**OBJECTIVE**

The objective of this study was to compare efficacy of heart rate lowering effects of esmolol and labetalol for patients with acute aortic dissection.

**BACKGROUND**

- Acute aortic dissection is a medical emergency that requires immediate intervention, usually in the form of hemodynamic control and surgical management. Stabilization of patients' hemodynamic status is the keystone in a successful treatment regimen.
- The Circulation guidelines recommend patients with an acute aortic dissection have a controlled heart rate of < 60 beats per min (bpm) and systolic blood pressure (SBP) of < 120 mmHg.
- This can be achieved using beta blocker administration, either esmolol or labetalol. Esmolol is a selective beta 1-adrenergic receptor blocker that also has alpha 1-adrenergic receptor-blocking properties. 4,5
- There are currently no studies looking at a head on comparison of these two agents.

**METHODS**

INSTITUTIONAL REVIEW BOARD approved retrospective cohort of patients treated at Advocate Christ Medical Center ED between January 1, 2016 and January 1, 2022.

**RESULTS**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Esmolol</th>
<th>Labetalol</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment duration (hr)</td>
<td>7.9 ± 2.9</td>
<td>5.7 ± 1.8</td>
<td>0.03</td>
</tr>
<tr>
<td>Incidence of MAP ≤ 65 mmHg</td>
<td>16 (27.1%)</td>
<td>5 (8.3%)</td>
<td>0.31</td>
</tr>
</tbody>
</table>

**SECONDARY OUTCOMES**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Esmolol</th>
<th>Labetalol</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to SBP &lt; 120 mmHg (min), median [IQR]</td>
<td>13 (9-11)</td>
<td>8 (6-10)</td>
<td>0.23</td>
</tr>
<tr>
<td>Achieve heart rate ≤ 80 bpm, n (%)</td>
<td>49 (86.5%)</td>
<td>29 (77.8%)</td>
<td>0.72</td>
</tr>
<tr>
<td>Achieve heart rate ≤ 80 bpm (min), median [IQR]</td>
<td>12 (10-13)</td>
<td>10 (8-13)</td>
<td>0.52</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

- No statistically significant difference in HR or BP control between agents.
- No significant difference in incidences of hypotension or mortality between agents.
- More esmolol patients reached HR or BP goals. Labetalol patients demonstrated faster control.
- Further studies are warranted to evaluate the most efficacious agent for hemodynamic control in acute aortic dissection.

**LIMITATIONS**

- Single center, small unmatched sample size
- Retrospective chart review
- Lack of documentation
- Bolus dosing underutilization
- Underpowered study

**FUTURE DIRECTIONS**

- Education on esmolol pharmacokinetics
- Ensure documentation on critical patients
- Prospective evaluation for efficacy
- Cost analysis

**ABBREVIATIONS**

HR - Heart Rate
MAP - Mean arterial pressure
SBP - Systolic blood pressure
BP - Blood pressure
AKI - Acute kidney injury
ED - Emergency department
SD - Standard deviation
IQR - Interquartile range

**REFERENCES**