ED-STEADI: Evaluating the Effectiveness of TUG Test as a Screening Tool for Geriatric Fall Risk Assessment

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Background

More than a third of patients 65 years of age or older fall each year. With the 'baby boomer generation' entering their geriatric years, the number of mechanical falls is expected to increase exponentially over the coming decade putting an enormous strain on the health care system. The Timed-Up-and-Go (TUG) test has been recommended by the CDC as an appropriate screening tool to identify elderly patients who may be at an increased risk of mechanical falls. This tool is not standard of care within an emergency department setting. My research aims to test the effectiveness of the TUG test as a screening tool for fall risk in elderly patients who present to the emergency department.

Methodology

The ED-STEADI research project is an IRB approved prospective study being conducted at the LVH-CC emergency department. Patients who meet inclusion criteria for the study (Table 1) are randomized into a control or intervention arm of the protocol and then receive follow up calls regarding fall data at defined intervals over the course of one year. At time of enrollment, the patients performed the TUG test and their performance was documented for analysis. Six months' worth of follow-up data was collected for a total of 60 patients to be analyzed. The distribution of the data for the time (seconds) in which subjects completed the TUG test was markedly skewed by outliers with long times. Therefore, results were reported as median seconds to better fit our data distribution. Evaluation of effectiveness of TUG as screening tool was based on sensitivity and specificity analysis. Analysis was completed using Pearson's chi-square and significance set at $p < 0.05$.

Results

Figure 1 depicts the Consort Flow Diagram for the enrolled patients undergoing TUG analysis. Of 55 patients analyzed, 28 were male and 27 were female. Average age of the participants was 73.6 years. Over the course of the 6 months of follow up, 15 of the 55 participants reported falling since their discharge from the ED at enrollment. Of the 55 patients analyzed, the median TUG time was 11 seconds. CDC guidelines state that TUG $\geq$ 12 seconds is at high risk for falling. Table 2 shows the observed contingency table for the data collected. In our study, the TUG test proved to have a sensitivity=86.7% and a specificity=50% in effectively identifying patients at high risk for falling (p-value=0.013).

Table 1: Depicts inclusion and exclusion criteria from patients to be eligible to participate in the ED-STEADI research study.

Inclusion Criteria	Exclusion Criteria
Age 65 or older	Age under 65
Participant being discharged home from ED	Patient discharged anywhere but home from ED
English speaking	Non-English speaking
Competent and able to consent	Incompetent and unable to give consent
Patient has mechanical fall risk*	Patients does not have mechanical fall risk

Table 2: Observed contingency table for TUG data of 55 participants subject to analysis. Fall Risk Factor presence or absence is defined by the CDC's recommendation of a TUG time $\geq$12 seconds equating to a high rall risk.

	Fall Occurred	Fall Did Not Occur	Totals
Fall Risk Factor Present	13	20	33
Fall Risk Factor Absent	2	20	22
Totals	15	40	55

*Mechanical fall risk defined by 1) reports to have fallen in the last year 2) reports worrying about falling and/or 3) admits to feel unsteady when standing or walking.

Figure 1: Consort Flow Diagram for Analysis of TUG Data for ED STEADI Participants

Enrolled ED STEADI Participants (n=60)

Excluded for Follow-up
• Withdrawal (n=3)
• Lost to Follow-up (n=1)

Participants Analyze TUG Data (n=56)

Absence of TUG Data
• Refusal to test due to pain (n=1)
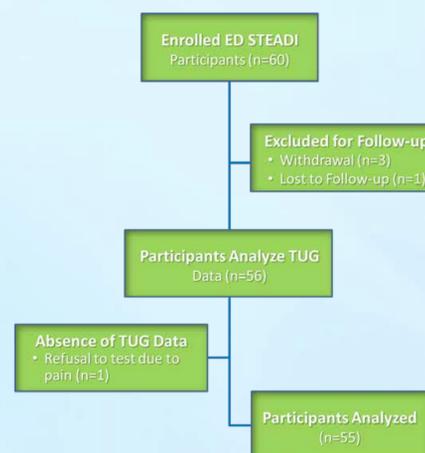
Participants Analyzed (n=55)

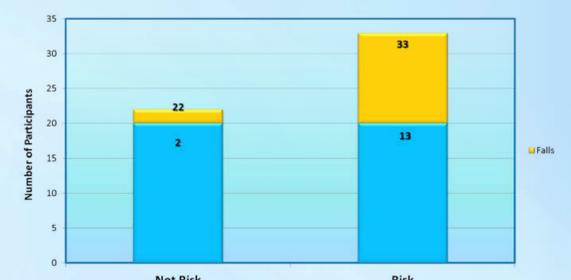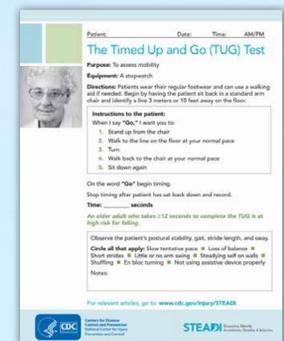Figure 2: CDC Risk Recommendation (All TUG Data)

Figure 2. Figure depicts the number of participants who fell at least once during their 6 month follow-up period based upon their risk stratification group as recommended by the CDC guidelines for the TUG test.

Conclusion/Future Implications

Although the TUG test has a poor specificity in identifying patients at high risk for fall, it is a safe quick test that can be done at with no cost within the emergency department setting and may be beneficial in starting the conversation about fall risk to patients being discharged home. This study only serves as a 'first look' at the larger study with a total of 250 patients to be analyzed. Further work could be done to determine if gender makes a difference in the predictive value of the TUG test. Hopefully, the results of this study can be used to test the effectiveness of this tool in settings outside the ED as well (ie perioperative care).