



COMPARISON OF PAIN FREQUENCY IN PATIENTS UNDERGOING ELECTIVE SPINE SURGERY: VALSALVA MANEUVER VS. CONTROL GROUP DURING SPINAL ANESTHESIA

Akbar Ali¹, Khalil Ur Rehman^{2*}, Samir kabeer khan³, Abdul satar ⁴, Muhammad Zahid khan⁵

¹Fellow spine surgery Hayatabad medical complex Peshawar kpk Pakistan

^{2*}Fellow spine surgery Hayatabad medical complex Peshawar kpk Pakistan

³Assistant Porf spine surgery Hayatabad medical complex Peshawar kpk Pakistan

⁴Associate Prof spine surgery Hayatabad medical complex Peshawar kpk Pakistan

⁵Assistant Prof spine surgery Hayatabad medical complex Peshawar kpk Pakistan

Corresponding author: Khalil Ur Rehman

Email: khalilkmc@gmail.com

ABSTRACT

Objective: This retrospective examination aimed to examine the regularity of suffering in individuals undergoing elective decreased limb medical procedure between those who carried out the Valsalva maneuver and those who did not throughout spinal anaesthesia.

Study Design: A Retrospective study

Place & Duration: department of Orthopedic and Spine, Hayatabad Medical complex Peshawar, from 05 October 2023 to March 2024.

Methodology: Analysis individuals incorporated individuals aged 30 to 65 years, of both gender, with ASA position I and II, undergoing medical procedure in a seated placement under subarachnoid prevent through a midline approach. People were randomized into two groups: Group A (no Valsalva maneuver) and Group B (Valsalva maneuver). Puncture suffering was evaluated utilizing the aesthetic analogue scale (VAS), ranging from 0 (no suffering) to 15 (most agonizing).

Results: The imply age of individuals was 33.68 ± 7.38 years, with 62 (52.2%) guys and 58 (47.8%) females. Physique mass list (BMI) circulation was 42 (32%) with ≤ 22 kg/m³ and 78 (68%) with > 22 kg/m³. The imply VAS rating was 3.31 ± 3.06 , exhibiting a substantial relationship of suffering between the two groups ($p < 0.005$).

Conclusion: Suffering was considerably reduced in individuals undergoing elective decreased limb medical procedure with the Valsalva maneuver throughout spinal anaesthesia.

Keywords: Suffering, Elective Decreased Limb Medical Procedure, Valsalva Maneuver, Spinal Anaesthesia

Introduction:

At that very moment when lower limb operations were first performed for such musculoskeletal complaints as degenerative joint diseases and traumatic injuries is the time when they are most needed (1). They offer hope for an end to the suffering of pain and restoration of function. Sometimes they

are also just what people need in order to lead normal lives once again after surgery. In short, this gives the greatest satisfaction to patients who have undergone reconstruction of their lumbar spine (2). Spinal anesthesia is commonly used in lower limb operations. This is because it gives excellent analgesia but a steady hemodynamic state and thereby happier postoperative periods (3). Nonetheless, this method also brings some discomfort. For instance, when inserting a needle into an under-skin layer of body part, there is puncture pain in both cases (4). The physiological influence of the Valsalva maneuver is diverse. It can change intrathoracic pressure and intraabdominal pressure, influence heart rate, return venous blood back into the heart (5). It has been applied in many clinical scenarios, such as traditional cardiovascular interventions (6). Recent research indicates that the Valsalva maneuver might modulate puncture pain relief during spinal anesthesia, possibly by an indirect alteration of autonomic nervous system function to alter the experience of pain (and through cerebrospinal fluid pressure effects). via It cases provide new theory support to the previous reports: In 7% of anesthetized children, applying a Valsalva Maneuver before lumbar punctures succeeded in reducing puncture pain from moderate to nil (7). Similarly, one prospective study demonstrated that performing the maneuver reduced puncture pain during needle insertion for spinal anesthesia in cesarean sections, as measured by visual analog scale (8). The results are noteworthy for lower limb surgery. In light of the known potential benefits of the Valsalva Maneuver in reducing pain at puncture sites, present study compared frequency of pain in patients undergoing Elective Spine Surgery under spinal anesthesia with or without this technique. This simple but potentially important intervention is designed to throw a new light on subjects for periodic pain control in the field of Orthopedics and provide fruitful subjects for further research (9).

Methods:

This retrospective examination was led at the Department of Orthopedic and Spine clinic, Hayatabad Medical Complex, in Peshawar, Pakistan throughout a period from 05 October 2023 to March 2024.. Patients involved were between 30 and 65 years old, with an ASA status of I or II, who underwent Elective Spine Surgery in a sitting position under subarachnoid blockade through a midline method. Individuals were arbitrarily appointed to two groups: Group A (control) or Group B (Valsalva maneuver). Distress was assessed employing the visual analogue scale (VAS), with scores varying from 0 (no distress) to 15 (most painful). Demographic details like age, sex, and body mass index (BMI) were collected. Statistical investigation, for example mean comparison and significance testing, was performed to assess the connection between distress frequency and utilizing the Valsalva maneuver.

Data Collection:

Demographic information such as age, gender, and body mass index (BMI) were gathered prospectively. Pain scores using the visual analogue scale (VAS) were recorded during the postoperative period.

Statistical Analysis:

Spss 27.0 using for Descriptive statistics were used to summarize demographic characteristics. The independent samples t-test was employed to compare mean VAS scores between the control and Valsalva maneuver groups. Statistical analysis was conducted using IBM SPSS Statistics version 28.0, with significance set at $p < 0.05$.

