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CLINICAL TRIAL REPORT

Dexmedetomidine Plus Stellate Ganglion Block Improves Postoperative Sleep Quality in Elderly Hip Arthroplasty Patients: A Randomized Controlled Trial

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Purpose: To investigate the effect of dexmedetomidine combined with stellate ganglion block (SGB) on postoperative sleep quality in elderly patients undergoing hip arthroplasty.

Methods: 126 patients aged $\geq$ 65 years undergoing hip arthroplasty were allocated to three groups: control (Group C), dexmedetomidine (Group D), and dexmedetomidine plus SGB (Group DS). Group D received dexmedetomidine (loading dose 0.5μg/kg over 10 min, then 0.2μg/kg/h infusion until surgery end). Group DS received the same regimen plus SGB at C6 with 5mL of 0.375% ropivacaine. The primary outcome was postoperative sleep quality assessed by the Richards-Campbell Sleep Questionnaire (RCSQ) on the first three postoperative nights. Secondary outcomes included postoperative visual analogue scale (VAS) scores, number of patient-controlled analgesia (PCA) and sleep quality using Pittsburgh Sleep Quality Index (PSQI) scores at one month postoperatively.

Results: On the first three postoperative nights (POD 1–3), the RCSQ scores were significantly higher in Groups D and DS compared with Group C ($P < 0.001$). Specifically, Group D had significantly lower RCSQ scores than Group DS at each postoperative time point (POD 1: mean difference = −6.912, 95% CI: −9.328 to −3.385; POD 2: mean difference = −8.425, 95% CI: −11.464 to −5.386; POD 3: mean difference −8.236, 95% CI: −12.144 to −5.406; $P < 0.001$). VAS scores on POD 1 and POD 2 were significantly lower in Group DS than in Groups D and C ($P < 0.001$). No significant differences in PSQI scores were found among the three groups at one month postoperatively ($P > 0.05$).

Conclusion: In elderly patients undergoing hip arthroplasty, dexmedetomidine combined with SGB significantly improved subjective sleep quality during the first three postoperative nights, although this beneficial effect was not maintained at one month postoperatively.

Keywords: dexmedetomidine, stellate ganglion block, sleep quality, hip arthroplasty

Introduction

Postoperative sleep disturbance (PSD) is a common complication following hip arthroplasty in elderly patients.[1–3] Previous studies have reported that the incidence of PSD following surgery ranges from 6.7% to 93%,[4] with Wylde et al reporting an incidence exceeding 50% in joint arthroplasty patients.[5] The risk of PSD increases with age, rendering elderly patients particularly vulnerable.[6] In this population, PSD may lead to postoperative delirium, anxiety, and depression, and delay functional recovery, prolong hospital length of stay, and increase medical costs.[7,8] Therefore,

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improving postoperative sleep quality is crucial for recovery and quality of life in elderly patients undergoing hip arthroplasty.

Dexmedetomidine, a highly selective α_2-adrenergic receptor agonist, exerts sleep-promoting effects by activating endogenous sleep pathways and reducing noradrenergic outflow from the locus coeruleus, thereby regulating the hypothalamic-pituitary-adrenal axis, improving sleep architecture, and prolonging non-rapid eye movement sleep.[9,10] Stellate ganglion block (SGB) regulates sympathetic nerve activity by blocking the stellate ganglion and has been shown to alleviate pain and improve postoperative sleep quality.[11–13] In contrast to the central action of dexmedetomidine, SGB provides regional blockade of sympathetic input at the cervical level, directly attenuating the peripheral surgical stress response and associated sympathetic hyperactivity.[14–16] We therefore hypothesized that their combined application may produce a synergistic effect.

To date, no study has investigated this potential synergy in hip arthroplasty. Therefore, we hypothesized that combining dexmedetomidine with SGB would significantly improve postoperative sleep quality in elderly patients undergoing hip arthroplasty compared with either intervention alone or placebo.

Materials and Methods

Ethics Approval

This prospective, randomized, controlled trial was approved by the Ethics Committee of the Affiliated Hospital of North Sichuan Medical College (Approval No. 2025ER129-1) and registered in the Chinese Clinical Trial Registry (ChiCTR2500103839). Written informed consent was obtained from all participants prior to enrollment.

