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Evaluate and Outcome Safety of Epidural Analgesia in Surgical Practice for Labour Pain: Study on Tertiary Hospital in Bangladesh

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Abstract **Original Research Article**

Background: It is possible to use epidural analgesia as a standard and efficient, reducing labor pain. Nevertheless, it might interfere with the body's natural process of giving birth. We wanted to see how labor went on behalf of female epidural analgesic patients that worked well in labor time, delivery method, and baby's health. ***Methods:*** This quasi-experimental study was conducted in the Department of Anaesthesia, Rajshahi Medical College Hospital, and Tertiary Hospital in Rajshahi, Bangladesh. From June 2018 to December 2020. We used a non-probability handy sampling approach to pick one hundred pregnant ladies. It was more convenient to split the participants into two groups of 50 each. The study included women of any time between conception and delivery at 37-41 weeks of pregnancy as a potential data source. This study examined the impact on labor progress, delivery method, and Apgar ratings of newborns using epidural analgesia in group B and non-epidural in group A in the lumber area. The second stage was normal for 77 Among individuals who underwent treatment. However, the second stage was extended for 23. ***Result:*** The epidural group consisted of 18 patients (36%), whereas the non-epidural group had 5 patients (10%). 4 patients (8%) experienced intrapartum problems in terms of epidural anesthesia, whereas the non-epidural group did not. In all, 65 Mothers gave birth to their children naturally by vaginal delivery, while 35 women gave birth using artificial means. The epidural group consisted of 29 patients (58%), while the non-epidural group had just 6 individuals (12%). Both groups of newborns had the Apgar test results: 8/10 (74.3%) and 9/10 (24.8%) at five minutes, and none of the babies in either group required bag or mask resuscitation. The average Apgar score for both groups was 8/10 (74.3%) and 9/10 (24.8%). ***Conclusion:*** Epidural analgesia improves an instrument's rate of delivery while prolonging the stages of childbirth. Epidural analgesia has minimal intrapartum problems but a good neonatal outcome.

Keywords: Epidural analgesia, Anaesthesia, labour Pain, Surgical Practice, Rajshahi Medical College Hospital.

INTRODUCTION

About 30% of women report that labor was significantly more complicated than they had anticipated. Labor is a physically and emotionally demanding event [1]. In spite of several non-pharmacological methods of treating painful conditions such as hypnosis, acupuncture, and training in different relaxation techniques, including transcutaneous electrical nerve stimulation (TENS) that have been reported, many people still ask for pain medication. Throughout history, mothers have been administered opium and hyoscine extracts in an effort to alleviate pain and suffering during tough labors, but epidural analgesia, which has gained popularity since the early 1970s, remains the most dependable method for alleviating labor pain. Both analgesia (reduction or elimination of pain) and anaesthesia (complete absence of sensations) are referred to as epidural when a local

anesthetic and/or opioid (natural or synthetic narcotic) injections are administered in the epidural area surrounding the spinal column [2, 3].

The somatic and visceral aspects of labor pain are both presents. Contractions generate cervical dilatation and effacement, which convey pain signals when stretched and distended. Early labor pain is attributed to the T10-L1 dermatomes. Somatic pain originates in the vagina, vulva, and perineum and begins late in the first stage of labor before cervical dilation is complete. It is conveyed through the pudendal nerve, connecting to the S2, S3, and S4 sacral nerves. Epidural blockage can stop these channels from working [4].

Having pain makes you tired, as well as causing long-term mental problems that might affect your bond with your infant during those first critical days. Furthermore, it harms the heart, metabolism, and endocrine system, making foetal hypoxia more likely [5]. Lumbar epidural analgesia is a pain-relieving technique used during childbirth that is both safe and effective. It's a flexible method that may be used to anesthetize a surgical delivery as well. With epidural analgesia, you'll get excellent pain relief without significant motor block, a reduction in maternal catecholamine, and a quick way to get under anesthesia during surgery [6]. Epidural analgesia is a common pain management option nowadays, but it might interfere with the natural process of childbirth if used improperly. Some research has shown that epidural analgesia and instrumental deliveries are linked to an extended second stage of labour and a decreased desire to push from the decreased bearing down reflex and reduced uterine activity. This research shows that instrumental deliveries can also prolong the second stage of labor. Second-stage cesarean sections, episiotomies, perineal injuries, maternal fever, partial blocks, post-dural puncture headaches, urine retention, and hypotension are all possible consequences for mothers who undergo cesarean sections. Low Apgar scores, the requirement for positive pressure breathing, delivery trauma, and admission to the neonatal intensive care unit are among neonatal outcomes [7, 8].

