ORIGINAL ARTICLE

OPEN ACCESS

Post Dural Puncture Headache- A Comparison of 25 G and 27 G Quincke Spinal Needles in Patients Undergoing Elective Caesarean Section under Spinal Anaesthesia

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Received: Aug 21,2020 Accepted: Nov 09,2020

Abstract

Objective: To find out and compare the frequency of PDPH with 25 G and 27 G spinal needle when they were used in obstetrics patients undergoing cesarean section.

Methodology: This study was carried out over a period of one year from 1st February 2020 to 31st January 2021 in the department of Anesthesiology and ICU of HBS General Hospital Islamabad. patients were randomly placed into two groups by coin toss method. Group I patients were given spinal anesthesia with 25 G Quincke needle and group II, patients were given spinal injection with 27 G Quincke needle. Frequency of headache and percentages were presented as qualitative variables and quantitative variables like age of the patients was presented as Mean ± SD. Sample t-test was applied on quantitative variables and Chi-square test was applied for comparison of PDPH. P value of less than 0.05 was considered significant.

Results: Six patients (15%) in group I developed PDPH whereas only one patient in group II (2.5 %) developed it. There was statistically significant difference (p =0.035) between the two groups.

Conclusions: We have concluded that 27 G Quincke spinal needle has clear cut advantage over 25 G Quincke spinal needle as far as frequency of PDPH is concerned in spinal anesthesia for cesarean section.

Keywords: Post dural puncture headache, spinal needles, elective cesarean section

Conflict of Interest: None **Funding Source**: None

Introduction

Spinal anesthesia has gained popularity as preferred anesthetic technique for elective cesaerian sections nowadays. Post dural puncture headache a serious complication of spinal anaesthesia results from leakage of CSF from dural puncture. Size of the needle used for spinal anesthesia, age and the sex of the patients are most important factors to determine the severity and frequency of the PDPH.

Nowadays general anesthesia for cesarean section has almost completely been replaced by regional anesthesia. This is mainly due to maternal risks involved in general anesthesia.[1] Spinal anesthesia has gained popularity as preferred anesthetic technique, because it is easy to administer, have immediate onset and provides excellent operating conditions. Spinal anesthesia also provides effective post-operative analgesia, lessens fetal as well as maternal complications of general anesthesia and requires minimal postoperative care.[2] But spinal anesthesia has its own complications. Post dural puncture headache (PDPH) is very disturbing complication of spinal anesthesia. PDPH is more common in young adults and particularly in obstetrics patients. It results from puncture of dura matter and signs and symptoms are caused due to leakage of cerebrospinal fluid (CSF) traction on the cranial contents and reflex cerebral vasodilatation[3]. PDPH may represent 2-7 days after lumber puncture and may persist up to six weeks; characteristically it is worse on sitting, occipital in distribution and very disabling for the patient.

The single most important factor affecting the frequency and severity of PDPH is the size of the needle used for dural puncture. The incidence is reduced by using

smaller gauge or pencil point needles and by aligning the bevel of the needle to penetrate the dura in sagittal plane.[4] Pencil point needles are still not widely available in Pakistan and needles smaller gauge less than 27 G are technically more difficult to use and are associated with high failure rate for spinal anesthesia. So 25 G, 26 G and 27 G Quincke needles are used frequently for this purpose. Incidence data of PDPH in Pakistan is not available but overall incidence of PDPH ranges from 0 to 30 %.[5]

Methodology

This study was carried out over a period of one year from 1st February 2020 to 31st January 2021 in the department of Anesthesiology and ICU of HBS General Hospital Islamabad. After the approval of Institutional Ethics Committee and getting written informed consent from 80 patients who were having an American Society of Anesthesiologists (ASA) physical status of I and II, scheduled for elective lower segment cesarean section (LSCS) were included in the study. All the parturients were having full term pregnancy. Patients with severe hypo-volemia, raised intracranial pressure, infection at the site of spinal injection, coagulopathy disorders, severe aortic or mitral stenosis, placenta previa grade II to IV, placenta accreta, twin pregnancy and pre-eclampsia were excluded from the study.

After clinical examination by the obstetrician, patients were investigates and evaluated for spinal anesthesia. Detailed physical and systemic examinations were carried out, airway of the patients were assessed and prepared for anesthesia and surgery. Sampling was done by consecutive probability technique and patients were randomly placed into two groups by coin toss method. Group I patients were given spinal anesthesia with 25 G Quincke needle and group II, patients were given spinal injection with 27 G Quincke needle. When the patients were shifted to Ot, intravenous line was maintained with 18 G intravenous canula and monitors were attached to patients. After preloading the patients with Ringer's lactate solution 07 ml per kg in initial 05 minutes, spinal anesthesia was administered to the patient in sitting position at L 3-4 or at L4-5 intervertebral space after subcutaneous infiltration of skin by 2ml of 2% lidocaine. Strict aseptic protocol was maintained while giving spinal injection and while penetrating the bevel of the needle was aligned in a sagittal plane to avoid cutting of dura fibres. An inj of 1.5 ml 0.75% hyperbaric bupivacaine was injected in to subarachnoid space. Patients were gently placed in supine position immediately after giving injection with left uterine displacement. PDPH was assessed after 12, 18, 24 and 48 hours after the operation. Post-dural puncture headache was defined as non-radiating severe headache felt in frontal or occipital areas, which increased in severity while attaining upright position and decreased when patient lied down.