Study Population

Inclusion Criteria

Patients aged ≥ 65 years with ASA I-III who were scheduled for hip arthroplasty were included in this study.

Exclusion Criteria

Exclusion criteria were as follows: serious cardiopulmonary disease or other major comorbidities; allergy to dexmedetomidine or local anesthetics; severe cognitive impairment or mental illness; failed subarachnoid anesthesia; or contraindications to subarachnoid block.

Randomization and Blinding

Patients were randomized (1:1:1) using a computer-generated sequence concealed in opaque, sealed envelopes. On the day of surgery, an independent anesthesia nurse opened the envelopes and assigned patients to Group C, Group D, or Group DS according to the sequence (Figure 1). To maintain blinding, dexmedetomidine and saline were supplied in identical containers, syringes, and colors. Patients in Group C and Group D received a sham procedure: ultrasound examination followed by a simulated puncture without fluid injection. SGB was performed by a separate anesthesiologist. After successful blockade, a surgical drape covered the patient's face. Investigators, patients, and outcome assessors remained blinded to group allocation.

Anaesthesia and Interventions

All patients participating in the trial underwent routine fasting, and no preoperative medications were administered. After entering the operating room, a multifunctional monitor was used to monitor heart rate, blood pressure, pulse oxygen saturation and electrocardiogram, then a peripheral venous access was established. All patients received oxygen via a mask. Subsequently, an ultrasound-guided iliac fascia block above the inguinal ligament was carried out on the surgical side. The high-frequency ultrasound probe was placed vertically at the middle one-third section of the inguinal ligament, oriented toward the umbilicus. The ultrasound image demonstrated a bow-tie pattern formed by the sartorius and abdominal muscles superior to the iliac muscle, along with the deep iliac circumflex artery inferior to the abdominal muscle. An 80 mm, 22 gauge needle was then positioned between the fascia iliaca and iliopsoas muscle. After negative

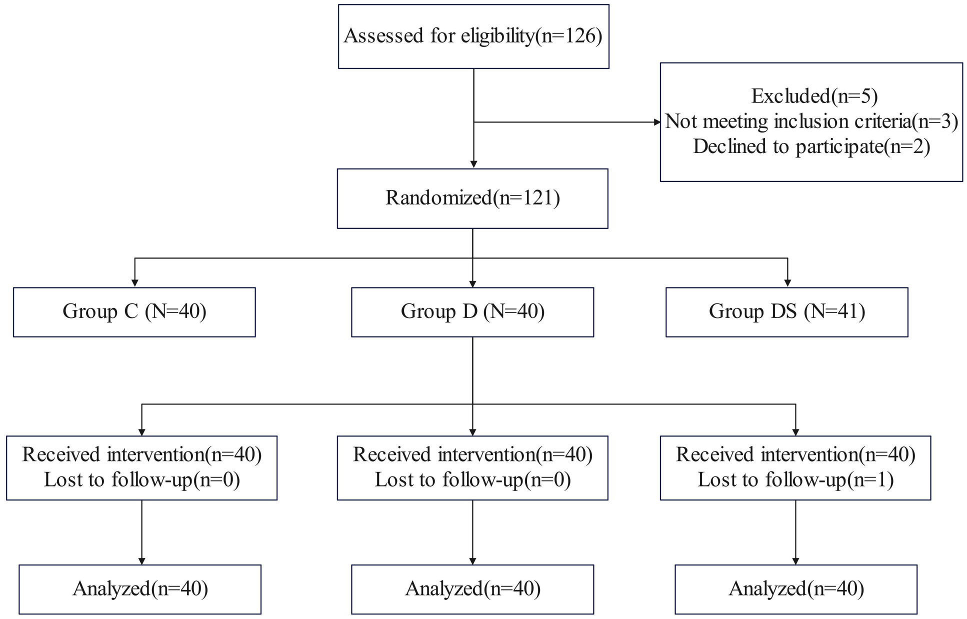

Figure 1 CONSORT flow diagram.
Abbreviation: CONSORT, Consolidated Standards of Reporting Trials.

aspiration, 30 mL of 0.25% ropivacaine was injected. Ultrasonic visualization confirmed the spread of ropivacaine between the iliac fascia and iliopsoas muscle, with elevation of the deep circumflex iliac artery by the iliac fascia.

