Pressure Device Reduces Propofol Injection-Related Pain in Patients Undergoing Surgery

A pressure vibration device can cut propofol injection pain in patients undergoing surgeries, matching low-dose ketamine without extra adverse events.

According to findings published in Regional Anesthesia & Pain Medicine, a pressure vibration mechanical device significantly reduced the incidence and severity of propofol (Diprivan; AstraZeneca) injection pain compared with placebo. Additionally, the device was observed to be at least as effective as low-dose ketamine.[1]

Propofol injection is a commonly used intravenous (IV) anesthetic and a sedative used to help patients relax or sleep prior to and during surgery or other medical procedures. In some cases, propofol may also be used to sedate patients with COVID-19 infection who need mechanical ventilation in the intensive care unit (ICU). Common adverse events of the agent include confusion; dizziness, faintness, or lightheadedness when suddenly getting up from a sitting or lying position; blurred vision; and headache, among others.[2]

Despite its frequent use, the study authors note that the IV injection can frequently cause pain upon administration, with incidence ranging from 28% to 91%. For this study, the investigators aimed to compare the effect of low-dose ketamine and a pressure vibration mechanical device with placebo to reduce pain experienced during injection in patients undergoing elective surgery.[1,2]

Study Design

For this randomized, double-blind, placebo-controlled trial, 300 adults were randomly assigned to receive treatment with pressure vibration (Group V), low-dose ketamine (Group K), or saline placebo (Group P). A total of 275 patients completed the study and were analyzed (Group V: 92; Group K: 91; and Group P: 92 patients).[1]

Patients received 5 mL of 0.9% saline (Group P), 50 µg/kg of ketamine that was diluted in 5 mL saline (Group K), and saline with an activated pressure vibration device that was applied proximal to the intravenous cannula (Group V), each administered over 1 minute. All patients received a 2-mg/kg infusion of propofol, with the first 25% delivered at 600 mL/hour. Pain was assessed using the McCrirrick and Hunter verbal rating score.[1]

The primary end point was pain during propofol injection. Continuous variables were analyzed using 1-way analysis of variance or Kruskal-Wallis tests and categorical variables with χ^2 tests, with Bonferroni correction applied for multiple primary end point comparisons.[1]

Study Findings

Among the 275 analyzed patients, the incidence of no pain was highest in Group V (51.1% [95% CI, 42.4%–59.8%]) compared with Groups P (30.4% [95% CI, 21.0%–39.8%]) and K (33.0% [95% CI, 23.3%–42.6%]; P = .001). Notably, severe pain was more frequent in Group P (18.5% [95% CI 10.5%–26.4%]) than in either Group K (5.5% [95% CI, 0.8%–10.2%]) or Group V (4.3% [95% CI, 0.2%–8.5%]; P = .001). Additionally, recall of injection-related pain at the 1-week period was significantly higher with placebo (55.4%) compared with ketamine (37.4%) and the vibration device (26.1%; P < .001). The authors wrote that hemodynamic variables and adverse events (AEs) were comparable across groups, and the most common AEs were bradycardia and hypotension.[1]

The findings suggest that the device can provide an effective, reusable, nonpharmacological alternative for patients undergoing surgery who experience propofol injection pain.[1]

For pharmacists, these findings are relevant because propofol injection pain is common and can affect perioperative comfort, and anesthesia teams often rely on pharmacologic strategies that may add complexity, monitoring needs, or additional medication exposure. Pharmacists who are involved in perioperative services should also recognize that AEs may still be common even with the device, and they should educate patients on these prior to surgery. Additionally, pharmacists can discuss and collaborate with anesthesiologists as well as other members of a surgical team to implement multimodal strategies to improve patient comfort, streamline workflows, and reduce unnecessary medication use.

REFERENCES

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