



# Evaluate Clinical Utility of Intensive Care After Thrombolysis: Feasibility and Validation Study



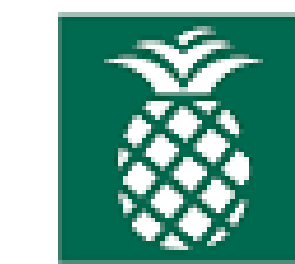
**Baptist Health South Florida**

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## Background

Under the current AHA/ASA established guidelines for AIS and thrombolysis, there is Class 1 evidence for ICU care after the administration of IV alteplase (IVT). **“All patients treated with IV alteplase for AIS**

**should be admitted to an ICU or dedicated stroke unit for ≥24 hrs of close**

**neurologic and cardiac monitoring”** Given this recommendation an Intensive Care After Thrombolysis (ICAT) score was developed to help predict critical care need after stroke. This score has only been assessed for IV alteplase. It is unclear of its predictive value for endovascular treatment (EVT).

## Purpose

The purpose of this study was to assess the sensitivity, specificity, and accuracy of the ICAT in predicting intensive care need in patients who underwent IVT, EVT, or both IVT & EVT.

## Design

**Study Sample:** Patients with a principle diagnosis code for Acute Ischemic stroke who underwent IVT or EVT or Both during between 10/01/16 –7/31/2019

**Variables of Interest:**

- Total ICU needs after 24hrs
- Total ICU needs during hospitalization
- Mortality for ICU and hospital
- LOS for ICU and hospital
- Complications
- Costs
- DNR, CMO, palliative care
- Mechanical ventilation
- ICU needs
- Active treatments
- ICP, A-line, other special monitoring

## Analytical Plan

- Reproduced the original study using the same ICU definition
- Expand study to EVT only and IVT/EVT patients
- Enhance ICU definition and evaluate IVT, EVT, and IVT/EVT patients

## Primary & Secondary Outcomes

ICU Level of Care <24-hours TPA

| Definition  | ICAT  | TISS Criteria | APACHE Active Tx | CPT Charge Code                           |
|---|-------|---------------|------------------|---|
| Cardiovascular, renal, neurological, pulmonary, gastrointestinal, miscellaneous | 26 tx | 35 tx         | 33 tx            | Total # charges in per pt at end of 24 hr |

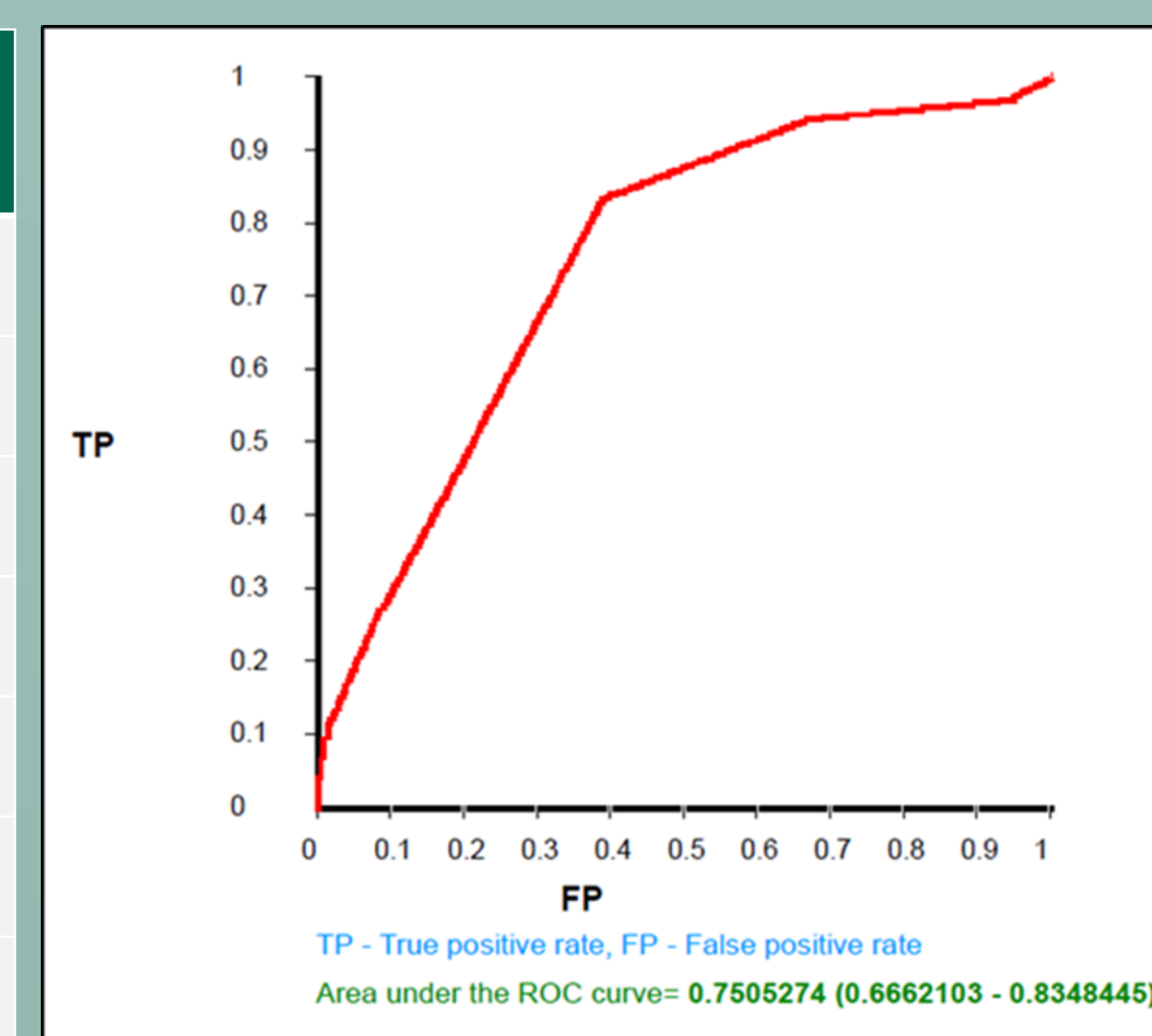
Binary outcome: Intensive Care Unit needs Present/Absent