Subsequently, the patient was placed in the lateral recumbent posture for spinal anesthesia at the L2-L3 or L3-L4 intervertebral space, with 1.6–1.8 mL of 0.75% bupivacaine administered. Once the subarachnoid anesthesia level attained T10, patients in Groups D and DS received an intravenous bolus of dexmedetomidine (0.5 μg/kg) over 10 minutes, followed by a continuous intravenous infusion (0.2 μg/kg/h) until the end of surgery. In contrast, patients in Group C received an equivalent volume of normal saline intravenously. All surgical operations were performed by a single highly skilled and experienced surgeon. To prevent postoperative nausea and vomiting, all participants were intravenously administered 5 mg of tropisetron.

Hypotension was defined as SBP decrease > 20% from baseline or SBP < 90 mmHg, and was treated with intravenous ephedrine (6 mg). Hypertension was defined as SBP > 180 mmHg or DBP > 110 mmHg, and was treated with intravenous urapidil (10–15 mg). Bradycardia was defined as HR<55 bpm, and was treated with intravenous atropine (0.3 mg). Tachycardia was defined as HR > 110 bpm, and was treated with intravenous esmolol (5–10 mg). For respiratory depression or hypoxia (SpO_2 < 90%), assisted positive pressure ventilation was provided.

Ultrasound-Guided Stellate Ganglion Block

An experienced anesthetist blinded to group assignment performed SGB under real-time ultrasound guidance. A single-dose SGB was performed once subarachnoid anesthesia reached T10. A high-frequency linear probe was placed on the ipsilateral anterior cervical region to visualize the longus colli muscle at the C6 level. Then, a 22-gauge, 80-mm needle was inserted in-plane into the prevertebral fascia. After negative aspiration, 5 mL of 0.375% ropivacaine was injected. Successful SGB was confirmed by Horner syndrome (ipsilateral ptosis, miosis, enophthalmos, conjunctival congestion).

Postoperative Analgesia Management

At the end of surgery, all patients received a patient-controlled intravenous analgesia (PCIA) device pre-loaded with 40 mg oxycodone, 200 mg flurbiprofen axetil, and 10 mg tropisetron. The PCIA apparatus was programmed for a continuous basal infusion at 2 mL/h. Moreover, if the VAS score exceeded 3, a 2 mL bolus could be self-

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administered via the PCIA apparatus for pain relief, with a 15-minute lockout interval. The PCIA device was removed at 48 hours postoperatively.

Outcome Measures

The primary outcome was sleep quality on postoperative days 1, 2, and 3 (POD1, POD2, POD3), measured by the Richards Campbell Sleep Questionnaire (RCSQ). The RCSQ is a well-validated 0–100 mm visual analog scale for subjective sleep quality, evaluating five dimensions: sleep latency, depth, efficiency, awakenings, and overall quality. The overall RCSQ score was the arithmetic mean of these five dimensions. Given that previous studies have demonstrated postoperative sleep disturbances typically persist for up to three days, a 3-day follow-up period was established as the practical observation duration. On each evaluation day, patients were instructed to complete the questionnaire between 07:00 and 09:00 a.m.

Secondary outcomes included preoperative RCSQ score (assessed on the day before surgery), operative time, intraoperative blood loss and urine output, intraoperative adverse events (nausea, vomiting, tachycardia, bradycardia, hypertension, hypotension, and desaturation), postoperative VAS scores at rest and during movement at 24, 48, and 72 hours, the number of PCA doses within 48 hours, and PSQI scores at one month postoperatively. Postoperative adverse events were also recorded.

Statistical Methods

The sample size calculation was based on the RCSQ score on the first night after surgery. In the pilot study, the RCSQ scores on the first night after surgery in Group C, Group D, and Group DS were 50 (14), 60 (19), and 68 (21), respectively. The sample size was determined using PASS 2021 software, with a two - sided test ($\alpha = 0.05$) and $(1 - \beta) = 0.9$, and 36 patients in each group. Given an anticipated dropout rate of 10%, the sample size was recalibrated to encompass 120 patients, with 40 patients allocated to each group.

