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Original Article

Role of Desmopressin in Prevention of Post Dural Puncture Headache after C-Section

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ABSTRACT

Objective: To determine the role of Desmopressin in prevention of post dural puncture headache after C-section.
Study Design: Quasi experimental study.
Place and Duration of Study: Gynecology and Obstetrics Department of a Tertiary Care Setting, from Jan to Jun 2022.
Methodology: A total of 300 females of age >16years undergone post-Dural puncture during cesarean section were included. Patients who had any gastric illness and emergency cases were excluded. The patient population was divided into two Groups; in Group-A patients were given intra-nasal Desmopressin while Group-B patients were given normal saline. Symptoms including headache and nausea appeared after dural puncture were recorded in a pre-designed questionnaire. The study also observed the duration of symptoms relieved. Statistical analysis was done using SPSS version-24. Descriptive and inferential statistics was applied.
Results: In a sample of 300 participants, Group-A (150 patients) were given Desmopressin and 150 patients of Group-B were given normal saline. The mean age of participants was 28.9±3.8 years. Mean spinal needle gauze size was 20.8±4.1 G. In Desmopressin Group the duration of symptoms was 24hrs for 20(13.3%) patients, 37(24.7%) patients had 48hrs to recover, 47(31.3%) had 72hrs and 46(30.7%) had <7days of time for the recovery of symptoms. While in normal saline Group most of the participants 64(42.7%) took<7 days to recover. While in normal saline Group most of the participants 64(42.7%) took a week to recover from PDPH
Conclusion: Desmopressin is more beneficial than normal saline for the prevention of post dural puncture headache in patients undergoing cesarean delivery under spinal anesthesia.

Keywords: Cesarean-Section, Desmopressin, Post Dural Puncture Headache (PDPH).

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INTRODUCTION

Spinal anesthetic is currently prevalent for cesarean sections (C-section) due to its safety, cost-effectiveness, dependability, ease of administration, fast onset, and optimal operating circumstances. This procedure is not devoid of problems. Post-dural puncture headache (PDPH) is a prevalent consequence associated with spinal anesthesia.[1] Following a c-section, almost one-third of women get PDPH, often manifesting between 24 to 72 hours following the dural puncture.[2,3]

The International Headache Society (IHS) defines PDPH as a headache that manifests within five days following a lumbar puncture. It is typically associated with cervical rigidity, tinnitus, photophobia, and nausea, which exacerbates in an upright posture and alleviates while supine.[4] PDPH may resolve spontaneously within one week or may endure for a longer duration, and it has been associated with the onset of persistent headache and backache.5 Headache is believed to result from cerebrospinal fluid loss by dural puncture, resulting in intracranial hypotension and stress on pain-sensitive intracranial structures.[6]

The gold standard for managing PDPH is the epidural blood patch (EBP); however, when it is unavailable or unsuitable, alternative methods are employed.[7] The prophylactic administration of 1-deamino-8-D-arginine vasopressin (DDAVP) is advantageous for individuals undergoing lumbar puncture.[8] Desmopressin is a selective agonist of type 2 vasopressin receptors, originally formulated for the treatment of diabetes. DDAVP may be utilized to mitigate hemorrhagic consequences in various invasive and surgical interventions (LSCS).[9] The administration of normal saline into the subarachnoid space after an inadvertent dural puncture decreased the occurrence of PDPH.[10] This research aims to assess the efficacy of Desmopressin compared to normal saline in preventing post-dural puncture headache following cesarean surgery.

METHODOLOGY

It was a quasi-experimental study conducted at the Gynecology and Obstetrics department of a

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Tertiary Care Setting, Pakistan during 6 months (Jan-Jun 2022). Data was collected through non-probability purposive sampling after taking informed consent from the IRB (IRB# 231/12/21).

A sample size of 136 was calculated using WHO sample size calculator by considering the PDPH mean difference of 0.89 among control and intervention Group,[11] (80% power and 5% margin of error). we recruited 300 participants (150 in each Group) for the generalization of the results.

Inclusion Criteria: A total of 300 pregnant females of age >16years undergone post-dural puncture during cesarean section developed PDPH were included.

Exclusion Criteria: Patients who had any gastric illness and emergency cases were excluded.

