

RESEARCH ARTICLE

COMPARISON OF OCCURRENCE OF POST DURAL PUNCTURE HEADACHE IN LOWER SEGMENT CAESAREAN SECTION UNDER SUBARACHNOID BLOCK BY MEDIAN VS PARAMEDIAN APPROACH: A RANDOMIZED INTERVENTIONAL STUDY

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Abstract

Aims: 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. Besides postoperative headache, other side effects like nausea, vomiting have been reported in the postoperative period. Hereby we conducted a study on patients undergoing lower segment caesarean section (LSCS) under spinal anaesthesia by either median or paramedian approach, and compared the occurrence of post dural puncture headache in both groups.

Methods and Material: 400 parturients of ASA grade I & II who underwent LSCS under spinal anaesthesia were divided into two groups: Group M (n=200) received spinal block by median approach while Group PM (n=200) received by paramedian approach. We observed the difference in proportion of cases who develop post dural puncture headache (PDPH) in both study groups and also to determine the difference in mean time duration of development of PDPH in both groups.

Statistical analysis used:The data was analysed by using chi-square and T-test where p<0.05 was considered as statistically significant

Results: 5 patients (2.5%) in group M developed PDPH whereas only 1 patient(0.5%) in group PM developed PDPH which was statistically non-significant (p=0.099). The mean time duration of onset of PDPH was similar in both groups.

Conclusions: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 with 25 G by either median or paramedian approach.

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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. 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.⁽²⁾

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 Method:-

Study Location:

The study was conducted in the department of anaesthesia and obs. & gynecology surgery OT of Zanana Hospital attached to S.M.S. Medical College, Jaipur after the approval of institutional ethical committee and obtaining written informed consent from all patients before participation.

Study Design:

Hospital based randomized interventional study.

Study Period:

Data collection was started after approval from research review board and Institutional Ethical Committee of S.M.S. Medical College Jaipur and clinical trial registry of India from September 2018 till 30th November 2018.

Sample size:

Sample size was calculated to be 200 subjects for each of two groups at alpha error 0.5% and power 80% assuming occurrence of PDPH in median and paramedian in LSCS cases 20% and 10% respectively (as per seed article). Hence for study purpose 400 cases (200 cases for each of group in the median and paramedian approach) were recruited.

Study universe:

Cases undergoing lower segment caesarean section (Duration 40-45 min) under spinal anaesthesia.

Sampling and randomization:

In this study simple random sampling was done by sealed envelope method. A total of 400 sealed envelope (200 per group) were made, each sealed envelope mentioning one of the study group.

Study Groups:

The patients were divided in two groups. Each group consisted of 200 patients (n=200). Group M (Median Approach) - Patients received spinal anaesthesia by median approach. Group PM (Paramedian Approach) - Patients received spinal anaesthesia by paramedianapproach.

Eligibiltiy Criteria:-

Inclusion criteria:

Surgery-lower segment caesarean section under spinal anaesthesia. Age group-18 to 40 Year ASA grade-I &II Patients who gave written informed consent.

Exclusion criteria:

Patients who refused to participate. Uncooperative patients. Patients with sepsis, bacteremia or skin infection of local site. Patients with h/o hypertension (Essential hypertension/Pregnancy induced hypertension). Patients with h/o headache. Patients with raised intracranial tension. History of coagulopathies.

Patients who received spinal anaesthesia more than one attempt.

Methodology:-

After obtaining institutional Ethical Committee approval and informed written Consent from each patient, a hospital based interventional study was conducted. The study was included 400 patients of ASA grade I and II age 18 to 40 requiring elective caesarean section. After pre-anaesthetic check-up and taking informed written consent and assessing fasting status.

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 metoclopemide 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 200 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 povidine 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 povidine 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 syring was disconnected, back flow of CSF was observed and than the patient turn supine andpillow was put under the shoulder and 15° 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.



(A) Ligaments of the lumbar spine: The supraspinous ligament connects the tips of the spinous processes, the interspinousligament connects the shafts of the spinous processes, and the ligamentumflavum connects the lamina. The posterior longitudinal ligament is a dense band that stretches along the posterior aspect of the vertebral bodies. (B) Midline vs paramedian approach to lumbar puncture: Using a traditional midline approach, the spinal needle is inserted in the narrow space in between spinous processes, while in a paramedianapproach, the spinal needle is inserted lateral to the spinous processes and angled toward the center of the spinal canal.³

Intra-operative vitals were recorded at 5minutes, 10minutes, 15minutes, 25minutes and 35minutes after giving the subarachnoid block. Level of sensory block assessed by pin prick, temperature and touch. Monitoring was done using continuous electrocardiography (lead II & V), non-invasive blood pressure and continuous pulse oximetry and patients given oxygen supplement at the flow rate of 4L/min by hudson mask. Intra-operative fluid management was done according to blood loss and hemodynamic parameters and maintenance fluid were given.

