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SOCIETY FOR NEUROSCIENCE IN ANESTHESIOLOGY AND CRITICAL CARE

ARTICLE OF THE MONTH

Efficacy of Perioperative Dexmedetomidine on Postoperative Delirium: Systematic Review and Meta-Analysis with Trial Sequential Analysis of Randomized Controlled Trials

X.Duan *et al. British Journal of Anaesthesia,* 121 (2): 384-397 (2018)

Welcome to the October 2018 edition of SNACC's article of the month!

This month, we address the prevention of post-operative delirium with the use of dexmedetomidine. This relatively new drug's potential in reducing this serious condition has been analyzed by the meta-analysis chosen by this month's expert commentators.

Commentary is provided by Drs. Monika Toton and Vijay Tarnal of the University of Michigan. Dr. Toton is currently a resident in anesthesiology at the University of Michigan. Dr. Tarnal is an assistant professor of anesthesiology at the University of Michigan Medical School, specialist in neuroanesthesia, and member of the SNACC communications committee. We thank them for their expertise and insight on this topic.

We invite SNACC members to further discuss this topic on the SNACC **Twitter** feed or on **Facebook**.

~ Adrian Pichurko, MD, Oana Maties, MD, and Nina Schloemerkemper, MD

Commentary

Monica Toton, MD; Vijay Tarnal, MD, FRCA

Postoperative delirium (POD) is associated with higher morbidity, mortality, prolonged length of hospital stay and increased healthcare costs.[1] The incidence of POD approaches 51% after surgery, with elderly patients (65 years or older) at a significantly higher risk.[2,3] Risk factors for postoperative delirium include higher ASA score, preoperative medications, metabolic disorders, pre-existing cognitive decline, surgery duration, site of surgery, intraoperative bleeding and pain. Dexmedetomidine has potential to decrease postoperative delirium, and multiple studies have been performed to study these effects.[4,5,6] There have been only a few studies evaluating effects on postoperative delirium in the non-cardiac surgical patient population[7].

A meta-analysis of randomized controlled trials was conducted by Duan *et al.* to determine whether dexmedetomidine in the adult surgical population decreases postoperative delirium incidence and furthermore to

assess the effect of timing of dexmedetomidine administration and age of patients on the incidence of postoperative delirium. In total, 18 studies were included in their analysis involving 3,309 patients (1,616 of whom received dexmedetomidine and 1,693 that received other drugs or saline).

For the primary outcome of postoperative delirium incidence, the meta-analysis showed that dexmedetomidine was associated with a significant reduction in POD incidence (OR 0.35; 95% CI 0.24-0.51, P<0.01). Furthermore, when stratified to cardiac versus non-cardiac surgery, both subgroups showed decrease in postoperative delirium incidence (cardiac with OR 0.41, 95% CI 0.26-0.63, P<0.01 and non-cardiac surgery with OR 0.33, 95% CI 0.18-0.59, P<0.01).

Additionally, this meta-analysis performed a subgroup analysis on the timing of dexmedetomidine administration. A total of 375 patients in three studies received dexmedetomidine during the intraoperative period and postoperative delirium incidence was reduced in this group (OR 0.26, 95% CI 0.14-0.48, PI <0.01) as well as 2,180 patients in twelve studies that received dexmedetomidine in the postoperative period who also experienced a reduction in postoperative delirium incidence (OR 0.30, 95% CI 0.21-0.44, P<0.01). However, three studies which included 754 patients found that there was no significant difference in POD incidence when dexmedetomidine was used during perioperative period (OR 0.87, 95% CI 0.56-1.36, P=0.55).

Furthermore, a subgroup analysis was performed to assess postoperative delirium incidence in those that are ≥65 years old versus those that are <64 years old. The authors found that dexmedetomidine reduced postoperative delirium in both subgroups (older age group OR 0.44, 95% CI 0.30-0.65, P<0.01 and younger age group OR 0.19, 95% CI 0.10-0.36, P<0.01).

While this meta-analysis did show a decrease of postoperative delirium in both cardiac and non-cardiac surgical patients, during intraoperative and postoperative periods and in all age groups, this study did have several limitations. Various dosing regimens were used in the studies that were included, some regimens included loading doses while others did not. For this reason, the optimal dose of dexmedetomidine is unknown. Other limitations relate to the individual studies, some of which had small sample sizes (<100 patients).

In summary, postoperative delirium is a prevalent problem in the hospital which carries long term risks, increasing morbidity, mortality and healthcare cost. This meta-analysis did provide evidence that dexmedetomidine decreases postoperative delirium in a surgical population which extends beyond the cardiac surgery patients. Dexmedetomidine may be useful for the non-cardiac surgery patient population as a pharmacologic intervention to decrease postoperative delirium. This is furthermore important in the neurosurgical and neurocritical surgery population as delirium can interfere with accurate neurological assessment checks. Dexmedetomidine may have protective effects regardless of timing (several studies showed benefit with intraoperative and postoperative dosing). However, further studies are needed to determine dosage of dexmedetomidine that reduces postoperative delirium. In addition specific studies on patient populations with risk factors for delirium may help determine exactly which patient population would most benefit from dexmedetomidine.

References

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