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Original Article

Epidural Analgesia for pain relief in labor in subjects with hemoglobin between 6 to 4 g/dL: A prospective study

Desai Pankaj, Sinha Archana, Gandhi Sulakshana, Prajapati Manisha,

Department of Obstetric Gynecology Medical College and SSG Hospital, Baroda

Abstract

Objectives : To evaluate the safety in labor of epidural analgesia for labor pain relief in severely anemic women. *Methods:* Eighty-four consecutive women with hemoglobin less than 6 g/dL were given epidural analgesia after ruling out contraindications. Their obstetric outcome was compared with 84 nonanemic women who were also given labor analgesia in the same way. Preloading in anemic subjects was reduced to half. *Results :* There was no increase in any complication in women with severe anemia receiving epidural analgesia. They had longer interval between drug administration and effect of analgesia. The level of analgesia was one root higher than that in non-anemic women. *Conclusion:* With adequate precautions epidural analgesia can be safely given for labor to anemic subjects for labor pain relief.

Key words : anemia, epidural analgesia, labor pain relief

Introduction

Epidural analgesia for pain relief in labor in considered a gold standard. However administering it in mothers with severe anemia can be understandably scary. The fears could be mainly consequences of hypotension following epidural and precipitating heart failure and allies. This prospective study was conducted to examine whether these fears are real and pertinent enough to deny these patients labor pain relief.

Methods

During the study period from 1st April 2005 to 30th June 2006 all subjects in active labor but with less than 6 cm dilatation of cervix and station of the head at zero or above were offered epidural analgesia for pain relief. Amongst these subjects there were 84 severely anemics with hemoglobin between 6 and 4 g/dL. Their obstetric outcome was compared with that of 734 nonanemics (hemoglobin in levels >10 g/dL) who were also given epidural analgesia. The severely anemic constituted the study group and the non-anemics constituted the control group.

Exclusion criteria were - pre-eclampsia, previous cesarean section, abnormal presentation, multiple pregnancy, abruptio placenta, placenta previa, and medical disorders including renal, respiratory and liver diseases.

Epidural analgesia was administered by standard technic. Preload was given to all subjects. For controls that were non-anemic 1 liter of lactated ringer solution was given. However to the severely anemic study group only 500 mL of lactated ringer solution was given slowly and discontinued if any sign of failure appeared.

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Correspondence :
Dr. Pankaj Desai
"Guru Kripa", Opp. Alankar Apartments,
Dandia Bazar, Baroda - 390 001.
Tel. (0265) 2432519/2437793 Email : drpankajdesai@gmail.com

Clinical parameters closely observed, and documented were changes in heart rate, blood pressure and features of cardiac failure. Complications related to epidural analgesia observed were nausea, vomiting, rigor, bradycardia, respiratory depression, micturition difficulty, speech loss, sedation, highspinal (wrong space), backache, and convulsions. Fetal condition was also monitored and evidence of fetal distress, on clinical and/or cardiotocographic monitoring, was recorded.

Results so obtained were tested for statistical significance by X^2 test and student t test. These were evaluated in the light of current literature to draw valid conclusions.

Results

In the study group 60.7% (51/84) were primigravidas compared to 42.1% (309/734) in the control group. All 84 subjects amongst controls were full term, none preterm or post-term. 641 subjects were full-term in controls, 50 preterm and 43 post term pregnancies. In the study group all were at term compared to 87.3%) (641/734) in the controls. 6.8% were preterm and 5.9% (43/734) posterm in the control group.

There was no significant difference between the stations at which epidural analgesia was administered in the two group (Table 1). None in either group was administered epidural if station was below zero.

Table 1. Station on administration of epidural analgesia.

Station	Study group (n=84)		Control Group (n=734)	
	Number	Percent	Number	Percent
-3	28	33.3	223	30.38
-2	36	42.9	314	42.78
-1	20	23.8	185	25.2
-0	00	0.0	12	1.63

X^2 1.65 P=0.05 (Not significant)

Women in the study group took significantly longer time for the epidural to give pain relief (X^2=11.98, P=0.017; (Table 2).

Table 2. Administration - analgesia interval.

