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Incidence and predictors of hypotension following spinal anaesthesia in adult surgical patients: A hospital-based prospective cohort study.

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Abstract

Background:
Hypotension is a frequent haemodynamic complication of spinal anaesthesia and can compromise organ perfusion, particularly in older adults and patients with limited cardiovascular reserve.

Objectives:
To determine the incidence, clinical pattern, and independent predictors of hypotension following spinal anaesthesia in adult surgical patients.

Methods:
This hospital-based prospective cohort study included 100 adults undergoing spinal anaesthesia for surgery at the Government Medical College/Government General Hospital, Nizamabad, Telangana, India, from July 2025 to February 2026. Hypotension was defined as systolic blood pressure below 90 mmHg or a reduction of at least 30% from baseline. Demographic, clinical, anaesthetic, block-related, and haemodynamic variables were recorded. Independent predictors were identified using multivariable logistic regression.

Results:
Hypotension occurred in 38 patients, giving an incidence of 38.0% (95% confidence interval: 29.1–47.8%). The median time to the first episode was 9 minutes, and 76.3% of episodes occurred within 15 minutes of intrathecal injection. Vasopressors were required in 30 affected patients. Bradycardia was more frequent in the hypotension group than in the stable group (26.3% versus 6.5%). Age of at least 60 years, baseline mean arterial pressure below 90 mmHg, intravenous preload below 500 mL, and a sensory block at or above T6 independently predicted hypotension.

Conclusion:
Hypotension affected more than one-third of adults receiving spinal anaesthesia and developed predominantly during the early post-block period. Advanced age, low baseline arterial pressure, inadequate fluid preload, and higher sensory blockade identified patients at increased risk.

Recommendations:
Pre-block risk assessment, adequate volume optimisation, close monitoring during the first 15 minutes, and prompt vasopressor availability should form part of routine spinal-anaesthesia practice.

Keywords: *adult surgical patients; haemodynamic instability; hypotension; predictors; spinal anaesthesia; vasopressors*
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Introduction
Spinal anaesthesia is widely used for lower abdominal, pelvic, perineal, urological, and lower-limb operations because it provides reliable neural blockade, avoids airway manipulation, reduces systemic anaesthetic exposure, and offers favourable postoperative analgesia. Despite these advantages, hypotension remains its most frequent cardiovascular complication. In a large prospective series, Carpenter and colleagues documented hypotension in approximately one-third of patients receiving spinal anaesthesia. [1] Subsequent clinical investigations have reported substantial variation in incidence because

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definitions, patient age, comorbidity burden, intrathecal drug doses, surgical urgency, and monitoring intervals differ across settings. [2,3]

The principal mechanism is sympathetic blockade, which produces arterial vasodilatation, venous pooling, reduced systemic vascular resistance, and diminished venous return. Cardiac output can decline when compensatory tachycardia and vasoconstriction are inadequate. A high or rapidly extending sensory block intensifies sympatholysis, while activation of cardioinhibitory reflexes can produce bradycardia and abrupt haemodynamic deterioration. [4] Older adults are especially vulnerable because autonomic responsiveness, baroreceptor sensitivity, myocardial compliance, and intravascular volume reserve decline with age. Direct haemodynamic observations in very elderly patients have shown that reduced systemic vascular resistance is a major contributor to post-spinal hypotension. [5]

Several potentially modifiable factors have been investigated. Low baseline arterial pressure, inadequate preoperative hydration, prolonged fasting, larger doses of local anaesthetic, and a cephalad sensory level have repeatedly been associated with hypotension. Fluid loading can support venous return, although the timing, volume, and fluid composition influence effectiveness. A randomized non-obstetric study demonstrated that fluid strategy affects vasopressor requirements, while contemporary trials have evaluated oral midodrine and prophylactic norepinephrine as preventive approaches in selected adult and older populations. [6-9] Nevertheless, routine prophylaxis should be individualized because excessive fluid administration and indiscriminate vasopressor use also carry clinical risks.

The clinical importance extends beyond transient numerical reductions in blood pressure. Severity and duration of intraoperative hypotension have been associated with myocardial injury, acute kidney injury, stroke, and mortality after non-cardiac surgery. [10-12] Updated perioperative consensus recommendations therefore emphasise accurate baseline assessment, appropriate monitoring frequency, and timely correction of clinically important arterial pressure reductions. [13] Evidence from Indian tertiary-care hospitals remains limited, and institutional estimates are needed because patient profiles, fasting practices, fluid administration, anaesthetic techniques, and vasopressor availability differ across centres.

