidate our patients into similar groups. These included systemic (non-neurologic), migraine (headache sequelae), seizure, unmasking/recrudescence, peripheral localization, drug-induced (including polypharmacy), other neurologic, and functional/psychogenic.

Results

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<td>265</td>
<td>75</td>
<td>105</td>
<td>105</td>
</tr>
</tbody>
</table>

Table 1: Comparison of Stroke Mictics (SM) and TIA

Results Continued
Between April 2012 and March 2017, there were a total of 398 stroke alerts at Brooke Army Medical Center. Two of the patients were excluded from further analysis due to inability to find their records in the inpatient electronic medical record. Of the remaining cases, 263 (66.4%) were given a final stroke mictic (SM) diagnosis and 133 (33.6%) resulted in a stroke equivalent diagnosis (Table 1). The final stroke mictic diagnoses are listed in Table 2. Final stroke equivalent diagnoses had a higher average age (70.1 vs 62.5) and NIHSS (8.6 vs 3.8) as compared to stroke mictics. In contrast to stroke equivalent patients, SM patients tended to be female (55.5% vs 44.4%), dependents including spouses and children (49.0% vs 35.3%), and were more likely to be discharged home (84.0% vs 57.1%).

IV tPA was administered 46 times over the time period, 36 of which to patients with a final diagnosis of AIS or TIA, and 10 patients with a final SM diagnosis. Four of 36 (11.1%) AIS/TIA patients had symptomatic intracranial hemorrhage (SICH), while none of the stroke mictics did. Of the patients who experienced SICH, their average NIHSS was twice as high as those without SICH (19.5 vs 9.7) and 3 of the 4 patients died before discharge. Among stroke equivalent patients, the most common reason for not administering IV tPA was that their last known normal time was outside of the approved window.

Conclusions
Our study found a significantly higher rate of stroke mictics among our population than has been reported in previous literature. Our next step is to further analyze these patients for specific vascular risk factors and determine whether certain factors may be more predictive of TIA, AIS, or ICH in the acute setting. Based on these findings, we will be critically evaluating our stroke alert process for continued quality improvement. At a time when acute stroke treatment windows have expanded, we should strive to optimize hospital processes to ensure appropriate activation of stroke alert systems and subsequent delivery of effective therapies to those who can benefit.

References