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Maximum IV tPA Dose for Obese Patients is Associated with Greater Likelihood of Hemorrhagic Conversion and Worse Functional Outcome at Discharge

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INTRODUCTION

IV tissue plasminogen activator (tPA, alteplase) is the mainstay of treatment for acute ischemic stroke at a weight-based dose of 0.9 mg/kg with a maximum limit of 90 mg for a person >100 kg (220 lb) according to United States (US) guidelines. The prevalence of adult obesity in the US has progressively increased; hence, the percentage of patients receiving the maximum dose is expected to rise as well. **We examined differences in patient characteristics and outcomes in acute ischemic stroke (AIS) patients who were treated with the weight-based dose (WBD) vs. the maximum dose (MD) of IV tPA.**

METHODS

We performed a historical cohort study using the local Get With The Guidelines-Stroke database from October 2013 to April 2017. Selection criteria included hospital admission, age ≥ 18 years, received IV tPA as treatment for AIS, and had a recorded weight (Figure 1).

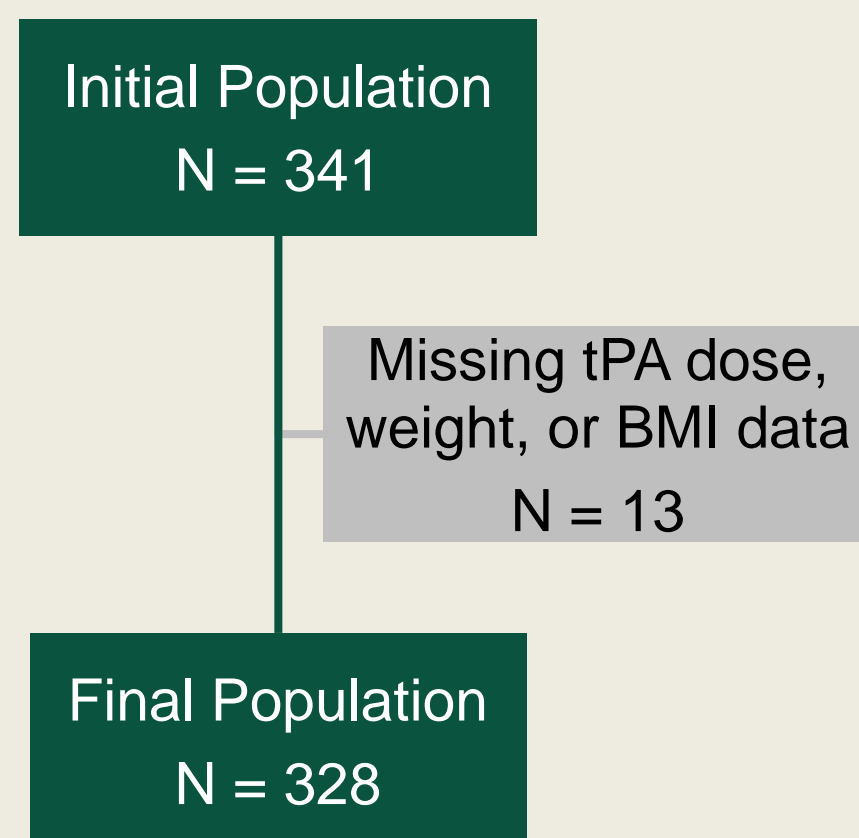


Figure 1. The patient population selection based on exclusion and inclusion criteria

Patients were dichotomized into **WBD group** (<90 mg), weighing <100 kg, and **MD group** (90 mg), weighing ≥ 100 kg. We analyzed categorical variables using Chi square tests and continuous variables using independent samples t-tests.

