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Efficacy of Epidural Labour Analgesia in Partueint Women Using Bupivacaine Fentanyl and Its Maternal and Fetal Outcome

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Abstract
Labour is an intense and often painful experience with as many as 30% of mothers finding it much more painful than expected. Neuraxial techniques are the gold standard for intrapartum labour analgesia. We in our study , studied the efficacy of epidural labour analgesia in the parturient women using low dose bupivacaine (0.0625%) and its maternal outcome with regards tothe duration of labour , mode of delivery, and pain relief and neonatal outcome.
In our study there is significant reduction in duration of first stage of labour and total duration of labour with no alteration of second and third stages of labour. The primary caesarean section rate, vaginal delivery rate were similar with a slight increase in the instrumental delivery. Labour epidural analgesia is the cornerstone in the management of pain during labour.
Keywords: *Epidural labour analgesia, first stage of labour , second stage of labour, mode of delivery, duration of labour, pain relief*

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I. Introduction

Labour is an intense and often painful experience with as many as 30% of mothers finding it much more painful than expected. Neuraxial techniques are the gold standard for intrapartum labour analgesia. Multiple randomized controlled trials comparing epidural analgesia with systemic opiods, nitrous oxide or both have demonstrated lower maternal pain scores and higher maternal satisfaction with neuraxial analgesia.

In addition to their analgesic benefits, the physiological benefits of neuraxial analgesia has been shown to improve maternal, cardiovascular and pulmonary physiology and acid-base status of the fetus.

As a result of the superior analgesia and maternal-fetal benefits afforded by neuraxial techniques and their improved safety, use of neuraxial labour analgesia has progressively increased over the past three decades.

II. Materials And Methods

In this study 542 parturients in active phase of labour were included. Out of these 542 parturients, 271 recruited to the study group and 271 who didn't receive labour epidural or any pain relief were included in the control group. Both primigravida and multigravida were included in the study.

PATIENTS SELECTION

INCLUSION CRITERIA:

a. Term Pregnancy
b. Single fetus
c. Parturients in labour with cervical dilatation more than 2cms with satisfactory uterine contractions.
d. Vertex presentation.

EXCLUSION CRITERIA:

a. Malpresentation
b. Multifetal gestation
c. Known allergy to local anaesthetics
d. Preterm labour
e. Maternal spinal deformities
f. Obstetric complications – severe preeclampsia with coagulation abnormalities, antepartum haemorrhage.

III. Methodology

Informed written consent was obtained from each parturient in the study group. Details of women of study group were entered in the proforma regarding history and findings in the physical examination.

Continuous clinical monitoring of Maternal vital signs – Pulse, Blood pressure, Respiratory rate , continuous fetal heart rate monitoring with contractions with external toco dynamometer were done and recorded.

An expert anaesthesiologist was available for administration of epidural analgesia and management of complications. Adequate pre-loading with Intravenous fluids was done.

PROCEDURE

An intravenous line was set up and 500ml of ringer lactate solution was infused over a short period of time. Patient was explained about the procedure and positioned in sitting posture of right or left decubitus position.

Strict aspetic precautions were taken and parts painted and draped. After infiltration of local anaesthetic by using needle through needle technique L2-3or L3-4 space located and the epidural space is identified by loss of resistance to air technique with 18 gauge Tuohy needle.

Injection of intrathecal drug was completed in 10 sec then 20G epidural catheter was threaded through the epidural needle into epidural space in cephalad direction. The epidural needle was slowly pulled out without disturbing the catheter, about 3 to 5 cm of catheter was left in epidural space. The catheter was well secured with plaster.

Initial dose of 0.0625 % bupivacaine with 20mcg of fentanyl is given and patient is positioned supine and monitored for pulse rate, blood pressure, respiratory rate, side effects of epidural analgesia for every 15 mins, the level of analgesia is assessed hourly and intermittent top up doses were given accordingly.

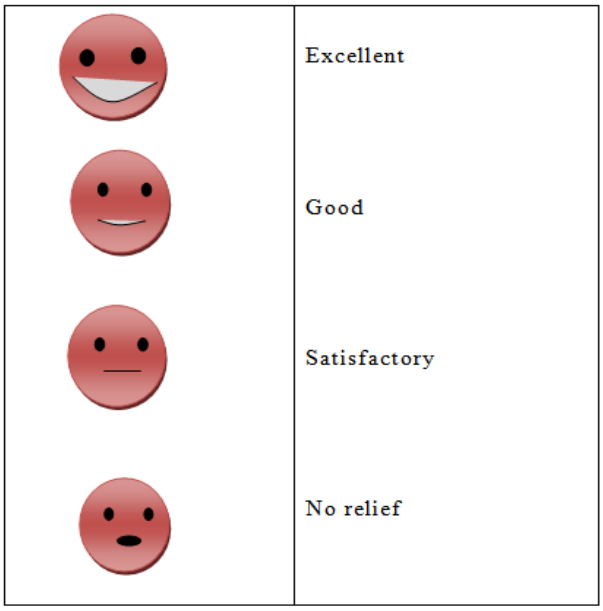
Efficacy of analgesia is assessed by visual analogue scale and pain score during labour was marked in VAS scale and VNRS scale post delivery.

The progress of labour, maternal vital signs and fetal heart rate were monitored regularly and plotted on a partogram.

Duration of various stages of labour like first stage, second stage and third stage were calculated.

Mode of delivery and indications for non vaginal route of delivery along with baby details were also recorded.

