

Perioperative Nicotine for Postoperative Pain and Nausea: A Systematic Review with Clinical and Methodological Insights

Ali Elkarouri

University of Medical Sciences and Technology, Khartoum, Sudan

Feras Almogbel

University of Medical Sciences and Technology, Khartoum, Sudan

Mohammed Alghamdi

University of Medical Sciences and Technology, Khartoum, Sudan

Ali Elkarouri

University of Medical Sciences and Technology, Khartoum, Sudan

Abdulrahman Alharbi

University of Medical Sciences and Technology, Khartoum, Sudan

Layan Almutairy

University of Medical Sciences and Technology, Khartoum, Sudan

Abstract

Context: Nicotine has been investigated in prior studies for its analgesic effects and its impact on postoperative nausea and vomiting (PONV), yet results have been inconsistent.

Objectives: This systematic review and narrative synthesis evaluates the effects of perioperative nicotine administration on postoperative pain control and PONV in patients undergoing general anesthesia.

Methods: A systematic literature review was conducted, and findings were summarized narratively. Comprehensive searches were performed in PubMed, the Cochrane Central Register of Controlled Trials (CENTRAL), and Google Scholar for studies published between 2004 and 2023, using a PICO-based approach. The PICO criteria included: Patients undergoing general anesthesia, perioperative nicotine as the intervention, placebo or no nicotine as the comparator, and pain scores as the primary outcome. The Mendeley application was utilized to eliminate duplicate data. Title, abstract, and full-text screenings were independently conducted by all authors using the online review platform Rayyan. Final data were individually extracted into Excel spreadsheets. The risk of bias in the included studies was assessed with the Cochrane Risk of Bias 2 (RoB 2) tool.

Results: Eleven studies encompassing 753 participants (384 receiving nicotine, 369 controls) were included. Of these, 514 were female and 239 were male, all having undergone different surgical procedures and receiving nicotine via various methods and dosage forms. The majority of participants were nonsmokers.

Primary outcomes across the studies predominantly involved postoperative pain scores, while secondary outcomes included the incidence of PONV, antiemetic requirements, and opioid consumption. No additional analyses were performed due to heterogeneity among the included studies.

Conclusions: Although perioperative nicotine administration demonstrated reductions in postoperative pain, nausea, vomiting, and opioid consumption in some studies, the effect of nicotine on PONV was inconsistent. Variability in patient populations, dosage forms, and dosages complicates the formulation of definitive clinical recommendations. Overall, perioperative nicotine shows promise for improving postoperative pain management, but its impact on PONV requires careful consideration. Nicotine administration has been investigated as an analgesic adjunct and as a strategy for preventing PONV. This systematic review aimed to determine the effect of perioperative nicotine administration on postoperative pain and PONV.