Initial Experience With Single Dose Dexmedetomidine For Procedural Sedation In Pediatric Patients: Case Reports

R Nazario

Citation

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Abstract

Objective: Several studies have evaluated the efficacy of continuous infusion of dexmedetomidine for procedural sedation of pediatric patients. There are few published reports of single dose dexmedetomidine for pediatric procedural sedation. We want to report on three pediatric patients who received single dose dexmedetomidine for procedural sedation.

Methods: Case reports of pediatric patients who received intravenous dexmedetomidine for procedural sedation at Kentucky Children's Hospital.

Results: Dexmedetomidine was administered as a single dose bolus of 1-3 mcg/kg over 10-15 minutes. In the clinical scenarios, effective sedation was achieved in order to perform MRI examinations and/or lumbar punctures. The only side effect related to administration was hypotension, which did not require intervention.

Conclusion: Single dose dexmedetomidine appears to provide adequate procedural sedation for pediatric patients. Further studies are needed to confirm the effectiveness of this sedation regimen.

INTRODUCTION

Dexmedetomidine is a relatively new, α_2-adrenergic receptor agonist with both sedative and analgesic properties. [1] It is classified as a sedative by the FDA and approved for sedation of adults in intensive care unit setting for up to 24 hours. [2] Several studies have evaluated the efficacy of dexmedetomidine as an agent for procedural sedation in the pediatric patient population. [3 4 5 6] In these studies, sedation was achieved by giving dexmedetomidine in an induction dose followed by a continuous infusion. A single intravenous dose of 0.5 mcg/kg has been used to decrease postoperative agitation and post anesthesia shivering. [4] A recent study suggested the efficacy of bolus dosing of dexmedetomidine, followed by IV infusion, in sedating children for CT scans. [7] There are no reports on the efficacy of single dose dexmedetomidine for procedural sedation.

METHODS

Hospital records of patients undergoing procedural sedation with dexmedetomidine were obtained. Patients were identified from a log kept of all procedural sedations performed by the author. The following demographic data was obtained: age, weight, gender, and underlying medical condition. Information pertaining to dexmedetomidine included indication for administration, procedure performed, bolus dose given, and adverse effects that could be attributed to the medication. Vital signs were monitored per hospital sedation protocol, including blood pressure, heart rate, respiratory rate, and pulse oximetry, in five-minute intervals.

RESULTS

The demographic data, indication for use, and dose administered is presented in Table 1. The following are brief descriptions of the individual cases.

Patient 1 is a 6 year old male who presented with fever and progressive pain in hip area and difficulty ambulating. MRI of the pelvis and femur was obtained to assess for septic hip, osteomyelitis and/or abscess. Dexmedetomidine 20 mcg IV

was given over 10 minutes. Appropriate sedation was achieved throughout the procedure. Vitals during procedure: heart rate 117-105; blood pressure126-99/91-40; respiratory rate 38-28; pulse oximetry 98-95% on room air. Patient was easily aroused at the end of the procedure with minimal stimulation. Total sedation time: 50 minutes

Patient 2 is a 3 year old female with a history of seizure disorder who presented with worsening seizure activity unresponsive to current pharmacologic therapy. A lumbar puncture was requested as part of ongoing evaluation of her seizure disorder. Dexmedetomidine 30 mcg IV was given over 10-15 minutes. Appropriate level of sedation was obtained throughout the procedure. Vitals during procedure: heart rate111-106; blood pressure 85-69/50-36; pulse oximetry 98-97 % on room air; respiratory rate 38-28. Patient tolerated procedure well, and was easily aroused after lumbar puncture was finished. Total sedation time: 20 minutes

Patient 3 is a 5 year old male who presented for evaluation of "starring spells". MRI of the head and EEG were ordered by the Pediatric Neurology service. Patient was taken to the MRI suite and given 75 mg pentobarbital IV. The patient had a paradoxical reaction to the drug, resulting in agitation. We were consulted at that point to manage further sedation. The patient received dexmedetomidine 50 mcg IV about 95 minutes after the initial dose of pentobarbital. Appropriate sedation was achieved after 15 minutes of loading dose. Patient remained appropriately sedated during both MRI and subsequent EEG. Patient was easily awoken after EEG. Vitals during procedure: heart rate 91-78; blood pressure 139-105/87-49; 99-97% on room air. Total sedation time: 53 minutes.

Figure 1

Table 1: Demographic data, indications for use and dose of dexmedetomidine for procedural sedation.

Patient no.	Age	Weight (kg)	Gender	Indication	Dose
1	6.5 y	19.1	M	MRI of pelvis and femur	20mcg IV (1 mcg/kg)
2	3.3 y	15.9	F	Lumbar puncture	30 mcg IV (1.9 mcg/kg)
3	5.8 y	22	M	MRI of head and EEG	50 mcg IV (2.27 mcg/kg)

DISCUSSION

Procedural sedation in children is a challenging endeavor. Several sedatives are used on a routine basis for different procedures, but none provide optimal safety profile, efficacy, and reliability.

Dexmedetomidine appears to be well tolerated by patients undergoing both painful and painless procedures. The hemodynamic changes related to blood pressure did not result in any intervention, difficulty during the sedation or during the recovery phase. Dexmedetomidine has been used effectively for sedation of pediatric patients, but always as either an infusion, or a loading dose followed by an infusion. The most common dosing parameter is a loading dose of 0.5-2 mcg/kg IV over 10-15 minutes, followed by an infusion of 0.25-1 mcg/kg/hr.

In this study, patients were given a higher loading dose, between 1-3 mcg/kg over 10-15 minutes. The patients tolerated the bolus well, and there was no need for additional bolus doses or maintenance infusions. The heart rate and blood pressure remained stable. Although an expected drop in blood pressure was recorded during the first 20 minutes after the initial bolus dose, none of the changes required intervention.

CONCLUSION

Dexmedetomidine is an effective agent for procedural sedation. It is usually dosed as either an infusion or a induction dose followed by an infusion. We report on the use of single dose dexmedetomidine for procedural sedations in children. A single 1-3 mcg/kg IV bolus dose over 10-15 minutes appears to provide adequate sedation for the performance of both painful and painless procedures in children. Further studies are needed to determine the safety and efficacy of this dosing regimen.

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Author Information

Rubén J. Nazario, MD
Assistant Clinical Professor, Section of Inpatient Pediatrics, Department of Pediatrics, University of Kentucky College of Medicine