Statistical analyses were performed using SPSS 27.0. Normality was assessed using the Shapiro–Wilk test. Continuous variables following a normal distribution were presented as mean±standard deviation (SD), otherwise, they were presented as median (interquartile range). For intergroup comparisons, one-way ANOVA with Bonferroni-adjusted pairwise comparisons was used for normally distributed data, and the Kruskal–Wallis test with Bonferroni-adjusted pairwise comparisons was used for non-normally distributed data. Categorical data were presented as frequencies (percentages) and analyzed using the chi-square test or Fisher's exact test, as appropriate.

For the RCSQ scores of the three groups at baseline and on the first three postoperative days, a generalized estimating equation (GEE) was applied for statistical analysis to investigate the effects of the group, time, and group-time interaction on RCSQ scores. Pairwise comparisons among the three groups at each time point were adjusted using Bonferroni correction to control for multiple comparisons. The average differences with 95% confidence intervals (CI) are reported. A two-sided $P < 0.05$ was considered statistically significant.

Results

Patient Characteristics

From June to October 2025, a total of 126 patients were assessed for eligibility. Of these, three did not meet the inclusion criteria, and two declined to participate. Thus, 121 patients were randomly assigned to Group C, Group D, or Group DS. One patient in Group DS was excluded from the final analysis due to loss to follow-up. Accordingly, 120 patients completed the study protocol.

The CONSORT flowchart detailing participant flow is shown in Figure 1. Baseline demographic characteristics are presented in Table 1. Analysis revealed no statistically significant differences among the three groups regarding age, gender, BMI, ASA status, and preoperative comorbidities.

Primary Outcomes

Preoperative RCSQ scores were comparable among the three groups (Wald $\chi^2 = 0.423$, $P = 0.809$). During the first three postoperative nights (POD 1–3), RCSQ scores in Groups D and DS were significantly higher than those in Group C ($P < 0.001$).

Table 1 Patient Baseline Characteristics

	Group C (n=40)	Group D (n=40)	Group DS (n=40)	F/X^2	P
Age(y)	72.23±6.65	71.62±5.43	73.27±7.31	0.528	0.591
Sex (M/F)	23/17	25/15	24/16	0.162	0.922
Height (cm)	160.18±7.24	159.27±6.39	160.56±7.34	0.385	0.680
Weight (kg)	60.32±7.07	58.91±6.92	58.94±7.21	0.806	0.449
BMI (kg/m^2)	23.56±4.21	23.27±3.28	23.01±3.23	0.415	0.661
ASA (I/II/III)	(0/31/9)	(0/29/11)	(0/28/12)	0.574	0.750
Preoperative comorbidities, n (%)					
Hypertension	17(42.50)	20(50.00)	19(47.50)	0.452	0.798
Diabetes	6(15.00)	9(22.50)	8(20.00)	0.696	0.706
Coronary heart disease	1(2.50)	3(7.50)	2(5.00)	1.018	0.601
Chronic obstructive pulmonary disease	2(5.00)	4(10.00)	3(7.50)	0.654	0.721

Table 2 Comparison of the Richards Campbell Sleep Questionnaire Among Three Groups

RCSQ Score	Group C (n=40)	Group D (n=40)	Group DS (n=40)	Wald x^2	Mean Difference (95% CI)	P
Pre-	66(55 70)	65(58 71)	67(58 72)	0.423	C VS D:-0.875(−3.157, 1.407) C VS DS:-1.525(−3.972, 0.922) D VS DS:-0.650(−2.994, 1.694)	0.809
POD 1	46(36 54)	53(46 63)*	60(55 67)*#	34.152	C VS D:-7.750(−11.49, −4.009) C VS DS:-13.65(−16.328, −10.482) D VS DS:-6.912(−9.328, −3.385)	< 0.001
POD 2	51(45 57)	55(48 62)*	63 (58 72)*#	26.976	C VS D:-3.900(−6.782, −1.107) C VS DS:-12.323(−15.180, −9.469) D VS DS:-8.425(−11.464, −5.386)	< 0.001
POD 3	51(49 61)	58(54 65)*	66(62 82)*#	32.587	C VS D:-7.250(−11.269, −3.978) C VS DS:-16.025(−19.370, −12.679) D VS DS:-8.236(−12.144, −5.406)	< 0.001
Group effect	Wald x^2 = 23.869, p < 0.001					
Time effect	74.829, p < 0.001					
Interaction effect	92.756, p < 0.001					

Notes: Compared with group C, *P<0.05; compared with group D, # P<0.05.
Abbreviation: Pre, preoperative day; POD, postoperative day.

