

Comparison of Handholding and Conversation alone or with Midazolam Premedication on Preoperative Anxiety in Adult Patients undergoing Lumbar Spine Surgeries: A Three Arm Parallel Randomized Controlled Trial

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Abstract

Introduction: Preoperative anxiety is associated with hemodynamic instability and poor post operative outcome like increased pain, analgesic consumption, recovery time and length of hospital stay. Present study aimed to compare effect of hand holding with conversation or IV midazolam and combination of these for relieving anxiety among patients undergoing lumbar spine surgery.

Material and Methods: This Hospital based three-arm parallel-group randomized controlled trial included 108 patients aged 18 to 45 years undergoing elective lumbar spine surgery. Randomization and sequentially numbered opaque sealed envelope were used allocate subjects to one of the three groups –

Group-A: 0.05 mg/kg of midazolam diluted in 5ml normal saline intravenously;

Group-B: hand-holding and conversation with 5ml normal saline intravenously;

Group-C: hand-holding and conversation with 0.05 mg/kg of midazolam diluted in 5ml normal saline intravenously. The Amsterdam Preoperative Anxiety and Information Scale (APAIS) was used to evaluate anxiety.

Results: The change in APAIS score post intervention was highest in Group C (5.42 ± 3.09), followed by Group B (4.33 ± 2.87) and minimum in Group A (1.80 ± 1.61); $\{p < 0.001\}$. Change in Ramsay sedation score was highest in Group C (1.06 ± 0.41), followed by Group A (0.91 ± 0.43) and minimum in Group B (0.16 ± 0.42), $\{p < 0.001\}$. The mean heart rate was significantly higher in Group B at 5 min ($p=0.030$), 10 min ($p=0.036$), 15 min ($p=0.031$) and 20 min ($p=0.028$). Mean SBP was significantly lower in Group B at 15 minute ($p=0.008$) and 20 minute ($p=0.004$). No significant difference was seen in DBP or MAP at any time intervals among the study groups (Figure 2).

Conclusion: Combination of hand-holding and conversation with injection midazolam in preoperative period is more effective in reducing anxiety in terms of lower SBP, HR and APAIS.

Keywords: Anxiety, APAIS, midazolam, preoperative, hand holding.

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Introduction

Anxiety is common before any surgery which gives an unpleasant feeling and may lead to cognitive, behavioral and physical complaint that results in negative effects in their recovery [1]. Approximately one-third of individuals under regional anaesthesia are extremely nervous before the procedure [2]. High preoperative anxiety level is found in females, young patients and patients without prior history of surgery [3,4]. This anxiousness, may be due to many factors like fear of surgery, postoperative pain, need for assistance, type of surgery, prior anaesthesia experience and preoperative information, as well as being in a unfamiliar surroundings, financial insecurities and seeing advanced medical machinery in the hospital [5-8].

Preoperative anxiety affects the postoperative outcomes in these patients, such as perception of pain, analgesic consumption, recovery time and length of hospital stay [9-11]. The activation of sympathetic nervous system releases catecholamines leading to tachycardia, hypertension, hyperthermia, increased muscle tone and sweating [12]. An increase in glucocorticoids due to this anxiety induced stress, causes reduced immune responses, a longer wound healing time, increased infection rates, and electrolyte imbalance [13-15].

Due to this negative impact of preoperative anxiety, different treatments have been evaluated including pharmacological and non-pharmacological approaches [16]. In pharmacological intervention benzodiazepines, mainly midazolam is most commonly used as premedication to decrease preoperative anxiety. Midazolam acts on GABA receptor to reduce anxiety, leading to sedation, anterograde amnesia, anticonvulsant effects and centrally produced muscle relaxation [17]. Midazolam has a fast onset of action and also allows rapid recovery [18]. However, its use is associated with side effects like paradoxical reactions, oversedation, decreased blood pressure, and respiratory depression.

Various non pharmacological methods like preoperative counselling, distraction attention focusing, music therapy, relaxation procedures like hand massage and simple hand holding with conversation etc. have been tried to reduce anxiety. Studies have shown that simply hand-holding has buffering effect as touch is a non-verbal method of expressing empathy to patients [19]. Beside hand-holding, conversation or talk therapy is a mode of treatment for anxiety which can help the person to feel less anxious. Spending time with patient and paying attention to them has a calming impact and give the patient a sense of security [20].

Present study aimed to compare the physical intervention hand holding with conversation and pharmacological drug midazolam in relieving preoperative anxiety in adult patients undergoing lumbar spine surgeries.