Epidural analgesia has been more popular in developing countries in recent years. Our anesthetists are now better equipped to determine which type of anesthesia is best for a certain patient based on their increased level of knowledge. Several reasons, including societal conventions, lack of public knowledge, and a lack of structured maternity care, may contribute to our community's lesser acceptance of this beneficial modality [9]. This is expected to be a long-term trend that improves. In this area of the globe, more study is needed to examine the outcomes of labor with epidural analgesia in terms of improved pain relief and mother satisfaction in order to enhance public acceptability [10].

MATERIAL AND METHODS

In the Department of Anaesthesia at Rajshahi Medical College Hospital and Tertiary Hospital in Rajshahi, Bangladesh, a quasi-experimental study was conducted from June 2018 to December 2020. Non-probability handy sampling approach was used to choose 100 pregnant women. There were two groups of fifty subjects each to make it easier to analyze the data. In group A, subcutaneous injections of distilled water were administered at the lumber area, whereas epidural analgesia was administered in group B. This was a single-blind placebo-controlled trial. Patients with spontaneous or forced labor, singleton cephalic presentation, and acceptable pelvic dimensions, as determined by clinical pelvimetry and reactive cardiotocography (CTG), were included in this study. LMP and ultrasonography verified the mother's gestational age. These women were eliminated from the research because of obstetrical difficulties, including twin pregnancies, prior cesarean sections, or relative cephalopelvic disproportions such as low maternal height and a large infant.

A history and physical examination were performed on each group after informed consent was obtained. Good uterine contractions and a cervical exam allowed doctors to diagnose an active stage of labor. It was determined if the mother's vital signs (blood pressure, pulse, and temperature) were steady and whether the fetus's CTG was adequate. A first aid kit that included an epinephrine inhaler, ephedrine, and thiopentone sodium was inspected. Each mother was turned to the left lateral position and urged to curl up to open the intervertebral spaces for group B parturient after an intravenous preload of 500cc of ringer's lactate took 20–30 minutes.

After a thorough cleaning by the anesthetist, the area from the infra scapular region to the natal cleft was cleansed with povidone-iodine and covered with a sterile sheet with a central hole in the lumber region. The L4-L5 interspaces were selected, and 1 percent lidocaine was injected beneath the surface of the skin. In order to progress the needle through the supraspinous and interspinous ligaments to ligamentum flavum, which felt considerably firmer, the skin was punctured with a 16-gauge Touhy needle. The style was then withdrawn. The loss of resistance method to inject air was utilized to find the epidural space. It took many gentle bounces of the Touhy needle to reach the epidural region. The syringe was withdrawn to check for any blood or CSF leakage (CSF). The needle was inserted into the epidural area using the catheter. After assessing the epidural space's depth with the Touhy needle, it was withdrawn. The catheter hub had a filter connected, and a sterile bandage had been placed over the puncture site. In order to check that the durometer had not been perforated and to prevent severe spinal

anaesthesia, we used 2cc of 0.25 percent bupivacaine or 10mg. Five minutes later, the mother's blood pressure was checked again. Bupivacaine injections in the left and right medial positions at 5-minute intervals are delivered to begin the block in the absence of any adverse sensory or motor effects.

Parturients were placed in the left lateral posture with cushions behind their backs and constantly monitored to avoid compression. Analgesia was maintained using standard top-ups, which were given every 1–2 hours based on the patient's assessment of their level of discomfort. A maternal pulse and blood pressure (BP) were measured every five minutes for 30 minutes after the block was started and every half hour after that.

Complications include hypotension (blood pressure less than 100/60mm Hg), unilateral block, unblocked segments, post-dural puncture headache, and cardiac arrest, among other things. In cases where analgesia was deemed insufficient, the block was evaluated by an Anaesthetist. Additional Anaesthetist intervention was defined as bupivacaine dosage, catheter reset, or catheter removal by Anaesthetist. There was no epidural analgesia administered to the parturient in group A. External CTG was used to measure fetal heart rate in both groups constantly. The partogram showed the labor's progress. Manual palpation and the tocodynometer in the CTG machine were used to monitor the duration, intensity, and interval of uterine contractions. If cervical dilatation failed to occur at a rate of at least 1cm/hr on two hourly vaginal examinations, an oxytocin infusion was started in accordance with our unit's practice for actively managing labor.