VISUAL ANALOGUE SCALE



VERBAL NUMERIC RATING SCALE (NRS-11)

RATING	PAIN LEVEL
0	No Pain
1 – 3	Mild Pain (nagging, annoying, interfering little with activites of daily living)ADL
4 – 6	Moderate Pain (interferes significantly with activites of daily living)ADL
7 – 10	Severe Pain (disabling, unable to perform activites of daily living)ADL

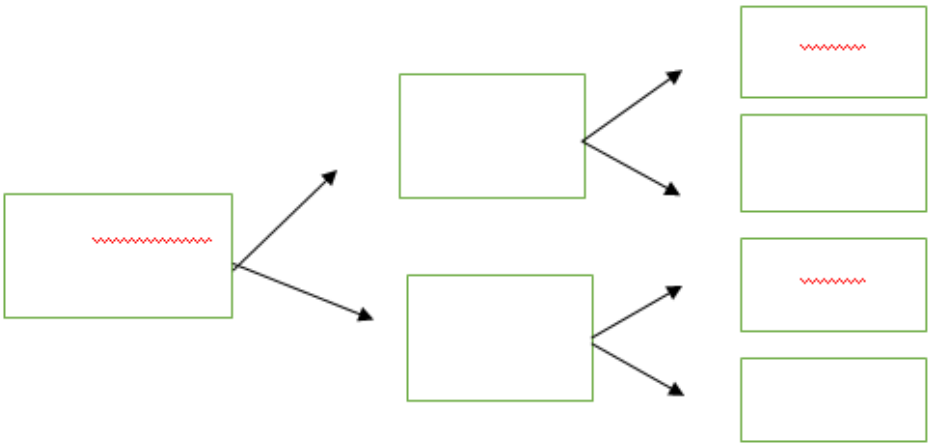
SATISTICAL ANALYSIS
The data was analysed using SPSS – 16.0 version.
Descriptive statistics were calculated for background variables.

- To determine the difference and proportion Chi – square test was used as test of significance
- To determine the difference and mean values between the two groups unpaired t-test was used as the test of significance.
- Differences were considered significant when p-value <0.05.

SAMPLE SIZE CALCULATION

- The proportion of women who had pain relief in epidural group was reported as 70-80% and in non epidural group was 30%
- To pick out this difference with 5% alpha – error and 90% power.
- The minimum sample size arrived as 266 and 265 in each group respectively.
- The expected proportion in the study group and control group was 266 and 265 but sample size collected was 271in each group to avoid errors of calculation.

IV. Results



ANALYSIS OF STUDY

1. AGE :

Age distribution	Study group		Control group	
16 – 22	84	30.9%	86	31.7%
23 – 28	135	49.8%	140	51.6%
29 – 34	52	19.1%	45	16.6%

Analysis of age in the study group shows that the range is 18 – 32 years with a mean age of 27.2 years and in the control group range is 19 – 32 years with a mean age of 26.9 years. The p Value is 0.277.

	N	RANGE	MEAN
STUDY GROUP	271	18 – 34	27.24
CONTROL GROUP	271	19 – 34	26.96

2. GESTATIONAL AGE

	N	MEAN in weeks
EPIDURAL GROUP	271	38.5
CONTROL GROUP	271	39.5

Term pregnancies were included in both the study and control group. The mean gestational age in study group is 38 weeks 5 days and in control group is 39 weeks 5 days. The p Value is 0.542

3. PARITY

Both primigravida and multigravida were matched in the study as well as control group. However we had more multigravida in the control group.

	STUDY GROUP	CONTROL GROUP
PRIMIGRAVIDA	238	173
MULTIGRAVIDA	33	98

4. CERVICAL DILATATION AT THE TIME OF EPIDURAL CATHETRISATION

Cervical dilatation	N = 271	%
2cm	36	13.2%
2cm – 3 cm	121	44.6%
3cm – 4 cm	111	40.9%
4cm – 5 cm	3	1.1%
More than 5 cm	-	-

The cervical dilatation at the time of insertion of epidural catheter was 2cm or more and with satisfactory uterine contractions.
44.6% women had epidural cathetrisation at 2-3cm dilatation and 40.9% at 3-4cm dilatation. None of them had epidural cathetrisation after 5 cm of cervical dilatation.

5. PAIN ASSESEMENT
The pain relief was assessed by asking the patient about the experience of pain and its severity during labour by marking them in a) visual analogue scale(VAS) verbal numerical rating scale(VNRS).

Based on the visual analogue scale, pain relief was excellent in 33.5%(91), good in 35.7%(97), satisfactory in 26.93%(73) and slight relief in 3.7%(10).

	Excellent	91	33.5%
	Good	97	35.7%
	Satisfactory	73	26.93%
	Slight	10	3.7%
	No relief		

Based on the verbal numeric rating scale

Pain score	Study group		Control group	
1/10	66	24.3%		
2/10	89	32.8%		
3/10	74	27.3%		
4/10	42	15.4%		
5/10			41	15.1%
6/10			38	14%
7/10			60	22.1%
8/10			132	48.7%
9/10				
10/10				

- 84.4% of women had experienced excellent pain relief and satisfaction with perception of very mild pain (VRNS score 1/10 to 3/10)
- 15.4% had good pain relief and satisfaction where they felt only mild to moderate amount of pain.(4/10)

- In the study group with epidural labour analgesia none of the patient had experienced a pain score more than 5/10.
- In the control group 29.1% experienced moderate pain relief and 70.8% experienced severe pain.
- P Value regarding the pain score when compared between the study group and the control group show statistical significance of 0.0001, Hence epidural analgesia provides excellent pain relief and satisfaction in labour.

6. DURATION OF 1st STAGE OF LABOUR

Duration of first stage of labour was calculated taking into accountonly the active phase of 1st stage of labour.

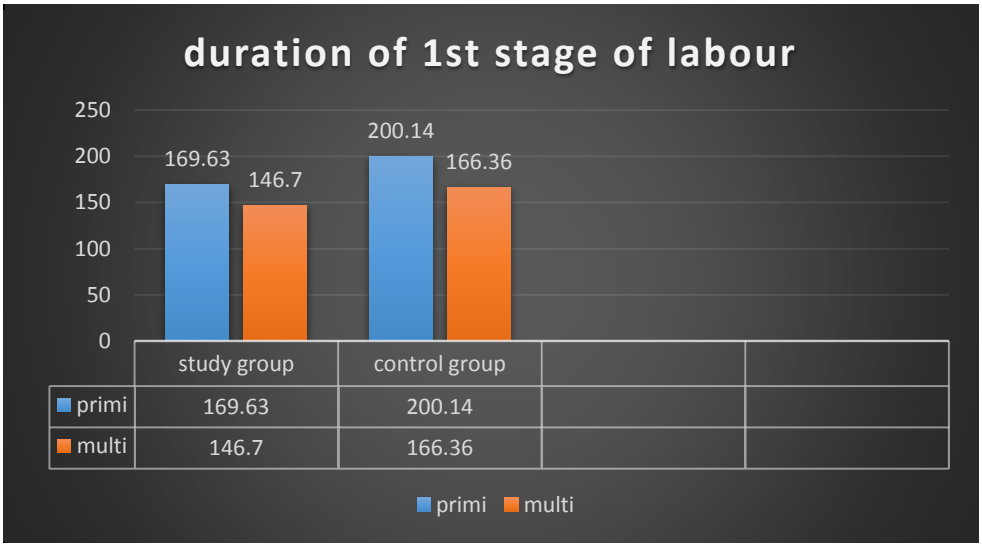
	Primigravida	Multigravida
Study group	57.2 min to 318.25 min 169.63 minutes (SD +_ 66.3)	56.75 min to 277.76 min 146.70 minutes (SD +_ 71)
Control group	60 min to 321.75 min 200.14 minutes (SD _+ 71)	56.80 min to 270.63 min 166.36 minutes (SD _+ 60.3)