RESULTS

| Characteristics | Weight-Based Dose (n=290) | Max Dose (n=38) | p-Value |
|-----------------------------|---------------------------|---------------------|---------|
| | Mean (range) | Mean (range) | |
| Age, mean (range) | 77 (24-104) | 62 (19-98) | <0.001 |
| Weight (kg) | 71 (32-99) | 116 (100-182) | <0.001 |
| | n (%) | n (%) | |
| Gender | | | |
| Male | 119 (41) | 29 (76) | <0.001 |
| Female | 171 (59) | 9 (24) | |
| Ethnicity | | | |
| Hispanic | 193 (67) | 19 (50) | 0.045 |
| Non-Hispanic | 97 (33) | 19 (50) | |
| Initial NIHSS | | | |
| Low (0-4) | 39 (13) | 9 (24) | 0.241 |
| Moderate (5-10) | 108 (37) | 12 (32) | |
| High (>10) | 143 (50) | 17 (44) | |
| Disposition | | | |
| Good (Home/rehab) | 201 (69) | 24 (63) | 0.442 |
| Poor | 89 (31) | 14 (37) | |
| Discharge mRS | | | |
| 0-2 | 66 (23) | 7 (18) | <0.001 |
| 3-6 | 224 (77) | 31 (82) | |
| 90 day mRS | | | |
| 0-2 | 100 (34) | 9 (24) | 0.627 |
| 3-6 | 111 (57) | 14 (37) | |
| Lost to follow-up | 79 (27) | 11 (29) | |
| Complications | | | |
| None Serious | 279 (97) | 37 (88) | 0.038 |
| Pneumonia | 16 (6) | 3 (7) | 0.671 |
| Serious Systemic Hemorrhage | 2 (1) | 1 (2) | 0.33 |
| Symptomatic ICH | 9 (3) | 4 (10) | 0.045 |

Table 1. Summary of patient characteristics and outcomes

- Patients in the **MD group** tended to be younger, male, non-Hispanic, and more likely to take antidiabetic and anticholesterol drugs than those in the WBD group
- There did not appear to be a trend for increasing volume of overweight/obese patients over the years

