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ORIGINAL ARTICLE

Intravenous versus Epidural Dexmedetomidine for Analgesia in Normal Vaginal Delivery: A Randomized Controlled Study

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ABSTRACT

Background: Patients and physicians face difficulties with labor pain, which is characterized by both visceral and somatic components. The best method for reducing pain during labor with prolonged labor and hypotension is epidural analgesia. As a supplement to local anesthetics during normal vaginal delivery, this study compares the analgesic efficacy, maternal hemodynamic stability, and fetal outcomes of intravenous versus epidural administration of dexmedetomidine.

Methods: this study is double blinded randomized controlled study.We randomly assigned 60 full-term primigravida women who were having a normal vaginal delivery to each of three groups: Group I had epidural bupivacaine and IV placebo for epidural analgesia, Group II received epidural bupivacaine and dexmedetomidine, and Group III received epidural bupivacaine and continuous intravenous infusion of dexmedetomidine.

The Visual Analog Scale (VAS), which measures onset of effective analgesia, was the primary outcome. Fetal outcomes, the 1ST rescue analgesia sedation levels, and maternal hemodynamics were secondary outcomes.

Results: The intravenous dexmedetomidine group (Group III) had a substantially earlier onset of analgesia (VAS $\leq$ 3) and lower maternal pulse rate and mean arterial pressure throughout labor than the other two groups ($p < 0.05$), without negative effects on fetal Apgar scores were noted. Both the intravenous and epidural dexmedetomidine groups scored higher on sedation and consumed fewer opioids than the control group.

Conclusions: Since intravenous dexmedetomidine offers quick and efficient analgesia during normal vaginal birth, it can be utilized as a supplement to epidural bupivacaine. Additionally, adding dexmedetomidine epidurally results in better hemodynamic stability and analgesia that is both effective and prolonged.

Keywords: Dexmedetomidine; Epidural analgesia; Intravenous analgesia; Labor pain; Normal vaginal delivery.

INTRODUCTION

Effective labor analgesia can improve maternal satisfaction, lower the rate of cesarean birth, and ensure the wellness of the mother and fetus [1]. Labor pain can be classified as either visceral or somatic. Visceral pain occurs early in the first and second stages of labour. Somatic labor pain is a characteristic of both the late first and second phases of labor. The T10 mediates the first stage of labor to L1 spinal segments, whereas the T12 mediates the second stage to L1 and S2 to S4 spinal segments [2].

Many methods have been used to alleviate labor discomfort. Epidural blocks continue to be the most frequently used method for easing labour pain [3].Inhalational analgesia with Entonox and parenteral opioids with pethidine or remifentanil are two pharmacological strategies for lowering labor pain [4]. With an α-1 to α-2 ratio of 1:1600, dexmedetomidine

is a more selective α-2 agonist and less likely to cause undesired side effects on α-1 receptors than clonidine. It inhibits pain transmission by attaching to pre- and post-synaptic α-2 receptors in the substantiagelatinosa of the dorsal horn of the spinal cord [5]. It promotes the progression of labor byenhancing uterine contractions' frequency and amplitude in a dose-dependent manner[6]. When used with local anesthetics, it can extend the duration of analgesia [8] and has a high placental retention rate (0.77 maternal/fetal index) [7]. Dexmedetomidine has been utilized more often for epidural labour analgesia because of its higher sedative scores and longer duration of analgesia [8,9]. However, it may cause bradycardia and hypotension, particularly at higher dosages [10].

This study examines the analgesic efficacy, mother hemodynamic stability, and fetal outcomes of intravenous versus epidurally administered dexmedetomidine as a complement to local anesthetics in women who are having a normal vaginal delivery.

METHODS

Following approval of the Menoufia Faculty of Medicine's local ethical committee (IRB 11\2022ANET49). ClinicalTrials.gov registered the trial (NCT05840328). Following a thorough explanation of the entire procedure, all patients who were enrolled in the study provided written informed permission under ethical standards and guidelines.

Menoufia University Hospital hosted this prospective, double-blinded (the patient and the observer) , randomized (using a computer-generated technique and closed envelope chosen by a nurse) controlled trial investigation. 60 full-term (≥37 weeks) healthy primigravida parturients ASAII who requested labor analgesia and had a single fetus scheduled for vaginal delivery with cephalic presentation and were between the ages of 19 and 30 years were the subjects of the study.

Patient refusal, systemic disorders (cardiac, diabetes, hypertension, renal,hepatic), and contraindication to epidural insertion were the exclusion criteria.

60 primigravida were included, and they were split into three equal groups at random using a closed-envelop approach chosen by a nurse and computer-generated numbers. Every patient had a detailed parturient history, thorough examination, and standard laboratory tests (complete blood count and INR)at the obstetric ward. After their arrival in the delivery room, following EMLA cream and alcohol swab cleansing, each parturient was placed into two18-gauge intravenous cannulas, one for the demonstrated drugs and the other for IV fluids, Ringer's solution (8 ml/kg) as a preload followed by continuous ringer infusion at a rate of 10 ml/min.

In the first phase of labor, an epidural catheter was placed in each group. In the active second stage of labor, with cervical dilation of 3-5 cm, an epidural was activated with 0.125% bupivacaine after each patient was then subjected to routine monitoring,which included non-invasive blood pressure checks, electrocardiograms, and pulse oximetry.