	1st stage				1st stage			
Duration of 1st stage of labour	Primigravida Study group N = 238		Primigravida Control group N = 173		Multigravida Study group N = 33		Multigravida Control group N = 98	
Less than 60 min	5	2.1%	2	1.1%	4	12.1%	5	5.1%
61 – 120	47	19.7%	24	13.8%	6	18.1%	17	17.3%
121-180	80	33.6%	41	23.6%	14	42.4%	36	36.7%
181-240	69	28.9%	53	30.6%	6	18.1%	29	29.5%
241-300	25	10.5%	36	20.8%	3	9%	11	11.2%
301-360	12	5%	16	9.2%				

The duration of first stage of labour was shortened in our study in primigravida who received epidural analgesia as compared with control group and P Value was 0.0001

However no difference in duration of first stage of labour was noted in the multigravida between the study and control group, with a P Value 0.125.

- In the study group active phase of 1st stage of labour ranges from 57.2 mins to 318.25 mins with the mean of 169.63 minutes in primi
- In the study group among the multi active phase of 1ststage of labour ranges from 56.75 minutes to 277.76 minutes with the mean of 146.70 minutes.
- In the control group active phase of 1st stage of labour ranges from 60 minutes to 321.75 minutes with the mean of 200.14 minutes in primi
- In the control group among the multi active phase of 1st stage of labour ranges from 56.80 minutes to 270.63 minutes with the mean of 166.36 minutes.



- The mean duration of active phase of 1st stage of labour in study group among primigravida is 169.63 minutes and 200.14 minutes in control group.
- The mean duration of active phase of 1ststage of labour in study group among multigravida is 146.70 minutes and 166.36 minutes in control group.

The first stage of labour is shortened approximately by 30.51 minutes in primigravida compared to control group, which is statistically significant (p Value 0.0001) and 19.66 minutes in multigravida compared to control group, which is not statistically significant (0.125)

7. DURATION OF SECOND STAGE OF LABOUR

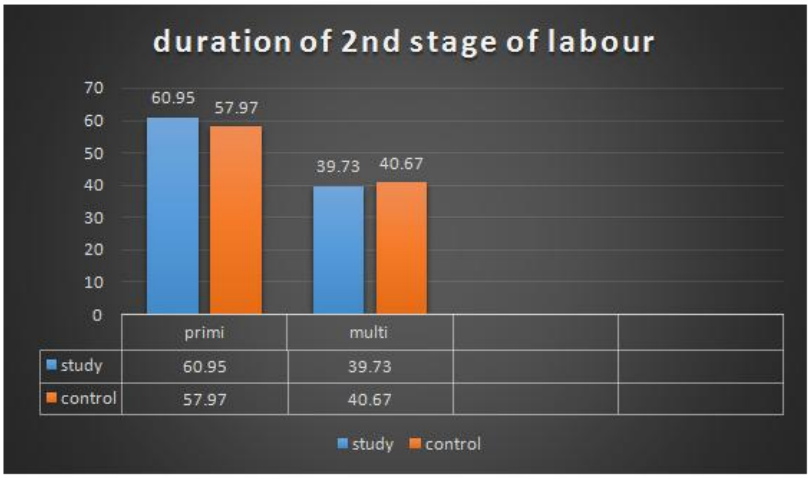
	2nd stage				2nd stage			
Duration of second stage of labour	a Primigravid Study group N = 238		Primigravida Control group N = 173		a Multigravid Study group N = 33		Multigravida Control group N = 98	
less than 30 min	6	23.5%	8	27.7%	5	45.4%	7	15.6%
31 – 60	2	38.6%	0	40.4%	5	45.4%	7	38.7%
61 – 120	0	33.6%	0	28.9%		9 %		2.3 %
121 -180	0	4. 2%		2.8 %				
more than 180 min								

The mean duration of second stage of labour were comparable in both the study and control group, with no statistical significance P Value = 0.381 in primi and 0.775 in multi respectively.

"Administration of epidural analgesia didn't affect the duration of 2nd stage of labour "

	Primigravida	Multigravida
Study group	25.46 min to 151 min 60.95 minutes (SD _+ 33.08)	26.53 min to 77.60 min 39.73 minutes (SD _+ 17.02)
Control group	23.57 min to 157.40 min 57.97 minutes (SD _+ 35.20)	23.62 min to 73.50 min 40.67 minutes (SD _+ 14.18)

- The duration of second stage of labour in study group among primigravida ranges from 25.46 minutes to 151 minutes with a mean of 60.95 minutes.
- The duration of second stage of labour in study group among multigravida ranges from 26.53 minutes to 77.60 minutes with a mean of 39.73 minutes.
- The duration of second stage of labour in control group among primigravida ranges from 23.50 minutes to 157.40 minutes with a mean of 57.97 minutes.
- The duration of second stage of labour in control group among multigravida ranges from 23.62 minutes to 73.50 minutes with a mean of 40.67 minutes.



- The mean duration of second stage of labour in primigravida is 60.95 minutes and 57.97 minutes in study and control group respectively, where in study group it is approximately prolonged by 2.98 minutes with a p Value 0.381 which is not statistically significant.
- The mean duration of second stage of labour in multigravida is 39.73 minutes in study group and 40.67 minutes in control group, where in study group it is approximately shortened 94 seconds with a P Value 0.775 which is not statistically significant.

8. DURATION OF THIRD STAGE OF LABOUR

- Third stage of labour is independent of epidural labour analgesia.
- Out of 271 only 3 had underwent Manual removal of placenta in study group and 2 in control group.
- Mild Atonic PPH was noted in 7 women in both groups and was managed medically none of them had any blood transfusions or prolonged hospital stay.