RESULTS

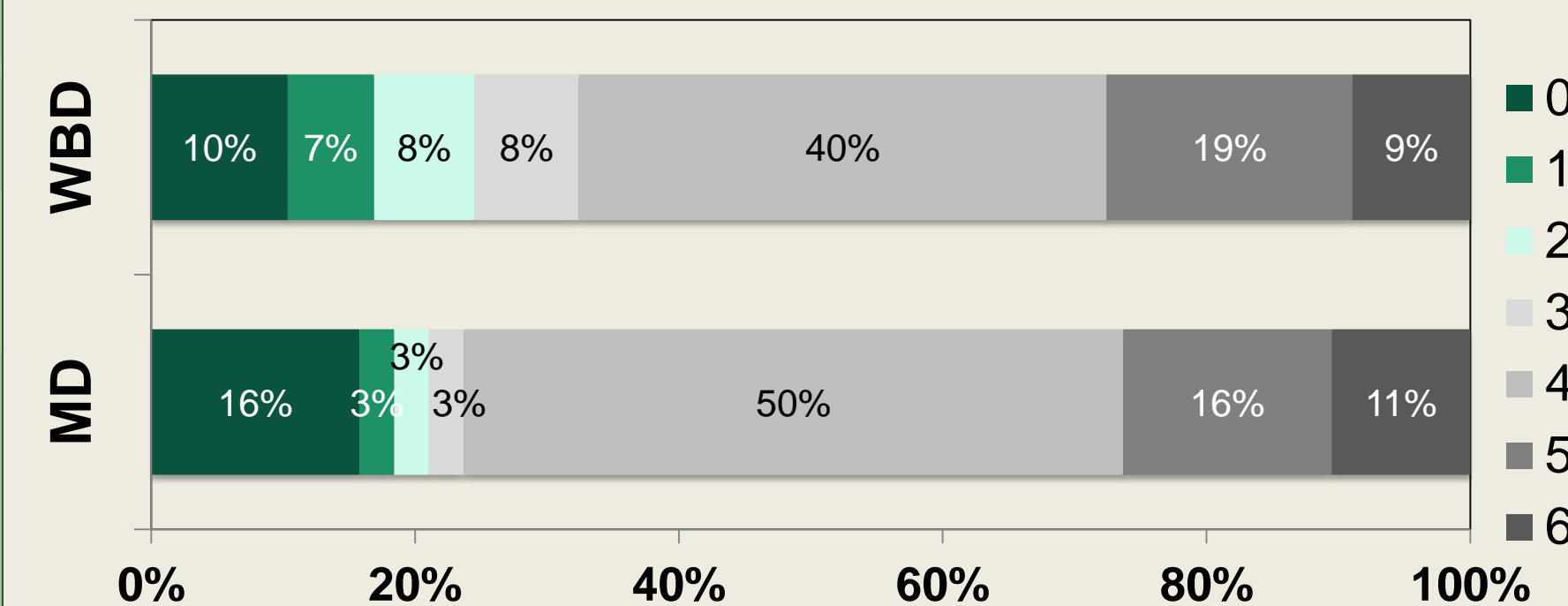


Figure 2. Discharge mRS of patients receiving weight-based dose vs max dose tPA

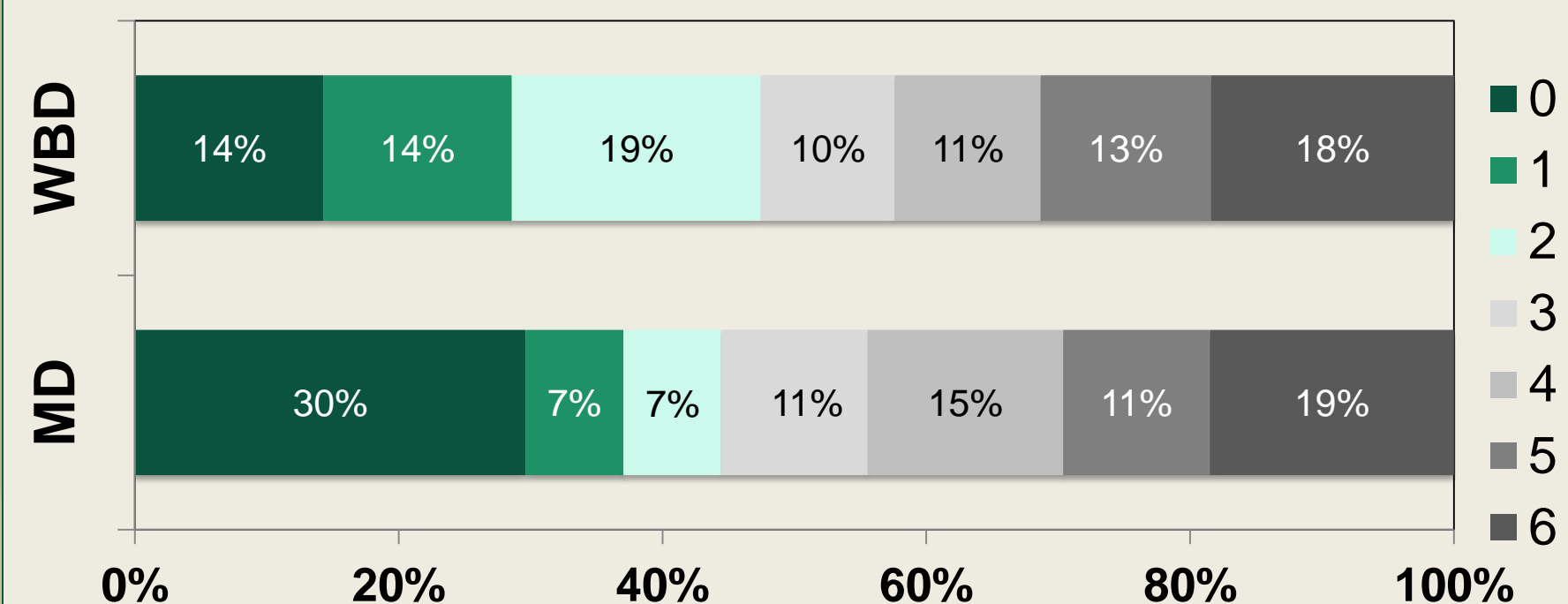


Figure 3. 90-d mRS of patients receiving weight-based dose vs max dose tPA

CONCLUSIONS

- **Overweight/obese patients who received MD IV tPA were more likely to have sICH and a worse discharge functional outcome vs. those in the WBD group**
- No difference in 90-d outcomes, likely resulting from a 28% lost to follow-up rate
- **Next step:** perform regression analysis to determine if the dosing itself explains the differences in sICH and outcomes
- The small n in the MD group did not allow for subgroup analyses; more cases will be added