Data was entered in SPSS version-22 for statistical analysis. Frequency of PDPH was presented as a number and percentage for qualitative variable, while quantitative variable like age, weight and height were denoted as mean ± SD. Chi-square test was applied for comparison of PDPH and sample T- test was applied on quantitative variables.

Results

A total of 80 full term pregnant patients planned for LSCS, who fulfilled the inclusion and exclusion criteria were included in the study. Each group contained 40 patients. Ages of patients ranged between 19-41 years. The mean ages of patients were 23.88±2.74 and 24.43±4.37 years in group I and II respectively. The other variables recorded in demographic data were also similar in both of the groups as shown in table 1. However six patients (15 %) out of 40 patients in group I developed PDPH whereas only one patient (2.5 %) out of 40 patients in group II developed it which showed statistically significant difference with a P value of 0.035, as shown in fig 1.

Table 1. Demographic Data. N=40

Study Groups	Group I	Group II
Mean age (Years)	23.88±2.74	24.43±4.37
Mean Weight (kg)	62.38±5.79	64.21±7.62
Mean Height (cm)	159.26±8.34	157.94±9.12
Primipara (No)	13(32.5%)	11(27.5%)
Multipara (No)	27(67.5%)	29(72.5%)
ASA I	22(55.0%)	19(47.5%)
ASA II	18(45.0%)	21(52.5%)

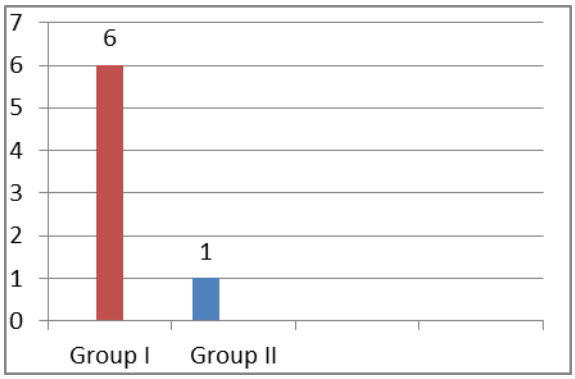

Fig 1. Incidence of Postdural puncture headache in group I and group II

Discussion

Among regional anaesthesia techniques, spinal anaesthesia is the most common. Spinal anesthesia is safe and widely practiced anesthetic technique all over the world for operation of cesarean section. The advantages are reliability, dense motor block, rapid onset, simplicity and avoidance of airway complications. Spinal anaesthesia has different complications and one complication is post dural puncture headache which is associated with type of needle. PDHP is a very serious complication and is more common in parturients as most of them are young[6]. In majority of cases this resolves spontaneously but in some patients headache lasts for months and years. With the development of fine gauge spinal needle there is significant reduction in post dural puncture headache.[7]

It has many advantages as compared to general anesthesia, but out of a few complication of spinal anesthesia, Although the incidence of PDPH has grossly reduced all over the world by introducing a smaller bore spinal needles[8], but still the reported incidence of PDPH after spinal anesthesia ranges from 4 to 40 % when 25 G Quincke spinal needle is used in patient for cesarean section. The frequency of PDPH with 27 G Quincke needle ranges from 1.1 % to 12.8 % but in some studies incidence of PDPH was 0 % with 27 G needle when spinal anesthesia was performed by consultants. The intensity of headache may range from mild to severe and symptoms may start on first or second day after spinal injection and may last for 72 hours. In most studies, symptoms of PDPH are less severe with 27 G Quincke needles and more with 25 G needles. Apart from other factors PDPH is related to the types of spinal needle used as well size of spinal needles.[9,10]

The use of smaller bore spinal needle progressively reduces the incidence as well as severity of PDPH. The introduction of pencil point needle has maximally reduced the incidence of PDPH as it is considered producing less damage to the dural fibers by splitting them instead of cutting them and allowing the hole to close more rapidly. Thus out of all types of needles, pencil point needles have lowest incidence of PDPH[11]. In current study as we observed the rate of PDPH was 15 % with 25 G (WB) needles, which was clearly more than the rate of PDPH noted with 27 G(NB) needles which was 2.5%. Therefore it was clearly demonstrated that there was a significant reduction in the incidence of post-dural puncture headache when 27 G, Quincke spinal needle was used for spinal anesthesia as compared to 25 G Quincke spinal needle. Our results are comparable with the other studies, as the incidence of PDPH in our settings is almost similar to these. [12,13,14]

Conclusion

We have concluded that 27 G Quincke spinal needles has clear cut advantage over 25 G Quincke spinal needles as far as the frequency and severity of PDPH is concerned, when used for spinal anesthesia for cesarean section.

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Authors Contribution:

[1,3,6]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published

[2,4,5] Drafting the work or revising it critically for important intellectual content;