

# Prospective Evaluation of clinical parameters and Initial cerebral CT for the prediction of Malignant Media Infarction (PREDICT MMI) - first interim analysis

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## Background

- The early identification of patients at high risk of developing space-occupying cerebral infarction (synonym: malignant middle cerebral artery infarction, MMI) would enable the targeted application of therapies aimed at reducing cerebral edema.
- Based on a retrospective analysis, we previously developed a predictive model for the occurrence of MMI, utilizing CT-based parameters in combination with clinical data (sensitivity: 78.57%, specificity: 79.45%, area under the curve [AUC]: 0.86).

## Aim

The aim of this study was to validate the predictive model (combining CT-based parameters with clinical characteristics) for the development of malignant middle cerebral artery infarction (MMI) in patients with large vessel occlusion (LVO).

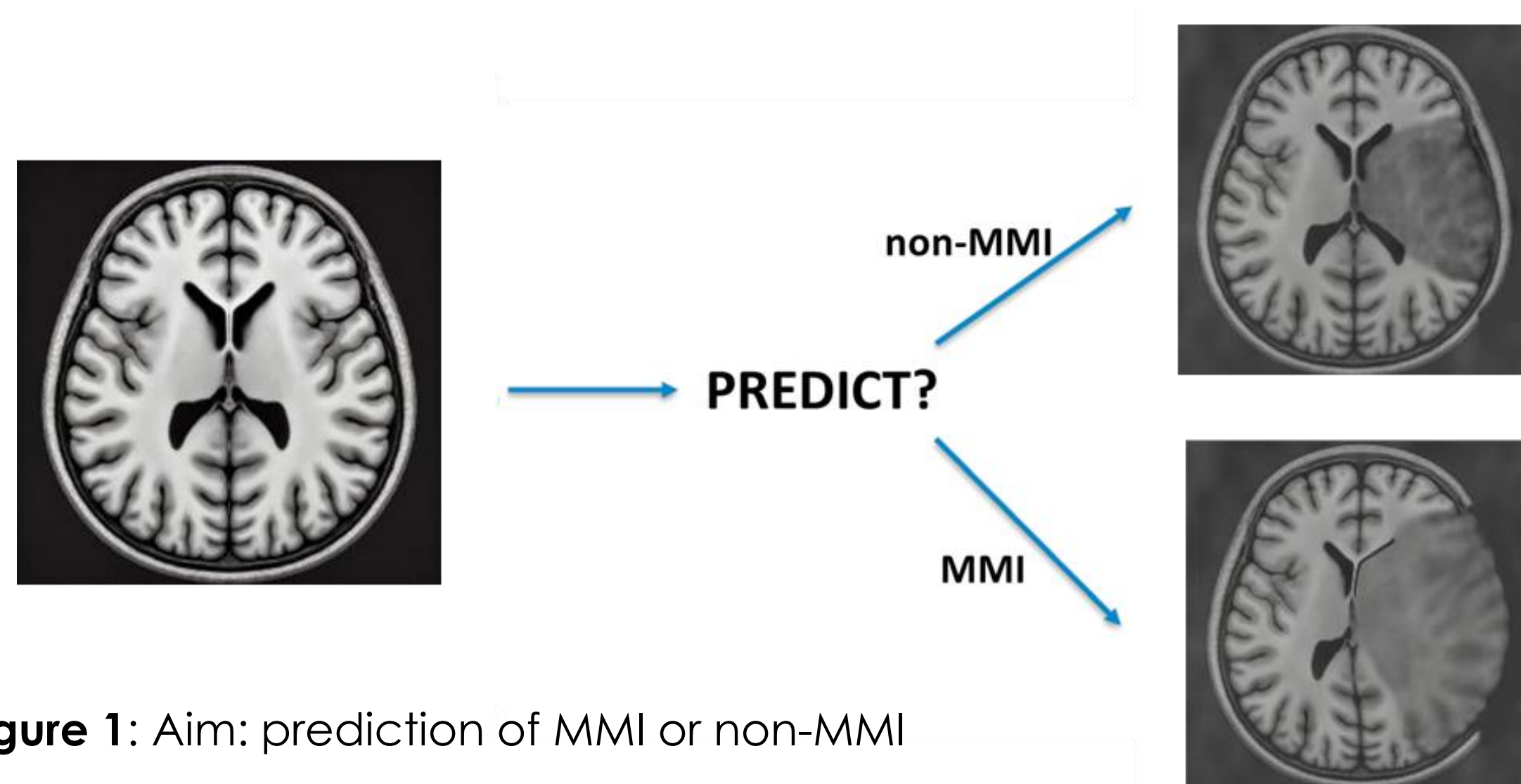


Figure 1: Aim: prediction of MMI or non-MMI

## Results

- The prospective validation of our model confirms its accuracy in predicting MMI in patients with LVO.