1% lidocaine was injected into the skin and subcutaneous tissue following aseptic procedures that included sterilizing the skin with povidone-iodine. Utilizing an 18-gauge Tuohy needle, the epidural space was located at the L4-L5 vertebral interspace and positioned using the loss-of-resistance-to-air approach. Once the epidural space is confirmed by the modified drip method, an epidural catheter should be inserted 3–4 cm into the epidural space and secured.

With left lateral uterine displacement, the pregnant female was in a supine position. Group Ihad a loading dose of 10 ml of 0.125% bupivacaine via epidurally, followed by an epidural continuous infusion of 0.125% bupivacaine at a rate of 10 ml as a maintenance analgesia. Each patient received an IV infusion of a placebo (normal saline) at a rate of 10 milliliters per hour.

GroupII received a loading dose of 10 ml of 0.125 % bupivacaine with 0.5 µg/ml dexmedetomidine, then a maintenance continuous epidural infusion of 0.125% bupivacaine with 0.5 µg/ml dexmedetomidine via a 50 ml syringe pump at a rate of 10 ml/hr. Each patient received an IV infusion of a placebo (normal saline) at a rate of 10 milliliters per hour.

GroupIII received a loading dose of 10 milliliters of 0.125% bupivacaine via epidurally, followed by an epidural continuous infusion of 0.125% bupivacaine at a rate of 10 milliliters perminute as a maintenance for analgesia. Dexmedetomidine (Hospiraprecedex® vial) 200µg<2ml via IV continuous infusion at a rate of 0.5µg/kg/hour.

The investigators removed parturients who had failed epidural analgesia and substituted them with another parturient. The patient was given intravenous 1000 mg of paracetamol and 30 mg of ketorolac if the VAS score was more than 3. If VAS continues to be more than 3, 50 mg of pethidine was administered intramuscularly after 30 minutes. If VAS >3 60 minutes after the last dose, extradose of pethidine (50 mg) would be administered again, with a 24-hour maximum doseof 400 mg [11].

The following data were recorded: the onset the analgesia (VAS ≤ 3), the level of block at that time by the modified Bromage scale, the static and dynamic VAS score of pain every 30 minutes, the Ramsey sedation score every 30 minutes, the vital signs (MAP, HR) every 10 minutes for an hour and then every 30 minutes for 8 hours. The side effects (nausea, vomiting, and inadvertent CS), the neonatal Apgar score, the umbilical fetal pH, and the start of breastfeeding afterward were recorded

Estimating the sample size:

A review of previous research [12] revealed that the groups under study had a 10% difference in means and SD onset of analgesia. Using G Power software, the minimum sample size is determined to be 60 participants with 80% power and 95% confidence interval.

Statistical analysis:

To conduct statistical analyses, IBM SPSS Statistics (version 25; IBM, Armonk, NY, USA) wasutilized. The Monte Carlo test (MC) was used to examine the relationship between qualitative variables whenever any predicted cells is fewer than five, while the chi-square test was applied for comparisons of categorical variables, which are displayed as counts and percentages. The Shapiro test was used to determine whether quantitative variables were normally distributed; mean (±standard deviation) was used to express continuously distributed, normally distributed variables. The median (25–75% interquartile range) was used to represent continuous variables that are not normally distributed. Three groups of regularly distributed continuous variables were compared using one-way analysis of variations (ANOVA), and three groups of non-normally distributed continuous variables were compared by the Kruskal Wallis test, which were followed by a *Post Hoc* test. P-values <0.05 will be considered significant.

RESULTS

Ten patients were eliminated from the study out of a total of 70 parturients having a typical vaginal delivery; eight of these patients did not fit the inclusion criteria, and two of them declined to take part (Fig. 1). Age, height, weight, and BMI were all comparable across the groups under study (p > 0.05)as showed in (Table 1). Group III (IV dexmedetomidine) experienced a substantially fasteronset of analgesia (VAS ≤ 3) than Group I and Group II, indicating a highly significant difference between the groups under study (p<0.001). Regarding static VAS at 30 minutes, 90 minutes, and 5, 8 hours, there was no statistically significant difference between the groups under study (Table 2). In terms of VAS at 60 minutes, 2 hours, 2.5 hours, 3 hours, 3.5 hours, and 4.5 hours with (p<0.001,0.014,0.003,0.005,0.007,0.039,0.037) respectively, there was a highly significant difference between the groups under study; Group II had a considerably lower VAS than Group I and Group III.

Throughout the duration, there was a highly significant difference between Group I and Group III.Table (3) demonstrated that, throughout most of the study period, group II had a statistically significant advantage over the other two groups in terms of dynamic VAS (p<0.001).The three groups under study showed a highly statistically significant difference in HR over time(p<0.05), with Group III (IV dexmedetomidine) having a less stable HR than Group I and Group II. The variation in heart rates over time in each group has significance (Figure 2).

The three groups under study had a highly statistically significant variation in MAP with

time ($p<0.05$). , with Group III (IV dexmedetomidine) having a more variation in MAP than Group I and Group II, according to Fig (3). Additionally, Group II is lessstable than Group I, indicating a considerable disparity between the two groups ($p<0.05$). Every group's MAP has changed significantly over time.