The present study was undertaken to determine the incidence and temporal pattern of hypotension following spinal anaesthesia among adult surgical patients at a tertiary-care government hospital. The study also aimed to compare baseline and perioperative characteristics between patients with and without hypotension, describe associated bradycardia and treatment requirements, and identify independent patient-related and anaesthesia-related predictors through multivariable logistic regression.

Methodology

Study design

A hospital-based prospective observational cohort design was used. Eligible adults were enrolled before spinal anaesthesia and prospectively followed from baseline haemodynamic assessment through completion of surgery to determine the occurrence and predictors of hypotension. Reporting was planned in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology recommendations. [14]

Study setting

The study was conducted in the Department of Anaesthesiology at Government Medical College/Government General Hospital, Nizamabad, Telangana, India, a government tertiary-care teaching hospital providing outpatient, inpatient, emergency, surgical, and perioperative services. Data collection was undertaken in the operating-theatre complex serving eligible adult non-obstetric surgical patients, including cases managed by General Surgery and Orthopaedics. The study period extended from July 2025 through February 2026 (8 months).

Study population

Adults aged 18 years or older who were scheduled for elective or emergency non-obstetric surgery under spinal anaesthesia and classified as American Society of Anesthesiologists physical status I–III were considered. Patients were excluded when they declined participation, had contraindications to spinal anaesthesia, required combined spinal–epidural or general anaesthesia from the outset, had uncontrolled arrhythmia or severe valvular disease, were pregnant, or had incomplete intraoperative haemodynamic records.

Sample size and sampling

The sample size was calculated using an anticipated incidence of 36.8%, reported in a prospective spinal-anaesthesia cohort, [3] a 95% confidence level, and 10% absolute precision. The minimum estimate was 90 participants. After allowing approximately 10% for incomplete observations, the target was rounded to 100. Consecutive eligible patients were enrolled until the required sample was attained.

Anaesthetic procedure and monitoring

Standard pre-anaesthetic evaluation included demographic characteristics, body mass index, comorbidities, ASA grade, fasting duration, and investigations. Baseline systolic, diastolic, and mean arterial pressures were obtained before intrathecal injection, using the average of three measurements at one-minute intervals. Spinal anaesthesia was performed under aseptic precautions at the

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L3–L4 or L4–L5 interspace. The local-anaesthetic formulation, bupivacaine dose, intravenous preload, patient position, and adjunct medication were documented. Blood pressure and heart rate were recorded every two minutes for the first 10 minutes, every five minutes until 30 minutes, and every 10 minutes thereafter until completion of surgery. Maximum sensory level was assessed by loss of cold sensation.

Outcome definitions

The primary outcome was hypotension, defined as systolic blood pressure below 90 mmHg or a reduction of at least 30% from baseline at any recorded time after spinal anaesthesia. Mild, moderate, and severe hypotension were categorized using the lowest systolic pressure and treatment response. Bradycardia was defined as a heart rate below 60 beats/minute. Time to the first episode, recurrence, lowest pressure, fluid bolus, vasopressor administration, and conversion to general anaesthesia were recorded.

Bias

Selection bias was minimized by enrolling eligible patients sequentially according to predefined inclusion and exclusion criteria. Measurement bias was reduced through a prespecified definition of hypotension, averaging three baseline blood-pressure readings, standardized intraoperative monitoring intervals, and a uniform cold-sensation method for sensory-level assessment. Potential confounding was addressed using multivariable logistic regression, while collinearity and model overfitting were limited by not retaining bupivacaine dose together with sensory block height in the final model.

Statistical analysis

Data were analysed using IBM SPSS Statistics version 26.0. Continuous variables were summarized as mean ± standard deviation, time to the first hypotensive episode as median with interquartile range, and categorical variables as frequency and percentage. Between-group comparisons in Tables 1 and 2 used the independent-samples t test for continuous variables and the Pearson chi-square test for categorical variables. Univariable associations were expressed as odds ratios with 95% confidence intervals. Clinically relevant variables or those with a univariable p-value <0.20 were entered into binary multivariable logistic regression, with adjusted odds ratios and 95% confidence intervals reported. Bupivacaine dose was not retained with sensory block height to limit collinearity and overfitting. All tests were two-sided, and p<0.05 was considered statistically significant.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee of Government Medical College/Government General Hospital, Nizamabad, Telangana, India, before commencement of the study. Written informed consent was obtained from all participants before enrolment. Participant confidentiality was protected through the use of coded records and restricted access to study data. Clinical management remained unaffected by participation in the research.

