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Original Research Article

A HOSPITAL BASED PROSPECTIVE STUDY TO COMPARE THE INCIDENCE OF POST-DURAL PUNCTURE HEADACHE (PPDH) FOLLOWING MEDIAN AND PARA-MEDIAN APPROACHES IN PATIENTS UNDERGOING SPINAL ANESTHESIA FOR LOWER SEGMENT CAESAREAN SECTION

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ABSTRACT

Background: Spinal anaesthesia is standard of care in obstetric anaesthesia, it provides excellent analgesia and good muscle relaxation. It can be done by either median or paramedian approach. We conducted a study on patients undergoing lower segment caesarean section (LSCS) under spinal anaesthesia by either approach and compared the occurrence of PDPH in both groups.

Materials and Methods: This is a hospital based prospective study done on 80 Patients underwent lower segment cesarean section under spinal anaesthesia. The patients were divided in two groups. Each group consisted of 40 patients. Group M (Median Approach) and Group PM (Paramedian Approach). Post-operatively, patients were observed at 24/48/72 hours and were assessed for any complaint of headache in term of its site, severity, characteristics (constant and throbbing) and symptoms possibly associated with PDPH like nausea, vomiting and neck stiffness to diagnose. The nature and severity of headache was assessed using the visual analog scale (VAS) score.

Results: A total of 4(10%) out of 40 patients in the paramedian group had PDPH, 3 (7.5%) out of 40 patients in the median group had PDPH, which is statistically insignificant (P>0.05). The severity is almost the same in both the groups. Only one patient in the paramedian group developed severe degree of PDPH. But statistically not significant (p>0.05). Totally 7 patients suffered from PDPH. In the paramedian group 2 patients had mild degree of PDPH, one had moderate degree of PDPH and one more had severe form PDPH. In the median group 2 patients had mild degree of PDPH, one had moderate degree of PDPH. These are statistically insignificant (P>0.05).

Conclusion: Hence from our observations we conclude that there is no statistically significant difference in the incidence of occurrence of PDPH when lumbar puncture is done by either median or paramedian approach.

Keywords: PDPH, Median Approach, Paramedian Approach, Headache, Spinal Anaesthesia.

INTRODUCTION

Spinal anaesthesia is standard of care in obstetric anaesthesia, it provides excellent analgesia and good muscle relaxation.[1] It provides adequate postoperative analgesia, avoids fetal as well as maternal risks of general anaesthesia and requires less intensive postoperative anaesthesia care.

Spinal anaesthesia is used extensively for lower abdominal and lower extremity surgeries because it has distinct advantages over general anaesthesia, minimum physiological disturbance resulting in

minimum stress response, optimal operative conditions, minimal intraoperative blood loss and less postoperative morbidity, it is often associated with significant adverse effects like hypotension, bradycardia and post dural puncture headache (PDPH).[2-4] Post-dural puncture headache was first documented by German surgeon.[5,6] Bier in 1899 also gained first-hand experience of the disabling headache related to dural puncture. Headache and backache are the dominant symptoms that develop after post-dural puncture. Ninety per cent of headaches will occur within 2-3 days of the procedure.[7,8]

Caesarean sections are frequently done with improved surgical skill, fetal monitoring and antibiotics, to facilitate good maternal and fetal outcome. It is easy to perform, provides fast onset of sensory and motor block with high success rate.9 It can be done by either median or paramedian approach. We conducted a study on patients undergoing lower segment caesarean section (LSCS) under spinal anaesthesia by either approach and compared the occurrence of PDPH in both groups. The aim of our study was a comparison of occurrence of post dural puncture headache in patients after lower segment caesarean section (LSCS) under spinal anaesthesia by median and paramedian approach.

MATERIALS AND METHODS

This is a hospital based prospective study done on 80 Patients belonging to the age group 18-60 years with ASA grade I and grade II underwent lower segment caesarean section under spinal anaesthesia at government district hospital, Sawaimadhopur, Rajasthan, India during study period.

The patients were divided in two groups. Each group consisted of 40 patients.

Group M (Median Approach) - Patients received spinal anaesthesia by median approach.

Group PM (Paramedian Approach) - Patients received spinal anaesthesia by paramedian approach.

