10-2018

Dexmedetomidine induced pyrexia

Stanlies D'Souza
Baystate Health, dsouzastan@yahoo.com

Dexmedetomidine-induced Pyrexia

Brian Mason MD, Stanlies D'Souza MD

Department of Anesthesiology at Baystate Medical Center / University of Massachusetts Medical School

INTRODUCTION

I am pleased to present a case highlighting a rare complication of dexmedetomidine and describing: (1). Its relationship to the administration of dexmedetomidine; (2). A possible mechanism for dexmedetomidine-induced fever; and (3). Management of dexmedetomidine-induced fever in a critical care setting.

CASE HISTORY

A 79-year-old male with incarcerated umbilical hernia, afebrile and on broad spectrum antibiotics, underwent a right hemicolectomy for incarcerated inguinal hernia. Following uneventful surgery, the patient was transferred to ICU for postoperative management. Intravenous dexmedetomidine infusion (1mg/kg bolus followed by 0.4 mcg/kg/hr) was started for postoperative agitation. However, shortly after starting the infusion, the patient became febrile to 105.8° by esophageal temperature. Dexmedetomidine infusion was discontinued, one (1) gram of intravenous acetaminophen was given, and a cooling blanket was applied; the fever subsequently decreased with complete resolution to normal baseline at six hours.

DISCUSSION

Dexmedetomidine's primary site of action is the Locus Coeruleus, the major noradrenergic nucleus of the brain that communicates with a wide subset of neural structures and plays a central role in a number of physiologic functions.[1] The primary effect of dexmedetomidine on the Locus Coeruleus is regulation of arousal, making it a common choice for sedation in the ICU. Recently, however, it has been found to play a role in the control of autonomic function[1] with the rare side effect of pyrexia. Nuclei in the Caudal Raphe Magnus are involved in thermoregulation, causing increases in body temperature secondary to direct stimulation from the Locus Coeruleus.[1]
Dexmedetomidine has been implicated in a small but growing number of case reports of drug-induced fever as a rare side effect.[2] In our case, after starting dexmedetomidine according to our institutional standards and established critical care guidelines[3], an extreme fever was noted; dexmedetomidine was immediately suspect due to the timing of the fever and lack of other readily identifiable causes, therefore it was immediately discontinued and the fever treated.

CONCLUSION

Dexmedetomidine-induced fever is a rare side effect that clinicians should be aware of, especially in the ICU setting, where it is a common choice for sedation. Since there are so few documented cases and the fever can manifest at varying time intervals[2], dexmedetomidine fever should be considered in the differential diagnosis for fever for any patient receiving it for sedation. One possible explanation for the mechanism of fever is via direct stimulation of areas of the brain responsible for thermoregulation, such as the Caudal Raphe Magnus by the Locus Coeruleus.[1] The Locus Coeruleus, as the primary site of action of Dexmedetomidine, is implicated in many important physiologic functions, although why some patients develop fever and others do not is not understood.[2] Diagnosis of dexmedetomidine-induced drug fever should be treated immediately, since body temperature can become severely elevated. As with other cases of drug fever, the offending agent should be discontinued and active cooling measures initiated. IV acetaminophen and cooling blankets can be employed and other causes of fever must be considered since dexmedetomidine-induced fever is a diagnosis of exclusion.

References:
1. Samuels ER, Szabadi E. Functional neuroanatomy of the noradrenergic locus coeruleus: its roles in the regulation of arousal and autonomicfunction part I: principles of functional organisation. *Curr Neuropharmacol* .2008;6(3):235–253.
2. Faust AC, Sutton SE. Dexmedetomidine-associated fever in the intensive care unit. *Ther Adv Drug Saf*. 2015;6(6):234-237. doi:10.1177/2042098615612661.
3. Barr J, Fraser G, Puntillo K, et al. Clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit. *Crit Care Med* . 2013;41(1): 263–306.