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Research Article

Post-Spinal Anaesthesia Low Back Pain Prevalence and Predictors; A Multi-Centers Study from Middle East

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Abstract

Background: Low back pain (LBP) is a common but under-recognized complication following spinal anaesthesia.

Aim of Study: We sought to determine the prevalence of new or worsened LBP among patients who underwent various surgeries under spinal anaesthesia and identify independent procedural and patient-related predictors.

Methods: We performed a retrospective cohort study of 165 patients who had various surgeries under spinal anaesthesia from different hospitals in Middle East region. Patient demographics, anaesthetic details (needle gauge, approach, puncture position, number of attempts), surgical data (procedure type, duration, patient positioning) and history of pre-existing LBP were extracted from medical records. Univariate and multivariate logistic regression analysis (IBM SPSS v20) showed odds ratios (OR) and 95% confidence intervals (CI), with $p < 0.05$ considered significant.

Results: Of 165 patients, 89 (54%) developed new or worsened LBP. On univariate analysis, large-bore needles (18-22 G) (OR 15.3; 95% CI 7.1-32.8; $p < 0.001$), median (midline) approach (OR 9.1; 95% CI 4.3-19.0; $p < 0.001$), ≥ 2 puncture attempts (OR 20.6; 95% CI 9.2-46.1; $p < 0.001$), lateral surgical positioning (OR 13.6; 95% CI 6.4-28.9; $p < 0.001$) and operative duration > 60 minutes (OR 12.3; 95% CI 5.8-26.0; $p < 0.001$) were significantly correlated with LBP. In multivariate modelling, only ≥ 2 puncture attempts (adjusted OR 4.1; 95% CI 1.1-15.2; $p = 0.038$) and longer surgery (> 60 minutes) (adjusted OR 4.1; 95% CI 1.3-12.8; $p = 0.014$) remained independent predictors. Hosmer-Lemeshow goodness-of-fit was satisfactory ($\chi^2 = 5.58$, $p = 0.47$).

Conclusion: More than half of patients experienced low back pain after spinal anaesthesia. Repeated dural puncture attempts and prolonged operative time independently increased risk. Strategies to achieve first-pass success-such as ultrasound guidance, optimized patient positioning, and experienced operators—and to minimize surgical duration may mitigate postoperative LBP.

Keywords: Spinal Anaesthesia; Low Back Pain; Puncture Attempts; Operative Duration; Median And Paramedian Approaches; Needle Gauge

Introduction

Spinal anaesthesia is widely used for abdominal, orthopaedic, and urologic surgeries due to its rapid onset and favourable safety profile. However, iatrogenic low back pain (LBP) following spinal puncture stays an under-appreciated source of postoperative morbidity. Estimates of post-spinal LBP vary from 20% to 60% depending on definition, patient population, and technique [1,2]. Mechanisms include ligamentous micro-trauma, peri-spinal muscle inflammation, and subtle epidural hematoma formation at the needle entry site [3]. Procedural variables—needle gauge and design, number of dural puncture attempts, approach (midline vs. paramedian), and patient posture during injection—have all been implicated but seldom tested simultaneously [4,5]. Prolonged surgical positioning may further exacerbate paraspinal muscle strain.

Aim of study

Our retrospective study aimed to determine the prevalence of new or worsened LBP among patients who underwent various surgeries under spinal anaesthesia and identify independent procedural and patient-related predictors.

Materials and Methods

Study Design and Population

This retrospective Cohort study included 165 adult patients from different hospitals in Middle East region with age ≥ 18 years in the period between January 1 and June 30, 2025. Exclusion criteria included combined spinal-epidural anaesthesia, pre-existing neurological deficits, emergent trauma requiring general anaesthesia, and incomplete documentation of post-operative pain.

Data collection

Demographic variables (age, sex, BMI), clinical history (prior LBP, prior spinal anaesthesia), anaesthetic details (needle gauge: 18-22 G vs. 23-29 G; puncture approach: midline vs. paramedian; patient puncture position; sitting vs. lateral decubitus; number of puncture attempts: 1 vs. ≥ 2), and surgical factors (procedure type, duration ≤ 60 vs. > 60 min, patient position during surgery supine vs. lateral) were abstracted.

Study definition

post-spinal anaesthesia LBP was defined as new lumbar pain or exacerbation of pre-existing back pain within 48 hours of spinal anaesthesia, persisting beyond routine postoperative analgesia.

Statistical analysis of the data

The statistical analysis of the data was performed using IBM SPSS software version 20.0 (Armonk, NY: IBM Corp, released 2011). Categorical data were summarized as numbers and percentages. Odd`s ratio used to calculate the ratio of the odds and 95% Confidence Interval of an event occurring in one risk group to the odds of it occurring in the non-risk group to detect the most affecting factor for affecting post spinal anesthesia LBP. Significance was set at $p \leq 0.05$.

