Original Article

Mode of Delivery and Duration of Second stage in Laboring Women after Low Concentration epidural Infusions Versus Parenteral Opioid Aanalgesia

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Objective: To compare the effects of low concentration epidural infusions of bupivacaine with parenteral opioid analgesia on mode of delivery and duration of second stage in laboring women.

Study Design: Quasi Experimental Study.

Place and Duration: Labour room Department Obstetrics and Gynecology, Mother and Child Health Care Unit 1.Pakistan Institute of Medical Sciences (PIMS), Islamabad.

Materials and Methods: The study included all laboring women in whom effect of epidural and parenteral analgesia on mode of delivery and duration of second stage of labour were recorded. The outcome of labour was assessed as duration of second stage of labour and mode of delivery in terms of spontaneous vaginal delivery, instrumental delivery or caesarian section.

Results: In Epidural Bupivacaine group there were 30 (44%) instrumental deliveries, 34 (50%) normal vaginal deliveries and 4 (6%) had cesarean section. In Parenteral Pentazocine group 16 (23.52%) patients had instrumental and rest 52 (76.27%) had normal vaginal delivery. There was significant (P-value < 0.05) difference in both groups with respect to mode of delivery i.e. 52 (76.27%) patients in Parenteral Pentazocine group and 34 (50%) patients in Epidural Bupivacaine group.

The comparison of duration of 2nd stage of labor in both groups showed that the mean duration of 2nd stage of labor in Epidural Bupivacaine group was significantly higher (75.19±8.10 vs. 37.40±0.61, P-value <0.05) as compared with Parenteral Pentazocine group.

Conclusions: Epidural analgesia using low concentration infusions of bupivacaine is unlikely to increase the risk of caesarean section but may increase the risk of instrumental vaginal delivery, as well as prolongs the second stage of labour, as compared to parenteral opioid analgesia group.

Key words: Epidural analgesia, Instrumental deliveries, Analgesia in labour.

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Introduction

Labour and birth, although considered as normal physiological process, can produce significant pain, requiring appropriate management. The pain of childbirth is arguably the most severe pain most women will endure in their lifetimes. The pain of the early first stage of labor arises from dilation of the lower uterine segment and cervix. Pain from the late first stage and second stage of labor arises from descent of the fetus in the birth canal, resulting in distension and tearing of tissues in the vagina and perineum. Methods used for labour analgesia are regional (epidural, commonly used), systemic (opioid derivatives, non-opioid pain killers, inhaled anesthetic agent) and other non drug approaches like psychoprophylaxis and physical methods like massage.[1-3]

Epidural analgesia offers best effectiveness and safety ratio.[2,3] Although it increases the rate of instrumental delivery, and prolongs second stage of labour yet its advantage of pain free labour, better psychological[6] and neonatal outcome and no significant complication outweighs this drawback. Epidural analgesia does not increases the rate of cesarean section[7], but increases

the duration of second stage of labour and less incidence of low Apgar score, in this group.

Parenteral opioid derivatives are cheap to use, easy to administer, readily available and provide good pain relief, [8,9] but are associated with longer onset of analgesia and low APGAR score. Among opioid derivatives, Pentazocine is an opioid analgesic, has a place in clinical practice. Epidural analgesia is very popular but not always accessible; Pentazocine is the option, which is effective in analgesia and causes less nausea and vomiting in mothers when used in combination with metoclopramide, and minimal neonatal respiratory depression as compared to other opioid derivatives.[10]

Although regional anesthesia has been associated with a reduction in anesthesia related maternal mortality, there is continuing controversy over whether epidural analgesia impedes the progress of labour by causing dystocia and increasing operative delivery rates.[11]

Previous reviews have included disparate regimens for epidural analgesia and women of mixed parity. We focused on epidural infusions containing low concentrations of local anaesthetic as these are associated with a lower risk of operative delivery.[12] We assessed all operative and instrumental deliveries

Materials and Methods

This collaborative study was undertaken at the Labour room Department of Obstetrics and Gynecology, and Anesthesiology at Mother and Child Health Care Unit I Pakistan Institute of Medical Sciences (PIMS), Islamabad. All spontaneous Labouring women with Singleton pregnancy and Vertex presentation at gestational Age of 37-42wk, entering the second stage of labour who had an epidural sited or given parenteral analgesia in active stage of labour were considered eligible for enrollment in the trial

Women with any systemic illness ;(coagulopathy, Ischemic Heart Diseases, Pre-eclampsia, Eclampsia, Diabetes mellitus)' were excluded from the study.

When possible the aims of the study were explained to patients in the antenatal clinic before labour, and provisional consent was obtained at this stage and confirmed when the patients were admitted in labour. History and examination was performed to meet the demands of inclusion and exclusion criteria of epidural analgesia and that of Pentazocine.

Results

Two groups of 68 patients each was made based on lottery method. One group was be labeled as group A and the other as group B.

Group A was given epidural analgesia by anesthetist at cervical dilatation of 3-4cm. 500ml of colloid solution was infused before activation with Bupivacaine 0.25%-0.5% in a dose of 20-75 mg (8-15 ml) as first dose. Top up doses were given by obstetrician with interval of 60-120 minutes in a dose of 15-50 mg (6-10 ml). (Maximum of two doses after activation). Group B was given Pentazocine in a dose of 30-60mg as intramuscular injection, every 2-3 hours (maximum of two doses after first dose), and was avoided with a window of 1-3 hours before delivery. Information was studied and collected as duration of second stage of labour mode of delivery in terms of operative or spontaneous vaginal delivery in both groups.