For the majority of the study period, the Ramsay Sedation Score showed a significant difference between the three groups under investigation ($p <0.05$). Group I and Group II differed significantly at 30 minutes, 60 minutes, 90 minutes, 2 hours, 2.5 hours, 3 hours, and 3.5 hours. However, Group II and Group III did not significantly differ during the study, also there was no statistically significant difference between the groups under study using the modified Bromage scale ($p = 0.159$). (Table 4)

Regarding fetal outcome which includes (umbilical pH, breastfeeding beginning, 1-minute, and 5-minute APGAR scores), there was no significance between the groups under study (Table 5) with $p > 0.05$.

Concerning postoperative complications (nausea, vomiting, and unintentional CS), there was no statistically significant difference between the groups under study ($p > 0.05$).

Table (1): Demographic characteristics, Onset of analgesia and Modified Bromage Scale

Variable	Group I(n=20)	Group II(n=20)	Group III (n=20)	Test	p-value
Age(Years)	25.80±2.82	25.10 ±3.46	23.85 ±2.70	F=2.149	0.126
BMI(Kg/m^2)	30.25±2.47	30.75 ±1.02	31.00 ±1.08	F=1.06	0.355
Onset of analgesia	23 (21-25)	25 (25-30) ‡	15 (15-20) #	K=34.36	**<0.001***

Group I: Epidural without dexmedetomidine, Group II: Epidural with dexmedetomidine, Group III: IV dexmedetomidine, Data expressed as mean±SD, or median (IQR). *: Statistically significant, F: One Way ANOVA test, K: Kruskal Wallis test. † Significance between Group I and Group II, ‡ significance between Group II and Group III, and # significance between Group I and Group III.

Table (2): Static Visual Analogue Scale (VAS)

VAS	Group I (n=20)	Group II (n=20)	Group III (n=20)	K	p-value
30 min	3 (3-3)	3 (2.25-3)	3 (3-3)	2.20	0.333
60 min	3 (2-3) †	2 (2-3) ‡	3 (2.25-3)	24.37	**<0.001***
90 min	2 (2-2.75)	2 (1-2)	2 (1-3)	3.94	0.139
2 hrs	2 (1-2.75) †	1 (1-2) ‡	2 (1-2)	8.47	**0.014***
2.5 hrs	2 (1.25-2.75) †	1 (1-2) ‡	2 (2-2)	11.57	**0.003***
3 hrs	2 (1.25-2) †	1 (1-2) ‡	2 (1.25-2)	10.61	**0.005***
3.5 hrs	2 (1.25-2.75) †	1 (1-2) ‡	2 (1-2)	9.84	**0.007***
4 hrs	2 (1-2.75) †	1 (1-2)	2 (1-2)	6.51	**0.039***
4.5 hrs	2 (1-2) †	1 (1-2) ‡	2 (1-2)	6.59	**0.037***
5 hrs	2 (1-2)	1 (1-2)	2 (1-2)	5.99	0.050
5.5 hrs	2 (1.25-2.75) †	1 (1-2) ‡	2 (2-2)	11.57	**0.003***
6 hrs	2 (1.25-2) †	1 (1-2) ‡	2 (1.25-2)	10.61	**0.005***
6.5 hrs	2 (1.25-2.75) †	1 (1-2) ‡	2 (1-2)	9.84	**0.007***
7 hrs	2 (1-2.75) †	1 (1-2)	2 (1-2)	6.51	**0.039***
7.5 hrs	2 (1-2) †	1 (1-2) ‡	2 (1-2)	6.59	**0.037***
8 hrs	2 (1-2)	1 (1-2)	2 (1-2)	5.99	0.050

Group I: Epidural without dexmedetomidine, Group II: Epidural with dexmedetomidine, Group III: IV dexmedetomidine, Data expressed as median (IQR), *: Statistically significant, K: Kruskal Wallis test. † Significance between Group I and Group II, ‡ significance between Group II and Group III, and # significance between Group I and Group III.

Table (3): Dynamic Visual Analogue Scale (VAS)

VAS	Group I (n=20)	Group II (n=20)	Group III (n=20)	K	p-value
30 min	3 (3-4) †	3 (2.25-3)	3 (3-3) #	11.92	**0.003***
60 min	3 (2-3) †	2 (2-2) ‡	3 (2.25-3)	24.35	**<0.001***
90 min	2 (2-3) †	2 (1-2)	2 (1-3)	8.77	**0.012***
2 hrs	2 (2-3) †	1 (1-2) ‡	2 (1-2)	16.98	**<0.001***
2.5 hrs	2 (2-3) †	1 (1-1.75) ‡	2 (2-2)	20.26	**<0.001***
3 hrs	2 (2-2.75) †	1 (1-2) ‡	2 (1.25-2)	20.91	**<0.001***
3.5 hrs	2 (1.25-2.75) †	1 (1-1.75) ‡	2 (1-2)	13.46	**0.001***
4 hrs	2 (2-2.75) †	1 (1-2) ‡	2 (1-2)	12.70	**0.002***
4.5 hrs	2 (2-2.75) †	1 (1-1) ‡	2 (1-2)	18.14	**<0.001***
5 hrs	2 (2-3) †	1 (1-2)	2 (1-2) #	20.27	**<0.001***
5.5 hrs	2 (2-2) †	2 (2-2)	2 (2-2) #	9.58	**0.008***
6 hrs	2 (2-3) †	2 (1-2) ‡	2 (2-2) #	21.16	**<0.001***
6.5 hrs	2 (2-3) †	2 (2-2)	2 (2-2) #	16.12	**<0.001***
7 hrs	2 (2-3) †	2 (1-2)	2 (2-2)	12.73	**0.002***
7.5 hrs	2 (2-2) †	2 (1-2) ‡	2 (2-2)	11.82	**0.003***
8 hrs	2 (2-2) †	1 (1-2) ‡	2 (2-2)	22.00	**<0.001***

