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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).

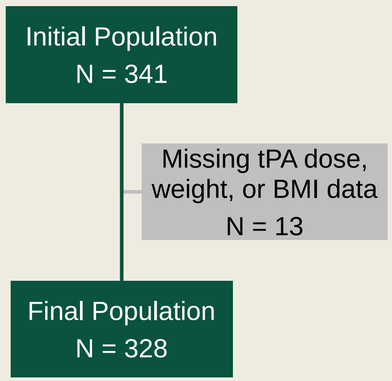

Figure 1. *The patient population selection based on exclusion and inclusion criteria*

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

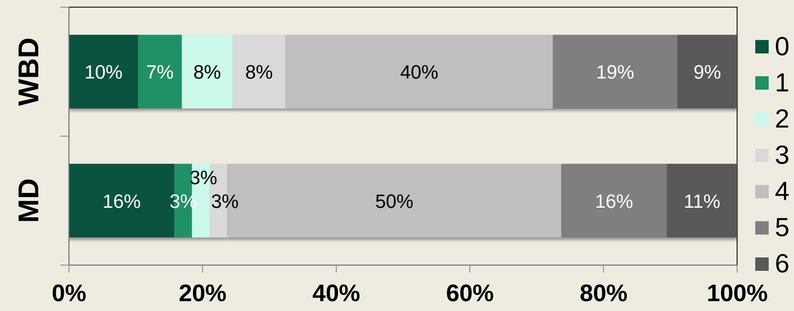

Figure 2. *Discharge mRS of patients receiving weight-based dose vs max dose tPA*

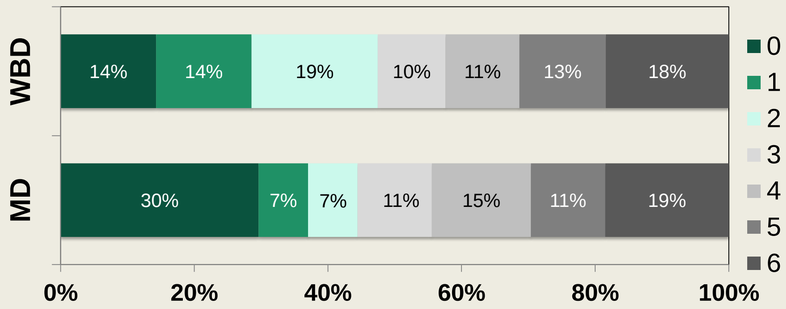

Figure 3. *90-d mRS of patients receiving weight-based dose vs max dose tPA*

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