Laboratory Complications Following Mechanical Thrombectomy: Functional and Neurological Outcomes


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Introduction

Stroke is the fifth leading cause of mortality in the United States, with ischemic stroke accounting for 70-80% of all stroke deaths.

Mechanical thrombectomy has emerged as standard of care for select patients with large-vessel occlusion, but many still experience lasting disability despite timely revascularization.

To identify those most at risk for adverse outcomes, we examined relationships between laboratory complications and discharge functional and neurological status following successful thrombectomy.
Methods

1. Cases of successful mechanical thrombectomy (TICI≥2b) for supratentorial proximal large-vessel occlusion at Columbia University Medical Center from 2015–2018 were identified.

2. Laboratory complications data including elevated creatinine, elevated liver transaminases, thrombocytopenia, leukopenia, and severe anemia (Hgb<7 g/dL) anytime during admission were obtained from the electronic health record.

3. Functional status was assessed by the modified Rankin Scale (mRS), and neurological status was assessed by the National Institutes of Health Stroke Scale (NIHSS).
Methods

4. Outcome measures included discharge modified Rankin Scale (mRS), inpatient mortality, and onset-to-discharge improvement in National Institutes of Health Stroke Scale (NIHSS).

5. Univariate and multivariate statistical analyses were performed to assess associations between laboratory complications and outcome measures.
Results

Frequency of laboratory abnormalities are detailed in Table 1.

On multiple logistic regression, elevated transaminases (OR=4.16, p=0.034) and thrombocytopenia (OR=11.9, p=0.014) predicted inpatient mortality.

On ordered logistic regression, elevated transaminases and thrombocytopenia predicted greater discharge mRS (OR=3.76, p=0.022 and OR=8.70, p=0.018) and less improvement in NIHSS (OR=0.312, p=0.018 and OR=0.111, p=0.002).

<table>
<thead>
<tr>
<th>Laboratory Abnormality</th>
<th>Frequency (%)</th>
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<tbody>
<tr>
<td>Severe anemia</td>
<td>13 (12.8)</td>
</tr>
<tr>
<td>Thrombocytopenia</td>
<td>9 (8.91)</td>
</tr>
<tr>
<td>Leukopenia</td>
<td>2 (1.98)</td>
</tr>
<tr>
<td>Elevated transaminases</td>
<td>16 (15.8)</td>
</tr>
<tr>
<td>Elevated creatinine</td>
<td>27 (26.7)</td>
</tr>
</tbody>
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Table 1: Frequencies of inpatient laboratory abnormalities for successful mechanical thrombectomy patients.
Discussion

Laboratory abnormalities during hospitalization are common in ischemic stroke patients undergoing mechanical thrombectomy. Elevated transaminases and thrombocytopenia were associated with poorer functional and neurological outcomes at discharge.

These complications share common themes of systemic inflammatory and immune dysregulation, which may be contributing to poor outcomes even after successful recanalization.
Conclusions

Many patients who undergo successful (mTICI ≥ 2B) mechanical thrombectomy following large vessel occlusion still suffer poor outcomes.

Elevated transaminases and thrombocytopenia independently predict inpatient mortality and unfavorable functional and neurological outcomes at discharge, suggesting that these abnormalities may be clinically important prognostic markers.

Subsequent studies will aim to confirm these findings prospectively, which will inform future care quality guidelines in this patient population.