ARTICLE:
• Citation: Hildreth AN, Mejia VA, Maxwell RA, Smith PW, Dart BW, Barker DE. Adrenal suppression following a single dose of etomidate for rapid sequence induction: a prospective randomized study. J Trauma. 2008 Sep;65(3):573-9.
• Country: University of Tennessee, Cattanooga, TN, USA
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PURPOSE:
• Research Question(s): What effect might a single dose of etomidate during RSI have on adrenal suppression and the first 24hrs of the resuscitation process, length of stay, and mortality.
• Hypothesis: Not formally stated but implied that a single dose of etomidate causes adrenal suppression and negatively influences resuscitation, LOS, and survival.

DESIGN:
• Study Design: Prospective, randomized, controlled, non-blinded study.
• Outcomes: 4-6 hr post-RSI cortisol, ACTH stimulation test cortisol, mortality, length of stay, intensive care unit LOS, ventilator days.

SUBJECTS:
• Subjects:
  o Number of Studies/Subjects: 61 screened, 30 enrolled, 31 excluded (protocol violation 45%, refused consent 16%, AMS/no injury 13%, no consent 10%, undetermined 16%)
  o Inclusion/Exclusion criteria: Inclusion: Trauma patients > 18yo requiring RSI in first 48hrs; Exclusion: prisoners, pregnancy, h/o adrenal insufficiency, adrenal trauma on CT, corticosteroids in previous year, patients on imidazole antifungals.
  o Demographics: Men 63%, Women 37%; blunt trauma 90%, penetrating 10%, no difference in age, ISS, lung AIS, head AIS, baseline cortisol.

METHODS:
• Interventions: Etomidate and succinylcholine vs. fentanyl, midazolam, and succinylcholine. Baseline cortisol, 4-6hr post-RSI cortisol, ACTH stim cortisol, clinical data.
• **Study Groups:** Group 1: RSI with 0.3mg/kg etomidate and 1mg/kg succinylcholine vs. Group 2: RSI with 100mcg fentanyl, 5mg midazolam, 1mg/kg succinylcholine.

**DATA ANALYSIS:**
- **Statistics Used:** Kolmogorov-Smirnov test for normality; two-tailed t-test for distributed data, Mann-Whitney test for departure from normality.
- **What, if any, confounding variables were controlled for / adjusted for:** Not controlled for intubation location.

**RESULTS:**
- **Brief answers to research questions:**
  1. A single dose of etomidate 0.3mg/kg for RSI results in a statistically significant drop in TOTAL serum cortisol 4-6hrs after RSI as compared to fentanyl and midazolam for induction (drop of 13 mcg/dL vs 1 mcg/dL). Impaired ACTH stimulation test is also observed (23 mcg/dL vs. 39 mcg/dL).
  2. Higher mortality in E group (2 vs. 0)
  3. Longer ICU LOS in E group (8 vs 3 days, p<0.05)
  4. Longer Hospital LOS in E group (14 vs 6 days, p<0.01)
  5. More ventilator days in E group (6.3 vs. 1.5 days, p<0.01)

**IMPLICATIONS FOR PRACTICE:**
- **Applicable to this clinical practice:** Yes, we perform RSI on most trauma patients at MMC requiring intubation.
- **Feasibility (cost, resources, etc):** Unclear, but likely feasible with minimal to no change in cost for etomidate vs. fentanyl/midazolam.
- **Clinically Relevant:** Possibly, if same results produced in a larger study with more power and more solid evidence. As is not clinically relevant.
- **Limitations:**
  o Small study (N=30) with multiple exclusions and protocol violations; Intention to treat analysis not employed; Not blinded; Confidence Intervals not reported and are likely very large given small size.
  o No individual patient data given, large standard deviations and 1 or 2 patients may have skewed all the data

**LEVEL OF EVIDENCE / DECISION FOR USE:**
- Background x Consider Replication Ready for use
- **Level of Evidence:**
  1a Evidence obtained from meta-analysis of randomized controlled trials
  X 1b Evidence obtained from at least one RCT
  IIa Evidence obtained from at least one well-designed controlled study without randomization
IIb  Evidence obtained from at least one other type of well-designed quasi-experimental study
III  Well-designed non-experimental studies
IV   Expert committee reports, opinions of experts