

**Intravenous ketamine sedation for painful oncology procedures.**

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*Abstract:*

**Background:** The aim of the study was to determine the efficacy and adverse effects of intravenous (iv) ketamine sedation administered by non-anesthetist physicians for painful procedures.

**Methods:** A single-agent, procedural sedation protocol using titrated doses of ketamine iv (maximum 2 mg·kg<sup>-1</sup>) was conducted in outpatient pediatric oncology patients undergoing lumbar puncture (LP), bone marrow biopsy/aspiration (BMBx/A), or combination (LP/BMBx/A) in a tertiary care setting. The efficacy of analgesia and sedation (ability to perform the procedure), procedure duration, recovery time, and the occurrence of adverse events are described.

**Results:** Fifty-eight subjects of a median age of 5 years (1–13) and median weight of 20 kg (10.5–68) underwent 119 sedations. An LP was performed in 73% of cases, BMBx/A in 13%, and LP/BMBx/A in 13%. Efficacy was 100% and the mean dose of ketamine was 1.3 mg·kg<sup>-1</sup> (0.4). The mean duration of the procedure was 6.6 min (4.2) and the recovery time was 11 min (4–45). Two subjects (1.7%) had a hypoxemia (SpO<sub>2</sub> of <94%). No major airway complications occurred. The prevalence of hypertension (systolic > 20% at 5 min) was 54%. The median pain visual analogue score (VAS) for an observer was 0 (range 0–3) and caregiver was 0 (range 0–4). The median VAS for satisfaction (observer) was 10 (range 7–10) and caregiver VAS was also 10 (range 5–10). At 24 h after discharge, the incidence of bad dreams was 3.3%; vomiting, 10.8%; and abnormal behavior, 4.2%.

**Conclusion:** Ketamine iv up to 2 mg·kg<sup>-1</sup> is an effective sedative for oncology procedures using a defined protocol.

*Commentary:*

This would have to be considered a relatively standard sedation study; however, there are some interesting features that deserve special mention. First of all, we must note that although ketamine has been around for 40 years or more, its application in pediatric sedation for painful procedures seems to be experiencing a sort of renaissance. As with anyone who has used this drug extensively, we are not surprised that as applied here, in a titrated IV application, nor that it is very effective. As always we would warn against reading too much into the safety of a drug given the numbers in this study are quite small (121 total sedations). We are (frankly) skeptical about the importance of mild hypoxemia episodes as is commonly reported in trials such as this. There is an implied assumption that these episodes are a surrogate marker of unsafe care but this has never been validated. The real worry here would be about significant airway obstructive symptoms such as laryngospasm, which is a dangerous but fairly low frequency event. In any case, the authors themselves point out the fact that the use of ketamine by providers who are not considered airway experts (EM, ICU, anesthesiologists etc.) remains controversial.

It is important to note that the authors did make a significant effort to define the “conditions” during the procedure by providing a “worst” pain score for the procedure. While this method is fairly crude, it is more information on the actual success or failure of the sedation than is usually provided. The authors threw out a couple of higher pain scores when the two observers did not agree; one would have to consult statisticians for the validity of this methodology.

In a very unusual feature, the authors actually obtained satisfaction scores from the patients’ families AND correlated their satisfaction with their previous experience. This is incredibly important since most studies that categorize satisfaction never tell us about the previous experience of their patients even though we know that this greatly biases their subjective feeling about how the sedation was conducted.

Finally, we should compliment the authors on their interest in providing a 24-hour follow up of their patients. The incidence of disturbing dreams, nausea and vomiting, and abnormal behavior was relatively low but far from insignificant – and probably would have been largely missed without this type of data collection.

Therefore, we are left with an observational study that has useful data but was unblinded and uncontrolled. Still, the data collected does add to our cumulative knowledge about the nature of ketamine sedation as provided in a clinic setting by non-traditional ketamine sedation providers.