9. DURATION OF 1ST STAGE OF LABOUR (Irrespective of parity)

	Duration in minutes (MEAN)
Study group	316.33 mins
Control group	366.50 mins

- The mean duration of active phase of 1st stage of labour irrespective of parity was 316.33 mins and 366.50 mins in study and control group respectively.
- The difference in duration of active phase of 1st stage of labour among study and control group was 50.17 minutes which is statistically significant with a P Value 0.0001.

10. DURATION OF 2ND STAGE OF LABOUR (Irrespective of parity)

	Duration in minutes(MEAN)
Study group	100.68 mins
Control group	100.64 mins

- The mean duration of 2nd stage of labour irrespective of parity (Primi and Multi) was 100.68 mins and 100.64 mins in study and control group respectively.
- The difference in duration of second stage of labour was 0.04 mins among both the groups which had no statistical significance (P Value = 0.386)

11. TOTAL DURATION OF LABOUR (1ST Stage and 2ND stage of labour irrespective of parity)

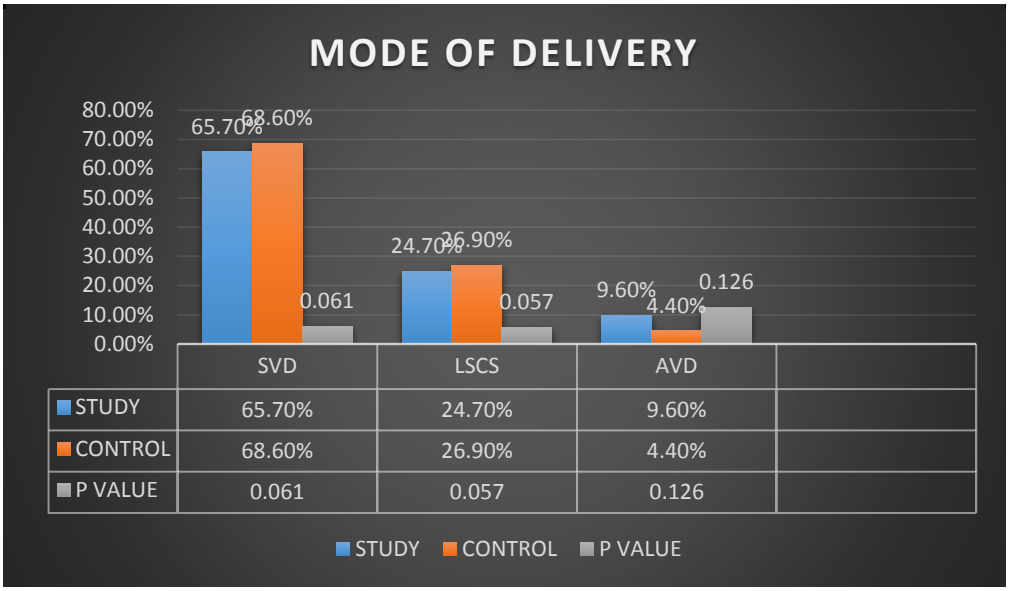
	Duration of labour(MEAN)
Study group	417.01 mins
Control group	467.14 mins

- The mean total duration of labour (1st stage and 2nd stage of labour) with epidural group was 417.01 mins and 467.14 mins in non epidural group.
- Study group showed statistically significant reduction of total duration of labour by 50.13 minutes with a P Value of 0.0001.

12. MODE OF DELIVERY

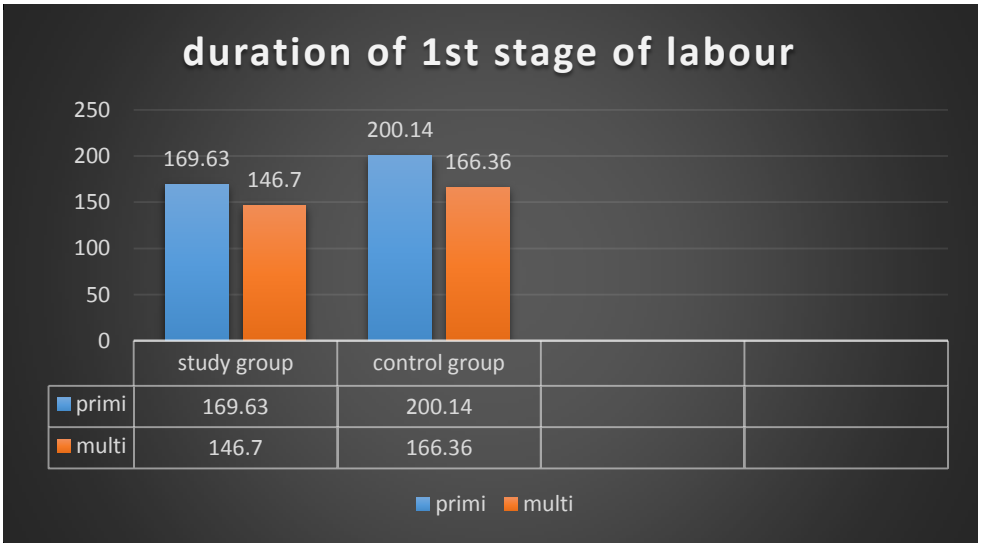
Mode of delivery	Study group		Control group		Value
Spontaneous vaginal delivery	78	5.7	86	8.6	.061
Assisted vaginal delivery	6	.6	2	.4	.057
Lower segment caesarean section	7	4.7	3	6.9	.126

- Out of total 271 parturients in the study and control group irrespective of parity -
- 178 (65.7 %) of had spontaneous vaginal delivery in the study group and 186 (68.6 %) in control group had spontaneous vaginal delivery.
- 26 (9.6 %) in study group and 12 (4.4 %) in control group had assisted vaginal delivery respectively.
- 67 (24.7 %) in study group and 73 (26.9 %) in control group had lower segment caesarean section respectively.