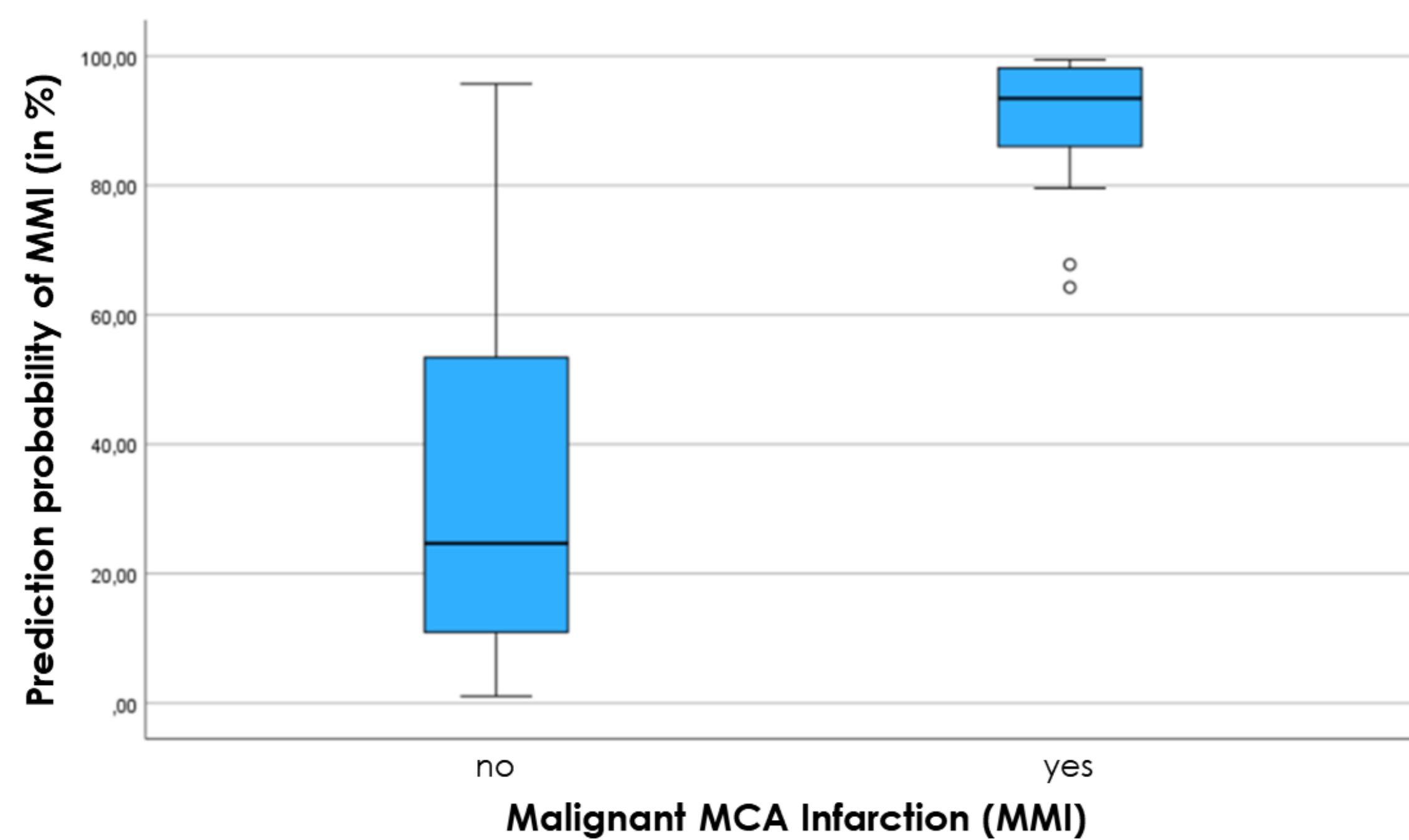


Figure 3: At a probability cut-off of  $\geq 80\%$ , 15 out of 18 patients with MMI and 83 out of 89 patients without MMI were correctly predicted.