If hypotension occurred (SBP<90 mmHg or decrease by more than 20% from baseline (SBP), it was treated with IV Mephentermine 6 mg aliquots, IV Atropine 0.6 mg given if bradycardia (HR<60 BPM) occurred after subarachnoid block. Maintain spo2 at more than 90%.

At the end of surgery, patients were shifted to the post-operative ward.

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).

Statistical Analysis:-

Statistical analysis was performed with the SPSS, version 21 for Windows statistical software package (SPSS inc., Chicago, IL, USA).

The Categorical data was presented as numbers (percent) and were compared among groups using Chi square test.

The quantitative data was presented as mean and standard deviation and were compared by students t-test. Probability was considered to be significant if less than 0.05.

Results:-

Out of 400 patients 6 patients developed PDPH;5 patients (2.5%) in group M whereas only 1 patient (0.5%) in group PM developed PDPH which was statistically not significant (p=0.099). The mean time to onset of PDPH was similar in both groups.

Demographic Variables:

Demographic Variables	Group M	Group PM	P Value
Age (Years)	23.74± 2.70	23.59± 2.59	0.545

Weight (Kg)	58.73 ±6.05	58.54 ± 6.08	0.766
Height (cm)	156.82± 3.21	157.07± 3.07	0.398

Hemodynamic Monitoring:



Mean Heart Rate



Mean Systolic Blood Pressure



Mean Diastolic Blood Pressure





In group M, 5 (2.5%) patients had PDPH and 195 (97.5%) patients did not PDPH. In group PM, 1 (0.5%) patient had PDPH and 199(99.5%) patients did not PDPH.



Mean Onset of headache:

Mean onset of headache in group M was 22.40±1.67 Mean onset of headache in group PM was 24 hrs

Discussion:-

In our study, the difference in the mean age (Group M was 23.4 ± 2.70 and Group PM was 23.59 ± 2.59), height (Group M was 156.82 ± 3.21 and Group PM was 157 ± 3.07), weight (Group M was 58.73 ± 6.05 and Group PM was 58.54 ± 6.08) and hemodynamic among these two groups was statistically not significant (p value >0.05), hence these two groups were comparable with respect to age, height, weight and hemodynamic.

Dagmar et al (2013) 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.

In our observation the total occurrence of PDPH was 1.5%. Out of 400 patients only six developed PDPH. Statistically the difference was not significant (p=0.217).

Teena Bansal et al (2018) 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% whereas in our study the total incidence was half (1.5%), probably because they used 23 G Quinke needle while we used 25 G Quincke.

In our study, the majority of patients developed headache on day one. The difference in the mean onset of headache in both two group was statistically not significant (p=0.432).

In 2017 ManishaKanagarajan et al studied that comparative analysis of safety and effectiveness of spinal anaesthesia though median and paramedian approach for caesarean section they found that mean onset of PDPH was similar in both groups (2.8 vs. 2.7 days). Their results are similar to ours, all patients presented in the first 72 hours.

In our study, the only patient in paramedian group who reported had mild headache. In the median group three patients had mild headache, one had moderate and one reported severe headache.

In 2018 Balwinderjit Singh et al studied the incidence of PDPH after spinal anaesthesia by median and paramedian approach. They observed that in paramedian group, one patient reported mild and moderate post spinal headache, respectively and 4 patients and 6 patients complained of mild and moderate post spinal headache, respectively in median group. They concluded that data were statistically significant (p<0.05).

Conclusion:-

We conclude if meticulous care is taken in not very experienced hands 25G Quincke needle is a good choice for subarachnoid block in parturients undergoing LSCS with spinal anaesthesia with any approach, median or paramedian. The occurrence of is similar by both approaches and much lower than reported in literature(1.5% v/s 25% / 10%/03%) also they all responded to simple measures like bed rest, IV fluids, diclofenac and coffee. Our incidence was probably low as our patients were ambulated after 24 hours as our institutional protocol.

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