Material and Methods

This Hospital based three-arm parallel-group randomised controlled trial was conducted in department of Anesthesiology and Neurosurgery theater at one of the largest tertiary referral hospital of Northern India.

Sample Size was calculated at 95% confidence and 80% power to verify the expected minimum change in APAIS (Amsterdam preoperative anxiety and information scale) score of 2.5 from preoperative period before and 20 minute after intervention and the pooled standard deviation for APAIS was assumed to be 3.6 based on past study findings with an allocation ratio of 1:1:1

A total of 108 patients aged 18 to 45 years and ASA (American Society of Anesthesiologists) grade I and II and undergoing elective lumbar spine surgery were included in the study. Patient on beta-blocker medication, any known psychiatric and memory disorder, history of drug abuse or addiction, and history of smoking and alcohol and those with history of hypertension were excluded from the study.

Eligible subjects were randomized to one of the three groups using Block randomization of varying block size through a computer-generated sequence, to ensure equal number of participants in each group. Allocation concealment was done using sequentially numbered opaque sealed envelope (SNOSE). The envelope was opened just before shifting into operation room. Patients were allocated to one of the three groups –

Group-A (n=36): received 0.05 mg/kg of midazolam diluted in 5ml normal saline intravenously; **Group-B** (n=36): received hand-holding and conversation with 5 ml normal saline intravenously; or **Group-C** (n=36): received hand-holding and conversation with 0.05 mg/kg of midazolam diluted in 5 ml normal saline intravenously. The blinding of participants and observers was only partial, i.e., for Group B and C but not for group A as it was not feasible.

The Amsterdam Preoperative Anxiety and Information Scale (APAIS) was used to evaluate anxiety among patients. The APAIS score included following six items that the patients was inquired about: 1. I am worried about the anesthetic; 2. The anesthetic is on my mind continually; 3. I would like to know as much as possible about the anesthetic; 4. I am worried about the procedure; 5. The procedure is on my mind continually; and 6. I would like to know as much as possible about the procedure. The measure of agreement with these statements was graded on a five-point Likert scale from 1 = not at all to 5 = extremely. The APAIS questionnaire score was translated in Hindi using forward-backward translation and validated. Sedation was assessed using the Ramsay sedation score.

After recording the baseline parameters in Operation theater, the patients were given IV midazolam (Group A/C) or saline (Group B) as per the group allocation. In Group B and C the patient's hands were then touched with warm hands and held with medium pressure for 20 minutes. Hand holding technique described Knable *et al.* Conversation with the patient was done by one of the researchers in Hindi language. Patients were explained regarding the surgical and anaesthesia procedure.

The anxiety score and Ramsay sedation score were recorded at 20 minute after the intervention while haemodynamic parameters (HR, SBP, DBP, MAP & SpO₂) were recorded at 1, 5, 10, 15 and 20 minutes after the intervention. This was the end point of our study.

Statistical analysis: Data were analyzed using International Business Machine Statistical Package for Social Sciences, version 21 for Windows (SPSS Inc., Chicago, IL, USA). Kolmogorov-Smirnov test was used to assess normality of the data. Categorical variables were presented as numbers (percent) and were compared among groups using the Chi-square test. The quantitative variables were presented as mean and standard deviation and were compared using Analysis of covariance (ANCOVA) test with Post-hoc analysis by bonferroni test. A p value ≤ 0.05 was considered as statistically significant.

Ethical Aspect

Ethical clearance was obtained from Institutional Ethics committee {no. 1100/MC/EC/2021} prior to initiation of study. Written informed consent was obtained from all patients prior to inclusion in the study.

Consort flow diagram is shown in figure 1.