Group I: Epidural without dexmedetomidine, Group II: Epidural with dexmedetomidine, Group III: IV dexmedetomidine, Data expressed as median (IQR), *: Statistically significant, K: Kruskal Wallis test. † Significance between Group I and Group II, ‡ significance between Group II and Group III, and # significance between Group I and Group III

.**Table (4):** Ramsay sedation score

Ramsay sedation score	Group I (n=20)	Group II (n=20)	Group III (n=20)	F	p-value
30 min	**1.85 ±0.37**	**1.95 ±0.22**	**2.00 ±0.00**	**1.90**	**0.159**
60 min	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
90 min	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
2 hrs	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
2.5 hrs	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
3 hrs	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
3.5 hrs	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
4 hrs	**1.75 ±0.44**	**1.95 ±0.22**	**2.00 ±0.00#**	**4.25**	**0.019***
4.5 hrs	**1.75 ±0.44**	**1.95 ±0.22**	**2.00 ±0.00#**	**4.25**	**0.019***
5 hrs	**1.75 ±0.44**	**1.95 ±0.22**	**2.00 ±0.00#**	**4.25**	**0.019***
5.5 hrs	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
6 hrs	**1.70±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
6.5 hrs	**1.70 ±0.47†**	**1.95 ±0.22**	**2.00 ±0.00#**	**5.72**	**0.005***
7 hrs	**1.75 ±0.44**	**1.95 ±0.22**	**2.00 ±0.00#**	**4.25**	**0.019***
7.5 hrs	**1.75 ±0.44**	**1.95 ±0.22**	**2.00 ±0.00#**	**4.25**	**0.019***
8 hrs	**1.75 ±0.44**	**1.95 ±0.22**	**2.00 ±0.00#**	**4.25**	**0.019***
Bromage Scale	**1.05 ±0.22**	**1.15 ±0.37**	**1.00 ±0.00**	**F=1.90**	**0.159**

Group I: Epidural without dexmedetomidine, Group II: Epidural with dexmedetomidine, Group III: IV dexmedetomidine, Data expressed as mean±SD, *: Statistically significant, F: One Way ANOVA test.† Significance between Group I and Group II, ‡ significance between Group II and Group III, and # significance between Group I and Group III.

Table (5): Fetal outcome

Variable	Group I (n=20)		Group II (n=20)		Group III (n=20)		Test of significance	p-value
	No.	%	No.	%	No.	%		
Umbilical Ph Normal	20	100	20	100	20	100	----	---
Breastfeedingonset Affected Not affected	0 20	0 100	0 20	0 100	2 18	10 90	$\chi2$=4.14	^{MC}0.326
APGAR (1 min) Mean ±SD	8.10 ±0.64		8.20 ±0.70		7.90 ±0.55		F=1.17	0.319
APGAR (5 min) Mean ±SD	8.55 ±0.60		8.45 ±0.60		8.35 ±0.49		F=0.62	0.543

Group I: Epidural without dexmedetomidine, Group II: Epidural with dexmedetomidine, Group III: IV dexmedetomidine, Data expressed as number of patients (%), or mean±SD, $\chi2$: Chi-squared test, MC: Monte Carlo test, F: One Way ANOVA test.

Table (6): Postoperative complications (n=60)

Variable	Group I (n=20)		Group II (n=20)		Group III (n=20)		$\chi2$	p-value ^{MC}
	No.	%	No.	%	No.	%		
Nausea Yes No	1 19	5 95	3 17	15 85	6 14	30 70	4.56	0.128
Vomiting Yes No	1 19	5 95	3 17	15 85	6 14	30 70	4.56	0.128
Inadvertent CS Yes No	0 20	0 100	0 20	0 100	0 20	0 100	---	----

Group I: Epidural without dexmedetomidine, Group II: Epidural with dexmedetomidine, Group III: IV dexmedetomidine, $\chi2$: Chi-squared test, MC: Monte Carlo test.