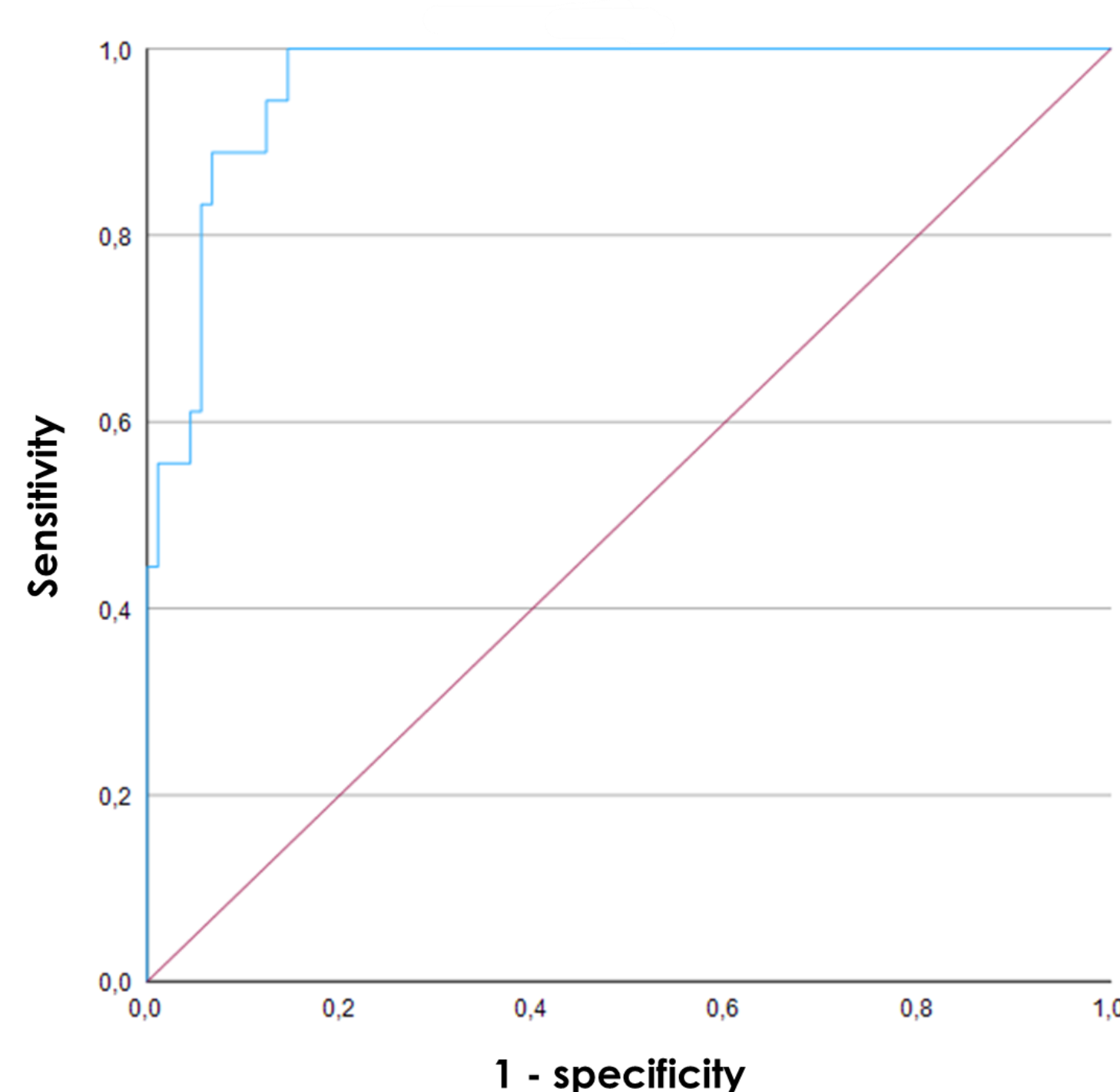