Type of Assisted vaginal delivery	Study group N = 26	Control group N = 12
Outlet forceps	18	5
Vaccum	8	7

- The primary caesarean section rate between the study and control group showed no statistical significance.
- There is an increase in the instrumental delivery vaginal delivery of 5.2 % in the study group when compared to control group. But there is no statistical significance, P value – 0.126 (> 0.005)



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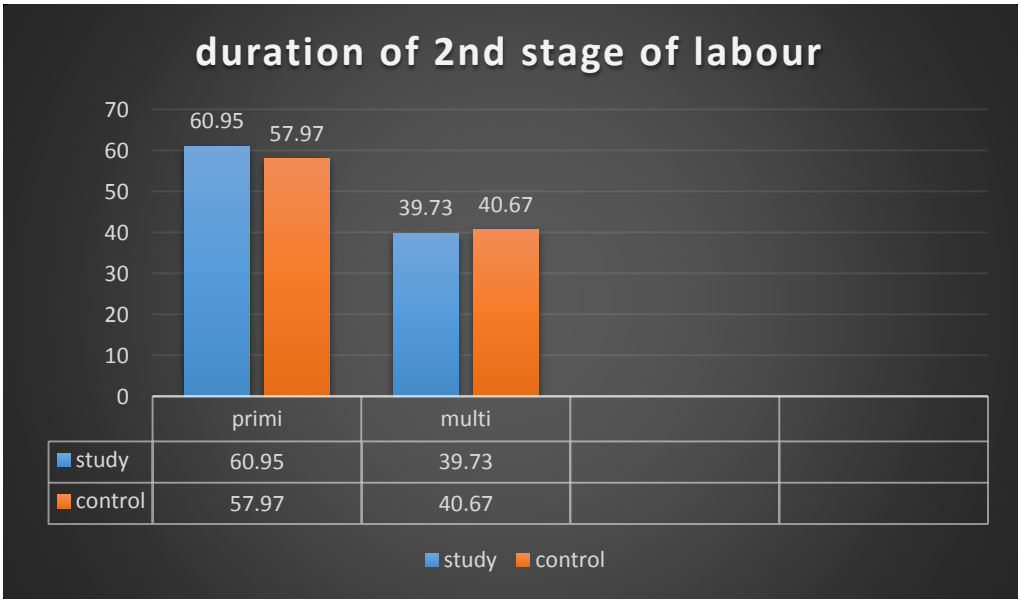

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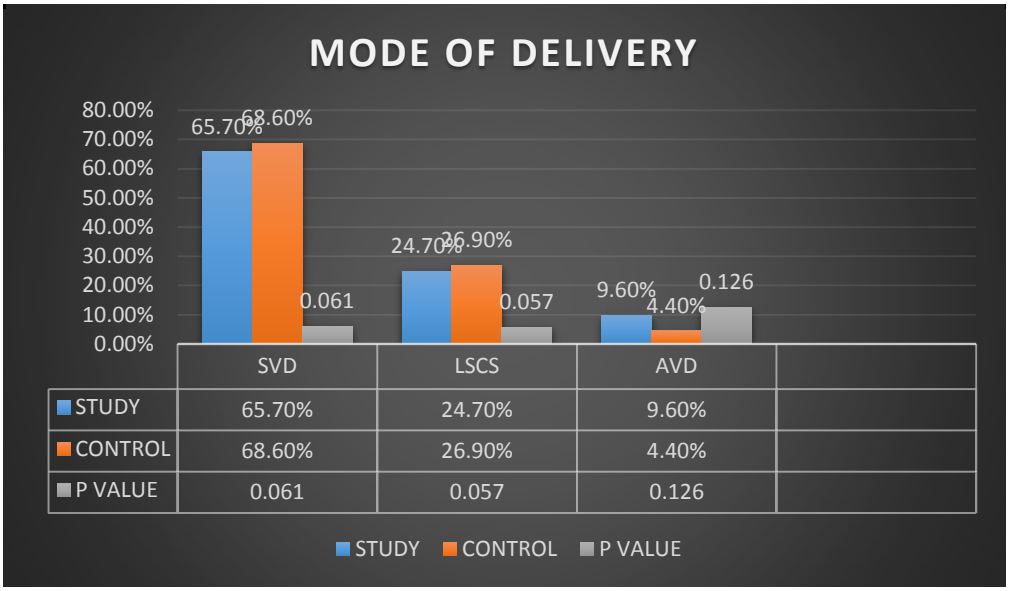

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- When analysing the primary caesarean section rate in multigravida 2.2% of multi in study group and 2.9% in control group had underwent lower segment caesarean section.
- Epidural labour analgesia did not have any impact on rate of caesarean section in multigravida.

19. INDICATIONS FOR LOWER SEGMENT CAESAREAN SECTION

STUDY GROUP

INDICATION	N = 67	
Fetal distress	2	7.7%
Arrest of descent	8	6.8%
Arrest of dilatation	7	5.3%

CONTROL GROUP

INDICATION	N = 73	
Fetal distress	24	32.8%
Failed induction	29	39.7%
Arrest of descent	7	9.5%
Arrest of dilatation	9	12.3%
Maternal demand	4	5.4%

47.7% women had underwent lower segment caesarean section in the study group due fetal distress but none of babies had NICU admissions for respiratory problems.

20. INDICATION FOR ASSISTED VAGINAL DELIVERY

INDICATION	Study group N = 26		Control group N = 12	
Maternal exhaustion	16	1.5 %		66.6 %
Fetal distress	10	8.4 %		%

61.5% in the study group had instrumental vaginal delivery due to failed secondary forces (maternal exhaustion) and 38.4% were due to fetal distress.

21. NEONATAL OUTCOME BASED ON APGAR SCORE

APGAR @ 1 MIN	STUDY GROUP		CONTROL GROUP	
< 5/10		1.1 %	5	1.8 %
6/10		1.4 %	4	1.4 %
7/10		2.5 %	8	2.9 %
8/10	57	94.8 %	2 52	92.9 %

APGAR @ 5 MIN	STUDY GROUP		CONTROL GROUP	
7/10	2	0.7 %		1 .1 %
8/10	8	2.9 %		2 .9 %
9/10	261	96.3 %	60	9 5.9 %

- 94.8% of study group showed APGAR of 8/10 at 1 min as compared to 92.9% of control group.
- 96.3% of study group and 95.9% of control group had APGAR of 9/10 at 5 min.
- Neither the study group nor control group had any adverse effects on neonatal outcome.