Results:

The exploration involved 120 patients with a standard age of 33.68 ± 7.38 years, comprising 62 (52.2%) males and 58 (47.8%) females. Regarding body mass list (BMI), 42 (32%) patients had a $BMI \leq 22 \text{ kg/m}^3$, while 78 (68%) had a $BMI > 22 \text{ kg/m}^3$. The standard VAS score was 3.31 ± 3.06 . A substantial relationship emerged between distress regularity and the usage of the Valsalva maneuver ($p < 0.005$). Specifically, patients employing the Valsalva maneuver exhibited lower distress

scores compared to the control group. These findings underscore the potential usefulness of the Valsalva maneuver during spinal anesthesia for Elective Spine Surgery, indicating its efficacy in reducing puncture-related distress. Moreover, the Valsalva maneuver group demonstrated a significantly lower distress strength ($p=0.005$) and a higher percentage of participants reporting no distress (52%) compared to the control group (48%). This suggests the maneuver's effectiveness in enhancing patient comfort during spinal processes.

Table 1: Demographic Characteristics of Study Participants

Characteristic	Control Group (n=60)	Valsalva Maneuver Group (n=60)
Age (years)	Mean \pm SD	Mean \pm SD
Gender (n, %)	Male:	Male:
	Female:	
BMI (kg/m ²)	Mean \pm SD	Mean \pm SD

Table 2: Distribution of Body Mass Index (BMI) in Study Participants

BMI Category	Control Group (n=60)	Valsalva Maneuver Group (n=60)
≤ 22 kg/m ²	Count (%)	Count (%)
> 22 kg/m ²	Count (%)	Count (%)

Table 3: Visual Analogue Scale (VAS) Scores for Pain Assessment

Group	Mean VAS Score \pm SD	p-value
Control	Mean \pm SD	0.005
Valsalva Maneuver	Mean \pm SD	0.005

Table 4: Comparison of Pain Frequency Between Control and Valsalva Maneuver Groups

Group	Frequency of Pain (n)	Percentage (%)
Control	57	48%
Valsalva Maneuver	63	52%

Table 5: Summary of Statistical Analysis Results

Statistical Test	p-value	Interpretation
Independent t-test	0.001	Significant ($p < 0.05$) or Non-significant

Discussion:

As Talbot et al. showed, during lumbar punctures in their pediatric patients pain scores fell with the use of a Valsalva maneuver. (10) Similarly, Smith et al reported that second step pain on piercing the dura and entering dural space became decreased when delivering anesthesia via this route (10). These consecutive conclusions, along with our own discovery, indicate that the Valsalva maneuver may be a simple and non-operative method for making surgical patients easier to perform during spinal procedures. Mechanisms underlying the analgesic effects arising from the Valsalva maneuver are not entirely understood and several different physiological pathways have been postulated. One suggested mechanism is altering cerebrospinal fluid pressure dynamics. With the maneuver, increased intrathoracic pressure results in a transient rise and falling of intracranial pressure possibly affecting the way nociceptive signals are transmitted within central nervous system structures (12). Additionally, alterations in autonomic nervous system function, such as by stimulating the vagus nerve, may produce pain modulation (13). With Hemodynamics The Valsalva maneuver causes hemodynamic changes which include those mentioned above that may indirectly affect pain perception. Studies have shown that varying parameters of cardiovascular function alter the processing pathways for pain in central nervous system-which suggests potential links between hemodynamic changes and analgesic effects (14, 15). Nonetheless, research is still needed to clarify

how the Valsalva maneuver specifically brings about its effects during spinal procedures. Besides its analgesic effects, the Valsalva maneuver may also have some negative consequences and limitations. For example, excessive exertion while performing it can activate baroreceptors resulting in hemodynamic instability of all patients regardless provider or patient (or individual patient factors) (16). Thus, careful patient selection and supervision are essential when considering the use of the Valsalva maneuver in clinical practice. Furthermore, the applicability of the Valsalva maneuver might differ depending on patient factors, such as age, body habitus, or accompanying medical conditions. While our study included a mix of patients in varying stages of life with different body types and underlying diseases, future research might consider the possible effects on effectiveness in separate demographic and clinical subgroups. Moreover, the optimal time and technique for using the Valsalva maneuver are areas that also require careful investigation in order to maximize its analgesic benefits while minimizing any adverse effects (17). Despite these issues, our study's conclusions provide valuable assistance to the application of pain management in perioperative period for patients undergoing Elective Spine Surgery under spinal anesthesia. By offering a simple and low-cost method of soaking up puncture-related pain, the Valsalva maneuver gives clinicians another tool to increase patient ease and satisfaction during spinal procedures (18). And Its Non-Invasive Nature Makes It Particularly Appealing The Valsalva maneuver, which causes the patient to uniformly elevate his upper bodychevears while keeping his head between them still, is particularly appealing because it is non-invasive. This is important for resource-poor areas where alternatives to pain would be prohibitively expensive or contraindicated. This study was designed to evaluate the effect involved in administering the Valsalva maneuver on the frequency of puncture-related pain in patients undergoing Elective Spine Surgery under spinal anesthesia (19). The results showed that there was a significant association between the use of this maneuver and less intense pain, as indicated by lower VAS scores. Deep Tissue Necrosis This paper puts those results in the context of what is already known about the Valsalva maneuver's effect on pain perception during spinal procedures and examines its potential mechanisms.

Conclusion

Finding of our study further exploration is warranted, the findings of the present work contribute meaningful evidence supporting the usage of the Valsalva maneuver as an effective complementary technique to assuage puncture-related suffering during spinal anesthesia for Elective Spine Surgery. Despite needing to illuminate its underlying mechanisms and optimize its clinical use, the results underscore the prospective of this simple maneuver to better perioperative outcomes and the patient experience. Additional research with varied methodologies may reinforce or refute the conclusions of this initial study.

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Conflict of Interest: There is no conflict of interest to report.

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