Initial assessment included a comprehensive history, emphasizing prior headaches, prenatal health, neuraxial analgesia and anesthesia during labor and delivery, as well as risk factors for diverse reasons of postpartum headache, prior to inclusion.[2] The patient population was divided into two Groups; in Group-A (n=150) patients were given intra-nasal Desmopressin with a dose of 150microg /puff according to bodyweight (>50kg weight: 2 puff; <50kg weight: 1 puff). Consecutively, Group-B (n=150) patients were given intra-nasal normal saline (dose: 2 puff of normal saline) repeated after 12 hours for 24 hours in both of the Groups. Data was recorded in a pre-designed questionnaire. The duration of symptoms relieved were observed and noted down after 24 hour, 48 hour, 72 hour and within 7 days among the both Groups. The effect of Group-A and Group-B in resolving the symptoms of post dural puncture headache were observed. Most of the patients were discharged from the hospital after 48hrs so the remaining data at 72 h and 7th day was received with telephonic contact or at follow-up visit after a week. The flow diagram of the data is shown in Figure.

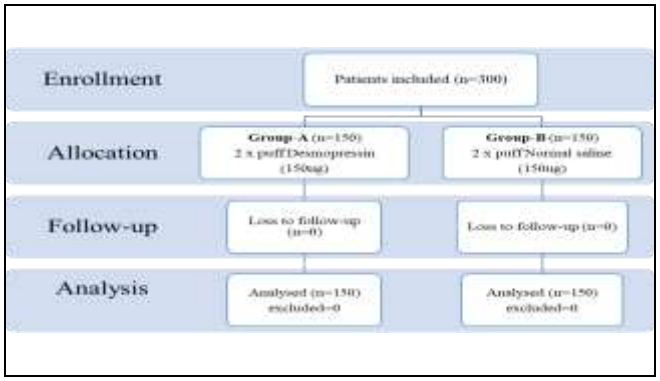

Figure: Flow diagram of the study (n=300)

Statistical analysis was done using statistical package for social sciences (SPSS) version-24. Mean and standard deviation was calculated for continuous variables and frequency (percentage) was calculated for categorical variables. Statistical tests including Pearson's chi-square test was applied to compare the efficacy of Desmopressin and normal saline. The *p*-value ≤0.05 was deemed significant.

RESULTS

A sample of 300 participants was divided into two Groups. In Group-A 150 patients were given Desmopressin and 150 patients of Group-B were given normal saline. All female patients undergone post dural puncture during C-section with mean age participants was 28.9±3.8 years. Mean spinal needle gauze size was 20.8±4.1 G.

Mostly senior residents 209(69.66%) gave spinal as compared to the consultants 43(14.33%). While 48(16%) junior resident gave spinal. Comparison of studied Groups with speciality showed statistical significant findings (*p*=0.024) as shown in Table-I.

Table-I: Association of study Groups with specialty (n=300)

Groups	Specialty			*p*-value
	Consultant	Senior Resident	Junior Resident	
Desmopressin (n=150)	14(9.3%)	107(71.3%)	29(19.3%)	0.024
Normal Saline (n=150)	29(19.3%)	102(68.0%)	19(12.7%)	
Total	43	209	48	300

Table-II: Association of Duration for Symptoms to relieve with two Groups (n=300)

Groups	Duration of symptoms				*p*-value
	24 Hours	48 Hours	72 Hours	<7 Days	
Desmopressin	20(13.3%)	37(24.7%)	47(31.3%)	46(30.7%)	0.031
Normal Saline	15(10.0%)	20(13.3%)	51(34.0%)	64(42.7%)	
Total	35	57	98	110	300

When compared the duration of Symptoms with treatment Groups, significant findings were observed (*p*<0.05) as depicted in Table-II. Most of the participants of Desmopressin Group recovered early then normal saline Group. In Desmopressin Group the duration of symptoms was 24hrs for 20(13.3%) patients, 37(24.7%) patients had 48hrs to recover, 47(31.3%) had 72hrs and 46(30.7%) had <7days of time for the recovery of symptoms as shown in figure. While in normal saline Group most of the participants 64(42.7%) took<7 days to recover, 51(34%) had 72hrs for recovery, 15(10%) had 24hrs, 20(13.3%) had 48hrs (*p*=0.031).