The second stage was permitted up to one to two hours with continuous electronic foetal monitoring. If the bradycardia or decelerations persisted, the appropriate action was made. Foetal scalp pH measurements were not available in our facility at the time. Therefore we relied on meconium-stained liquor and aberrant foetal heart rate patterns to diagnose foetal distress. A neonatologist was contacted when the infant was born, and the baby's APGAR score and the necessity for bag and mask resuscitation were determined.

Result data included second-stage labor length, delivery method, intra-partum problems, newborn Apgar scores at 1 minute and 5 minutes, and bag and mask resuscitation requirement in either group. Using SPSS version 28.0 v, we analyzed the information above. Demographics, the length of the second stage, and the delivery method were only a few of the factors examined. The Chi-square test was performed to compare two groups based on the outcome variables. The *p*-value of >0.05 or below was considered significant.

RESULTS

This research comprised 100 pregnant women who met the inclusion criteria. The majority of the ladies were between the ages of 20 and 30 (84 percent). The patients were, on average, 26.21 years old. To be considered full-term, women had to be 37–41 weeks pregnant, on average, with a gestational age of 38, 49 weeks. One-fifth of the participants in the research were primigravida, and one-half were multigravida.

The second stage was normal for seventy-seven patients (less than an hour), whereas it was extended for twenty-three patients (more than an hour). There were 16 primigravida (69.56 percent) and 7 multigravidas (30.43 percent) in this group, with the second stage of labor lasting more than 2 hours for the former and more than 1 hour for the latter. Patients with a protracted second stage received more epidural analgesia (36%) than those without a lengthy second stage (10%), according to the research (Table-1). Intra-partum problems occurred in four patients out of 100, all of whom were in the epidural group (8%), whereas no such issues occurred in the non-epidural group. 65 individuals had spontaneous vaginal deliveries with or without episiotomy out of 100, while the other 75 had tools used in delivery.

Table-1: Duration of the second stage of labour between non-epidural and epidural groups

Duration of second stage of labour	Groups		Total
	Non-epidural	Epidural	
<1 hour	45 (90%)	32 (64%)	77
1 hour or >1 hour	2 (4%)	5 (10%)	7
2 hours or >2 hours	3 (6%)	13 (26%)	16
Total	50	50	100
p=0.008			

Table-2: Mode of delivery between non-epidural and epidural groups

Mode of delivery	Groups		Total
	Non-epidural	Epidural	
SVD with episiotomy	44 (88%)	21 (42%)	65
Forceps delivery	4 (8%)	27 (54%)	31
Vento use delivery	2 (4%)	2 (4%)	4
Total	50	50	100
P=0.021			

Table-3: Apgar scores at 1 minute in non-epidural and epidural groups

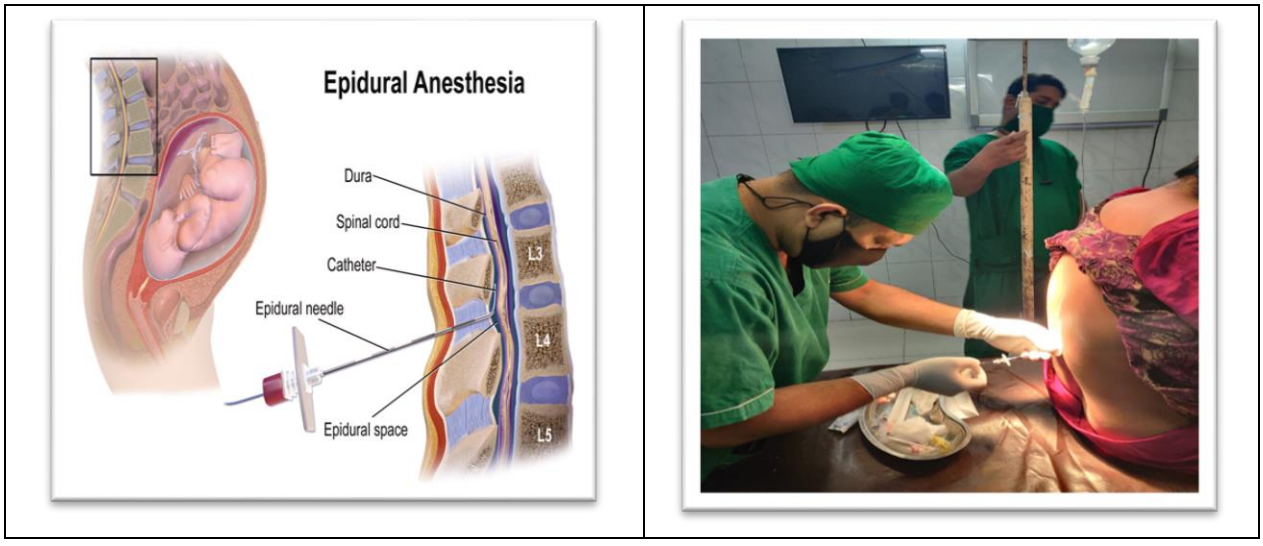
Apgar scores at 1 minute	Groups		Total
	Non-epidural	Epidural	
5/10	14 (28%)	8 (16%)	22
6/10	27 (54%)	33 (66%)	60
7/10	9 (18%)	9 (18%)	18
Total	50	50	100
P=0.327			

