Miner, J. R., Danahy, M., Moch, A., & Biros, M. (2007). Randomized Clinical Trial of Etomidate Versus Propofol for Procedural Sedation in the Emergency Department. *Annals of Emergency Medicine*, *49*(1), 15–22. doi:10.1016/j.annemergmed.2006.06.042

Based on "The User's Guides To The Medical Literature: A Manual for Evidence-Based Clinical Practice", second edition.

ARE THE RESULTS VALID?	
At the beginning, did intervention and control groups start with the same prognosis?	
Was randomization process adequate?	Yes. The process resulted in an adequate and similar number of participants in each group. The types of procedures distributed to each group were also similar.
Was randomization concealed?	Yes. Each participant received a sealed envelope with their group assignment which had been randomly chosen by a computer. Clinicians, investigators, and participants did not know which group each envelope would randomize the participant to.
Were patients in the study groups similar with respect to known prognostic factors?	All patients were ASA category I and patients in each group were of similar age. These are likely to be two important predictors for the measured outcome. It is unclear if history of OSA was taken into account, which could be an important predictor for the outcome of interest.
In the middle, was prognostic balance maintained as the study progressed?	
To what extent was the study blinded (patients, care givers, data collectors, outcome assessors, investigators and statisticians)?	The study was not blinded. Once assigned to a group, the treatment was known or could be discerned by the caregivers date collectors and patients.
If study was not sufficiently blinded, were the groups balanced regarding co-interventions and frequency of follow up?	Yes. Co-interventions included increasing supplemental O2, use of BVM, airway repositioning, stimulation to induce breathing, and were similar in each group. Follow up consisted of a post-procedural assessment of patient satisfaction, pain associated with the procedure, and recall of the procedure. Both groups had 100% participation with the follow up assessment.

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Were outcomes assessed appropriately? What methods were used to enhance the quality of g multiple observations, training of assessors)?	The primary outcome measured was subclinical respiratory depression defined as a >10mm Hg change from baseline ETCO2, an O2 sat of < 92% during the procedure, or airway obstruction with absence of gas exchange as indicated by absent ETCO2 waveform during procedure. All of these objective measures were determined with the appropriate equipment. Clinical respiratory depression, as defined by the need to increase supplemental O2, the use of BVM, the use of airway repositioning maneuvers, or performing patient stimulation to induce breathing was determined by post-procedure physician query. This method is subject to recall bias. None of these measures has been validated a predictor of a clinically important outcome. The presence of myoclonus was measured by the report of an observer. It is unclear if this was by the physician or a research assistant. This method is subject to bias based on differences between what each observer deems to be myoclonus. This measurement if subject to additional bias in this study because there is no blinding so the observer knows which drug each patient received. Depth of sedation was measured in two ways. First, using a bispectral index monitor which is an EEG that provides a score of 1 to 100 indicating a patients alertness. This has been previously published and shown to correlate with a patients recall of events and the incidence of respiratory depression. The second method of measure was a subjective scale, the modified Observers Assessment of Alertness score. This is subject to the rater bias and is complicated further by the study not being blinded.

	The post-procedure assessment of procedural recall, pain, and satisfaction was done using visual analog scales. It is unclear whether these were validated research tools as no reference was provided. In order to enhance the quality of multiple observations, the authors attempted to measure outcomes with more than one tool. For example measuring respiratory depression with objective measures as well as with the clinical measures. This was also true for how they measured alertness. The article states that data was collected and entered by a "trained research assistant" however they do not state how many research assistants participated, which would give us an idea of how much inter-observer error to expect, or what specific training the research assistants had.
At the end, were the groups prognostically balanced at the study's completion?	
Was follow-up complete?	Yes. 100% of study participants receiving drug completed the follow up analysis.
Were patients analyzed in the groups to which they were randomized (intention to treat principle)?	No. There were a total of 6 patients randomized to a group that did not receive treatment drug and were not analyzed. There is no explanation as to why this was so.
Was the trial stopped early?	No.

WHAT ARE THE RESULTS?

How large and how precise was the intervention effect?	**Subclinical respiratory depression:** -7.9% (CI -20.9 to 5.1%) **Loss of ETCO2 waveform:** -6.2% (-13.4 to 0.9%) **O2 Sat <92%:** 0.3% (-7.5 to 8.2%) **Time to return to baseline mental status:** 2.0 min (0.4 to 3.6 min) **Myoclonus:** 18.2% (10.1 to 26.2%) **Successful procedure:** -7.4% (-14.3 to -1.1%)
HOW CAN I APPLY THE RESULTS?	
Was the study PICO question similar to my PICO question?	Yes, the question was similar. The article addressed 2 of the drugs/drug combinations of interest. It addressed the success rate of procedures, but did not do sub-group analysis specifically for fracture/dislocation reductions. It also examined the other outcomes of interest: patient satisfaction, safety in terms of hypoxia, frequency of airway manipulation, hypotension, and other adverse events.
Were all-important outcomes considered? If composite endpoint, how it relate to the important-outcomes considered?	Yes. The authors examined multiple secondary outcomes including adverse events such as hypotension, requirement for airway support or intervention, amount of drug required to achieve sedation, procedure success rate, and patient satisfaction. They did use a composite endpoint but also presented and analyzed the date for the individual endpoints. It is unclear whether the composite endpoint relates to a clinically important outcome or an outcome which would be important to the patient. The authors

	acknowledge this in the article.
Is the intervention feasible?	Yes. Both drugs are readily available in our practice environment and the use of either is subject to physician discretion.
Are the likely intervention benefits worth the potential harm and costs?	No clinically important differences were demonstrated in this article. Additional investigation would be required to determine the risk/benefit profile between the use of these two drugs.

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