THE USE OF DEXMEDETOMIDINE FOR SEDATION IN PATIENTS WITH TRAUMATIC BRAIN INJURY

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Background: Dexmedetomidine (DEX) is a selective agonist of the alpha-2 adrenergic receptors with sedative and analgesic properties without producing respiratory depression. The use of DEX in neurosurgical patients has been described.[1] There are no reports of its use in patients with traumatic brain injury (TBI). We report successful use of DEX infusion for sedation and ventilator wean in TBI patients.

Methods: DEX infusion was used in 3 patients (ages 19, 22, and 57 yr.) admitted to the trauma intensive care unit (ICU) after initial stabilization of the TBI. All patients were involved in motor vehicle collision and sustained orthopedic injuries, and were intubated in the emergency room. None of the patients had surgically correctable intracranial pathology on computed tomograms of brain. One patient required insertion of intracranial pressure (ICP) monitor and ventriculostomy drain for management of generalized cerebral edema and mild intracranial hypertension. Remifentanil was used for sedation in this patient. The other two patients were sedated with fentanyl and propofol. Sedation was continued until patients showed improvement with serial clinical and neuro-radiological examination, and as long as ICP monitor was in place. A Ramsay[2] scale was used to measure sedation and agitation as sedatives were reduced.

Results: All patients demonstrated significant (Ramsay 1) levels of anxiety and agitation as remifentanil, propofol of fentanyl infusions was reduced. Sedation had to be increased for safe patient care. Repeated measures at reducing sedation were fraught with patient agitation and tachypnea to the extent that it was deemed unsafe to extubate the patients. DEX was then administered for sedation. During an initial loading dose of DEX (1 mcg/kg) over 1 hour, propofol or remifentanil infusions were weaned to off and fentanyl infusion reduced to 0.5 mcg/kg/hr for analgesia for orthopedic injuries. After an initial load, DEX infusion was started at 0.2 mcg/kg/hr and titrated upward every 10 minutes until a Ramsay score of 2-3 was achieved. Ventilator was rapidly weaned once this goal was achieved. DEX infusion required achieving this goal ranged from 0.4 to 0.7 mcg/kg/hr. All patients were able to be extubated safely and uneventfully. DEX infusion was gradually reduced and discontinued 6-8 hours after extubation.

Conclusions: The patients with TBI commonly experience agitation and anxiety while weaning sedation and ventilator. This may lead to prolonged ventilator and sedation use, and potential increase in the cost of ICU care and complications. DEX with its novel properties of sedation without depressing respiration may represent an ideal agent in the ICU care in the patients with TBI. Low dose fentanyl should be considered for analgesia, as many patients with TBI also have associated orthopedic injuries. Further studies comparing DEX with other sedative agents are warranted in this group of patients.

References:

1. Anesth Analg 2001;92:1250-3.
2. BMJ 1974;2;654-61