In our study the mean maternal age of Epidural Bupivacaine group (Group A) was 25.88±3.505 years and the mean age in Parenteral Pentazocine group (group B) was 26.01±3.483 years. The distribution of parity was as; there were 43 (63.24%) patients in group A and 39 (57.35%) patients in group B who were nulliparous. Similarly in group A, 15(22.06%) and 10 (14.71%) patients and in group B, 22 (32.35%) and 7 (10.29%) patients who presented with parity of 1 and 2.The mean gestational age in Epidural Bupivacaine group was 38.72±1.359 weeks and in Parenteral Pentazocine group the mean gestational age was 38.71 ± 1.339 weeks. Table I shows mode of delivery among the patients.

Table I: Comparison of Mode of Delivery

Mode of Delivery	Group		Total
	Epidural Bupivacaine	Parenteral Pentazocine	
instrumental	30	16	46
normal vaginal delivery	34	52	86
Cesarean section	4	0	4
Total	68	68	136

* P-value = 0.002

Discussion

Labour and birth, although considered as normal physiological process, can produce significant pain, requiring appropriate management. Methods used for this purpose are regional (epidural, commonly used), systemic (opioid derivatives, non-opioid pain killers, inhaled anesthetic agent) and other non drug approaches like psychoprophylaxis and physical methods like massage.[13]

Epidural analgesia offers best effectiveness and safety ratio. Although it increases the rate of instrumental delivery, yet its advantage of pain free labour, better psychological and neonatal outcome and no significant complication outweighs this drawback. Epidural

analgesia increases the duration of second stage of labour and there is less incidence of one min Apgar score below 7 in this group.[14]

In our study data was analyzed for 136 Laboring women. In Epidural Bupivacaine group there were 30 (44%) instrumental deliveries, 34 (50%) normal vaginal deliveries and 4 (6%) delivered with cesarean section. In Parenteral Pentazocine group 16 (23.52%) patients delivered instrumentally and remaining 52 (76.27%) delivered normally.

Our results correspond with Bakhamees H's study in 2007 "Does epidural increase the incidence of cesarean delivery or instrumental labor in Saudi populations?" It proved that laboring women who receive epidural analgesia during labor do not seem to be at an increased risk of delivery by caesarean section.[15]

In our study among Epidural group Out of 4 cesarean section 3 were performed due to persistent bradycardia before full dilatation, and 1 was performed due to grade 3 meconium and failure to descent.

A similar study was done by Berqlund A, lefevre-cholay H, Bacci A, Blyumina A and Lindmark G. "Successful implementation of evidence-based routines in Ukrainian maternities." The results of their study support our findings because cesarean section rate was not increased by epidural analgesia.[16]

Among Epidural group there were 30 instrumental deliveries. Out of them 16 were performed due to poor maternal effort, 10 were due to persistent ocipitotransverse position, and 4 were due to grade 3 meconium and bradycardia. Among Parenteral Group 6 were due to poor maternal effort, 6 were due to grade 3 meconium and 4 were due to bradycardia at full dilatation due to cord around neck. A univariate analysis was done in 2012 by Revicky. V to identify factors, like epidural analgesia, that had a significant association with shoulder dystocia. Therefore regular drills for shoulder dystocia and awareness of increased incidence with instrumental deliveries are important to reduce fetomaternal morbidity and mortality.[17] The results of our study partially contradict with Wassen MM.

In 2011, a systematic review "Early versus late epidural analgesia and risk of instrumental delivery in nulliparous women" showed no increased risk of caesarean or instrumental vaginal delivery for women receiving early epidural analgesia at cervical dilatation of 3 cm or less in comparison with late epidural analgesia.[18]

According to our data, there was a significant (P-value < 0.05) difference in both groups with respect to mode of delivery in terms of spontaneous vaginal deliveries i.e. 52 (76.27%) patients in Parenteral Pentazocine group and 34 (50%) patients in Epidural Bupivacaine group.

Our results correspond to the study "The effect of epidural analgesia on labor progress and outcome in nulliparous women", by O Hana HP in 2008.[19] It showed that Epidural analgesia in nulliparous parturients increases the risk for labor dystocia and accordingly is an independent risk factor for vacuum extraction. Nevertheless, it does not pose an independent risk for cesarean delivery.

A similar study was done by Wong CA in 2010 " Advances in labor analgesia"[20] in which it proved that, Neuraxial labor analgesia (most commonly epidural or combined spinal-epidural) is the most effective method of pain relief during childbirth and the only method that provides complete analgesia without maternal or fetal sedation.

The mean duration of 2nd stage of labor in Epidural Bupivacaine group was significantly higher (75.19±8.10 vs. 37.40±0.61, P-value <0.05) as compared with Parenteral Pentazocine group. Among both groups there was no significant difference in mean duration of first and second stage of labor.

Our results correspond to Halpern and Stephen H. "Effect of labor analgesia on labor outcome" (2010).[21] The comparative study of parenteral opioids with neuraxial analgesia showed no increase in the incidence of cesarean section, although it is associated with a longer (~16 min) second stage of labor. The incidence of operative vaginal delivery is higher in the epidural group. There was no difference in neonatal outcome. Neuraxial analgesia does not interfere with the outcome of labor.

In a retrospective study conducted in 2011 on "Effect of epidural analgesia on labor and delivery", Gerli.S et al. showed that the duration of the first and second stage, and total duration of labor was longer in epidural group. However, epidural analgesia was not demonstrated as an independent risk factor for prolonged labor.

The variable most influencing the total duration of labor and the duration of the first stage was nulliparity; the factors most influencing the duration of the second stage were old age, a reduced body mass index and a high newborn weight.[22]

Conclusion

Epidural analgesia using low concentration infusion of bupivacaine is unlikely to increase the risk of caesarean section, but may increase the risk of instrumental vaginal delivery. Epidural analgesia, however, had a longer second stage of labor, but neonatal outcomes remained unharmed.

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