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# Opioid-free Anesthesia for Craniotomy in Supratentorial Tumors: An Open-labeled Single-blinded Randomized Controlled Study

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## Abstract

**Background:** Opioid-free anesthesia (OFA) offers potential benefits of smoother recovery and reduced complications, compared with conventional opioid-based approach. We aimed to evaluate the use of OFA as an alternative approach to conventional opioid-based anesthetic regimen in patients undergoing supratentorial brain tumor surgery.

**Methods:** Adult patients (>18 y) with supratentorial tumors undergoing elective craniotomy under general anesthesia (Aug 2022 to Dec 2023) were randomized into Dexmedetomidine (group D) or Fentanyl (group F) group. Primary outcome included emergence and extubation times and secondary outcomes were hemodynamic responses, pain scores, rescue analgesic use, and complications.

**Results:** A total of 44 patients were randomized (22 per group). Of these, 33 patients completed the study. Demographic variables were comparable, except for age and body mass index. Emergence (8.2±3.3 min vs. 6.8±2.6 min [ P =0.18]; Mean Difference [MD], 95% CI: 1.42, -0.69 to 3.55) and extubation times (12.7±4.2 min vs. 11.2±3.9 min [ P =0.27]; MD, 95% CI: 1.58, -1.31 to 4.46) were comparable between the groups, respectively. Group D demonstrated better hemodynamic stability during Mayfield pin application and tracheal extubation. Postoperative pain scores were similar, except at 12 hours, where group D reported lower Numerical Rating Scale. Postoperative Richmond Agitation-Sedation Scale at different time points was comparable between the groups.

**Conclusion:** Our preliminary data suggest that OFA may provide better hemodynamic stability and improved pain control at 12 hours compared with opioid-based anesthesia, while maintaining similar emergence and extubation times.

**Keywords:** craniotomy; dexmedetomidine; hemodynamic stability; opioid-free anesthesia; postoperative pain.