Specifically, on POD 1, the average difference in RCSQ scores was −7.750 (95% CI: −11.49, −4.009) between Group C and D, and −13.65 (95% CI: −16.328, −10.482) between Group C and DS. On POD 2, the average differences were −3.900 (95% CI: −6.782, −1.107) and −12.323 (95% CI: −15.180, −9.469). On POD 3, the average differences were −7.250 (95% CI: −11.269, −3.978) and −16.025 (95% CI: −19.370, −12.679), respectively.

Moreover, Group DS had significantly higher RCSQ scores than Group D at all postoperative time points. The mean differences between Group D and Group DS were −6.912 (95% CI: −9.328, −3.385) on POD 1, −8.425 (95% CI: −11.464, −5.386) on POD 2, and −8.236 (95% CI: −12.144, −5.406) on POD 3, all with P < 0.001 (Table 2).

Secondary Outcomes

On POD 1, both Group D and Group DS had lower resting and movement-evoked VAS scores than Group C, with Group DS lower than Group D (P < 0.05). On POD 2, resting VAS scores were lower in Group D and Group DS than in Group C; for movement-evoked pain, Group DS had lower scores than both Group C and Group D (P < 0.05). On POD 3, no significant differences were found among the three groups (P > 0.05) (Table 3).

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Table 3 Comparison of the VAS Scores at Rest and Movement Among Three Groups

	Group C (n=40)	Group D (n=40)	Group DS (n=40)	*H*	*P*
VAS score at rest					
POD 1	4(2–4)	3(3–4)*	2(2–3)*#	18.624	<0.001
POD 2	4(3–4)	3(1–3)*	1(0–2)*#	32.417	<0.001
POD 3	2(2–3)	2(2–3)	2(1–2)	3.136	0.242
VAS score at move					
POD 1	5(4–5)	4(4–5)*	3(3–4)*#	15.832	<0.001
POD 2	4(4–5)	4(2–4)	3(2–3)*#	28.536	<0.001
POD 3	3(3–4)	3(3–4)	3(2–3)	5.092	0.078

Notes: Compared with group C, *P<0.05; compared with group D, # P<0.05.
Abbreviation: POD, postoperative day.

Table 4 Intraoperative and Postoperative Outcomes

	Group C (n=40)	Group D (n=40)	Group DS (n=40)	*F*/*H*	*P* value
Intraoperative period					
Duration of surgery, min	115.3±11.6	116.4±15.3	111.9±14.1	1.127	0.324
Estimated blood loss, mL	80(50–100)	100(50–120)	100(50–150)	4.825	0.090
Urine output, mL	400(300–500)	300(230–520)	400(220–640)	2.756	0.252
Postoperative period					
Number of PCA administrations	17.5(11.2–18.9)	11.3(6.9–16.7) *	6.7(3.9–11.6) *#	25.138	<0.001
PSQI scores at one month postoperatively	6.3±3.1	7.0±3.4	6.5±3.2	0.487	0.615

Notes: Compared with group C, *P<0.05; compared with group D, # P<0.05.

PCA administrations within 48 hours were significantly fewer in Group D and Group DS than in Group C, and lowest in Group DS. No significant between-group differences in PSQI scores were found at one month postoperatively (Table 4).

Both Group D and Group DS had significantly higher rates of intraoperative bradycardia than Group C. Postoperative adverse events were similar among the three groups (Table 5).

