Stroke is a leading cause of death and disability in the U.S. with rates on the rise. Management, treatment, and prevention has traditionally been provided by neurologists, but increasingly provided by neurosurgeons, with or without surgical interventions.  

In acute ischemic stroke (AIS), thrombolytics such as IV-rt-PA* may be used to curtail further ischemia. Since the MERCI trial in 2008, stroke management evolved to include surgical intervention, i.e. mechanical thrombectomy (MT), with or without initial IV-rt-PA. MT, endovascular neurosurgeons can mechanically retrieve thrombi and efficiently reestablish blood flow to penumbra zones surrounding core infarcts.  

With MT, endovascular neurosurgeons can mechanically retrieve thrombi and efficiently reestablish blood flow to penumbra zones surrounding core infarcts. An increased number of candidates are undergoing MT procedures through the advent of Telestroke units which allows earlier assessment of AIS patients. In this study, we reviewed all AIS patients who initially presented to outside hospitals (OSH) within our Thomas Jefferson University Hospital (TJUH) Telestroke network and transported via our emergency transport system.  

Our aim was to assess the management of AIS patients by neurovascular surgeons compared to neurologists and its practical implications on patients clinical outcome.

**IV-rt-PA** = intravenous recombinant tissue plasminogen activator; **MT** = mechanical thrombectomy; **AIS** = acute ischemic stroke; **OSH** = outside hospital; **TJUH** = Thomas Jefferson University Hospital

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### Introduction

- Stroke is a leading cause of death and disability in the U.S. with rates on the rise. 
- Management, treatment, and prevention has traditionally been provided by neurologists, but increasingly provided by neurosurgeons, with or without surgical interventions.
- In acute ischemic stroke (AIS), thrombolytics such as IV-rt-PA* may be used to curtail further ischemia.  
- Since the MERCI trial in 2008, stroke management evolved to include surgical intervention, i.e. mechanical thrombectomy (MT), with or without initial IV-rt-PA.
- With MT, endovascular neurosurgeons can mechanically retrieve thrombi and efficiently reestablish blood flow to penumbra zones surrounding core infarcts.
- An increased number of candidates are undergoing MT procedures through the advent of Telestroke units which allows earlier assessment of AIS patients.  
- In this study, we reviewed all AIS patients who initially presented to outside hospitals (OSH) within our Thomas Jefferson University Hospital (TJUH) Telestroke network and transported via our emergency transport system.
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### Study Design

**Cohort:**  
- AIS patients managed by neurologists/neurosurgeons who presented through the telestroke (TS) hospital network (>40 regional medical institutions within PA and NJ) from 2011–2016 (n = 1,353).

**Study protocol:**  
- Decision to administer IV-rt-PA was determined by consulting TJUH telemedicine physician. Patients were then transferred to TJUH for further management.
- Patients received multidisciplinary care and were closely monitored by the TJUH admitting physician: Neurologist or Neurosurgeon.
- Stroke territory was recorded based on diagnostic imaging.
- Patients with NIHSS >6 who either were ineligible for IV-rt-PA or did not improve after IV-rt-PA were evaluated for possible MT intervention.

**Outcome variables:**  
- Measured by clinical outcomes: functional outcome score, i.e. mRS (modified Rankin Score), mortality rate, and number of patients receiving MT and/or IV-rt-PA.

**Complications and Comorbidities:**  
- Covariates used for risk adjustment were age and gender.
- The comorbidities used for risk adjustment were: hypertension, diabetes mellitus, smoking, MT, TICI score, recanalization device, IV-rt-PA, NIHSS before treatment.

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### Outcomes

**Neurologist-managed (n = 1137)**

**Neurosurgeon-managed (n = 216)**

<table>
<thead>
<tr>
<th>IV rt-PA</th>
<th>MT</th>
<th>IV rt-PA</th>
<th>MT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical only</td>
<td>62.9%</td>
<td>0.72</td>
<td>0.971-2.09</td>
</tr>
<tr>
<td>20%</td>
<td>57.5%</td>
<td>98.6%</td>
<td>0.483</td>
</tr>
<tr>
<td>34%</td>
<td>9.4%</td>
<td>52%</td>
<td>-</td>
</tr>
<tr>
<td>MT</td>
<td>62%</td>
<td>52%</td>
<td>-</td>
</tr>
<tr>
<td>NIHSS</td>
<td>9.0 ± 8.42</td>
<td>0.14 ± 0.72</td>
<td>-</td>
</tr>
<tr>
<td>mRS ≤ 2</td>
<td>55.7%</td>
<td>98.6%</td>
<td>0.873</td>
</tr>
<tr>
<td>MT</td>
<td>7.4%</td>
<td>7.4%</td>
<td>0.464</td>
</tr>
<tr>
<td>IV rt-PA</td>
<td>34%</td>
<td>20%</td>
<td>0.924</td>
</tr>
</tbody>
</table>

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### Discussion

**Conflict of results in literature exist about whether neurologists are more likely to administer IV-rt-PA compared to other specialties. In our retrospective telestroke study, we found no significant difference between the two physician groups in IV-rt-PA administration (OR, 0.98; CI95%, 0.70-1.38; p=0.924), with neurologist-managed 34% (273/1137) and neurosurgeon-managed 20% (43/216).

**Referrals by neurologists or neurovascular surgeons for MT were comparable (5.3% vs. 7.4% respectively) (OR 1.22, CI95%, 0.071-2.09; p=0.464).**

**58% of neurologist-managed AIS patients had mRS<2 compared to 99% of neurosurgeon-managed AIS patients, likely due to the efficacy of MT in treating AIS.**

**There was no difference in mRS nor mortality (p=0.873 and p=0.483 respectively), with similar clinical outcomes and hospital course (management and treatment).**

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### Conclusion

Telemedicine is allowing for more patients suffering from AIS to receive care by dedicated stroke physicians including neurovascular surgeons.

Our study does not find any difference in outcome between neurologists, who have traditionally managed stroke care, and neurosurgeons.

Although ischemic stroke is a matter of multidisciplinary management, these surgeons are appropriately knowledgeable to prescribing IVrt-PA and concurrently performing MT in a highly-specialized stroke unit.

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### Acknowledgements

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### Bibliography


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