Procedural Sedation and Analgesia by Non-Anesthesiologists

I read with interest the study by Borker, *et al.*, on procedural sedation and analgesia (PSA) in children undergoing oncology procedures(1). I acknowledge that this study is timely and contributes valuable data. However, I have a few comments to offer:

1. The authors have stated that intravenous midazolam was given initially, followed by intravenous ketamine "till the patient became unresponsive to verbal stimuli and light touch"(1). They have defined success of sedation as "successful completion of the procedure in a minimally responsive subject"(1). The authors should clarify whether their aim was to induce all children into a state of "deep sedation"(2). This clarification is important as "deep sedation", unlike "moderate sedation", is risky as it is often accompanied by a loss of protective reflexes, including loss of ability to maintain a patent airway independently(2). Older children may require only "moderate sedation" as they are likely to cooperate willingly during a procedure provided there is no pain(2).

2. The authors have stated the age range of their patients to be 4-18 years; with median age being 10 years. They have also stated that "none of the patients complained of post- procedure pain nor recalled the procedure at the follow up visit". I would like to know the mean age of their patients and whether oral analgesics were prescribed at the time of discharge.

   Although, PSA can significantly minimize or even totally eliminate pain during a procedure, it cannot prevent a child from experiencing pain at home following the procedure. In a recent study reported by me and my colleagues, 28 (56%) children (mean age 9 years) remembered being in pain following procedures(3). Hence, oral analgesics should necessarily be prescribed for two to three days following a procedure or until the time the pain subsides totally. Also, the authors have not mentioned the time period between the procedure and the follow-up visit. This information is important as young children may not remember the procedure, the procedure-related pain and the post-procedure pain, if not asked in time.

3. In my opinion, during every procedure and recovery a neutral observer should have used a standard "behavior score" (such as the visual analog scale) to objectively rate the efficacy of the PSA. This data would have added weight to the study's conclusions.

4. Lastly, the authors should have used topical eutectic mixture of local anesthetics (EMLA) in their patients before giving intravenous midazolam and ketamine to help minimize the pain and anxiety associated with venous cannulation(4).

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Procedural Sedation and Analgesia (Reply)

1. The aim of procedural sedation was to induce a state of primary sedation wherein protective airway reflexes and airway patency is maintained. Deep sedation where such reflexes are lost was not intended.
2. The mean age of the patients was 9.2 years. The post-operative questionnaire was administered 1-7 days after the procedure. The mean and median duration between the procedure and the time the questionnaire was administered is unfortunately not available. Oral analgesics were not prescribed routinely for all patients, however since the majority of the procedures were lumbar punctures this was not deemed necessary.
3. The suggestion of having a neutral observer for objective assessment is appreciated and would definitely have added weight to the study. We accept this as a limitation of the study.
4. Most of the patient on this study had long term venous access catheters for treatment purposes. Hence, peripheral venous access was not obtained.

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