22. NEONATAL OUTCOME BASED ON BIRTH WEIGHT

Birth weight compared to AVD in study and control group

Birth weight	Study group N = 26/271		Control group N = 12/271	
2 kg – 2.5 kg				
2.6 kg – 3 kg	0	38.4 %		16.6 %
3.1 kg – 3.5 kg	5	57.6 %		41.6 %
3.6 kg – 4 kg		3.8 %		41.6 %

When analysing the weight of babies born by AVD 57.6% of them were between 3.1-3.5 kg and 3.8% between 3.6-4 kg and almost similar outcomes were noted in the control group also.

CORRELATION BETWEEN BIRTH WEIGHT AND LSCS

Birth weight compared to LSCS in study and control group

Birth weight	Study group N = 67/271		Control group N = 73/271	
2kg – 2.5kg		10.4 %		6.8 %
2.6kg – 3kg	0	14.9 %		10.9 %
3.1kg – 3.5kg	4	50.7 %	7	50.6 %
3.6kg – 4kg	6	23.8 %	3	31.5 %

Both weight of babies born of LSCS in both study and control group were similar.

23. TOTAL NUMBER OF TOP UP DOSES REQUIRED

Top up doses	N = 271	Percentage %
0	39	14.4 %
1	84	31 %
2	92	33.9 %
3	56	20.7 %

No top up dose were required in 39 women (14.4 %), 84 women (31%) required single top up dose and 92 of them (33.9%) required second top up dose and 56 (20.7%) required third top up dose.

24. COMPLICATIONS(STUDY GROUP)

There were no major complications noted. Of the minor complications 38 parturients in the study group had headache, severe post dural puncture headache was noted in 2 and were managed conservatively with intravenous fluids, 14 had difficulty in voiding the first urine post delivery. 1 parturient in study group had hypotension which was managed conservatively with intravenous fluids.

	N	%
PDPH	38	14%
URINARY RETENTION	14	5.1%
NAUSEA & VOMITTING	10	3.6%
HYPOTENSION	1	0.3%
FETAL DISTRESS	-	
FEVER	-	

V. Discussion

Intrapartum epidural analgesia provides effective pain relief in labour, while the mother remains comfortable and co-operative during labour.

A combination of epidural opioids with local anaesthetics has been used in various studies to improve pain relief during labour and to reduce the side effect such as motor paralysis of abdomen and pelvic muscles usually seen when local anaesthetics used alone.

We in our study used low dose 0.0625 % bupivacaine and 20mcg of fentanyl.

The patients of the study and control group belong to the age group of 17 to 37 years. Labour epidural was initiated according to the patients request as and when they experienced severe pain and started as early as 2cm (13.2%). Labour was augmented by artificial rupture of membrane followed by oxytocin drip administered in theinfusion pump and titrated according to the uterine contractions. Continuous fetal heart rate monitoring was done.

Control group was selected and was matched according to the study group though we had more multigravida in control group.

Cervical dilatation – Timing of epidural cathetrisation

"According to American College of Obstetrics and Gynaecology committee concluded that maternal request is sufficient medical indication for pain relief during labour.

A meta analysis including 5 randomised trials and retrospective cohort studies demonstrated that early administration of neuraxial analgesia <3cm didn't increase the rate of caesarean or delivery. (study done by Wang F, Shen X, Guo et al in 2009)

In present study 13.2% had epidural catheterization at 2cm and 44.6% at 2-3cm dilatation 40.9% at 3cm-4cm and 1.1% at 4-5cm.

A meta-analysis including five randomized trials and one retrospective cohort study including over 15,000 nulliparous women demonstrated that early administration of neuraxialanesthesia (≤3 cm, including latent phase administration) did not increase cesarean and instrumental delivery rates compared to later administration (cervical dilation ≥4 cm). In addition, some of these trials found that women who have early administration of neuraxialanesthesia have significantly shorter labors than those in whom anesthesia administration was delayed.

In present study 57.8% women had epidural catheterization at less than 3 cm dilatation.

Quality of pain relief

The perception of pain intensity was low among women who received epidural both during the first stage of labour as well as during second stage of labour.

A higher proportion of women in the epidural group rated their satisfaction and pain relief as excellent and good Majority of the patients had also experienced good pain relief even during episiotomy repair.

- In present study 33.5% and 36.7% had excellent and good pain relief, none of the women experienced no pain relief with epidural analgesia according to visual analogue scale
- According to verbal numerical rating scale the 84.4% experienced excellent pain satisfaction with very mild pain or no pain and 15.4% experienced good pain satisfaction with mild to moderate amount of pain, showed a statistical significance with a P Value 0.0001.

Based on few meta analysis and randomized control trials published in Cochrane review by Liu and Long in 2015 and 2003 studied in 120 women stated that " Women in the epidural group experienced reduced pain compared to those in no epidural or placebo showing a significant P value = 0.01 ((SMD -9.55, 95% CI -12.91 to -6.19; 120 women; studies = 2; I2 = 84%; Tau2 = 4.97; Chi2 = 6.40; P = 0.01; Analysis 2.1).
Study done by De orange in 2011 in 70 women showed that a higher proportion of women in the epidural group rated their satisfaction with pain relief as excellent or very good (RR 1.32, 95% CI 1.05 to 1.65; 70 women; studies = 1; Analysis 2.5). cochrane)

Another study done by Long in 2003 suggests that the perception of pain intensity was low among women who received epidural during first stage of labour (P value 0.0001)

The present study is comparable with studies done by Long in 2003 with a P Value 0.0001, hence epidural analgesia is recommended as gold standard for pain relief which was also attributed to excellent in house anaesthist team and institutional backup.

Duration of 1st stage of labour

	Year of study	Duration in mins(mean)
Stud et al	1980	480 mins
David chestnut	1994	381 mins
Russell et al	1995	299 mins
Nisha R Agarwal et al	1996	235 +89 mins
Porozhanova V et al	1998	240 + 198 mins
Impey et al	2000	294+156 mins

IN PRESENT STUDY IRRESPECTIVE OF PARITY

Study group	Control group
316.33 mins	366.50 mins

P Value = 0.000
Mean difference 50.17 mins
In present study

Primigravida	Multigravida
169.63 minutes	146.70 minutes

First stage of labour was shortened in the following studies - Studies done by Long in 2003 and Morgan Oris in 1999 in 30 and 66 women showed a significant P value 0.0005 (MD -55.09 minutes, 95% CI -186.26 to 76.09; random-effects; 189 women; studies = 2; I2 = 92%; Tau2 = 8236.28; Chi2 = 12.10; P = 0.0005; Analysis 2.20)

Study done by Fyneface-ogan et.al 2009 and Wong et al in 2005 with N=50 and 750 the first stage of duration was shortened.

