

## Translational Stroke Research Supplementary Material

### Precision Stroke Animal Models: The Permanent MCAO Model Should be the Primary Model, Not Transient MCAO

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#### Calculation of the number of large vessel occlusion (LVO) patients recanalized

Using the percentage of patients administered tPA (up to 15% [1]) and the total number of patients with LVO (300,000) yields 45,000 LVO patients which receive tPA (15% x 300,000).

The number of recanalizations from tPA is obtained from the number of patients receiving tPA (45,000) and the rate of recanalization (11% [2] to 40% [3]). The number of LVO patients with recanalization after tPA is 4,950-18,000 (11% x 45,000 = 4,950, 40% x 45,000 = 18,000).

Mechanical embolectomy is utilized after tPA therapy has failed to achieve reperfusion. Thus, patients receiving embolectomy (8,000-12,000 [4]) are part of the 45,000 LVO patients receiving tPA. Embolectomy has a rate of recanalization about 75% [2], so there are 6,000-9,000 LVO patients which recanalization from embolectomy (75% x 8,000-12,000). Since embolectomy is used after tPA has failed to achieve recanalization, the total number of LVO patients with recanalization is the sum of patients with tPA-induced recanalization (4,950-18,000) and embolectomy-induced recanalization (6,000-10,000), or 10,950-27,000.

#### Calculation of the number of LVO patients classified as subtype A

The study by Man *et al.* reported 28 LVO patients with recanalization after treatment (tPA and/or embolectomy). The study grouped patients into quartiles based on infarction volume. The first and second quartiles contained 15 and 13 LVO patients with recanalization, respectively. Thus, the number of LVO patients of subtype A in the study by Man *et al.* was 28 of 76 LVO patients [5], or 37%.

The study by Gasparotti *et al.* reported 19 of 27 LVO patients receiving treatment had recanalization (11 patients recanalized had good outcome, 8 patients recanalized had poor

outcome). Thus, the number of LVO patients of subtype A in the study by Gasparotti *et al.* was 19 of 27 [6], or 70%.

Based on these two studies, the range of subtype A LVO patients is 37-70%. Extrapolating these percentages from small studies to the entire LVO patient population yields:

$$\text{Subtype A} = \frac{(37 - 70\% [5,6])(10,950 - 27,000)}{300,000} = 1.4 - 6.3\%$$

#### Calculation of the number of LVO patients classified as subtype B

A two center collaborative study by Bang *et al.* investigated LVO patients receiving treatment (tPA and/or embolectomy). Of the patient population within the study, 98 and 43 were found to have recanalization, and made up groups 1 and 2, respectively. Of the 98 LVO patients in group 1, 14 of them had symptomatic hemorrhage, or 14.3%. Of the 43 LVO patients in group 2, 13 of them had symptomatic hemorrhage, or 30.2%. Groups 1 and 2 differed based on collateral flow, thus these two groups were not combined for this calculation, so the number of treated LVO patients with recanalization is between 14.3% and 30.2% [7]. Extrapolating this range to the entire LVO patient population yields:

$$\text{Subtype B} = \frac{(14.3 - 30.2\% [7])(10,950 - 27,000)}{300,000} = 0.5 - 2.7\%$$

#### Calculation of the number of LVO patients classified as subtype C

The study by Man *et al.* grouped patients into quartiles based on infarction volume. Within the fourth quartile, 9 of the LVO patients with large infarction volumes had recanalization. The third quartile had infarction volumes greater than and less than 70 mL volume described for LVO patients of subtype C. Based on the mean and standard deviation reported, about 10 patients had infarction volumes larger than 70 mL. Within the third quartile, 14 patients had vessel recanalization. Assuming that all 10 large volume patients within the third quartile had recanalization, then 19 of 76 treated LVO patients were of subtype C (= 25%). If one assumes that all the small infarction volume patients in the third quartile (= 9) had recanalization, then the 5 of the large infarction volume patients in the third quartile must have vessel recanalization. Therefore, the LVO patients of subtype C may also be 14 of the 76 treated LVO patients [5] (= 18.4%).

In the studies by Hacke *et al.* and Rieke *et al.* of LVO patients, 40 and 13 received tPA, respectively. Of the LVO patients receiving tPA, 9 of 40 [8] and 0 of 13 [9] had reperfusion. Combined, the recanalization rate for treated LVO patients was 9 of 53, or 17%.

Extrapolating the range of LVO patients subtype C (17-25%) to the entire LVO patient population yields:

$$\text{Subtype C} = \frac{(17 - 25\% [5,8,9])(10,950 - 27,000)}{300,000} = 0.6 - 2.3\%$$

## References

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