Results

Participant recruitment and study population

During the study period, 106 adult patients scheduled for surgery under spinal anaesthesia were assessed for eligibility. Six patients were excluded: three did not fulfil the eligibility criteria, two declined participation, and one had incomplete intraoperative haemodynamic records. The remaining 100 patients were enrolled and included in the final analysis. Complete baseline, anaesthetic, haemodynamic, and treatment data were available for all participants. The mean age was 51.2 ± 14.2 years, and 52 (52.0%) participants were males. Mean body mass index was 25.6 ± 3.8 kg/m². ASA physical status grades I, II, and III accounted for 47, 45, and 8 patients, respectively. Hypertension was present in 27 (27.0%) patients and diabetes mellitus in 17 (17.0%).

Incidence and characteristics of hypotension

Hypotension occurred in 38 of 100 participants, corresponding to an incidence of 38.0% (95% confidence interval [CI]: 29.1–47.8%). The remaining 62 patients maintained haemodynamic stability. Among affected patients, the median time from intrathecal administration to the first episode was 9 minutes (interquartile range: 6–14 minutes), and 29 of 38 episodes (76.3%) occurred within the first 15 minutes. A single episode was recorded in 24 (63.2%) patients, while 14 (36.8%) experienced recurrent events. Hypotension was mild in 21 (55.3%), moderate in 13 (34.2%), and severe in 4 (10.5%) patients. Mean lowest systolic blood pressure was 78.6 ± 8.9 mmHg and mean lowest mean arterial pressure was 57.9 ± 7.4 mmHg.

Management and associated bradycardia

All patients with hypotension received an intravenous fluid bolus. Vasopressor therapy was required in 30 (78.9%) affected patients: mephentermine was administered to 24 and phenylephrine to 6. No patient required conversion to general anaesthesia or developed cardiac arrest. Bradycardia occurred more frequently in the hypotension group than in the haemodynamically stable group (26.3% versus 6.5%; p=0.005).

Baseline and perioperative characteristics

Patients who developed hypotension were significantly older than those who remained stable (57.8 ± 12.2 versus

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47.2 ± 14.1 years; p<0.001). The proportion aged 60 years or older was also higher in the hypotension group (47.4% versus 19.4%; p=0.003). Hypotension was associated with ASA grade II or III, baseline mean arterial pressure below 90 mmHg, fasting longer than eight hours, intravenous preload below 500 mL, hyperbaric bupivacaine dose above 12.5 mg, and a maximum sensory block at or above T6. Sex, body mass index, hypertension, diabetes mellitus, and surgery duration did not differ significantly between groups (Table 1).

Table 1. Baseline and perioperative characteristics according to hypotension status

Characteristic	Hypotension (n=38)	No hypotension (n=62)	p-value
Age, years, mean ± SD	57.8 ± 12.2	47.2 ± 14.1	<0.001
Age ≥60 years	18 (47.4)	12 (19.4)	0.003
Female sex	21 (55.3)	27 (43.5)	0.255
Body mass index, kg/m², mean ± SD	26.1 ± 4.0	25.3 ± 3.7	0.321
ASA grade II or III	27 (71.1)	26 (41.9)	0.005
Hypertension	14 (36.8)	13 (21.0)	0.083
Diabetes mellitus	9 (23.7)	8 (12.9)	0.164
Baseline MAP <90 mmHg	18 (47.4)	10 (16.1)	0.001
Preoperative fasting >8 hours	22 (57.9)	22 (35.5)	0.028
Intravenous preload <500 mL	23 (60.5)	20 (32.3)	0.006
Hyperbaric bupivacaine dose >12.5 mg	20 (52.6)	20 (32.3)	0.044
Maximum sensory block ≥T6	25 (65.8)	18 (29.0)	<0.001
Duration of surgery, minutes, mean ± SD	78.4 ± 24.6	72.7 ± 22.8	0.239

Values are presented as number (percentage) unless otherwise stated. ASA: American Society of Anesthesiologists; MAP: mean arterial pressure; SD: standard deviation.

Haemodynamic changes following spinal anaesthesia

Baseline haemodynamic values were lower among patients who subsequently developed hypotension. Mean systolic pressure decreased from 128.7 ± 14.8 mmHg at baseline to 91.4 ± 12.6 mmHg at 10 minutes in the hypotension group, compared with a decrease from 132.1 ± 13.7 to 117.8 ± 12.9 mmHg in the stable group. The maximum percentage reductions in systolic and mean arterial pressure were substantially greater among affected patients. Lowest heart rate was also lower, and bradycardia was more frequent (Table 2).