DISCUSSION

This research aimed to assess the efficacy of prophylactic normal saline against Desmopressin in

preventing post-dural puncture headache in patients undergoing cesarean delivery with spinal anesthesia. PDPH is the predominant complication of neuraxial anesthesia, hypothesized to arise from intracranial hypotension caused by persistent cerebrospinal fluid loss through a dural tear, primarily associated with needle size, shape, and type. Additional, less probable risk factors include female gender, youth, pregnancy, low BMI, prior PDPH episodes, and a history of migraine headaches.[12,13]

In our study, mean age of all female patients who had undergone post dural puncture during C-section was 28.9±3.8 years. These findings are comparable with another study, who had the mean age of the participants 26.3±4.21 years with a range of 18 to 38 years.[14]

The size of the needle is the primary factor in the onset of PDPH. The reduced needle diameter is believed to effectively decrease the occurrence of PDPH. A slender pencil tip spinal needle presents a decreased risk of PDPH.[2] Our study results are similar with the above mentioned studies. We used the mean spinal needle gauze size of 20.8±4.1 G.

The total incidence of PDPH) following neuraxial operations ranges from 6% to 36%.[15] Another research revealed a PDPH incidence of 29.6%, with the largest number of affected individuals observed in the control Group compared to the therapeutic Group (36.8% vs 22%).[14]

The main outcomes of interest were the incidence and severity of PDPH, assessed postoperatively at 12 hours, 24 hours, 48 hours, 72 hours, and on the seventh day. When compared the duration of Symptoms with treatment Groups, there were significant findings. More participants of Desmopressin Group recovered early than the normal saline Group. In Desmopressin Group the duration of symptoms was 24hrs for 20(13.3%) patients, 37(24.7%) patients had 48hrs to recover, 47(31.3%) had 72hrs and 46(30.7%) had <7days of time for the recovery of symptoms. While in normal saline Group most of the participants (64(42.7%) took<7 days to recover, 51(34%) had 72hrs for recovery, 15(10%) had 24hrs, 20(13.3%) had 48hrs. Ahuja *et al.*,[10] and Patel *et al.*,[15] in their studies investigated the preventative advantages of intrathecal normal saline demonstrated a statistically significant disparity in the intensity and prevalence of post-dural puncture headache (PDPH) across the Groups. These findings corroborates with our study results because in our study Desmopressin was more effective than normal saline (p<0.024). Similarly, Tohid Karami in his RCT also showed that VAS score was markedly reduced in the intervention Group compared to the control Group.[16] On contrary to our results, The results of another RCT showed that interventional Group had no effect on the prevention of PDPH when compared with placebo (p=0.502).[11] A recent study from Pakistan reported that the hospital stay of patients receiving EBP treatment had a shorter hospital stay and higher satisfaction rate than the control Group. The trans-nasal SPGB is a gold standard, non-invasive, safe, straightforward, and efficacious therapy for PDPH, characterized by a low complication rate.[17]

A further study was undertaken to assess that spinal anesthesia, as a fundamental skill, necessitates attention in the design of the learning process within any training program. The objective was to assess the learning curve of the junior resident throughout their training program to determine the length and number of cases required for proficiency in spinal anesthesia.[18] However, in our study, mostly senior residents 71.4% gave spinal as compared to the consultant 9.5%, while only 19% junior resident gave spinal. When compared the doctor-wise spinal with the Groups we had significant findings (p=0.024).

Desmopressin is superior to prophylactic intrathecal infusion of normal saline for the prevention of PDPH in patients undergoing cesarean birth with spinal anesthesia. Normal saline is a safe and straightforward approach. Additional research is necessary to provide a definitive conclusion. Normal saline may be used in resource-limited settings if suitable spinal needles are unavailable and care of moderate to severe PDPH is impractical.

LIMITATION OF STUDY

This study was time constrained (24 hours to 7 days) to show the effectiveness of prophylactic normal saline and Desmopressin for the prevention of PDPH for a longer period. Advance studies including RCTs and longitudinal studies with follow-ups are required.

CONCLUSION

Desmopressin is more advantageous than the prophylactic intrathecal administration of normal saline for the prevention of PDPH in patients who are undergoing cesarean delivery under spinal anesthesia. PDPH is a common side effect of neuraxial anesthesia that has a significant impact on the mother, the newborn, the family, and the healthcare system. This is especially true for patients with moderate to severe PDPH who are tolerant of conservative management, as the current preventive and

treatment modalities are inconclusive and there is a need for innovative research on preventive strategies.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

TM & SF: Data acquisition, data analysis, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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