Results

A total of 165 patients met inclusion criteria. Post spinal anaesthesia LBP was present in 54.5% of included patients. Mean age was 42 ± 17 years; 64% were female. Mean BMI was 28.6 ± 6.2 kg/m^2, 21.8% had undergone spinal anaesthesia previously, and 52% had a history of transient LBP, 69.1% of them had elective surgeries opposite to 30.9% of them had emergency surgeries, 56.4% of patients were in sitting position during spinal anaesthesia while 43.6% of patients were in lateral decubitus position during spinal anaesthesia. Big needle sizes were used in 50.9% of patients while small needle sizes were used in the other 49.1% of patients, paramedian spinal anaesthesia approach was used in 56.4% of patients opposite to median approach that was used in 43.6% of patients , 41.8% of patients were subjected to single 1 attempt of spinal puncture while the other 58.2% of patients were subjected to 2 or attempts of spinal puncture, 56.4% of patients were in lateral surgical position while the other 43.6% of patients were in supine surgical position. Duration of surgery was less than 60 minutes in 40.0% of patients and more that 60 minutes in 60.0% of patients (Table 1).

	No. (%)
Post spinal anesthesia low back pain	
No	75 (45.5%)
Yes	90 (54.5%)
Gender	
Male	59 (35.8%)
Female	106 (64.2%)
Age (Years)	
Min. - Max.	18.0 - 80.0
Mean ± SD.	41.64 ± 17.12
Median (IQR)	39.0 (28.0 - 52.0)
BMI (kg/m^2)	
Less than 18.5	21 (12.7%)
Normal (18.5 - 24.9)	39 (23.6%)
25 - 29.9	44 (26.7%)
30 or higher	61 (37.0%)
Previous history of Low Back Pain	86 (52.1%)
Previous history of spinal anesthesia	36 (21.8%)
Urgency of surgery	
Elective	114 (69.1%)
Emergency	51 (30.9%)
Position during spinal anesthesia	
Sitting	93 (56.4%)
Lateral decubitus	72 (43.6%)
Size of needles	
Big needle (18-22 G)	84 (50.9%)
Small needle (23-29 G)	81 (49.1%)
Spinal anesthesia approach	
Paramedian	93 (56.4%)
Median	72 (43.6%)
Number of attempts	
1	69 (41.8%)
2 or more	96 (58.2%)
Surgical Position	
Lateral	93 (56.4%)
Supine	72 (43.6%)
Duration of surgery	
Less than 60 minutes	66 (40.0%)
More than 60 minutes	99 (60.0%)

Table 1: Distribution of the cases studied according to different parameters (n = 132).

Univariate logistic regression analysis

All study variables were subjected for statistical univariate logistic regression analysis and revealed the following variables that could be significant predictors of post spinal anaesthesia LBP: Needle gauge 18-22 G vs. 23-29 G (OR 15.25; 95% CI 7.10-32.75; p < 0.001). Midline approach vs. paramedian (OR 9.08; 95% CI 4.33-19.01; p < 0.001). Two or more puncture attempts vs. 1 (OR 20.58; 95% CI 9.19-46.10; p < 0.001). Lateral surgical position vs. supine (OR 13.63; 95% CI 6.44-28.86; p < 0.001). Duration > 60 min vs. ≤ 60 min (OR 12.27; 95% CI 5.79-26.04; p < 0.001). Sitting puncture vs. lateral decubitus (OR 2.07; 95% CI 1.11-3.87; p = 0.023).

Other variables (gender, age, BMI, urgency of surgery, prior LBP/anaesthesia) were not significant (Table 2).

	Post spinal anesthesia low back pain		OR (LL – UL 95%C. I)	p
	No (n = 75)	Yes (n = 90)		
Gender				
Female	52 (69.3%)	54 (60.0%)	1.000	0.214
Male	23 (30.7%)	36 (40.0%)	1.507 (0.789 – 2.879)	
Age (Years)	40.59 ± 16.88	42.52 ± 17.36	1.007 (0.989 – 1.025)	0.469
BMI (kg/m^2)				
Normal (18.5 – 24.9)	20 (26.7%)	19 (21.1%)	1.000	
Less than 18.5	12 (16.0%)	9 (10.0%)	0.789 (0.271 – 2.298)	0.665
25 – 29.9	20 (26.7%)	24 (26.7%)	1.263 (0.532 – 2.997)	0.596
30 or higher	23 (30.7%)	38 (42.2%)	1.739 (0.771 – 3.925)	0.183
Previous history of Low Back Pain	38 (50.7%)	48 (53.3%)	1.113 (0.603 – 2.055)	0.733
Previous history of spinal anesthesia	13 (17.3%)	23 (25.6%)	1.637 (0.764 – 3.510)	0.205
Urgency of surgery				
Elective	53 (70.7%)	61 (67.8%)		0.689
Emergency	22 (29.3%)	29 (32.2%)	1.145 (0.589 – 2.228)	
Position during spinal anesthesia				
Lateral decubitus	40 (53.3%)	32 (35.6%)	1.000	0.023*
Sitting	35 (46.7%)	58 (64.4%)	2.071 (1.107 – 3.874)	
Size of needles				
Small needle (23-29 G)	61 (81.3%)	20 (22.2%)	1.000	<0.001*
Big needle (18-22 G)	14 (18.7%)	70 (77.8%)	15.250 (7.101 – 32.753)	
Spinal anesthesia approach				
Paramedian	62 (82.7%)	31 (34.4%)	1.000	<0.001*
Median	13 (17.3%)	59 (65.6%)	9.077 (4.334 – 19.010)	
Number of attempts				
1	57 (76.0%)	12 (13.3%)	1.000	<0.001*
2 or more	18 (24.0%)	78 (86.7%)	20.583 (9.190 – 46.100)	
Surgical Position				
Supine	56 (74.7%)	16 (17.8%)	1.000	<0.001*
Lateral	19 (25.3%)	74 (82.2%)	13.632 (6.438 – 28.863)	
Duration of surgery				
Less than 60 minutes	52 (69.3%)	14 (15.6%)	1.000	<0.001*
More than 60 minutes	23 (30.7%)	76 (84.4%)	12.273 (5.785 – 26.040)	