Table 5 Adverse Events

	Group C (n=40)	Group D (n=40)	Group DS (n=40)	X^2	*P*
Intraoperative period, n (%)					
Tachycardia	2(5.00)	3(7.50)	1(2.50)	1.053	0.591
Bradycardia	2(5.00)	8(20.00)*	10(25.00)*	10.341	<0.010
Hypertension	7(17.50)	12(30.00)	11(27.50)	1.944	0.378
Hypotension	4(10.00)	3(7.50)	3(7.50)	0.234	0.889
Desaturation	0(0.00)	0(0.00)	0(0.00)	–	–
Nausea	0(0.00)	3(7.50)	1(2.50)	3.106	0.212
Nerve block complications	0(0.00)	0(0.00)	0(0.00)	–	–
Vomiting	0(0.00)	0(0.00)	0(0.00)	–	–
Postoperative period, n (%)					
Delirium	6(15.00)	4(10.00)	4(10.00)	0.654	0.721
Desaturation	0(0.00)	0(0.00)	0(0.00)	–	–
Nausea	2(5.00)	3(7.50)	4(10.00)	0.887	0.642
Vomiting	0(0.00)	0(0.00)	0(0.00)	–	–
Uroschesis	4(10.00)	5(12.5)	3(7.50)	0.553	0.759

Note: Compared with group C, *P<0.05.

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Discussion

In this prospective, randomized, controlled trial, we investigated the effects of dexmedetomidine combined with SGB on postoperative sleep quality in elderly patients undergoing hip arthroplasty. Our findings demonstrated that both dexmedetomidine alone and its combination with SGB significantly improved postoperative sleep quality compared with the placebo. The combination group (Group DS) achieved the highest RCSQ scores on POD1, 2, and 3. Furthermore, the combination intervention was associated with better pain control and reduced PCA requirements without a significant increase in adverse events. These results support our hypothesis that combining dexmedetomidine with SGB exerts a synergistic effect on postoperative sleep quality in elderly patients undergoing hip arthroplasty.

In our study, the RCSQ was utilized to assess their nighttime sleep quality during the postoperative period, and the PSQI was used to assess sleep quality at one month postoperatively. Both instruments have been validated within Chinese populations.[17–19] The PSQI is widely acknowledged as a dependable scale for the evaluation of chronic sleep quality across a one-month period. In contrast, the RCSQ is designed to mirror acute alterations in sleep quality and encompasses five dimensions for the comprehensive assessment of patient sleep. Recent research has also confirmed the validity and reliability of the RCSQ among general surgical patients.[20,21]

Postoperative sleep disturbance (PSD) is particularly prevalent in elderly patients undergoing major orthopedic surgery, and its multifactorial etiology involves surgical stress, pain, sympathetic overactivity, and inflammatory responses.[22,23] In our study, Group C exhibited the lower RCSQ scores on POD1, 2, and 3, consistent with the high risk of PSD reported in the literature.[3] The significant improvement in RCSQ scores in Group D indicate that dexmedetomidine can improve sleep quality. Consistent with our research results, previous studies have demonstrated that dexmedetomidine induces an unconscious state analogous to natural sleep through the activation of the endogenous sleep-promoting pathway.[24] Moreover, Jiang et al have demonstrated that dexmedetomidine can activate neurons in the suprachiasmatic nucleus and promote slow-wave sleep.[25] The latest research has revealed that dexmedetomidine activates the α_2 receptor of astrocytes and suppresses the release of complement C3. This not only improves sleep quality but also has a dual effect in alleviating cognitive dysfunction.[26] These multiple effects together contribute to an indirect improvement in sleep quality.

Meanwhile, the superior outcomes in Group DS suggest that the addition of SGB can bring additional benefits compared to using dexmedetomidine alone. Previous studies have found that ultrasound-guided SGB can ameliorate sleep disorders induced by sympathetic hyperactivity through the inhibition of the sympathetic-adrenal system and the reduction of pain transmission.[27] Moreover, ultrasound-guided SGB can enhance sleep quality through the inhibition of the sympathetic nerve plexus surrounding the vertebrobasilar artery and posterior cerebral artery.[28]