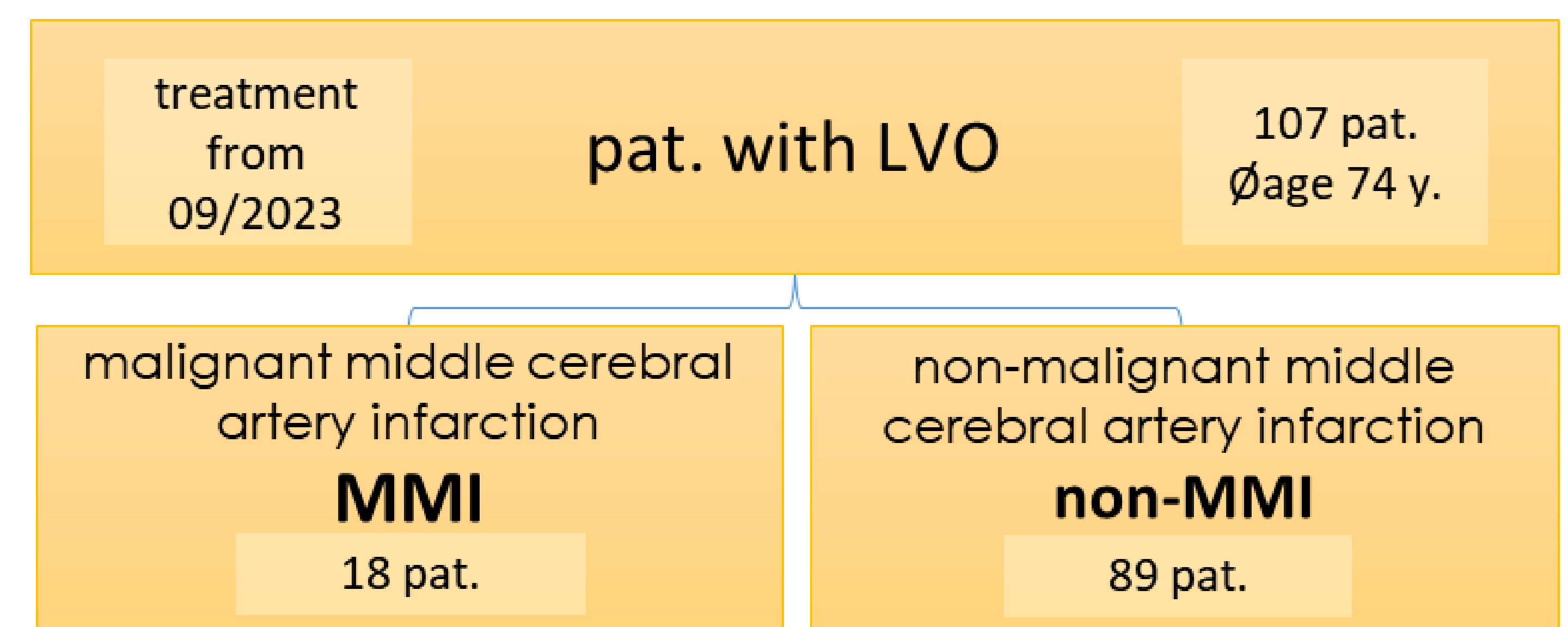


