Clinical use of dexmedetomidine in pediatrics: a report of 31 cases

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Introduction: Although not approved for pediatric use, dexmedetomidine, an alpha-2 agonist eight times more specific than clonidine, provides analgesia, anxiolysis, and sympatholysis. Recognizing its uniqueness and potential benefit for several pediatric needs, 31 patients received dexmedetomidine for perioperative, pain, or behavioral management.

Methods: After approval of guidelines by the Pharmacy and Therapeutic Committee, patients received a loading dose of 0.5 mcg/kg over fifteen minutes, followed by an infusion of 0.25-0.75 mcg/kg/hr. Duration of infusion ranged from 12 to 144 hours. All patients were monitored in the pediatric intensive care unit. Patients were selected for management of pain and behavioral needs, to decrease the incidence of mechanical ventilation for patients with pulmonary compromise, and to enhance perioperative anesthesia care. The patient's ages ranged from 10 months to 19 years. Diagnoses included congenital muscular dystrophy, spinal muscular atrophy, myasthenia gravis Rhett Syndrome, opioid--augmented respiratory failure, relapsing pancreatitis, pectus excavatum, familial polyposis, severe neurobehavioral disorders, and 11 cases of idiopathic scoliosis.

Results: Dexmedetomidine was effective for all selected indications. Patients with pulmonary compromise from muscular or neuromuscular disorders undergoing major surgery, thoracotomy or spinal fusion, maintained adequate ventilation avoiding postoperative ventilation. Although hypotension did occur with inadequate fluid replacement or an excessive infusion rate, intropeative anesthetic management was enhanced by the cardiovascular stability provided by thealpha-2 receptor effect of dexmedetomidine for all major surgeries. Patients with neurobehavioral disorders and difficult to control physical outbursts remained sedated, responsive, and controllable postoperatively. A patient with relapsing pancreatitis unresponsive to a multitude of analgesics, including ketamine and epidural catheter placement, demonstrated dramatic analgesia from dexmedetomidine. A ventilator dependent patient receiving infusions of opioids and benzodiazepines was extubated within forty hours after dexmedetomidine was administered to allow for decreasing the infusions. During spinal fusion surgery somatosensory evoked response monitoring was unaffected by dexmedetomidine infusion. Adverse reactions were few: one occurrence of heart rate 50 bpm (preoperative heart rate was 55 bpm); reintubation of a patient postoperatively after excessive fluid management; and two postoperative occurrences of systolic blood pressure less than 85 mm Hg

Discussion: Indications for administering dexmedetomidine to pediatric patients are evolving**.** The administration of
this alpha-2 agonist to 31 pediatric patients, 48% with an assigned ASA risk of 3 or 4, without a major complication demonstrates that it is safe when appropriately monitored. From this nucleus of patients it appears that dexmedetomidine may be a very useful medication in the management of complex major surgeries, providing postoperative pain relief, facilitating opioid withdrawal, weaning patients from mechanical ventilation, and avoiding postoperative or opioid-precipitated ventilation in patients with pulmonary compromise. Furthermore, in addition to the patients described, patients with sickle cell disease, cystic fibrosis, radiation oncology halo apparatus treatments and other conditions may benefit from its availability. Hopefully this presentation will encourage controlled studies of this medication for pediatric and surgical needs.