

SEE Summaries of Emerging Evidence

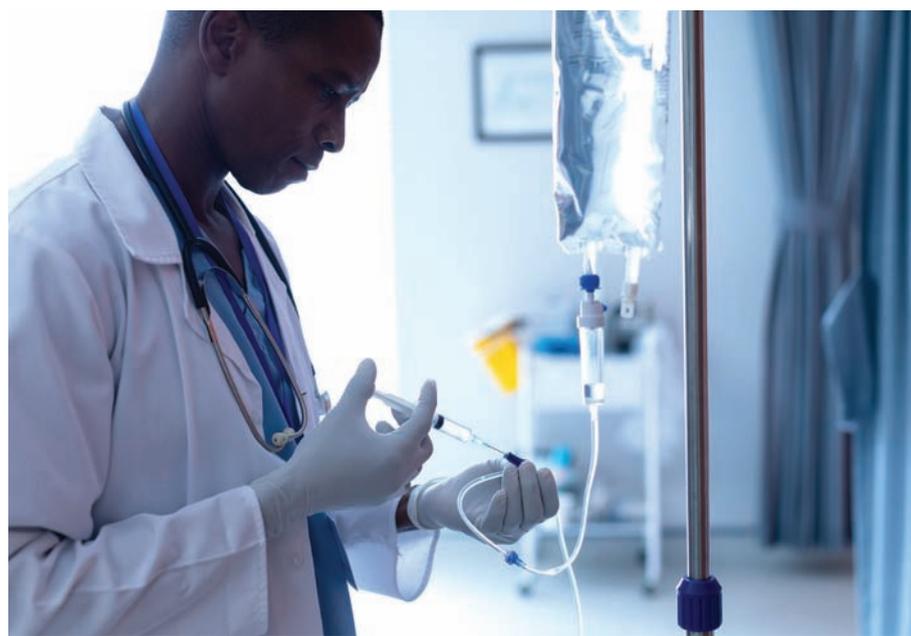
SEE Question

Your next patient is scheduled for a gynecologic laparotomy, for which you plan combined epidural and general anesthesia. She recalls having severe shivering after her last surgery and asks if there is any way to prevent this. According to a recent placebo-controlled trial, what is the MOST likely outcome if you administer a single prophylactic dose of I.V. acetaminophen to this patient?

- (A) Reduced risk of severe shivering in the postanesthesia care unit (PACU) (C) No effect on body temperature 30 minutes after arrival in the PACU
- (B) Increased risk of severe shivering after discharge from the PACU

Postoperative shivering is not only disturbing to patients but can also increase catecholamine release, oxygen consumption, postoperative pain, and the risk of cardiovascular complications. While shivering in the initial postoperative period may be due to hypothermia, it may also occur in people who are normothermic. The latter occurrence has been attributed to an increase in the body temperature set point after surgery, which results in a normal temperature being perceived by the body as “low,” triggering a shivering response to generate heat. Acetaminophen is well known for its ability to lower body temperature in both febrile and afebrile individuals. It has been suggested that acetaminophen may also reduce or prevent the postoperative increase in body temperature set point, thus reducing the risk of postoperative shivering.

A recent randomized, placebo-controlled, triple-blind trial evaluated the effectiveness of a single dose of acetaminophen for preventing postoperative shivering in women undergoing elective gynecologic laparotomy with combined epidural and general anesthesia. Patients received a single I.V. dose of 15 mg/kg of acetaminophen (n = 18) or placebo (n = 19) after induction of general anesthesia. The general and epidural anesthesia techniques, as well as the perioperative warming methods, were standardized. All patients were admitted to



the PACU for 30 minutes after surgery. The shivering score of each patient was assessed during the PACU stay and one hour after PACU discharge. Shivering scores ranged from 0 (no shivering) to 4 (generalized shivering), and *severe shivering* was defined as a shivering score above 2. Body temperature was measured at the forehead immediately before induction of general anesthesia, at initiation of surgery, at the end of surgery, upon arrival in the PACU, and at discharge from the PACU. Bladder temperature was measured at the same time points, and axillary temperature was measured one hour after PACU discharge. The

primary study outcome was the rate of severe shivering in the PACU.

The main study results were as follows:

- The rate of severe shivering in the PACU was lower in the acetaminophen group (22.2%) than in the placebo group (73.7%), with a relative risk of 0.302 (95% CI, 0.122-0.746).
- The median shivering score in the PACU was lower in the acetaminophen group (0; interquartile range [IQR], 0-4.0) than in the placebo group (4.0; IQR, 2.5-4.0).
- No patient in either group exhibited severe shivering one hour after discharge from the PACU.

- The median shivering score one hour after discharge from the PACU was similar between groups.
- Both forehead and bladder temperatures were similar between groups during surgery and on arrival in the PACU but were lower in the acetaminophen group than in the placebo group 30 minutes after arrival in the PACU.
- Axillary body temperature one hour after discharge from the PACU was lower in the acetaminophen group than in the placebo group.
- Perioperative hypothermia (body temperature below 36 °C at any time) occurred in three patients in each group. These results suggest that a single dose of acetaminophen reduces the likelihood of severe postoperative shivering in the early postoperative period. Postoperative body temperature was lower with acetaminophen than with placebo, suggesting that acetaminophen reduced shivering by suppressing the postoperative increase in body temperature set point. ■

Bibliography:

- Kinjo T, Tadokoro T, Tokushige A, et al. Effects of perioperative administration of acetaminophen on postoperative shivering: a randomized, triple-blind, placebo-controlled trial. *Anesth Analg*. 2020;130(4):983-990. doi:10.1213/ANE.0000000000004306

Answer: A

Interested in becoming a question writer for SEE? Active ASA members are encouraged to submit their CVs for consideration to Wade Weigel, MD, FASA, SEE Editor-in-Chief, at see@asahq.org.

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