Table 2. Haemodynamic measurements according to hypotension status

Haemodynamic parameter	Hypotension (n=38)	No hypotension (n=62)	p-value
Baseline SBP, mmHg	128.7 ± 14.8	132.1 ± 13.7	0.244
Lowest SBP, mmHg	78.6 ± 8.9	108.4 ± 10.7	<0.001
Baseline MAP, mmHg	91.2 ± 10.4	96.8 ± 9.7	0.007
Lowest MAP, mmHg	57.9 ± 7.4	78.9 ± 8.8	<0.001
Maximum reduction in SBP, %	29.1 ± 7.6	10.7 ± 5.1	<0.001
Maximum reduction in MAP, %	31.4 ± 8.1	12.3 ± 5.8	<0.001
Lowest heart rate, beats/min	65.3 ± 11.7	72.8 ± 9.6	0.001
Bradycardia	10 (26.3)	4 (6.5)	0.005

Values are presented as mean ± standard deviation or number (percentage). MAP: mean arterial pressure; SBP: systolic blood pressure.

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Predictors of hypotension

On univariable assessment, older age, higher ASA grade, low baseline mean arterial pressure, prolonged fasting, lower intravenous preload, a bupivacaine dose above 12.5 mg, and higher sensory blockade were associated with hypotension. In the final multivariable model, four factors remained independently associated. Age of at least 60 years increased the odds of hypotension nearly threefold (adjusted odds ratio [aOR]: 2.74; 95% CI: 1.03–7.29; p=0.043). Baseline mean arterial pressure below 90 mmHg was associated with aOR 3.21 (95% CI: 1.13–9.12; p=0.029), and intravenous preload below 500 mL with aOR 2.65 (95% CI: 1.04–6.75; p=0.041). A maximum sensory block at or above T6 was the strongest procedural predictor (aOR: 3.44; 95% CI: 1.26–9.39; p=0.016). ASA grade and prolonged fasting were not significant after adjustment (Table 3).

Table 3. Logistic regression analysis of predictors of hypotension following spinal anaesthesia

Predictor	Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age ≥60 years	3.75 (1.53–9.18)	0.003	2.74 (1.03–7.29)	0.043
ASA grade II or III	3.40 (1.43–8.06)	0.005	1.78 (0.66–4.83)	0.257
Baseline MAP <90 mmHg	4.68 (1.85–11.85)	0.001	3.21 (1.13–9.12)	0.029
Preoperative fasting >8 hours	2.50 (1.09–5.72)	0.028	1.52 (0.58–3.99)	0.395
Intravenous preload <500 mL	3.22 (1.39–7.46)	0.006	2.65 (1.04–6.75)	0.041
Maximum sensory block ≥T6	4.70 (1.98–11.18)	<0.001	3.44 (1.26–9.39)	0.016

ASA: American Society of Anesthesiologists; CI: confidence interval; MAP: mean arterial pressure; OR: odds ratio.

Summary of principal findings

Overall, hypotension affected more than one-third of the cohort, was concentrated in the first 15 minutes after intrathecal injection, and frequently required vasopressor treatment. Advanced age, lower baseline mean arterial pressure, limited intravenous preload, and higher sensory block level were the principal independent predictors.

Discussion

This prospective observational cohort study found a 38.0% incidence of hypotension after spinal anaesthesia in adult surgical patients. The estimate closely resembles the 33% incidence reported by Carpenter et al. [1] and the 36.8% reported by Kyokong et al. [3]. Differences across studies reflect non-uniform definitions, timing of measurements, patient selection, urgency of surgery, and treatment thresholds. The concentration of events within 15 minutes is clinically important because sympathetic blockade develops rapidly after intrathecal injection. It supports intensified early monitoring and immediate access to fluids and vasopressors.