## Outcome of Interest: ICU Level of Care Needed ICU Level of Care Provided in Terms of Treatment by Definition

| Admission   | Original Study Criteria | TISS Criteria | APACHE Active Tx | Critical Care CPT Code |
|-------------|-------------------------|---------------|------------------|------------------------|
| ER          | 86                      | 113 (26%)     | 114              | 44                     |
| Day 1 Total | 118                     | 138 (32%)     | 132              | 115                    |
| Entire Stay | 174                     | 295 (68%)     | 292              | 161                    |

## Original ICAT Performance

| Cutoff at 2 or more | IV alteplase % (95% CI) |
|---------------------|-------------------------|
| Sensitivity         | 94.4 % (81.8-98.4)      |
| Specificity         | 32.9% (26.1-40.6)       |
| PPV                 | 24.3%                   |
| NPV                 | 96.3%                   |
| Accuracy            | 44.3%                   |
| AUC                 | 0.75 (0.66-0.83)        |
| Youden Index        | 0.3                     |



## Calibration & Discrimination

| ICAT  | IVT     |          |       | EVT     |          |       | IVT/TPA |          |       |
|-------|---------|----------|-------|---------|----------|-------|---------|----------|-------|
|       | ICAT ≥2 | ICU Need | Total | ICAT ≥2 | ICU Need | Total | ICAT ≥2 | ICU Need | Total |
| +     | 34      | 106      | 140   | 54      | 53       | 107   | 36      | 59       | 95    |
| -     | 2       | 52       | 54    | 8       | 13       | 21    | 2       | 11       | 13    |
| Total | 36      | 158      | 194   | 62      | 66       | 128   | 38      | 70       | 108   |

|                  | IVT % (95% CI)     | EVT % (95% CI)    | IVT/TPA % (95% CI) |
|------------------|--------------------|-------------------|--------------------|
| ICAT Sensitivity | 94.4 % (81.8-89.4) | 87.1% (76.5-93.3) | 94.7% (82.7-98.5)  |
| ICAT Specificity | 32.9% (26.1-40.6)  | 19.7% (11.8-30.8) | 15.7% (9.0-25.9)   |
| PPV              | 24.3%              | 50.4%             | 37.9%              |
| NPV              | 96.3%              | 61.9%             | 84.6%              |
| Accuracy         | 44.3%              | 52.3%             | 43.5%              |
| AUC              | 0.75 (0.66-0.83)   | 0.47 (0.37-0.57)  | 0.59 (0.49-0.70)   |

## Conclusions & Next Steps

The ICAT score is **NOT** a clinically feasible risk prediction score to identify patients who may require high-intensity level of care after receiving EVT or IVT and EVT.

**Next Steps:**

- Using our own multivariate modeling identify our own risk assessment score to predict ICU care need.
- Add stimulation testing on patients with false negative/positive predictions of ICU needs using a real life scenarios (retro-observational design)
- Scenario test using an assessment of ICU need type, duration and location of ICU needs (ED, ICU, PCU, Med/surg) at their current admitted unit, and whether a transfer is required or not.