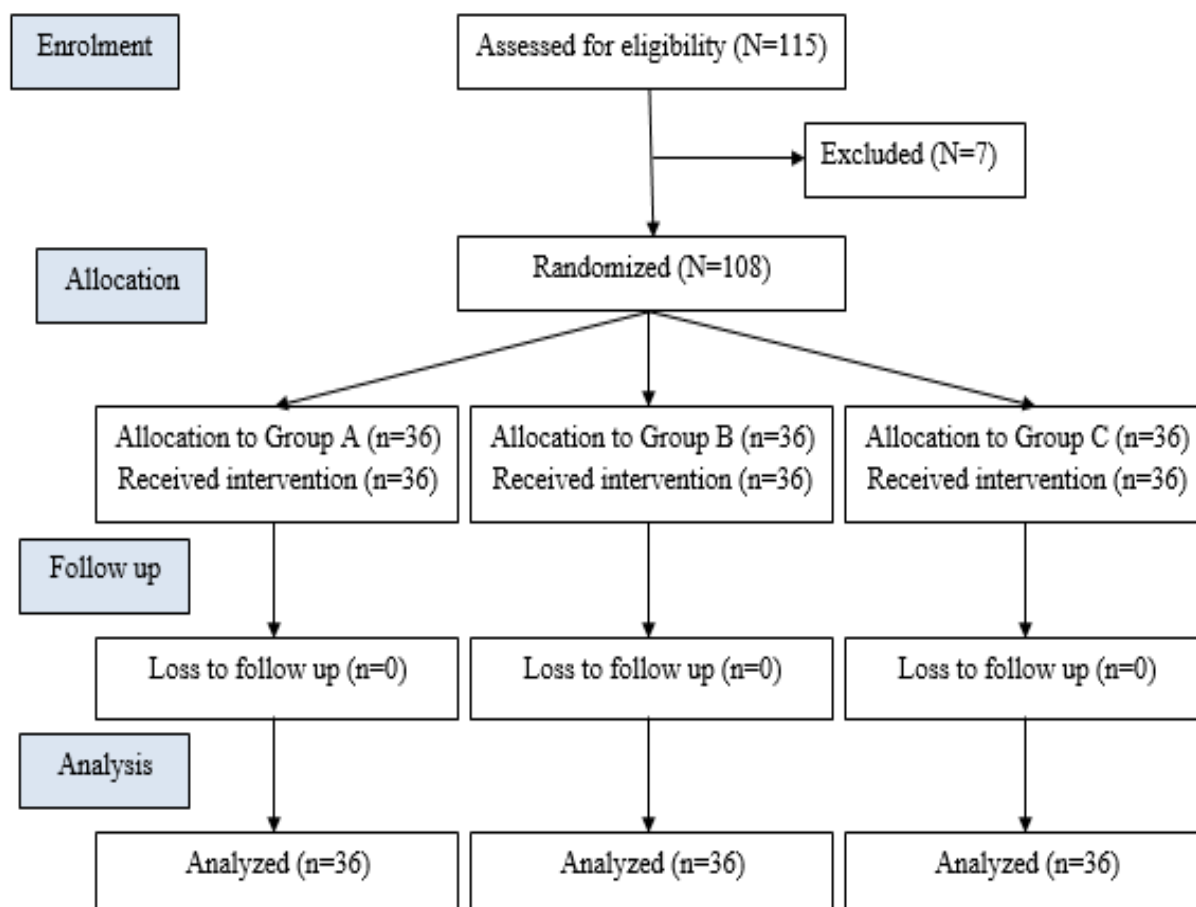


Figure 1: CONSORT flow diagram for the study

Results

A total of 36 patients were included in each group. Mean age of patients in Group A, B and C were 31.89, 33.11 and 35 years respectively ($p=0.264$). No significant difference was seen in gender composition ($p=0.254$) and ASA grade ($p=0.165$) among the study groups (Table 1).

The pre intervention APAIS score was similar in all groups ($p=0.447$). The change in APAIS score post intervention was highest in Group C (5.42 ± 3.09), followed by Group B (4.33 ± 2.87) and minimum in Group A (1.80 ± 1.61), this difference was found to be statistically significant ($p<0.001$). On post hoc analysis, significant difference was seen for each group (A.vs.B: $p<0.001$, B.vs.C: $p=0.035$; A.vs.C:

$p<0.001$). This shows that anxiety was relieved highest in Group C followed by Group B. The pre intervention Ramsay sedation score was similar in all groups ($p=0.495$). Change in Ramsay sedation score was highest in Group C (1.06 ± 0.41), followed by Group A (0.91 ± 0.43) and minimum in Group B (0.16 ± 0.42), this difference was found to be statistically significant ($p<0.001$). On post hoc analysis, significant difference was seen between Group A and Group B ($p<0.001$) and between Group B and Group C ($p<0.001$) as shown in Table 2.

The mean heart rate was significantly higher in Group B at 5 min ($p=0.030$), 10 min ($p=0.036$), 15 min ($p=0.031$) and 20 min ($p=0.028$). Mean SBP was significantly lower in Group B at 15

minute ($p=0.008$) and 20 minute ($p=0.004$). No significant difference was seen in DBP or MAP

at any time interval among the study groups (Figure 2).