Figure 4: Receiver-Operator (ROC)-curve of the predicted risk depending on the outcome. The model exhibits a sensitivity of 83.3%, a specificity of 93.2%, and an AUC of 0.965.

## Retrospective overview

prediction model	parameters
M0 „NWU-only“	Net water uptake (NWU)
M1 „CT-only“	M0 + volume of cerebrospinal fluid (CSF)
M2 „basic clinic“	M1 + clinical data (age, NIHSS, recanalization success (TICI-Score), occlusion localisation)
M3 „advanced clinic“	M2 + laboratory parameters (urea, creatinine, hematocrit, serum sodium, serum glucose)

## Methods



NIHSS	$\phi 17$
i.v. thrombolysis	40 (37,4%)
thrombectomy	84 (78,5%)
Tici-Score $\geq 2b$	79 (73,8%)
affected side: right	49 (45,8%)
occlusion location	ICA 12 (11,2%) Carotis-T 23 (21,5%) MCA-M1 72 (67,3%)

Table 1: Clinical data. Absolute number (in %)

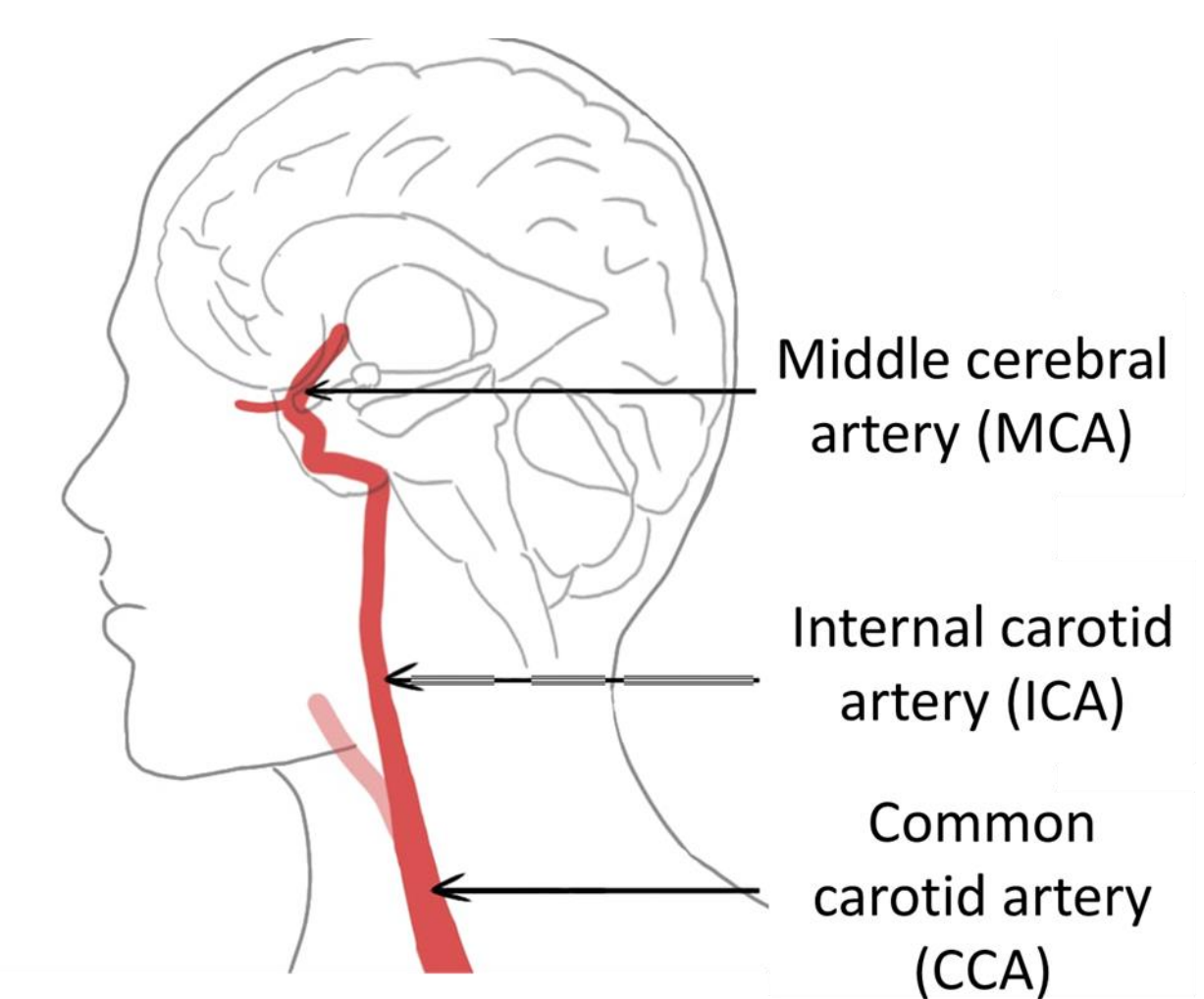


Figure 2: Occlusion localisation included in this study

## Conclusion

- Advantage: The model offers simple and rapid app-based applicability, utilizing data already available at the time of admission to the stroke unit or intensive care unit.
- Future Directions: Further validation is planned in a prospective multicenter cohort, alongside the establishment of its clinical applicability.