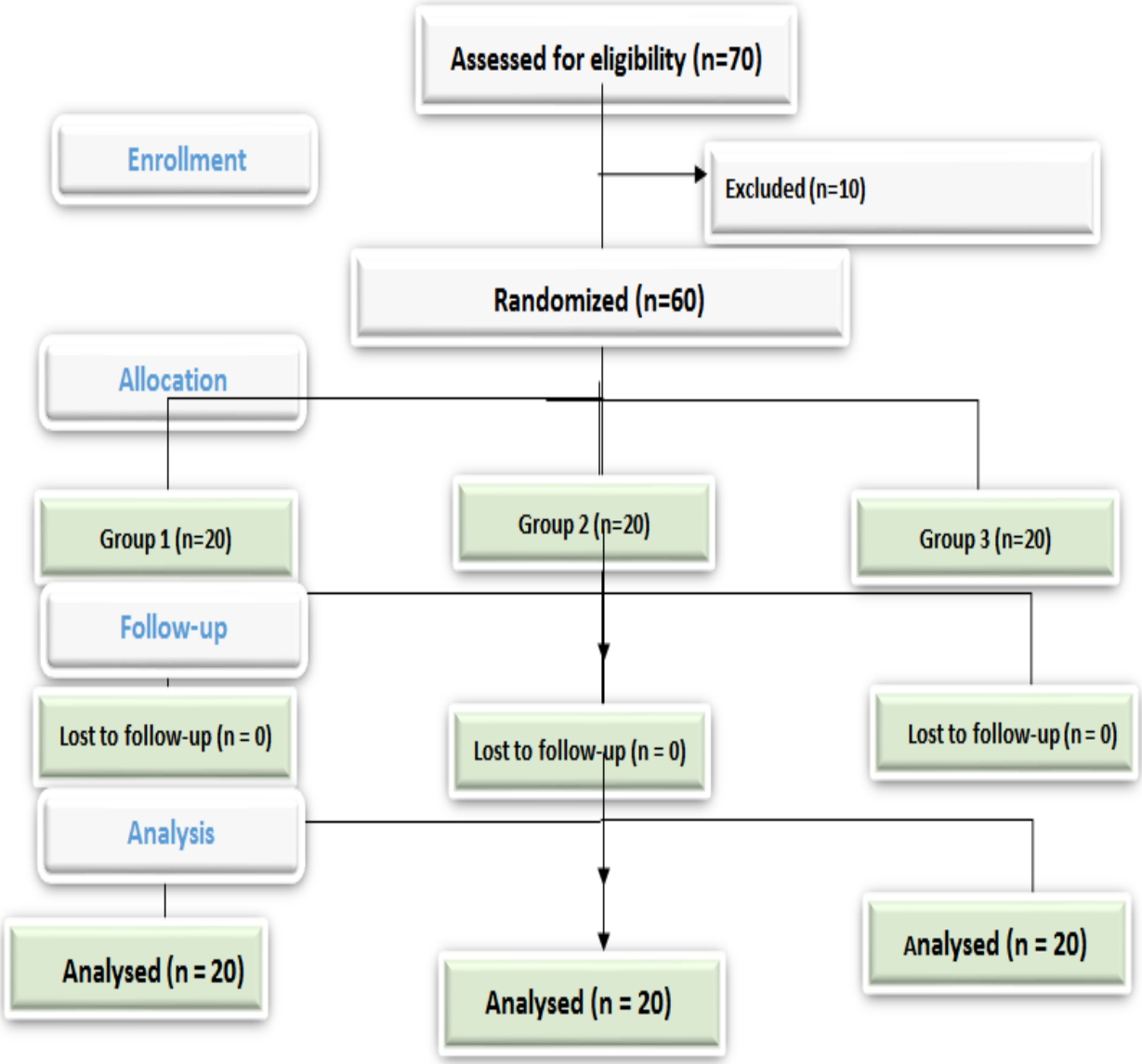

Figure 1: Study flow chart

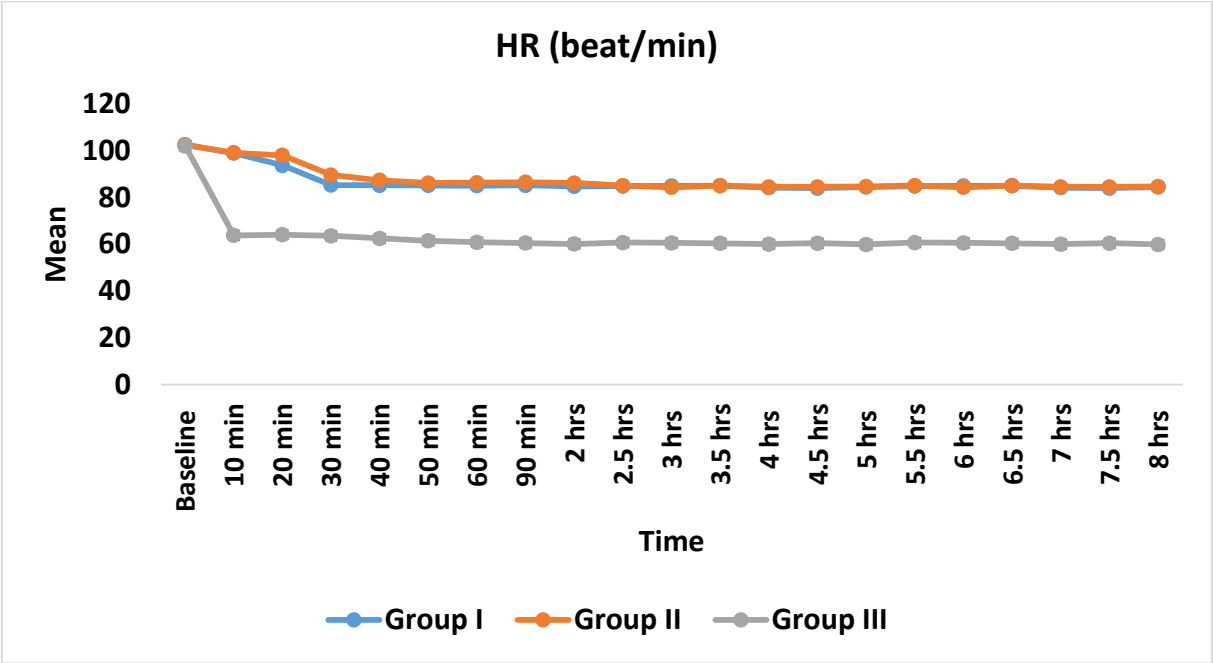

Figure 2: Meanheart rate among studied groups at different intervals.

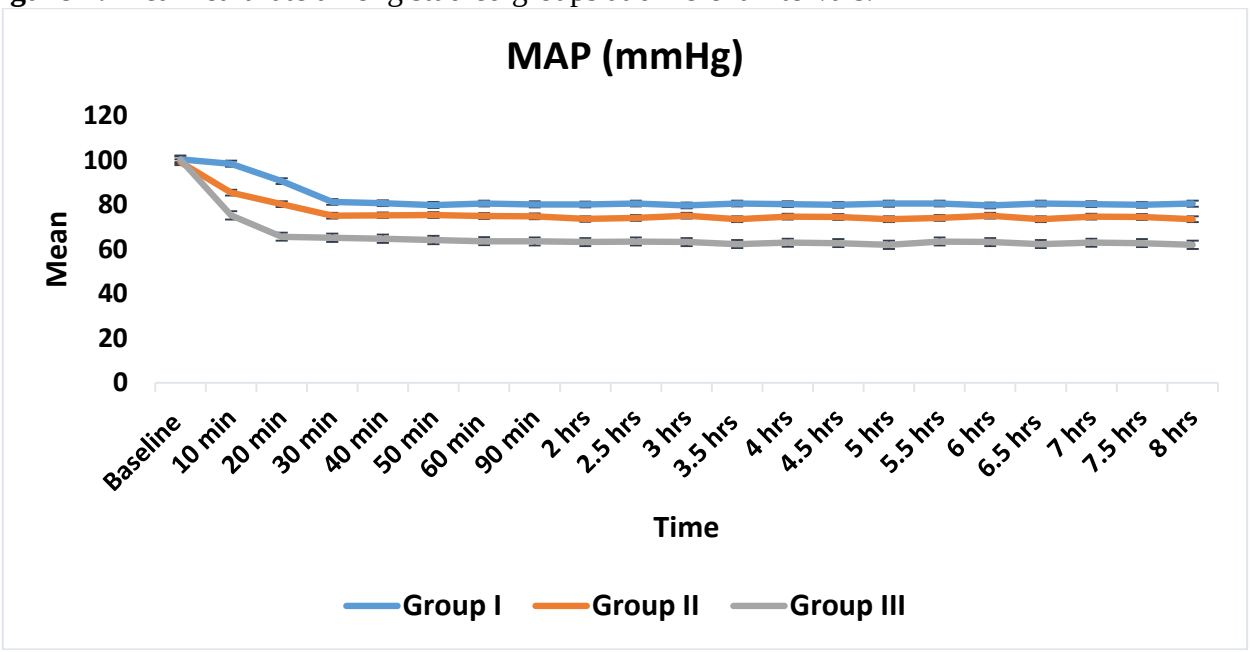

Figure 3: Mean arterial blood pressure among studied groups at different intervals.

DISCUSSION

The practice of minimizing labor agony for mothers using a range of methods is known as painless childbirth, or labor analgesia. In addition to having a quick-acting, efficient analgesic effect and fewer side effects, the favouredlabour analgesia should be based on maternal and fetalwellbeing. [13] Since epidural blocking can be customized for each patient and encourages painless labor, it is the most effective approach of labor analgesia [14]. The use of opioids and α2-adrenoreceptor agonists as adjuvant medications is a way. anesthetists have been looking for ways to enhance analgesia's effects while avoiding the previously described side effects. [15-16]

The effects of intravenous (IV) and epidural dexmedetomidine as a supplement to local anesthetics in labor analgesia for a normal vaginal delivery were examined in the current study as 60 pregnant females were divided into three groups; one received epidural bupivacaine analgesia, one received epidural bupivacaine with dexmedetomidine analgesia and the other received epidural bupivacaine analgesia and IV dexmedetomidine infusion.

In comparison to Group I (epidural bupivacaine with placebo), it was shown that Group III (IV dexmedetomidine) experienced a noticeably fasteronset of effective analgesia. Nevertheless, out of the three groups, group II (epidural bupivacaine with dexmedetomidine) has the lowest VAS.