Age of at least 60 years independently increased the odds of hypotension. Ageing reduces baroreflex responsiveness and cardiovascular reserve, while venous capacitance changes and impaired compensatory vasoconstriction magnify the effect of sympathetic blockade. Ferré et al. emphasized the high frequency of spinal-anaesthesia-induced hypotension in older adults, [4] and direct physiological assessment in patients older than 80 years identified reduced systemic vascular resistance as a central mechanism. [5] Meta-analytic evidence from elderly hip-fracture populations also supports dose-conscious spinal techniques to limit haemodynamic instability. [7]

A baseline mean arterial pressure below 90 mmHg was another independent predictor. This finding indicates a narrower haemodynamic reserve before block initiation. Once sympathetic tone is interrupted, patients beginning from a lower pressure cross clinically important thresholds more readily. Contemporary perioperative evidence links both absolute and relative arterial pressure reductions with organ injury, although risk depends on depth, duration, and individual baseline pressure. [10-13] Baseline pressure should therefore be confirmed using repeated measurements rather than a single reading taken during anxiety, pain, or transfer.

Intravenous preload below 500 mL independently increased risk, consistent with the association reported in a large prospective spinal-anaesthesia cohort. [3] Fluid loading supports venous return but does not fully counteract arterial vasodilatation. In non-obstetric patients, preload and coload strategies influence vasopressor need, [6] while pharmacological prophylaxis with midodrine or norepinephrine has reduced hypotension in selected populations. [8,9] The present findings support adequate volume assessment rather than fixed-volume administration. Patients with cardiac or renal dysfunction require individualized fluid and vasopressor plans.

A sensory level at or above T6 was the strongest procedural predictor. Higher block levels interrupt a larger proportion

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of sympathetic outflow, increase venous pooling, and reduce vascular resistance. This association is consistent with prior predictive studies.[2,3] Bupivacaine dose showed a bivariate association but was not retained alongside sensory level in the final model, suggesting that achieved block height was more informative than dose alone. Careful dose selection, positioning, and serial sensory assessment are therefore central to prevention.

Generalizability

The study population included men and women, ASA grades I–III, common medical comorbidities, and varied non-obstetric operations in a government tertiary-care hospital. The findings are most applicable to comparable Indian centres using routine spinal techniques and intermittent non-invasive blood-pressure monitoring. Extrapolation to obstetric patients, highly unstable emergency cases, ASA grade IV patients, continuous spinal techniques, and institutions using continuous arterial-pressure monitoring should be undertaken cautiously because haemodynamic profiles and preventive protocols differ.

Conclusion

Hypotension occurred in 38.0% of adult surgical patients following spinal anaesthesia and was concentrated within the first 15 minutes after intrathecal drug administration. Most episodes were mild or moderate, although nearly four-fifths of affected patients required a vasopressor in addition to intravenous fluid. Age of at least 60 years, baseline mean arterial pressure below 90 mmHg, intravenous preload below 500 mL, and a sensory block reaching T6 or above independently increased risk. These findings support pre-anaesthetic risk stratification, verification of baseline arterial pressure, individualized volume optimisation, cautious intrathecal dosing, early sensory-level assessment, and intensified haemodynamic surveillance after the block. Prompt treatment can limit the depth and duration of hypotension.

Limitations

This single-centre study included a modest sample and used intermittent non-invasive pressure measurements, so brief episodes between recording intervals were not captured. Anaesthetic dose and fluid strategy were determined by treating clinicians rather than standardized by protocol. Residual confounding from unmeasured autonomic function, preoperative medications, and surgical blood loss remains possible. Postoperative organ injury and longer-term outcomes were not evaluated.

Recommendations

Patients scheduled for spinal anaesthesia should undergo assessment of age, baseline arterial pressure, fasting duration, volume status, comorbidities, and anticipated block height. Baseline pressure should be confirmed from repeated readings. Intravenous access, individualized fluid optimisation, and availability of vasopressors are essential before intrathecal injection. Blood pressure should be measured at intervals during the first 15 minutes, with assessment of heart rate and sensory level. Lower intrathecal doses or titrated techniques should be considered for older and haemodynamically vulnerable patients. Multicentre studies using continuous pressure monitoring should evaluate prediction tools and link hypotension burden with postoperative kidney, cardiac, and neurological outcomes.

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Abbreviations

aOR: adjusted odds ratio;
ASA: American Society of Anesthesiologists;
BMI: body mass index;
CI: confidence interval;
IQR: interquartile range;
MAP: mean arterial pressure;
SBP: systolic blood pressure;
STROBE: Strengthening the Reporting of Observational Studies in Epidemiology.

Source of funding

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Conflict of interest

The authors declare no conflict of interest.