The following studies show first stage was not prolonged- Porozhanova.V and Bozhinova.S in 1998 studied the effect of epidural analgesia on the I stage of labour and found that the I stage of labour was not prolonged by epidural analgesia.(19). Similar results were published by impey et.al in 2000,(15), Nisha.R. Agarwal et.al in 1996 (18).

NiteenArsule(1) MeghaTajane(3) in 2015 studied the effects of lumbar epidural analgesia in first stage of labour found that 1st stage of labour was not prolonged. The average length of active phase of labour in their study was 334+_71.75 minutes.

Similar results were published by Stud et al in 1980 in whose study average duration was 480 min with epidural analgesia and David 1994 and Russell et al in 1995 and Botill et al in 1997 was 381 and 299 mins and 269 mins respectively.

No significant effect on first stage of labour was noted in the following study –

A meta analysis of randamozied trials of epidural versus no epidural in labour found that no significant effect on first stage of labour with a mean difference of 18.1mins study done by Anim-Somuah M, Smyth R, Jones, L. Epidural versus non-epidural or no analgesia in labour. Cochrane Database Syst Rev 2011; :CD000331
The present study is comparable with studies done by David Chestnut in 1994 and Stud et al in 1980 and Impey et al in 2000 with 1st stage duration of 381 mins and 480 mins 294+_156 mins respectively.
In our study the mean duration of active phase of 1st stage of labour in study group among primigravida was 169.63 minuts and multigravida was 146.70 minutes.
It is shortened by 30.51 minutes in primi compared to control group which is statistically significant (P Value 0.0001) and 19.66 minutes in multi compared to control group which is not statistically significant (P value 0.125), may be because of more numbers of multi in control group and number of multi who opted for epidural were less in study group.

When compared irrespective of parity the duration of labour in the study and control group were 316.33 mins and 366.50 mins with a mean difference of 50.17 mins with a statistical significance with a P Value 0.0001 which is comparable with Long in 2003, Morgan Oris in 1999 showed a statistical significance in their studies (0.0005) However more number of adequately covered RCTs are required to prove in the future

Duration of 2nd stage of labour

Author	Year of study	Duration in mins (mean)
Stud et al	1980	57.9 mins
Cohen et al	1987	52 mins
David Chestnut	1994	112 mins
Russell et al	1995	104 mins
Botill et al	1997	46 mins
Shallysengar	2015	70 mins
Nisha R Agarwal et al	1996	38.2 mins
Porozhanova V et al	1998	31.06 mins
Impey et al	2000	51.2 mins

IN PRESENT STUDY IRRESPECTIVE OF PARITY
The mean duration of 2nd stage of labour irrespective of parity

Study group	Control group
100.68 mins	100.64 mins

P Value = 0.014
Mean difference – 0.04 mins

In Present study

Primigravida	Multigravida
60.95 mins	39.73 mins

The following studies show second stage of labour was not prolonged -
According to Porozhanova.V and Bozhinova.S in 1998 studied the duration of II stage of labour was not prolonged by epidural analgesia (19). Impey.et. al. also, in his study in 2000 concluded that the duration of II stage of labour was not prolonged by epidural analgesia (mean duration of II stage – 36mins) (15).Nisha.R. Agarwal et.al found that the duration of II stage of labour was 38.2 mins (18).

The following studies and meta analysis showed prolonged second stage with no statistical significance -
Genc in 2015, Liu in 2015, Long in 2003, Morgan Oriz in 1999 in Cochrane analysis had prolonged second stage with no statistical significance P value = 0.28 (MD 7.66 minutes, 95% CI -6.12 to 21.45; random-effects; 344 women; studies = 4; I2 = 78%; Tau2 = 148.06; Chi2 = 13.87; P = 0.28; Analysis 2.21cochrane)

The mean duration of II stage of labour in studies by Russell et al in 1995 had 104 mins. David Chestnut in 1994 was 112 mins respectively.
Irrespective of parity the duraaion of labour was 100.68 mins in the study group and 100.64 mins in the control group.

The mean duration of 2nd stage of labour irrespective of parity was prolonged by 0.04 mins with no statistical significance with P value 0.386 which was comparable with studies done by Genc in 2015 and Long in 2003.
These observations are in par with the study by David Chestnut in 1994 and Russell et al in 1995.

The duration of second stage of labour is comparable in both the study and control group strengthening the fact that epidural labour analgesia did not prolong the second stage of labour, did not cause motor blockade, did not interfere with the descent of the presenting part or interfere with maternal expulsive forces.
The mean duration of 2nd stage of labour among primi and multi in study group was 60.95 mins and 39.73 mins respectively. It is lengthened by approximately 2.98 mins among primi compared to control group with a P value 0.381 which is not statistically significant and among multi is shortened by approximately 94 seconds with a P value 0.775 which is not statistically significant.

Total duration of labour

Author	Year of study	Duration in mins
Stud et al	1980	537.9 mins
David Chestnut	1994	493 mins
Russell et al	1995	403 mins
Botill et al	1997	376.2 mins
Nisha R Agarwal et al	1996	261+104 mins
Porozhanova V et al	1998	266 +213.08 mins
Impey et al	2000	333 mins + 176 mins

IN PRESENT STUDY

Study group	417.01 mins
Control group	467.14 mins

Stud et al in 1980 (4) showed the mean total duration of labour was 537.9 mins , david chestnut 1994 reported as 493 mins, Russell et al in 1995 reported as 403 mins and Botill et al in 1997 showed the mean duration of labour was 376.2 mins. Nisha.R.Agarwal.et.al(18) in 1996 reported a mean total duration of labour 261 mins ± 104mins, Porozhanova.V.et.al in 1998 (19) showed the mean total duration of labour to be 266 mins ± 203.08mins. Impey.et.al in 2000(15) reported mean total duration of labour as 333 mins ± 176 mins.

The total duration of labour in present study was shortened by 50.13 mins in study group compared to the control group.

The total duration of labour was significantly shortened in the study group with a P Value of 0.0001 probably explained due to reduction of maternal anxiety, augumented cervical dilatation and not causing motor blockade during 2nd stage.