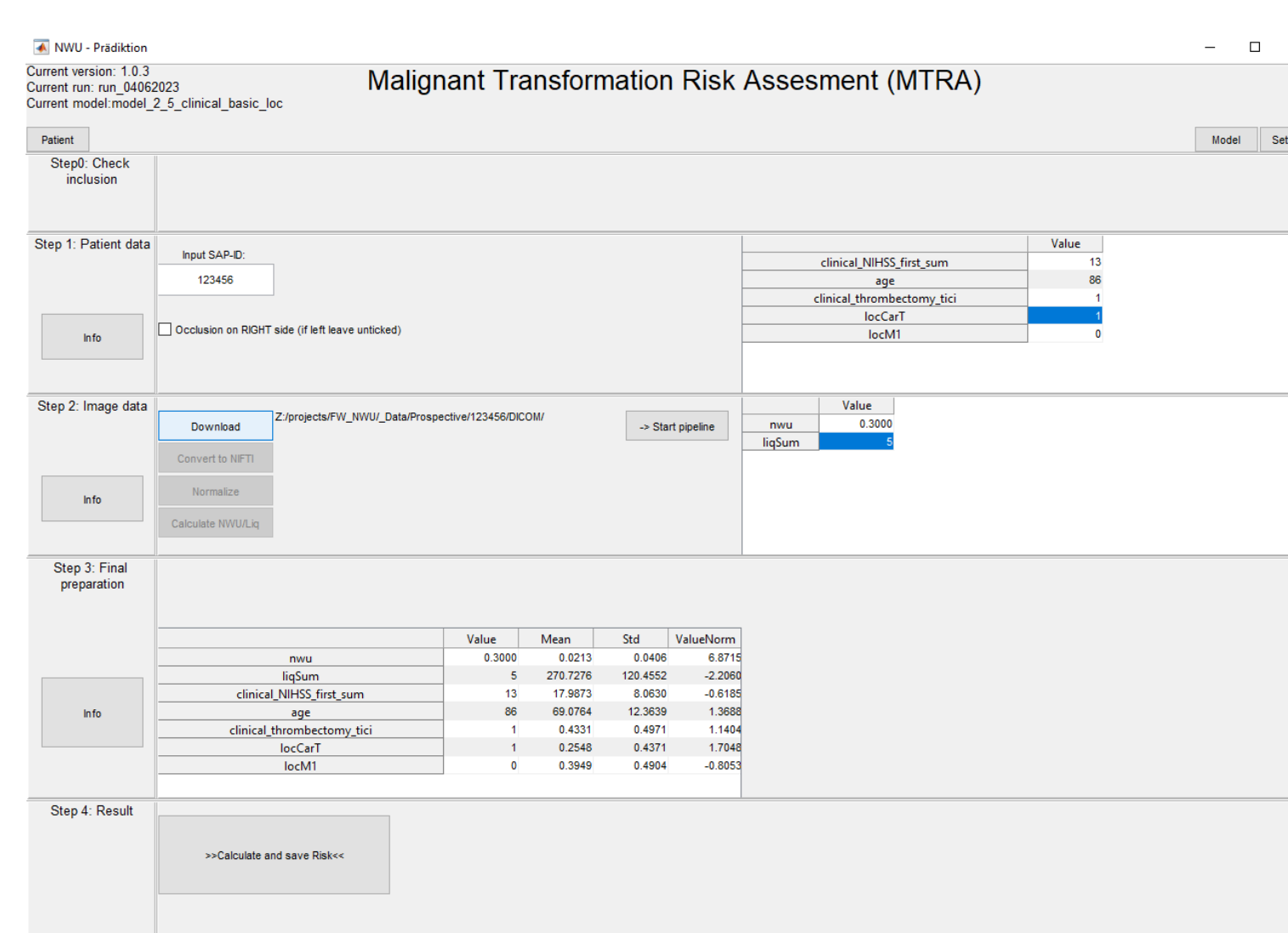


Figure 5: Malignant Transformation Risk Assessment (MTRA) – semi-automatic algorithm for prediction of space-occupying brain infarction.

- last seen well < 24 h
- non-contrast CT
  - NWU+CSF
  - affected site R/L
- occlusion in: CCA/ICA/CarT/M1
- age:...
- 1. NIHSS:...
- recanalisation: yes/no