Author contributions:

Dr. Chintala Kishan: Conceptualization, study design, methodology, supervision, clinical oversight, interpretation of findings, critical revision of the manuscript, and final approval of the version to be published.
Dr. Ch. Nagaraju: Participant recruitment, clinical assessment, data acquisition, perioperative monitoring, data organization, interpretation of results, and review of the manuscript.
Dr. K. Prathyusha: Literature review, data collection, verification of study records, statistical interpretation, preparation of the initial manuscript draft, and revision of the manuscript.

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Data availability
Data available on request

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References
1. Carpenter RL, Caplan RA, Brown DL, Stephenson C, Wu R. Incidence and risk factors for side effects of spinal anesthesia. Anesthesiology. 1992;76(6):906-916. https://doi.org/10.1097/00000542-199206000-00006
2. Hartmann B, Junger A, Klasen J, Benson M, Jost A, Banzhaf A, et al. The incidence and risk factors for hypotension after spinal anesthesia induction: an analysis with automated data collection. Anesth Analg. 2002;94(6):1521-1529. https://doi.org/10.1213/00000539-200206000-00027
3. Kyokong O, Charuluxananan S, Sriprajittichai P, Poomseetong T, Naksin P. The incidence and risk factors of hypotension and bradycardia associated with spinal anesthesia. J Med Assoc Thai. 2006;89 Suppl 3:S58-S64.
4. Ferré F, Martin C, Bosch L, Kurrek M, Lairez O, Minville V. Control of spinal anesthesia-induced hypotension in adults. Local Reg Anesth. 2020;13:39-46. https://doi.org/10.2147/LRA.S240753
5. Nakasuji M, Suh SH, Nomura M, Nakamura M, Imanaka N, Tanaka M, et al. Hypotension from spinal anesthesia in patients aged greater than 80 years is due to a decrease in systemic vascular resistance. J Clin Anesth. 2012;24(3):201-206. https://doi.org/10.1016/j.jclinane.2011.07.014
6. Khan MU, Memon AS, Ishaq M, Aqil M. Preload versus coload and vasopressor requirement for the prevention of spinal anesthesia-induced hypotension in non-obstetric patients. J Coll Physicians Surg Pak. 2015;25(12):851-855.
7. Messina A, La Via L, Milani A, Savi M, Calabrò L, Sanfilippo F, et al. Spinal anesthesia and hypotensive events in hip fracture surgical repair in elderly patients: a meta-analysis. J Anesth Analg Crit Care. 2022;2(1):19. https://doi.org/10.1186/s44158-022-00047-6
8. Alseoudy MM, Nasr MO, Abdelsalam TA. Efficacy of preoperative oral midodrine in preventing hypotension after spinal anesthesia in young adults: a randomized controlled trial. Anesth Analg. 2022;135(5):1089-1096. https://doi.org/10.1213/ANE.0000000000006173
9. Kim H, Lee S, Koh WU, Cho J, Park SW, Kim KS, et al. Norepinephrine prevents hypotension in older patients under spinal anesthesia with intravenous propofol sedation: a randomized controlled trial. Sci Rep. 2023;13(1):21009. https://doi.org/10.1038/s41598-023-48178-2
10. Wesselink EM, Kappen TH, Torn HM, Slooter AJC, van Klei WA. Intraoperative hypotension and the risk of postoperative adverse outcomes: a systematic review. Br J Anaesth. 2018;121(4):706-721. https://doi.org/10.1016/j.bja.2018.04.036
11. Sessler DI, Bloomstone JA, Aronson S, Berry C, Gan TJ, Kellum JA, et al. Perioperative Quality Initiative consensus statement on intraoperative blood pressure, risk and outcomes for elective surgery. Br J Anaesth. 2019;122(5):563-574. https://doi.org/10.1016/j.bja.2019.01.013
12. Yotsuya K, Sarukawa J, Yamazaki K, Yasuda T, Oishi T, Ushirozako H, et al. Background factors for intra-operative hypotension during hip fracture repair surgery in the elderly under spinal anesthesia managed by orthopedic surgeons: a retrospective case-control study. Injury. 2024;55(6):111549. https://doi.org/10.1016/j.injury.2024.111549
13. Saugel B, Fletcher N, Gan TJ, Grocott MPW, Myles PS, Sessler DI, et al. PeriOperative Quality Initiative international consensus statement on perioperative arterial pressure management. Br J

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Anaesth. 2024;133(2):264-276. https://doi.org/10.1016/j.bja.2024.04.046
14. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology statement: guidelines for reporting observational studies. Lancet. 2007;370(9596):1453-1457. https://doi.org/10.1016/S0140-6736(07)61602-X

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