Table 1: Baseline characteristics of study groups

	Group-A	Group-B	Group-C	p-value
Age in years	31.89±9.00	33.11±9.99	35.00±8.34	0.264
Gender Male	17 (47.2%)	11 (30.6%)	17 (47.2%)	0.254
Female	19 (52.8%)	25 (69.4%)	19 (52.8%)	
ASA Grade I	24 (66.7%)	20 (55.6%)	16 (44.4%)	0.165
Grade II	12 (33.3%)	16 (44.4%)	20 (55.6%)	

ASA - American Society of Anesthesiologists

Table 2: Comparison of APAIS score and Ramsay sedation score among study groups

		Group-A	Group-B	Group-C	p-value (ANCOVA)
Anxiety (APAIS score)	Pre intervention	13.44 ± 1.59	13.081±1.52	13.06±1.19	p<0.001 AvsB<0.001 BvsC=0.035 AvsC<0.001
	Post intervention	11.64 ± 1.79	8.75±1.21	7.64±1.05	
	Change in score	1.80 ± 1.61	4.33 ± 2.87	5.42 ± 3.09	
Ramsay sedation score	Pre intervention	1.28 ± 0.45	1.17 ± 0.38	1.19 ± 0.40	p<0.001 AvsB<0.001 BvsC<0.001 AvsC=0.557
	Post intervention	2.19 ± 0.40	1.33 ± 0.48	2.25 ± 0.44	
	Change in score	0.91 ± 0.43	0.16 ± 0.42	1.06 ± 0.41	

APAIS- Amsterdam Preoperative Anxiety and Information Scale; multiple comparisons done using Bonferroni

