ARTICLE:
- Citation: A Prospective Observational Study of the Effect of Etomidate on Septic Patient Mortality and Length of Stay. ACADEMIC EM 2009; 16-11-14.
- Country: USA
- Funding Sources: none disclosed

PURPOSE:
- Research Question(s): What is the difference in in-hospital mortality and hospital length of stay between septic patients given etomidate and those given alternative induction agents for RSI.
- Hypothesis: Patients given etomidate would have longer hospital stays and increased mortality when compared to patients given alternative agents.

DESIGN:
- Study Design: Prospective, non-randomized, observational cohort study
- Dependent / outcome Variable(s): Primary outcome was in-hospital mortality; secondary outcome was overall hospital length of stay.
- Independent / research Variable: Induction agent etomitate vs. other (benzos, propofol, ketamine, or none)

SETTING / SUBJECTS:
- Research Setting: Conducted at a large tertiary care suburban community hospital with over 85K annual ED visits and 700 inpatient beds.
- Subjects:
  - Study population: Patients over the age of 18, who met SIRS criteria, had a suspected or documented infection, and intubation performed in the ED.
  - Number (control / intervention groups): total of 106 patients over a 9 month enrollment period. 74 patients in the etomidate group, 32 patients in the variable group.
**Demographics:** Baseline Patient Characteristics, Severity of Illness, and Use of Supplemental Steroids and Vasopressors (table 1)

<table>
<thead>
<tr>
<th></th>
<th>Etomidate (n = 74)</th>
<th>No Etomidate (n = 32)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>76 (66–82)</td>
<td>79 (70–85)</td>
</tr>
<tr>
<td>MEDS score</td>
<td>13 (10–16)</td>
<td>13 (10–15)</td>
</tr>
<tr>
<td>Mean arterial pressure</td>
<td>73 (57–88)</td>
<td>78 (57–97)</td>
</tr>
<tr>
<td>Heart rate</td>
<td>104 (79–131)</td>
<td>116 (79–131)</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>46</td>
<td>44</td>
</tr>
<tr>
<td>Supplemental steroids</td>
<td>50</td>
<td>69</td>
</tr>
<tr>
<td>Vasopressors</td>
<td>58</td>
<td>59</td>
</tr>
</tbody>
</table>

- **Attrition:** none

**METHODS:**
- Research coordinators alerted when any septic patient was intubated.
- Weekly records collected from automated medication dispensing machines to determine removal of intubation medications
- Severity of illness determined by MEDS (Mortality in ED Sepsis Score)
- **Instruments:** A standardized abstraction form was created for data collection. Data included patient demographics, induction agent, time of intubation, supplemental steroid use, laboratory results, Mortality in ED Sepsis (MEDS) score, hospital LOS, and discharge status
- **Interventions:** Multiple interventions were performed; vasopressor and supplemental steroid use was documented and evaluated.
- **Study Groups:** Induction using etomidate vs. induction with alternative or no induction medication
- **Data Collection:** There were study coordinators involved in data collection as well attending and resident physicians

**DATA ANALYSIS:**
- **Level of Data:** Categorical
- **Statistics Used:** Mortality was compared using the Wilson score method. The unadjusted mortality between the two cohorts with the chi-square test. The LOS of all patients and surviving patients with the Mann-Whitney U test.
- Multiple logistic regression modeling was performed to obtain adjusted odds ratios for the outcome of death controlling, for measured covariates related to the severity of illness. Linear regression modeling was performed to examine the effects of the same variables of LOS.

**RESULTS:**
- There was no statistically significant difference in mortality between groups. There was a non-statistically significant trend toward increased hospital LOS in the etomidate group.
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Etomidate (n=74)</th>
<th>Alternative Agents (n=27)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>In hospital mortality %</td>
<td>38</td>
<td>44</td>
<td>-</td>
</tr>
<tr>
<td>Hospital LOS days</td>
<td>8</td>
<td>6.5</td>
<td>0.18</td>
</tr>
<tr>
<td>Hospital LOS days for those surviving to d/c</td>
<td>10</td>
<td>7.5</td>
<td>0.08</td>
</tr>
</tbody>
</table>

- In-hospital mortality of patients given etomidate was 38% (CI=28-49%), those receiving alternatives 44% (CI=28-61%). Mortality rate of patients receiving no induction agent was 20%.
  - Overall hospital LOS for patients who received etomidate was 8 days (3-13) versus 6.5 days (3-9.75) for the other group. (p=0.18)
  - Of patients surviving to hospital discharge, LOS was 10 days (7-16.25) in patients who received etomidate versus 7.5 days (4.75-10.5) in those who did not. (p=0.08)

- **Limitations**: Lack of power due to small sample size. Non-blinded, non-randomized. Outcomes may have been influenced by physician choice of intubation agent because it was non-randomized. Sensitivity analysis showed a change of as few as 2 patients miscategorized by outcome or treatment would result in the gain of statistical significance in the differences in LOS. No medication dosing information given.

**IMPLICATIONS FOR PRACTICE:**
- **Applicable to this clinical practice**: The study is applicable to our study population. It does not definitively answer the question and would not alter current practice based on these results.

- **Clinically Relevant**: If there was a significant difference shown in mortality or hospital LOS it would be clinically relevant. This study showed non-significant trends with a small study population. It is not practice changing.

**LEVEL OF EVIDENCE / DECISION FOR USE:**
- Consider Replication

- **Level of Evidence**:
  
  IIb   Evidence obtained from at least one other type of well-designed quasi-experimental study