Mode of delivery

Author	VD	VD	SCS
K S James et al 1998	7%	%	7%
Zun Zhang et al 2001	3%	2%	4.4%
Celleno and Capogna 1988	3.3%	0%	.6%
Russell et al 1995	6%	0%	4%
Dahl et al 1999	2%	%	%
Hart et al 2003	1%	9%	0%
Desai Pankaj et al 2006	5.12%	5.45%	.43%
ShailySengar 2015	2%	2%	%

In present study

178 (65.7 %) in the study group had spontaneous vaginal delivery and 26 (9.6 %) had instrumental delivery , 67 (24.7 %) underwent lower segment caesarean section.

Mode of delivery	Study group		Control group		Value
	N		N		
Spontaneous vaginal delivery	178	5.7	186	8.6	.061
Assisted vaginal delivery	26	.6	12	.4	.057
Lower segment caesarean section	67	4.7	73	6.9	.126

K.S.James et.al. in 1998 (10) reported spontaneous vaginal delivery rate of 77%, instrumental delivery rate of 6% and caesarean section rate of 17%. Zun Zhang.et.al in July 2001(38) reported spontaneous vaginal delivery rate of 63%, instrumental delivery rate of 23% and caesarean section rate of 15%. Celleno and capogna in 1988 (9) showed in their study a spontaneous delivery rate of 83.3 %, instrumental delivery rate 10% and caesarean section rate of 6.6 %. Russell et al in 1995 (6) reported 46 % spontaneous vaginal delivery, 40 % instrumental delivery and 14 % caesarean section. Dahl et al in 1999 (10) reported 82 % spontaneous vaginal delivery 9 % instrumental delivery and 9 % caesarean section.

A meta-analysis of 38 randomized trials comparing all modalities of epidural with any form of pain relief not involving regional blockade or no pain relief in labor, concluded epidural analgesia did not significantly increase the risk of cesarean delivery (RR 1.10, 95% CI 0.97-1.25) Anim-Somuah M, Smyth R, Jones, L. Epidural versus non-epidural or no analgesia in labour. Cochrane Database Syst Rev 2011; :CD000331

In the present study 65.7% of parturients had spontaneous vaginal delivery in study and control group, the present study is comparable with study Desai Pankaj et al in 2006 and ShailySengar in 2015 and Zun Zhang et al in 2001

RCT conducted by Philipsen and Jensen 1989 (13) sharma et al 1997 (14) Bofill et al 1998(7), Clark and collegues 1998 (15) showed no significant difference between caesarean delivery with epidural analgesia compared to those without epidural analgesia.

However there is 5.2% increase in the rate of instrumental delivery in study group compared to control group but is statistically not significant.

This goes to show that the mode of delivery is not altered by epidural labour analgesia in accordance with the above mentioned studies.

The route of delivery was not affected by administrated by epidural labour analgesia in study group, evidenced as both in study and control group had similar incidence of vaginal delivery (65.7%) and 9.6% incidence of instrumental delivery in the study group with 5.2% increase compared to control group and the primary lower segment caesarean section rate was similar in both the study and control group.

In a meta analysis labour analgesia was associated with increased risk of instrumental delivery. One of the possible explaination is that epidural promotes a difference in obstetrical management due to prescence of effective pelvic analgesia, encourages the obstetrician to get biased to the use of instrumental vaginal delivery

(Bofill JA, Vincent RD, Ross EL, et al. Nulliparous active labor, epidural analgesia, and cesarean delivery for dystocia. Am J ObstetGynecol 1997; 177:1465.

Segal S, Blatman R, Doble M, Datta S. The influence of the obstetrician in the relationship between epidural analgesia and cesarean section for dystocia. Anesthesiology 1999; 91:90.)

Apgar score

The Apgar score at 1 minute was 8/10 in 94.8% in study group and 92.9% in control group. The Apgar score at 5 minute was 9/10 in 96.3% in study group and 95.9% in control group. The difference was not statistically significant.

None of the neonates had Apgar score <5 at birth inspite of slight increase in the rate of instrumental vaginal delivery.

Total number of Top-up doses required

- 20.7% (56) required three top up doses, 33.9% (92) required two top up doses and 31% required single top up dose.
- Initial dose was sufficient in 14.4% (39) women.

Complications

- The least complication rate can be explained by the institutional care and excellent anaesthetic team which followed all the protocols meticulously.

	N %
HEADACHE	38 14%
URINARY RETENTION	14 5.1%
NAUSEA & VOMITTING	10 3.6%
HYPOTENSION	1 0.3%
FETAL DISTRESS	-
FEVER	-

- Out of 14% women who had headache 2 of them required hospitalisation because of severity, 5.1% had urinary retention and 3.6% had nausea and vomiting, 0.3% had hypotension which was managed conservatively with intravenous fluids. None of the women experienced fetal distress.
- A few meta analysis done by Howel in 2001 and Loughnan in 2000 showed no clear difference between the groups for women reporting lower backache. (RR 1.00, 95% CI 0.89 to 1.12; 814 women; studies = 2; Analysis 1.14; moderate-quality evidence).(Cochrane review)
- Meta analysis done by Freeman in 2014, Heed in 2002, Longtenberg in 2017 and Long in 2003 showed that there was no clear difference between the two groups on incidence of headache. (RR 1.06, 95% CI 0.74 to 1.54; 1938 women; studies = 4; Analysis 1.19).
- Fewer women in the epidural group experienced nausea and vomiting (average RR 0.62, 95% CI 0.45 to 0.87; 4440 women; studies = 15; I2 = 70%; Tau2 = 0.24; Chi2 = 46.51, df = 14; P < 0.0001; Analysis 1.21),

VI. Conclusion

Administration of labour epidural analgesia is the corestone in the management of pain during labour providing excellent pain relief in 84.4% of labouring women.

Contrary to the popular belief that epidural lengthens the duration of labour, our study showed statistically significant reduction in the first stage of labour and total duration of labour with no alteration of second and third stage of labour. However we need more RCTs to prove this.

Its safe, not affecting the route of delivery with a slight (5.2%) increase in instrumental vaginal delivery rate (not statistically significant) without major feto-maternal side effects.

Hence, It is a simple, safe, effective and excellent method of labour analgesia.

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