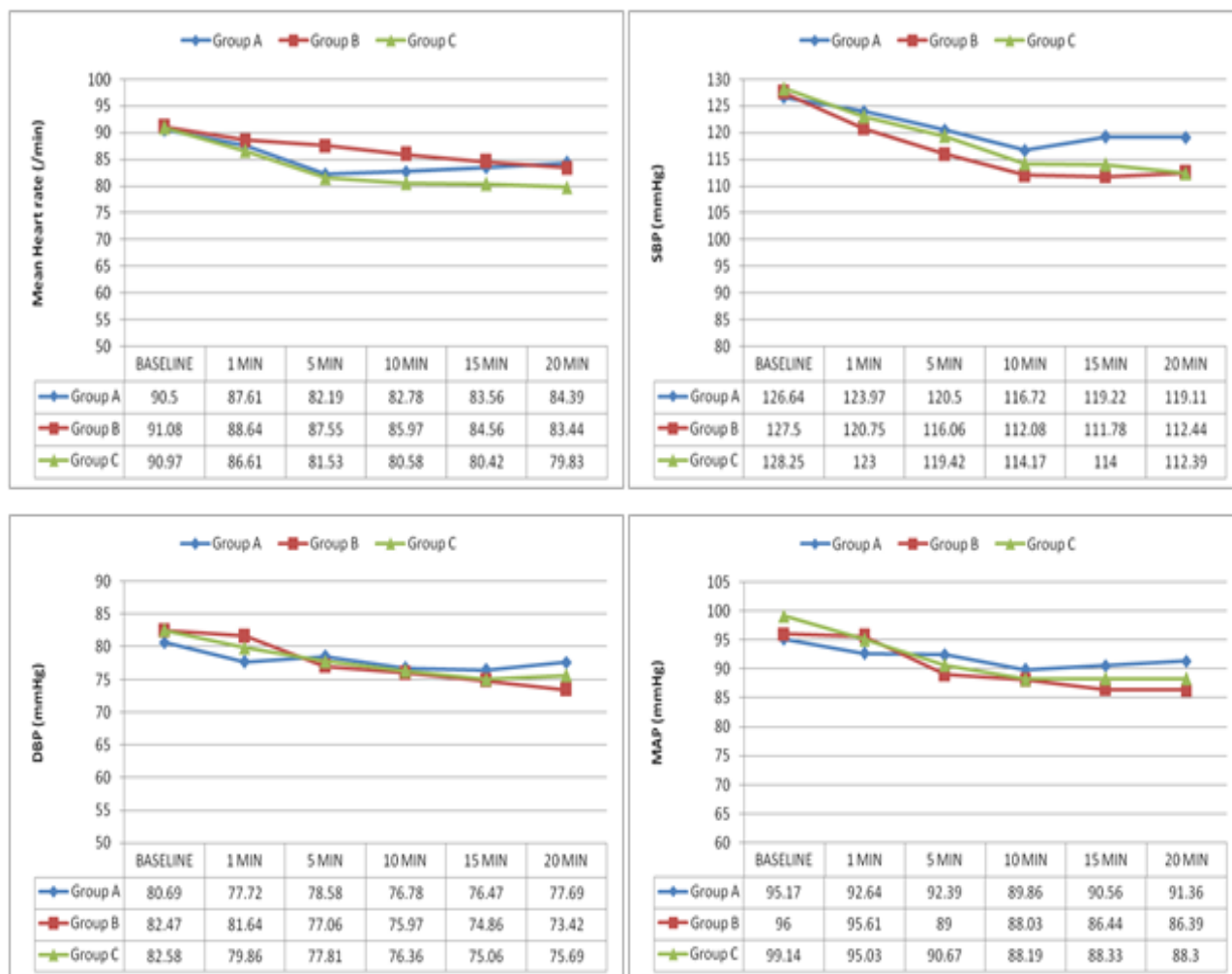


Figure 2: Comparison of hemodynamic parameters among study groups

Discussion

Surgery is a stressful event that makes patients anxious and most surgical patients experience moderate to severe anxiety before their surgeries [21]. Anxiety increases risk of intraoperative haemodynamic instabilities and postoperative complications like pain, delayed healing and increased hospital stay and reduced patient satisfaction [22]. Various pharmacological or non-pharmacological interventions are used to allay this anxiety.

Among pharmacological intervention, midazolam is a preferred choice as an anxiolytic as it reduces anxiety with a minimal impact on cognition or wakefulness because it is quickly metabolized and mental

functions return to normal within a short period of time. However, the side effects include excessive sedation, lowered blood pressure and respiratory depression [21]. To avoid these side effects associated various non-pharmacological techniques have been introduced to lessen anxiety [23]. Handholding is one non-pharmacological, noninvasive intervention that is harmless, economic and easy to perform so it can be a good preoperative intervention [24]. Handholding can boost patient comfort and cooperation, which in turn can help the procedure to go more smoothly and decrease patient’s anxiety level [22].

We studied the role of hand-holding and conversation on preoperative anxiety level and compared them alone and with midazolam premedication in patients undergoing lumbar spine surgeries under general anaesthesia. Group C (Midazolam + hand holding and conversation) showed highest alleviation of anxiety across all indicators (HR, MAP and APAIS).

HR and blood pressure are markers of physiological anxiety. Mean heart rate was lowest among Group C. Mean SBP was significantly lower in Group B at 15 minute ($p=0.008$) and 20 minute ($p=0.004$). However no significant difference was seen in DBP or MAP at different time intervals.

Sriramka B *et al* a similar study also found that mean HR was significantly reduced in patients receiving combination of hand holding and conversation with IV midazolam group at 20 min after the intervention, but no significant changes were seen in MAP [22]. Kim BH *et al* reported significant decrease in SBP in hand holding and spoken information group, whereas no significant change was observed in MBP [26]. Farmahini M *et al* also found significant decrease in HR ($p<0.001$) with hand and foot massage [25]. Reduction in SBP is expected because SBP is HR dependent, whereas MBP due to auto-regulation did not change significantly.

APAIS is a comprehensive tool to estimate anxiety. Group C (combination of hand-holding and conversation in addition to IV midazolam) showed highest decrease in APAIS score. Farmahini M *et al* in a similar study also found that both hand and foot massage significantly decreases the peri-operative anxiety of patients undergoing phacoemulsification cataract surgery [25]. Sriramka B *et al* also found a highest decrease in anxiety in group receiving combination of IV midazolam and hand holding and conversation [22]. Kim BH *et al* found that hand holding and spoken

information group showed significant decrease in APAIS score in patients undergoing percutaneous vertebroplasty under local anaesthesia [26], which support our decision to club both hand-holding and conversation as a single intervention in our study.

Nazari R *et al* also observed that hand massage significantly reduces anxiety in patients of ophthalmology surgery under local anaesthesia using S-STAI inventor [27].

Moon JS *et al* also observed that handholding significantly reduces anxiety in cataract surgery patients under local anaesthesia using VAS score [24].

Ramsay sedation score showed minimal changes with hand holding and conversation (Group B) compared to those who received midazolam (group A & C). Sriramka B *et al* also reported sedation in groups receiving IV midazolam [22], which is expected as midazolam is a short acting rapid onset benzodiazepine.

Our study is among the few studies using combination of hand-holding and conversation in the preoperative period. Our study also compared the pharmacological and non-pharmacological methods, proving their combination to be most effective.

Limitation: complete blinding was not possible as hand holding and conversation cannot be concealed. Also patient satisfaction and analgesic requirement was not assessed in our study.

Conclusion

Present study concludes that a combination of hand-holding and conversation with injection midazolam in preoperative period is more effective in reducing anxiety in terms of lower SBP, HR and APAIS score when compared with either technique alone. This combination is simple, effective and free of side effects. Hence we suggest that hand-

holding with conversation can be used as a supportive measure and adjunct with midazolam to reduce anxiety in preoperative period by anaesthesiologist.

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