Jun et al.'s (17) experiment, which involved randomly assigning 150 nulliparous patients to two groups of 75 cases each—ropivacaine (R) and ropivacaine dexmedetomidine (R+Y)—supported our findings.The study discovered that, in an intra-group comparison, VAS scores were lower following the start of analgesia and during delivery, than they were before analgesia. Of these, parturients in the ropivacaine plus dexmedetomidine group had a lower VAS score than those in the ropivacaine group.

Also, Cheng et al. [18]who aimed to compare analgesic effects of dexmedetomidine or sufentanil, both combined with ropivacaine, in epidural analgesia during labor,reported that there was statistically significant difference between the studied groups regarding VAS. However, when Delavari et al.[19]evaluated the effect of IV dexmedetomidine on labor, found that the mean pain score decreased dramatically after dexmedetomidine administration, during labor, and after placental expulsion.

Meanwhile, Kumari et al. [20] compared the effects of intravenous versus epidural dexmedetomidine on the duration of analgesia following intrathecal block with bupivacaine in lower limb surgery and found that IV dexmedetomidine produced analgesia more quickly than epidural dexmedetomidine. However, when comparing epidural and IV dexmedetomidine as an adjuvant to epidural anesthesia in the lower abdomen and lower limb surgery, Rinkal et al. [21] discovered a quicker onset in the epidural dexmedetomidine group. The discrepancy can result from variations in the amounts and concentrations of the medications under study

Throughout labor, Group III's heart rate (HR) and mean arterial pressure (MAP) were much lower than those of the other groups, particularly when compared to Group I and Group II. This suggests that IV dexmedetomidine has a bigger cardiovascular impact. While the HR and MAP stayed within clinically acceptable ranges, these variations were statistically significant at several periods.

So,In the current study, we found a statistical significance between the groups under investigation in terms of HR and MAP over time, with Group III (IV dexmedetomidine) having a less stable HR and MAP than Group I and Group II.

Along with our results, Cheng et al.[18]reported that there was no statistically significant difference between the studied groups regarding HR before anesthesia, there was a statistically significant difference between the studied groups regarding HR 15 min after anesthesia induction and 2 h postpartum.

Also, Afandy et al.[22] who aimed to assess the effectiveness of dexmedetomidine as a supplement to bupivacaine in epidural analgesia for normal delivery, they reported that the mean heart rates were significantly lower in the dexmedetomidine group than the control group.

When Delvari et al.[19] assessed the impact of IV dexmedetomidine alone on labor pain in primipara pregnant women without epidural supplementation, they found no statistically significant difference between the groups under study in heart rate and MAP.

There was a significant difference in the Ramsay Sedation Score between the dexmedetomidine groups and control groups. Cheng et al.[18],reported that there was a statistically significant difference between the studied groups regarding Ramsay sedation score as the dexmedetomidine group had better sedation scores throughout the whole time.

Fetal outcomes, as determined by Apgar scores at 1 and 5 minutes, umbilical pH, and onset of breastfeeding did not significantly differ across the groups. Results were similar across all groups, suggesting that dexmedetomidine usage had no negative effects on infant health.

The results of this study showed that there was no statistically significant difference between the groups under investigation in terms of fetal outcomes (umbilical pH,

breastfeeding onset, 1 minute, and 5-minute APGAR scores).

This was consistent with the findings of Delavari et al. [19]& Cheng et al. [18]&Afandy et al.[22] who stated that the mean Apgar scores at 1 and 5 minutes did not differ statistically significantly between the groups under study. This is caused by the lipid solubility of dexmedetomidine, which causes it to be maintained in placental tissues (0.77 maternal/fetal index of serum dexmedetomidine) [7]. Additionally, Wang et al. [23], discovered that the use of dexmedetomidine during the perioperative phase of cesarean sections was not only favorable for the early transition from infant feeding to exclusive breastfeeding, but also had the potential to enhance the parturient's comfort and quality of recovery, optimize analgesia, reduce the time to first lactation, and promote breastfeeding.

Also, it may not be necessary to stop breastfeeding or discard expressed breast milk after taking dexmedetomidine in nursing mothers, according to Dodd et al. [24], who described a case of a breast feeding female who had a bolus and infusion of the drug as part of her intraoperative sedation during an awake craniotomy.

We did not find any statistically significant differences between the groups under study when it came to postoperative problems (nausea and vomiting). This was consistent with the findings of Jun et al. [17]& Cheng et al. [18], who found no statistically significant difference in postoperative nausea and vomiting between the groups under study. Additionally, Afandy et al. [22] found no statistically significant difference in postoperative maternal problems between the groups under study.

Relatively small-sized patients, a single-center study, a particular age range, primigravida women, the use of a single dosage of dexmedetomidine, and the absence of maternal and fetal serum dexmedetomidine measurement were among the limitations of our current investigation.

Conclusions: Compared to epidural dexmedetomidine, which had a much lower VAS and better cardiovascular stability than IV dexmedetomidine, the former had a significantly faster onset of effective analgesia and superior sedation. However, there was no discernible difference in the fetal outcomes between the groups.

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REFERENCES

1- Vallejo MC, Firestone LL, Mandell GL, Jaime F, Makishima S, Ramanathan S. Effect of epidural analgesia with ambulation on labor duration. Anesthesiology 2001;95:857–61.

2- Kuczkowski KM. Ambulatory labor analgesia: what does an obstetrician need to know? ActaObstetGynecolScand 2004;83:415–24.