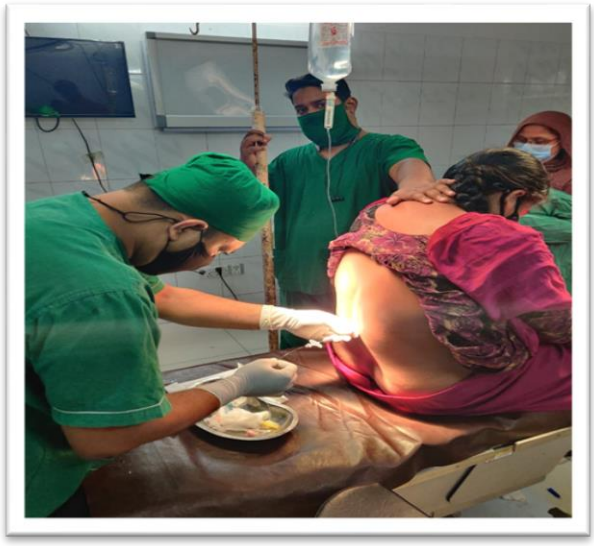
Table-4: Apgar scores at 5 minutes in non- epidural and epidural groups

Apgar scores at 5 minutes	Groups		Total
	Non-epidural	Epidural	
8/10	36 (72%)	39 (78%)	75
9/10	14 (28%)	11 (22%)	25
Total	50	50	100
P=0.645			

There were only 21 spontaneous vaginal deliveries with or without episiotomies in the epidural group (42%), while there were 44 spontaneous vaginal deliveries in the non-epidural group (88 percent). 27 individuals in the epidural group received forceps delivery (either mid-cavity or outlet forceps). And 2 patients in the nonepidural group received ventouse delivery (due to malrotation) (Table-2). On the other hand, 16 percent of babies who received an epidural and 28 percent of babies who did not receive an epidural received Apgar scores of 5/10, 66 percent of babies who received an epidural, and 54 percent of babies received Apgar scores of 6/10. At one minute, 18 percent of babies received an epidural, and 18 percent of babies received Apgar scores of 7/10 (Table-3). As seen in Table-4, the Apgar score has improved after five minutes.

Epidural Anesthesia During Labor





DISCUSSION

In the last several decades, epidural analgesia has grown in popularity. In addition to mounting evidence of improved effectiveness and safety, the role of acceptance has increased due to advancements and improvements in the pharmacological arsenal, equipment, monitoring, and clinical care. Epidural analgesia affects the obstetric process, progress, and result of labor, which causes a lot of worry in obstetrics [11].

In our research, the criteria for a protracted second stage of labor were 2 hours or more for primigravidas and 1 hour or more for multigravidas (from complete cervical dilatation till the birth of the baby). This means that 77% of women had a typical second stage of labor, lasting less than an hour, whereas 23% of women experienced a protracted second stage. In Rajshahi, Bangladesh, researchers at the Department of Anaesthesia at Rajshahi Medical College Hospital and the Tertiary Hospital from June 2018 to December 2020, reported on the impact of epidural analgesia in 80 primigravidas. These results were remarkably similar. However, although the research used oxytocin augmentation, only 86.25 percent of the patients had normal labor length [12]. A comparison of our study's results showed 45 patients with a normal second stage (1 hour) were in the non-epidural group, compared to 32 patients (64%), who were in the epidural group. Patients with prolonged second stages were more likely to be in the epidural group, at 36%, compared to 10% in the non-epidural group [13]. Did another study in which 84% of the control group and 31% of those who received epidural anesthesia had normal second stage length (1 hour), whereas only 16% of the control group and 70% of those who received epidural anesthesia had extended second stage (16% vs. 70% p>0.05).

