Ultrasound-Guided Bilateral Infraorbital Nerve Block in Endoscopic Transnasal Transsphenoidal Pituitary Surgery: A Randomized Comparison of 0.2% Ropivacaine Alone Versus 0.2% Ropivacaine with Fentanyl for Intraoperative Analgesia and Postoperative Recovery

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Abstract

Background: Endoscopic transnasal transsphenoidal (TNTS) pituitary surgery involves significant nociceptive stimulation of richly innervated nasal structures, necessitating robust multimodal analgesia. Ultrasound-guided bilateral infraorbital nerve block (IONB) is an emerging adjunct in this setting. Whether the addition of fentanyl to ropivacaine augments analgesic efficacy remains insufficiently studied.

Objectives: To compare intraoperative opioid consumption and postoperative analgesic outcomes between 0.2% ropivacaine alone (Group R) and 0.2% ropivacaine combined with 25 mcg fentanyl (Group F) for ultrasound-guided bilateral IONB in patients undergoing endoscopic TNTS pituitary resection.

Methods: In this prospective, randomized, double-blind study conducted at a tertiary neuroscience centre (January 2024–April 2025), 50 adult patients (ASA I–III) scheduled for elective endoscopic TNTS pituitary tumor resection were allocated by computer-generated randomization to Group R (0.2% ropivacaine, n=25) or Group F (0.2% ropivacaine + 25 mcg fentanyl, n=25). Ultrasound-guided bilateral IONB was performed post-induction under standardized general anesthesia. Primary outcome was total intraoperative intravenous fentanyl consumption. Secondary outcomes included postoperative VAS pain scores, time to first rescue analgesic, and total rescue analgesic doses in 24 hours.

Results: Intraoperative fentanyl requirement was significantly lower in Group F (212 ± 50.58 mcg) compared to Group R (292 ± 45.83 mcg; $p < 0.0001$). Group F demonstrated significantly lower postoperative VAS scores at 1, 4, 18, and 24 hours ($p < 0.05$), a prolonged time to first rescue analgesic (285.2 ± 14.48 vs. 219.72 ± 17.38 minutes; $p < 0.0001$), and fewer rescue analgesic doses in 24 hours (2.8 ± 0.577 vs. 4.08 ± 0.759; $p < 0.0001$). No adverse events attributable to the block or fentanyl adjuvant were observed in either group.

Conclusion: The addition of 25 mcg fentanyl to 0.2% ropivacaine for ultrasound-guided bilateral IONB significantly reduces intraoperative opioid requirements and improves postoperative analgesia in patients undergoing endoscopic TNTS pituitary surgery, without compromising safety. This combination represents an effective opioid-sparing regional analgesic strategy in neuroanaesthetic practice.

Keywords

Infraorbital nerve block, ropivacaine, fentanyl, pituitary surgery, transnasal transsphenoidal, neuroanaesthesia, regional analgesia, opioid-sparing.