3- Marucci M, Fiore T. Epidural analgesia for labour and delivery: current evidence. Minerva Anestesiol 2004;70:643–50.

4- Volmanen P, Akural E, Raudaskoski T, Ohtonen P, Alahuhta S. Comparison of remifentanil and nitrous oxide in labour analgesia. ActaAnaesthesiolScand 2005;49:453–8.

5- Sudheesh K, Harsoor S. Dexmedetomidine in anesthesia practice: a wonder drug? Indian J Anaesth 2011;55:323–4.

6- Nair AS, Sriprakash K. Dexmedetomidine in pregnancy: review of literature and possible use. J ObstetAnaesthCrit Care 2013;3:3–6.

7- Zhang C, Li C, Pirrone M, Sun L, Mi W. Comparison of dexmedetomidine and clonidine as adjuvants to local anesthetics for intrathecalanesthesia: a meta-analysis of randomized controlled trials. J ClinPharmacol 2016;56:827–34.

8- Karuna H, Rajeshwari TN, Prabha P, Ramesh R, Anis N, Rinita P. Comparison between fentanyl 2 µg/mL versus dexmedetomidine 1.5 µg/mL as adjuvants with isobaric bupivacaine 0.0625% in epidural labor analgesia. J Evid Based Med Healthc 2016;3:4974–80.

9- Wangping Z, Ming R. Optimal dose of epidural dexmedetomidine added to ropivacaine for epidural labor analgesia: a pilot study. Evid Based Complement Alternat Med 2017;2017:7924148.

10- Yang SK, Liu M, Chen J, Yang YY, Zhuan FZ, Sun WQ, et al. Comparison of dexmedetomidine and lipophilic opioids as

adjuvants to local anesthetics for epidural labor analgesia: a meta-analysis of randomized controlled trials. Signa Vitae 2023;19:24–6.
11- Abdollahi M, Mojibian M, Pishgahi A, Mallah F, Dareshiri S, Mohammadi S, et al. Intravenous paracetamol versus intramuscular pethidine in relief of labour pain in primigravid women. Niger Med J 2014;55:54–7.
12- Mishra N, Jain A, Sharma M. Intravenous dexmedetomidine for labour analgesia in women with preeclampsia. J Evol Med Dent Sci 2016;5:3408–12.
13- Nanji JA, Carvalho B. Pain management during labor and vaginal birth. Best Pract Res ClinObstetGynaecol 2020;67:100–12.
14- Halliday L, Nelson SM, Kearns RJ. Epidural analgesia in labor: a narrative review. Int J GynaecolObstet 2022;159:356–64.
15- Rahmati J, Shahriari M, Shahriari A, Nataj M, Shabani Z, Moodi V. Effectiveness of spinal analgesia for labor pain compared with epidural analgesia. Anesth Pain Med 2021;11:87–90.
16- Halliday L, Shaw M, Kyzayeva A, Lawlor DA, Nelson SM, Kearns RJ. Socio-economic disadvantage and utilization of labour epidural analgesia in Scotland: a population-based study. Anaesthesia 2024;79:473–85.
17- Jun W, Zhengzhuang AN, Li O. Analgesic efficacy of dexmedetomidine used for epidural anesthesia on labor analgesia. Biomed Res 2018;29:426–30.
18- Cheng Q, Bi X, Zhang W, Lu Y, Tian H. Dexmedetomidine versus sufentanil with high- or low-concentration ropivacaine for labor epidural analgesia: a randomized trial. J ObstetGynaecol Res 2019;45:2193–201.
19- Delavari A, Dehgan M, Lak M. Evaluating the effect of dexmedetomidine intravenous infusion on labour pain management in primipara pregnant women: a nonrandomised clinical trial study. Rom J Anaesth Intensive Care 2021;28:10–8.
20- Kumari N, Kulkarni JV, Chitravanshi N. Intravenous versus epidural dexmedetomidine: comparison of effect on prolongation of analgesia after subarachnoid block with bupivacaine in lower limb surgery. Indian J AnaesthAnalg 2020;7:957–62.
21- Bhadiyadra R, Vaghela A, Desai KA, Vachhrajani PN. A comparison of epidural versus intravenous dexmedetomidine as an adjuvant to epidural anesthesia in lower abdominal and lower limb surgery. Int J Sci Res 2018;7:7–10.
22- Afandy ME, Abusabaa M, Lotfy HA, Mansour RF. Effect of the use of dexmedetomidine as a local anesthetic adjuvant to bupivacaine 0.125% in epidural labor analgesia: randomized controlled study. Ain Shams J Anaesthesiol 2021;13:1–8.
23- Wang Y, Fang X, Liu C, Ma X, Song Y, Yan M. Impact of intraoperative infusion and postoperative PCIA of dexmedetomidine on early breastfeeding after elective cesarean section: a randomized double-blind controlled trial. Drug Des DevelTher 2020;14:1083–93.
24- Dodd SE, Hunter Guevara LR, Datta P, Rewers-Felkins K, Baker T, Hale TW. Dexmedetomidine levels in breast milk: analysis of breast milk expressed during and after awake craniotomy. Breastfeed Med 2021;16:919–21.

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