Exclusion Criteria:

1. Patients belonging to ASA grades III, IV and V
2. Patient refusal & uncooperative
3. Patients with sepsis, bacteremia or skin infection of local site.
4. Patients with raised intracranial tension.
5. Patients with bleeding and clotting disorders
6. Allergy to drugs
7. History of migraine or any chronic headache preoperatively or on the morning of surgery.
8. More than two dural punctures.
9. Severe hypovolemia and shock

Methodology

After arrival of patient in OT, patient identified and an IV line was secured with 18G/20G cannula and standard monitoring including NIBP, ECG and pulse oximetery was done. Co-loading was done with ringer lactate solution at a dose of 10 ml/kg and aspiration prophylaxis (injection metoclopramide and injection ranitidine) given IV before subarachnoid block to all patients.

All patients were randomly allocated into two groups (Group M and Group PM) of 40 each by using sealed envelope method. Baseline vitals were noted just before lumbar puncture. Patient was made to sit up on the table. The back was painted with povidone iodine solution from mid- scapular region to buttock and laterally anterior superior iliac spine both sides. Patient was draped with hole sheet, L3-4 inter-space was identified by the line crossing the highest point of iliac crest and excessive povidone iodine was wiped off by the use of sterile gauze. The 25G Quincke needle (B-Braun) was inserted in the midline in L3-4 space with the bevel facing to the side as soon as give way was felt, stylet was withdrawn free flow of CSF seen and 2ml of 0.5% bupivacaine heavy was injected. At the completion of injection the syringe was disconnected, back flow of CSF was observed and then the patient turns supine and pillow was put under the shoulder and 15o trendelenburg tilt was given.

In patient of the paramedian group, the lumbar puncture was done in the L3-4 space 1cm lateral to the midline.

Post Operative Recordings: Post-operatively, patients were observed at 24/48/72 hours and were assessed for any complaint of headache in term of its site, severity, characteristics (constant and throbbing) and symptoms possibly associated with PDPH like nausea, vomiting and neck stiffness to diagnose or exclude PDPH and vitals.

The nature and severity of headache was assessed using the visual analog scale (VAS); 0 being no headache and 10 being worst imaginable headache. When patient complaint of pain in ward or recovery room, patient was asked to mark the strip at a point that corresponds to the level of pain intensity, they felt at that time. The most important criterion for classifying headache as PDPH was its postural nature. Transient headache limited to the day of surgery was not be considered as PDPH.

The grading of headache is defined as follows:

Grade I (mild)-VAS Score 1-3

Grade II (moderate)-VAS Score 4-7

Grade III (severe)-VAS Score 8-10

Therapy with hydration, NSAIDs +/-caffeine and foot end elevated was recommended to patients experiencing postural headache. Data collection was done by filling the proforma containing the demographic details of the patient, hemodynamic changes and severity of PDPH. Data was collected and recorded as per proforma. Data was analyzed by chi square test for occurrence of PDPH. Overall significance level was maintained at $p<0.05$.

Side effects: The following side effects were looked for: Bradycardia (PR<60bpm) and hypotension (defined as a decrease of MAP by more than 20% from baseline or a fall of SBP below 90 mmHg). Nausea and vomiting – assessed by three-point scale.

0= no nausea and vomiting,

1= mild to moderate nausea or vomiting not needing treatment,
2= severe nausea or vomiting needing treatment
Any other complication and patients' complaints (if any).

RESULTS

Our study showed that the age of the patients in groups A and B were 23.96± 2.58 years and 23.25± 2.68 years respectively statistically insignificant (P>0.05). The BMI of the patients in groups A and B were 28.52±1.08 kg/m2 and 27.93±1.17 kg/m2 respectively statistically insignificant (P>0.05). [Table 1]

A total of 4(10%) out of 40 patients in the paramedian group had PDPH, 3 (7.5%) out of 40 patients in the median group had PDPH, which is statistically insignificant (P>0.05). [Table 2]

The severity is almost same in both the groups. Only one patient in the paramedian group developed severe degree of PDPH. But statistically not significant (p>0.05). Totally 7 patients suffered from PDPH. In the paramedian group 2 patients had mild degree of PDPH, one had moderate degree of PDPH and one more had severe form PDPH. In the median group 2 patients had mild degree of PDPH, one had moderate degree of PDPH. These are statistically insignificant (P>0.05). [Table 3]

