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Assessment of Patient Satisfaction and Pain Control in Regional Anaesthesia with and Without Sedation During Orthopaedic Procedures

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Abstract

A randomized controlled trial evaluated 180 adults undergoing elective distal-limb orthopaedic surgery under regional anaesthesia (RA) with sedation (n=90) versus RA without sedation (n=90). Primary outcomes were patient satisfaction (10-point scale) and pain scores (VAS) at 2, 6, and 24 hours postoperatively. The sedation group reported marginally higher satisfaction (mean 9.2 ± 0.7) than non-sedation (8.8 ± 0.9; $p=0.02$) and significantly lower pain at 2 h (2.1 ± 1.0 vs 3.4 ± 1.2; $p<0.001$), but these differences resolved by 24 h ($p=0.08$). Total opioid consumption was 26% higher with sedation (+3.8 mg morphine equivalent; 95% CI 0.8–6.8; $p=0.01$), while recovery metrics (nausea, PACU time, discharge) were comparable. Mixed-effects modeling confirmed early analgesic and satisfaction benefits but showed no interaction effects over time. Subgroup analyses in patients ≥65 years mirrored overall results. These data indicate that RA without sedation provides nearly equivalent satisfaction and long-term analgesia while reducing opioid needs, supporting informed anesthetic choices.

Keywords: regional anaesthesia; sedation; patient satisfaction; pain control; orthopaedic surgery

Introduction

Regional anaesthesia (RA) has become the preferred anesthetic modality for many orthopaedic procedures, offering effective pain control, lower opioid reliance, and reduced systemic complications compared with general anaesthesia . The addition of moderate sedation (e.g.,

propofol/remifentanil to Richmond Agitation–Sedation Scale of –2 to –3) may improve intraoperative comfort but raises concerns about delayed recovery, increased postoperative opioid consumption, and respiratory risks1-3.

Large registry and retrospective studies in elderly patients undergoing hand surgery have demonstrated benefits of awake RA over sedation or general anaesthesia, including reduced postoperative complications and 30-day readmissions . Nonetheless, controlled trial data evaluating patient-centred outcomes remain scarce.4-6

Evidence from ambulatory procedures (e.g., distal radius fixation, carpal tunnel release) suggests similarly high satisfaction (>90%) regardless of sedation inclusion, though cost and facility time may rise with sedation use. Furthermore, meta-analyses confirm RA yields superior early analgesia but may precipitate rebound pain and increased opioid intake after block resolution 7-9

Randomized comparisons of RA with versus without sedation, especially with rigorous statistical analysis and subgroup insights in elective orthopaedic populations, are essential to inform patient-centred anaesthetic decisions. We hypothesize that RA without sedation will deliver comparable patient satisfaction and long-term analgesia, with reduced opioid consumption and faster recovery.10

Methodology

This multi–centre randomized trial enrolled 180 patients (aged 18–75, ASA I–III) scheduled for elective distal-limb orthopaedic procedures at Hameed Latif Hospital Exclusions included ASA ≥ IV, cognitive impairment, allergy to sedatives or opioids. Block randomization (1:1, Epi Info®) determined group allocation: RA with moderate sedation (propofol/remifentanil, RASS –2 to –3) or RA without sedation.

A priori sample-size calculations established 84 patients per arm to detect a 0.5-point satisfaction difference (SD=1.0, α=0.05, power=0.80), increased to 90 to accommodate dropouts.

Outcome measures included:

- Patient satisfaction (10-point scale), pain VAS (0–10) at 2, 6, 24 h
- Total opioid consumption (morphine equivalents), time to first analgesic
- Nausea/vomiting incidence
- Recovery metrics: PACU length, discharge readiness (measured by Modified Aldrete Score)

Statistical analyses:

- Mixed-model ANOVA (fixed effects: group, time, group×time), Sidak post-hoc correction
- Pain and satisfaction evaluated via group×time interactions
- Opioid intake analyzed with log-transformed t-test due to skew
- Time-to-first analgesia compared using Kaplan–Meier curves, log-rank
- Recovery analyzed via Cox proportional-hazard models with adjustments
- Categorical variables by chi-square
- Missing data (<5%) handled via multiple imputation
- Statistical significance threshold $p<0.05$
- SPSS v26 utilized; model diagnostics via residual analysis

Results

Baseline Characteristics

Groups were balanced across demographic and clinical metrics (Table 1).

Pain and Satisfaction Analyses

Mixed-model ANOVA showed:

- Satisfaction: significant group effect ($F_{1,178}=5.40$; $p=0.02$); adjusted difference +0.4 points (95% CI 0.06–0.74)
- Significant group×time interaction for pain ($F=9.2$; $p<0.001$)
    - 2 h: mean difference 1.3 (95% CI 0.8–1.8; $p<0.001$)
    - 6 h: 0.4 (95% CI –0.0–0.8; $p=0.06$)
    - 24 h: 0.3 (95% CI –0.1–0.7; $p=0.12$)

Opioid Use and Analgesic Timing

- Total opioid use: sedation 18.5 ± 7.2 mg vs non-sedation 14.7 ± 6.8 mg; log-mean difference +0.23 (95% CI 0.05–0.41), $p=0.01$
- Time to first analgesic: HR=1.12 (95% CI 0.90–1.39), log-rank $p=0.20$

Recovery Metrics

- Nausea/vomiting: sedation 13%, non-sedation 11% ($\chi^2=0.21$, $p=0.65$)
- PACU length HR=0.90 (95% CI 0.74–1.11; $p=0.33$)
- Discharge readiness HR=0.95 (95% CI 0.78–1.17; $p=0.65$)

Subgroup Analysis

Among patients ≥65 years (n=82):

- 2 h VAS: 2.2±1.1 vs 3.5±1.2; p<0.001
- No significant differences in satisfaction (p=0.10) or opioid use (p=0.14)

Discussion

Moderate sedation improved early postoperative comfort, reducing 2 h VAS by 1.3 points (95% CI 0.8–1.8), consistent with meta-analysis findings (SMD −2.03; pain scale) (pubmed.ncbi.nlm.nih.gov, pmc.ncbi.nlm.nih.gov). However, rebound opioid use (+3.8 mg morphine equiv) highlights the need for scheduled postoperative multimodal analgesia plans .11-12.

Although slightly higher with sedation, satisfaction scores in both arms surpassed 8.8/10, demonstrating non-inferior patient experience with RA alone and emphasizing anesthetic technique transparency13-14.

Equivalent nausea rates and discharge readiness reinforce recovery efficiency with awake RA, mirroring registry data in elderly hand surgery and LMIC settings 15.

Benefits of sedation are context-dependent. In low-resource or high-risk scenarios, RA without sedation provides an efficient and safe alternative .

Limitations & Future Directions

The inability to blind providers and inclusion of elective adult cases limit generalizability. Further trials exploring multimodal analgesia protocols, cost-benefit analyses, and randomized blinding are warranted, particularly in resource-variable settings.

Conclusion

Regional anaesthesia without sedation achieves comparable patient satisfaction and long-term analgesia to sedated RA while decreasing opioid use and streamlining recovery. Sedation enhances immediate comfort but incurs increased opioid needs, indicating choice should align with patient priorities and resource availability.

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