

A Comparative Study between Intranasal Tapentadol versus Intravenous Tramadol in Patients Undergoing Elective Surgery under General Anaesthesia

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Abstract

A study was conducted in the Department of Anaesthesiology, Calcutta National Medical College & Hospital with the aim of comparing Tapentadol (45 mg) nasal spray and intravenous Tramadol (100 mg) for postoperative analgesia. A total of 70 patients undergoing elective breast surgeries were included after obtaining informed consent. Patients were systematically allocated into either the Tapentadol or Tramadol group, and the study drugs were administered 10 minutes before induction of anaesthesia. Both groups were comparable in terms of age, sex, ASA physical status, and anthropometric data. Baseline hemodynamic parameters such as SBP, DBP, MAP, and PR were similar in both groups, though Tapentadol showed slightly lower values at 120 minutes, indicating better hemodynamic stability. The mean extubation time was significantly shorter in the Tapentadol group, and the time to the first rescue analgesic was longer, showing prolonged analgesic effect. Tapentadol also achieved a Ramsay sedation score of 2 more quickly, suggesting faster recovery. Postoperative NRS pain scores were consistently lower in the Tapentadol group across all observed intervals, confirming superior analgesic efficacy. The incidence of postoperative nausea and vomiting was lower with Tapentadol (22.9%) compared to Tramadol (37.1%), and although this difference was not statistically significant, it was clinically meaningful. Tapentadol demonstrated better gastrointestinal tolerability and patient comfort. Overall, Tapentadol nasal spray proved to be a more effective, better tolerated, and faster-acting analgesic compared to intravenous Tramadol for postoperative pain control in elective breast surgeries.

Keywords: Pain, chronic pain, postoperative pain, Tapentadol, Tramadol, Analgesia, Control of pain, NRS score, PONV, Intranasal Tapentadol.

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Introduction

Pain, as defined by the International Association for the Study of Pain (IASP), is an unpleasant sensory and emotional experience linked to actual or potential tissue damage[1]. Perioperative pain management includes strategies before, during, and after surgery to control pain[2]. These strategies vary based on the timing of the intervention but often share similar techniques. Intraoperative pain control may include systemic medications and regional techniques like epidurals or nerve blocks. Chronic postsurgical pain lasts beyond 3–6 months and is often neuropathic in nature, due to nerve injury during surgery[3]. Because pain is subjective, consistent use of validated pain assessment tools is crucial. Using the same scale throughout the perioperative period improves accuracy and helps guide treatment. Effective postoperative pain control is essential for recovery, improving outcomes such

as sleep, mobility, and reducing complications like DVTs[4]. While opioids remain common for analgesia, their side effects have led to reduced use. Tapentadol and Tramadol are opioids with dual mechanisms of action. Tapentadol combines mu-opioid receptor activation with norepinephrine reuptake inhibition, while Tramadol also affects serotonin reuptake[5]. Intranasal Tapentadol, a newer delivery method, may offer faster pain relief and higher patient satisfaction compared to intravenous Tramadol. This study aims to compare intranasal Tapentadol and IV Tramadol in elective surgery patients, evaluating pain control, safety, and satisfaction to determine the optimal approach for perioperative pain management.

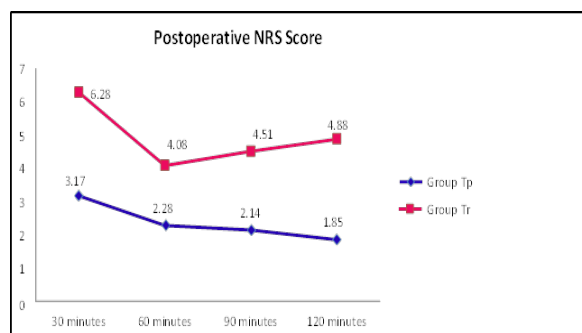
Objective: To compare the analgesic efficacy, hemodynamic stability, and incidence of

postoperative nausea and vomiting between intranasal Tapentadol (45 mg) and an equianalgesic dose of intravenous Tramadol (100 mg).

Methodology: In the present study, a total of 70 patients undergoing elective surgical procedures (simple mastectomy or excision of breast fibroadenoma) who met the inclusion criteria were enrolled after proper explanation and obtaining written informed consent. Patients were allocated to either the Tapentadol or Tramadol group using a systematic allocation technique. The study drug was administered 10 minutes prior to induction of anesthesia. Both groups were comparable with respect to age, sex, ASA status, and mean anthropometric parameters ($p > 0.05$).

Result

In this study, hemodynamic parameters (SBP, DBP, MAP, and PR) were monitored across both Tapentadol and Tramadol groups. Baseline values for all parameters were comparable between the groups. At the 120-minute mark, the mean SBP, DBP, MAP, and PR were slightly lower in the Tapentadol group compared to the Tramadol group, with statistical significance, though the actual differences were minimal. Time to extubation was significantly shorter with Tapentadol (10.49 ± 2.54 min) compared to Tramadol (12.09 ± 1.95 min) ($p = 0.004$). Time to first rescue analgesic was significantly longer in the Tapentadol group (87.60 ± 13.60 min) vs. Tramadol (65.20 ± 9.07 min) ($p < 0.0001$). Time to achieve Ramsay Sedation Score 2 was significantly shorter in the Tapentadol group (38.31 ± 5.12 min) vs. Tramadol (54.37 ± 7.65 min) ($p < 0.0001$). Postoperative pain (NRS scores) was consistently lower at all measured intervals in the Tapentadol group ($p < 0.05$). Incidence of postoperative nausea and vomiting (PONV) was lower in the Tapentadol group (22.9%) compared to the Tramadol group (37.1%). While not statistically significant ($p = 0.192$), it was noted to be clinically meaningful, indicating better gastrointestinal tolerability with Tapentadol.



Conclusion

Tapentadol nasal spray offers effective and superior analgesia compared to intravenous Tramadol for

both perioperative (short-duration surgeries) and postoperative pain management, with no major adverse effects and better hemodynamic stability. Based on the findings of this study, we recommend that intravenous Tramadol may be replaced with the more efficacious and patient-friendly Tapentadol nasal spray for intraoperative and postoperative pain control in short surgical procedures.

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