Beyond the individual mechanisms of each intervention, emerging evidence suggests potential synergistic pathways that may explain the enhanced effect of their combination. First, α_2-adrenergic receptor activation by dexmedetomidine directly inhibits sympathetic ganglionic transmission through postsynaptic suppression of muscarinic stimulation, while also reducing presynaptic neurotransmitter release,[29] this peripheral sympatholytic effect may complement and potentiate the regional sympathetic blockade achieved by SGB. Second, both dexmedetomidine and SGB have been shown to exert anti-inflammatory effects, dexmedetomidine reduces neuroinflammation by inhibiting microglial activation and suppressing the NLRP3/Caspase-1 signaling pathway, thereby decreasing pro-inflammatory cytokines such as IL-1β and TNF-α, which are known to disrupt normal sleep architecture.[30,31] Concurrently, SGB has been demonstrated to attenuate perioperative inflammatory responses and reduce stress hormone levels.[32] The combined anti-inflammatory effect may therefore provide a more favorable systemic environment for postoperative sleep recovery. Third, recent clinical evidence indicates that dexmedetomidine combined with SGB can reduce serum orexin-A levels, a neuropeptide involved in arousal regulation, which may contribute to improved sleep quality in a dose-dependent manner.[33] While these mechanistic insights are promising, further preclinical and clinical studies are needed to fully elucidate the molecular pathways underlying this synergistic interaction.

The secondary outcomes further support the clinical relevance of the combination therapy. Pain is a well-established contributor to poor postoperative sleep, and effective analgesia often correlates with improved sleep.[22] In our study, Group DS exhibited the lowest resting and movement-evoked VAS scores on POD 1 and POD 2, as well as the fewest

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PCA demands within 48 hours. This analgesic advantage may partly explain the superior sleep outcomes in Group DS. Dexmedetomidine provides analgesia and reduces sympathetic-mediated pain amplification, while SGB directly interrupts nociceptive transmission at the cervical sympathetic chain. The convergence of these two mechanisms likely resulted in better pain control.

Although Group D and Group DS had higher rates of intraoperative bradycardia, these events were responsive to standard treatment with atropine. No significant differences were observed among the three groups in terms of postoperative adverse events, indicating that dexmedetomidine combined with SGB can be safely used in elderly hip arthroplasty patients.

Our study has several limitations. First, this was a single-center investigation, which may restrict the generalizability of our findings. The beneficial effects observed in our study may not be directly reproducible in other settings with different patient demographics, surgical protocols. Accordingly, multicenter studies enrolling more diverse populations are warranted to validate the validity of our conclusions. Second, the assessment of sleep quality in our study was mainly based on subjective rating scales. Future studies are encouraged to incorporate objective monitoring tools such as polysomnography, which would enable a more precise evaluation of the effects of dexmedetomidine combined with SGB on postoperative sleep quality and help further clarify the underlying mechanisms. Third, elderly patients with preoperative sleep disorders were excluded from our study, which restricts the generalizability of our findings to a broader population, particularly those who may benefit most from improved sleep quality. Accordingly, future studies specifically enrolling patients with preexisting sleep disturbances are warranted to investigate whether the combined intervention yields comparable beneficial effects in this high-risk population. Fourth, no validated minimal clinically important difference (MCID) has been established for the RCSQ. Thus, the clinical significance of our findings should be interpreted with due caution. Lastly, although we evaluated sleep quality using the PSQI at 1 month postoperatively, this follow-up duration may still be insufficient to reflect the complete long-term efficacy on postoperative sleep recovery. Future studies with longer follow-up periods are warranted to determine whether the beneficial effects of dexmedetomidine combined with SGB can be sustained over time.

Conclusion

The present study revealed that the combined use of dexmedetomidine and stellate ganglion block enhanced subjective sleep quality among elderly patients undergoing hip replacement under spinal anesthesia during the early postoperative period (the first three postoperative nights). Of note, this improvement was limited to the acute phase, as no sustained effect was observed one month postoperatively.

Data Sharing Statement

The datasets that were generated throughout the course of the present study, as well as those subjected to analysis during this research, can be obtained from the corresponding author upon receipt of a reasonable request.

Ethical Adherence

All study patients provided informed consent, and all procedures adhered to the Declaration of Helsinki.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that there are no conflicts of interest associated with the present research.

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