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Original Research Article

A Clinical Assessment of the Effect of Intrathecal Fentanyl for Prevention of PDPH in Caesarean Section

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Abstract

Aim: The aim of the present study was to compare the incidence of post dural puncture headache (PDPH) with or without intrathecal fentanyl in parturients undergoing lower segment cesarean section (LSCS).

Methods: The present study was conducted in the Department of obstetrics and Gynaecology, Gauri Devi Institute of Medical Science & Hospital, Durgapur, West Bengal, India for one year . A total of 200 patients aged between 18 to 45 years of ASA grade II who underwent elective or emergency caesarean section were selected for the study and randomly allocated into either group.

Results: The demographic profile i.e. mean age, weight, height and BMI were comparable in both the groups. The demographic profile was comparable in both the groups. The incidence of PDPH was 1% with fentanyl group and 4% with control group. The PDPH was mild in fentanyl group and moderate in control group. Backache, vertigo, nausea and vomiting each had an incidence of 1% in the fentanyl group as compared to 3% cases of backache, nausea and vomiting in control group. Pruritus was not reported in either of the groups.

Conclusion: We concluded that the incidence and severity of post dural puncture headache (PDPH) was decreased with intrathecal fentanyl (25µg) in caesarean section in a non-significant manner. Though the severity increased in the control group but it was also insignificant. Although an overall protective effect of neuraxial fentanyl was not observed in this study, its role as prevention for PDPH in caesarean section remains to be investigated.

Keywords: Postdural puncture headache, subarachnoid block, fentanyl, LSCS, intrathecal

Introduction

Pain during childbirth has been described by women as severe [1] and frequent; these parturients especially those in the developing countries have few or no options for labor pain relief during childbirth. Parenteral opioids and sedatives are the most frequently prescribed agents for women in labor in many poor resource settings. [2] This method of pain relief has been shown to have little or no effect on labor pain. [3] Pain relief not only provides patient's comfort, but also attenuates the release of stress hormones, whose actions can draw from the parturients' reserves as well as depriving the fetus of oxygen and nutrients. [1] The provision of effective labor analgesia is now known to decrease the inhibitory effects of endogenous maternal catecholamine on uterine contractility, attenuates maternal acidosis, and improves intrapartum maternal well-being.

Although the gold standard in labor analgesia is the utilization of epidural services [2] which are widely used to provide pain-free labor in many parts of the world and have the advantage of providing flexibility to meet the needs of each patient. [4] The use of single-shot intrathecal low dose bupivacaine for labor analgesia has been demonstrated and found to be effective. [5] The advantages of this form of technique include the rapidity of onset and reliability, with minimal hemodynamic changes and motor block. Several adjuncts have been added to intrathecal bupivacaine to prolong the duration of sensory block. Such adjuncts include the use of fentanyl [6], sufentanil [7], morpine [8], clonidine [9] and dexmedetomidine [10] just to mention but a few.

Clinical research has shown that the use of smaller-gauge needles, particularly of the pencil-point design, are associated with a lower risk of PDPH than cutting-point needle tips. [11,12] However, the cost and lack of availability of the pencil-point needles make it difficult to be routinely used in parturients, especially in low-income countries. Neuraxial narcotics were found to reduce the

incidence of PDPH after accidental dural puncture (ADP) during epidural anaesthesia. [13-15] In addition, Martlew conducted a 9-year prospective audit and found that spinal opioids might prevent PDPH. [16]

The aim of the present study was to compare the incidence of post dural puncture headache (PDPH) with or without intrathecal fentanyl in parturients undergoing lower segment cesarean section (LSCS).

Materials and Methods

The present study was conducted in the Department of obstetrics and Gynaecology, Gauri Devi Institute of Medical Science & Hospital, Durgapur, West Bengal, India for one year . A total of 200 patients aged between 18 to 45 years of ASA grade II who underwent elective or emergency caesarean section were selected for the study and randomly allocated into either group.

Group F: Received bupivacaine 2ml + fentanyl 0.5 ml (25 µg)

Group C: Received bupivacaine 2ml + normal saline 0.5 ml

Patients with any history of pregnancy induced hypertension, eclampsia, neurological deficit, migraine or any other headache, altered anatomy of spine (scoliosis, lordosis), on any analgesic medication, BMI>35 and in those where more than 1 attempt was required for SAB were excluded from the study.

After a thorough pre anaesthetic check-up and written informed consent, patients were shifted to operation theatre. ECG, non-invasive blood pressure, heart rate, and SpO2 were monitored throughout the procedure (Mindray ipm10). An intravenous (IV) line was secured with 18G cannula and all the patients were hydrated with 10 ml/kg RL and premedicated with IV metoclopramide 10 mg. SAB was performed in sitting position through midline approach at L3-L4 interspace. A 25 guage Quincke spinal needle was used to perform SAB with bevel of the needle in lateral position after injecting the drug spinal needle was removed with stylet in situ [4].