Three hours after complete cervical dilation is indicated for fetal descent and spontaneous rotation with acceptable CTG. For multigravidas, further top-ups may be required to increase bupivacaine's effects on the motor blockage. Therefore, the decision to intervene was made after 1 hour, whereas for primigravidas, the decision was made after 2 hours. Prospective observational research [14] found women who had continuous 0.125 percent bupivacaine infusion during the second stage of labor. Had labor twice as long as women who did not get continuous 0.125 percent bupivacaine infusion. Compared to women who did not get epidural analgesia, those who had a quantitative evaluation of four trials conducted by Jan Zhang15 saw a 63% increase in the duration of the second stage of labor. Epidural analgesia rose from 15% to 23% (p0.05) of labors, with a second stage lasting more than two hours [15]. Using epidural analgesia improves the likelihood of a woman having a natural birth. Instrumental delivery is reported to occur anywhere from 10% to 56% of the time. Variations in local anaesthetic concentrations, mixed opioid regimes, inadequate mother attempts, and motor inhibition of the pelvic muscles are to blame for the broad range of outcomes during childbirth. In our research, 64.4% of patients gave birth naturally, whereas 34.6% used instruments to help them (forceps or ventouse). An identical study [16] found that 57.50 percent of women gave birth naturally by vaginal delivery, whereas 32.50 percent did so via instrument. While 42 percent of patients in the epidural group had spontaneous vaginal deliveries, 58 percent of patients in the epidural group had instrumental deliveries, and 44 patients (88 percent) in the non-epidural group had instrumental deliveries, 29 patients (58 percent) in the epidural group had spontaneous vaginal deliveries, and 6 patients (12 percent) in the non-epidural group had instrumental deliveries.

This is greater than what [17] found, who found a 40% instrumental delivery rate in the epidural group and a 10% instrumental delivery rate in the

control group (p0.05 for 40% versus 10%). The P value in both trials is substantial, however in our research, 10 patients required forceps delivery because of foetal distress, which was demonstrated by decelerations on the computerized tomography (CTG). Intrapartum foetal monitoring has been shown to increase the number of obstetrical interventions. There was a high instrumental delivery rate (89 percent) in another research [4,18] because of the extended second stage and 11 percent because of meconium-stained fluid and persistent bradycardia. Epidural usage and assisted vaginal birth have a complicated relationship. It's hard to tell if epidural analgesia makes obstetricians use forceps more or if patients with epidural analgesia have more forceps used on them. Due to wide variations in obstetric practice across individual obstetricians and institutions, it's impossible to accurately evaluate all of these potential causes of bias.

Epidural analgesia is a surgical procedure, although there are no known life-threatening side effects when performed by a skilled surgeon. In our research, four women (8 percent) in the epidural group experienced intra-partum problems, whereas no difficulties occurred in the control group. Two of the patients had some degree of paralysis. According to (19), deviating from the midline plane during epidural catheter insertion results in a 1.5–2.1 percent unilateral block/partial block incidence. It has been shown that ephedrine treatment was not necessary for our trial, and the patient's blood pressure was promptly raised with intravenous fluids when they suffered hypotension (mean systolic BP less than 90 mmHg). 3–5% of people will have this occurrence, according to the literature [20]. An intrapartum post-dural puncture headache in one patient was treated with a blood patch and was later reported to be rare. This high rate of intra-partum problems is most likely the result of a lack of access to senior anesthetists who were on call 24 hours a day, seven days a week.

No group A or B in our study had 1 minute Apgar scores that were better than the others in terms of neonatal outcome. Both groups' Apgar scores at 5 minutes were nearly identical. None of the infants required resuscitation using a bag and mask. Similarly, in research [12], the epidural block had no negative impact on Apgar scores in newborns. 10 According to a comprehensive review and meta-analysis, there was no difference between delayed pushing and early pushing in women with epidural analgesia in terms of Apgar scores, resuscitation, umbilical arterial pH, or perinatal mortality. This study's findings were based on information gleaned from over 2,000 babies [21]. The use of epidural anesthesia can make childbirth less painful, safer, and more comfortable for moms and their babies. When it comes to obstetric outcomes, it's important to keep in mind that, aside from analgesia, numerous factors, including the size of the baby and the sufficiency of the pelvis, impact the course of labor. Epidural analgesia should be studied for its impact on the obstetric result, and qualified staff should be on hand to give the greatest benefit with the least amount of risk.

CONCLUSION

Using epidural analgesia during labor is really beneficial since it comparatively reduces the mother and the infant's pain. Due to malrotation and extended second stage and the obstetrician practice style, it increases the instrumental delivery rate while also lengthening the duration of the second stage of labor. Epidural analgesia has a good neonatal result and just a few intrapartum problems.

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