Table 2: Univariate logistic regression analysis for different parameters affecting Post spinal anesthesia low back pain.

OR: Odd`s Ratio; C.I: Confidence Interval; LL: Lower Limit; UL: Upper Limit; p: p Value for Odd`s ratio for comparing between the studied groups. *: Statistically significant at p ≤ 0.05.

Multivariate logistic regression analysis

The study variables that were statistically significant in the univariate logistic regression analysis were subjected furthermore for the multivariate logistic regression analysis to verify which variables could be used as significant independent predictor of post spinal anaesthesia LBP and revealed that only ≥ 2 puncture attempts (adjusted OR 4.06; 95% CI 1.08-15.24; p = 0.038) and operative duration > 60 min (adjusted OR 4.14; 95% CI 1.34-12.83; p = 0.014) remained independent predictors. The model proved good calibration (Hosmer-Lemeshow $\chi^2 = 5.58$, p = 0.47) (Table 3).

Discussion

Post spinal anaesthesia LBP stays a prevalent and clinically significant complication following spinal anaesthesia, with implications for patient satisfaction, recovery outcomes, and overall quality of life.

	B	SE	Sig.	OR	95% CI	
					LL	UL
Position during spinal anesthesia (Sitting)	0.095	0.497	0.849	1.100	0.415	2.915
Size of needles (Big needle (18-22 G))	1.499	0.871	0.085	4.476	0.811	24.702
Spinal anesthesia approach (Median)	-0.016	0.882	0.985	0.984	0.175	5.545
Number of attempts (2 or more)	1.402	0.674	0.038*	4.063	1.084	15.236
Surgical Position (Lateral)	0.288	0.665	0.665	1.334	0.362	4.907
Duration of surgery (More than 60 minutes)	1.421	0.577	0.014*	4.143	1.337	12.833

Table 3: Multivariate analysis Logistic regression for different parameters affecting PDPH. B: Unstandardized Coefficients (linear regression).

SE: Estimates Standard error; OR: Odds Ratio; CI: Confidence Interval; LL: Lower Limit; UL: Upper Limit

Hosmer and Lemeshow Test = $c^2(p) = 5.584$ (0.471).

This study confirms that LBP after spinal anaesthesia is common, affecting over half of our patients. Repeated puncture attempts are strongly implicated in the pathogenesis of post spinal anaesthesia LBP. Tissue trauma, vascular disruption, and potential nerve irritation during multiple insertions may sensitize the lumbar region to postoperative stress. This study showed that patients who underwent two or more puncture attempts were more likely to develop post spinal anaesthesia LBP [3]. Longer procedures may compound paravertebral muscle strain and ischemia from sustained positioning [6].

Needle gauge also showed a significant association with post spinal anaesthesia LBP. Patients receiving spinal anaesthesia with larger needles (18-22G) were more likely to develop post spinal anaesthesia LBP compared to those administered with smaller needles (23-29G), corroborating earlier findings [4,9,10,11]. Larger needles may cause extensive soft tissue disruption from skin to subarachnoid space, increasing the likelihood of postoperative discomfort. However, when analysed multivariate like needle size did not retain independent significance, suggesting that procedural difficulty-manifested as multiple attempts-may mediate its impact [4,7]. The use of fine-gauge, pencil-point needles, and enhanced operator training could reduce overall LBP incidence, also minimize surgical duration and improve intraoperative positioning (e.g., frequent repositioning, gel pads) may further mitigate risk [8].

Limitations of our Study

The retrospective design, potential underreporting of LBP in medical records. Relatively small sample size.

Conclusion

In this cohort retrospective study, 54% of patients developed low back pain following spinal anaesthesia. Repeated dural puncture attempts and operations lasting > 60 minutes were independently increasing the risk. Strategies to achieve first-pass block success and to streamline surgical workflows may reduce this prevalent complication.

This result agrees with several studies that have revealed the same result [12,13].

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Conflicts of Interest

The authors declare no conflicts of interest.

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