Postoperatively all the parturients were monitored for next 3 days in ward and then telephonically after discharge till 14th day for headache and any other complications. If any patient complained headache, further its onset, characteristics, duration, severity, aggravating and relieving factors or any other associated symptoms like backache, vertigo, nausea, vomiting, pruritis were monitored. Severity of headache was evaluated by a visual analogue scale score (VAS). PDPH was treated with adequate hydration, coffee or 500 mg paracetamol.

Results

Table 1: Demographic profile

	Group F (Mean ± SD)	Group C (Mean ± SD)
Age (yr)	24.18 ± 3.77	26.14±5.15
Weight (kg)	58.02 ± 7.43	58.92±6.06
Height (cm)	156.04 ± 21.19	158.78±5.65

The demographic profile i.e. mean age, weight, height and BMI were comparable in both the groups.

Table 2: Post dural puncture headache

Characteristics of PDPH	Group C No. ofpatients (%)	Group F No. ofpatients (%)	p value
Incidence	4 (4%)	1 (1%)	0.12
Severity			
Mild (VAS≤3)	3 (3%)	1(1%)	0.36
Moderate (VAS 4-7)	2 (2%)	0	0.12
Severe (VAS>7)	0	0	0
Site			
Frontal	3 (3%)	1(1%)	0.32
Generalized	2 (2%)	0	0.18
Quality			
Dull aching	4 (4%)	1(1%)	0.085
Throbbing	0	0	0
Associated symptoms			
Backache	3 (3%)	1(1%)	0.24
Vertigo	0	1(1%)	0.32
Nausea /vomiting	3(3%)	1(1%)	0.28
Pruritus	0	0	0

The demographic profile was comparable in both the groups. The incidence of PDPH was 1% with fentanyl group and 4% with control group. The PDPH was mild in fentanyl group and moderate in control group. Backache, vertigo, nausea and vomiting each had an incidence of 1% in the fentanyl group as compared to 3% cases of backache, nausea and vomiting in control group. Pruritus was not reported in either of the groups.

Discussion

Subarachnoid block is the most widely used technique for LSCS. Although subarachnoid block (SAB) is safe and highly effective but it also has its associated complications like hypotension, unilateral block, transient neurological symptoms and post-dural puncture headache (PDPH) with other less common side effects being backache, nausea, vomiting, vertigo, tinnitus and blurring of vision. PDPH is the most distressing complication and clinically presents with frontal and occipital headache. [17] PDPH is most commonly seen in the obstetric population may be due to raised intraabdominal pressure during pregnancy which alters CSF pressure.18 Unintetional dural puncture and CSF leak, dehydration during labour and rapid change in blood volume following delivery can also lead to PDPH, but the exact mechanism is still unknown. [18] Small doses of fentanyl are effective with faster onset and increased duration of action. Spinal opioids besides being advantageous in systemic pain management are found to reduce incidence of PDPH in SAB and epidural anaesthesia. [19]

PDPH is more common in low BMI patients. Adequate hydration prevents the PDPH and most of the patients respond to simple analgesics like paracetamol. Pharmacological treatment for PDPH includes caffeine, sumatriptan, gabapentin, epidural blood patch and acupuncture. The use of neuraxial opioids have been reported to reduce the incidence of PDPH after SAB. Most studies have used intrathecal morphine for prevention of PDPH in caesarean section. [20] The demographic profile i.e. mean age, weight, height and BMI were comparable in both the groups. The demographic profile was comparable in both the groups.

Opioids when combined with local anaesthetics improve the quality of block and reduce the need for systemic opioids postoperatively. [21] The other possible mechanism of action of opioids is an effect on pre and post synaptic neurons and activation of analgesia system of body. Activation of opioid receptor leads to closing of voltage sensitive calcium channels increasing the potassium efflux from cell leading to hyperpolarization and reduced cAMP production via inhibition of adenylyl cyclase.[22] Another possible explanation is rostral spread of epidural morphine to induce central analgesia from the neuraxial lumbar region. [22] The incidence of PDPH was 1% with fentanyl group and 4% with control group. The PDPH was mild in fentanyl group and moderate in control group. Backache, vertigo, nausea and vomiting each had an incidence of 1% in the fentanyl group as compared to 3% cases of backache, nausea and vomiting in control group. Pruritus was not reported in either of the groups. Lesser incidence of PDPH with higher dose of intrathecal opioids has been reported when using different doses of spinal opioids. [23] Reduced incidence of postoperative PDPH in case of accidental dural puncture following attempt of epidural anaesthesia has been reported. [23] The severity of PDPH differs significantly in control group as compared to opioid group as indicated by higher VAS score. [21,23-25]

Conclusion

We concluded that the incidence and severity of post dural puncture headache (PDPH) was decreased with intrathecal fentanyl (25µg) in caesarean section in a non-significant manner. Though the severity increased in the control group but it was also insignificant. Although an overall protective effect of neuraxial fentanyl was not observed in this study, its role as prevention for PDPH in caesarean section remains to be investigated.

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