Table 1: Demographic variables of patients

Demographic Variables	Group M	Group PM	P Value
Age (Years)	23.96± 2.58	23.25± 2.68	>0.05
BMI (kg/M^2)	28.52±1.08	27.93±1.17	>0.05

Table 2: Incidence of PDPH in both the groups

Incidence of PDPH	No of cases	PDPH	Percentage	P- Value
Group PM	40	4	10%	>0.05
Group M	40	3	7.5%	

Table 3: Severity of PDPH in both the groups

	PDPH	Mild	Moderate	Severe	P -value
Group PM	4	2	1	1	>0.05
Group M	3	2	1	0	

DISCUSSION

Spinal anaesthesia is a standard anesthetic technique in obstetrics, as it provides good analgesia and muscle relaxation. But every procedure comes with certain side effects and complications. Lumbar puncture for subarachnoid block is done by either median or paramedian approach. The advantages of spinal anaesthesia lie in its simple technique, the certainty of the block, and fewer side effects and complications. One of them is post-dural puncture headache (PDPH).

The mechanism of PDPH is commonly thought to be persistent leakage of CSF through the dural defect at a faster rate than that of CSF production. The transdural leak leads to decreased CSF volume and pressure. When the patient is in the upright position, gravity causes intracranial contents to place traction on the exquisitely innervated meninges and pain-sensitive intracranial vessels, which refer pain to the frontal region via the trigeminal nerve, to the occiput via the glossopharyngeal and vagus nerves, and to the neck and shoulder via the upper cervical nerves. Compensatory distention of intracranial blood vessels may also be a mechanism.[10-12]

PDPH, although a vexing problem to both the anaesthesiologist and the patient, is ordinarily a self-limiting condition. The usual period of compliance is 4 days, and by the end of one week, 75% will have subsided.[13] However those lasting longer, or those that are severe, are discomforting to the patient and require treatment.[14,15]

Dagmar et al (2013),[16] studied the incidence and clinical significance of postdural puncture headache in young orthopedic patients and parturient in which they concluded that the rate of PDPH was similar in young orthopedics (13.6%) and parturient (14.3%), and was not statistically significantly different. Our study showed that the age of the patients in groups A and B were 23.96± 2.58 years and 23.25± 2.68 years respectively statistically insignificant (P>0.05).

In our study, the incidence of PDPH is 10% in the paramedian group and 7.5% in the median group, which is statistically insignificant (p>0.05). A study done by Janik R & Dick W showed that the incidence of PDPH was higher in the paramedian approach when compared to the midline approach. However, the needle used in their study was a non-cutting needle: 25G Whitacre.[17] Another study done by Faramarz Mosaffa and Khoamorad Karimi have also demonstrated that the incidence of PDPH was higher in the paramedian approach when compared to the midline approach in orthopaedic patients,(incidence was 9.3% in the median and 10.7% in the paramedian group).[18] Another study done by Afsaneh Sadeghi, et al, have shown the incidence of headache was 9.8% in the paramedian group versus 9.4% in the median group (statistically not significant) in patients undergoing elective caesarean.[19]

Teena Bansal et al (2018),[20] studied 200 parturients to compare median and paramedian approach

regarding incidence of PDPH under subarachnoid block in caesarean section. They observed that total incidence of PDPH was 3%, probably because they used 23 G Quinke needle while we used 25 G Quincke.

The exact mechanisms leading to PDPH are still not completely understood, PDPH is believed to be caused by dural leakage of CSF from the iatrogenic dural puncture following diagnostic lumbar puncture or spinal anesthesia.[21] The median approach involves the passage of the needle through the supraspinal and interspinal ligaments and the ligamentum flavum, but the paramedian approach avoids the supra and interspinal ligaments and approaches the ligamentum flavum directly after passing through the paraspinal muscles. The paramedian approach appears to be an easier method due to the easier positioning of patients, especially for short-statured pregnant patients who may have difficulty assuming the proper position for the median technique.[22]

CONCLUSION

We conclude that there is no difference in PDPH incidence with median versus paramedian approaches, and therefore recommend the paramedian approach, especially for pregnant and short-stature patients and those who cannot assume the proper position for the median approach; the easier positioning would result in less pain for the patient and a higher success rate for spinal anaesthesia.

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