Time (Minutes)	Study group (n=84)		Control group (n=734)	
	No.	Percent	No.	Percent
08	00		68	9.26
10	67	79.8	54.2	73.84
12	00	0.00	20	2.72
15	17	20.2	10.8	14.71

X^2 = 11.98 P=0.017 (Significant)

The level of analgesia was T 10 in all the women in the study group as compared to 91.95% women in the control group. This difference was statistically significant. (X^2, 8.13, P=0.017 Table 3). In 59 (8.01%) and 7 (0.95%) in the controls this level was T_{11} and T_{12} respectively.

Table 3. Highest segment of loss.

Level of analgesia	Study group (n=84)		Control group (n=734)	
	Number	Percent	Number	Percent
T10	84	100.00	675	91.95
T11	00	00.00	59	80.1
T12	00	00.00	07	0.95

X^2 = 8.13 P=0.017 (Significant)

The incidences of dreaded complications of postadministration tachycardia, hypotension and vomiting were not statistically different in the two groups meaning epidural analgesia does not increase the chances of these complications in severely anemic subjects with the policy of restricting the preload fluid but not withholding it. (Table 4).

Table 4. Postprocedure tachycardia/hypotension.

	Study group (n=84)		Control group (n=734)	
	Number	Percent	Number	Percent
Tachycardia	00.00	00.00	04.00	0.54
Hypotension	00.00	00.00	07.00	0.95
Vomiting	00.00	00.00	12.00	1.63

X^2=46 Fisher 1 tailed : 0.648 Fisher 2 tailed : 1.0 (Not significant)

Administration of epidural analgesia did not affect the mode of delivery in anemic subjects. In both the groups, the mode of delivery was similar (Table 5).

Table 5. Mode of Delivery.

	Study group (n=84)		Control group (n=84)	
	Number	**Percent**	**Number**	**Percent**
Normal	41	48.8	448	61.04
Interventional vaginal delivery	35	41.7	226	30.79
Cesarean delivery	08	9.5	60	8.17

X^2 = 4.84 P=0.08 (Not significant)

As shown in Table 6, there was no significant increase in number of babies born asphyxiated when epidural analgesia was given in anemic subjects with Hb between ranging from 4-6 g/dL.

Table 5. Neonatal apgar score <8.

	Study group (n=84)		Control group (n-734)	
	number	**percent**	**number**	**percent**
At 0 minute	09	1.7	40	5.45
At 1 minute	00	0.0	09	1.23
At 5 minutes	00	0.00	03	0.41

X^2 3.71, P = 0.05 (Not significant)

Discussion

Epidural analgesia for pain relief in labor is accepted widely. It is proved to be effective in reducing pain, has no significant impact on the risk of cesarean section, maternal satisfaction is high, and does not have effect on the neonate [1].

Severe anemia (Hb<6 g/dL) is a high-risk obstetric condition. Its complications are dreadful. Epidural analgesia can produce hypotension and tachycardia [2]. Both of these can be scary if they are to occur in subjects with severe anemia. It is therefore considered as a relative contraindication to give epidural analgesia in these subjects. However from the paucity of literature on the subject, it seems that this is not a so well studied aspect of pain relief in labor. Denying epidural analgesia for such subjects seems to be a result of traditional wisdom rather than scientifically evaluated facts.

From the present prospective case controlled study feel that the fear of administering epidural analgesia in subjects with anemia seems to be overblown. Indeed we have restricted the fluid administered in preload but have also not withheld preload. There is tight rope walking here. Preload if not given can lead to precipitous fall in blood pressure and a subsequent adverse obstetric outcome. At the same time excess preload can precipitate a congestive cardiac failure in severely anemic subject. Hence we restricted the preload fluid to half that used in non-anemic subjects. This policy seems to have worked quite well.

A higher duration of time taken by the drug to act after administration in anemic subjects as reflected in the increased administration to analgesia interval is interesting. However, it is difficult for us to speculate the reasons thereof. T_{10} was the highest level of effect in anemic subjects. The same was lower in nonanemic subjects. But this in no way increased the propensity to develop a high spinal. However it alerts the obstetricians and the anesthetistis to be careful when giving epidural analgesia in anemic subjects. They can expect one level higher of effect and these subjects can take more time to get the analgesia effect. However on other counts, the anemic status of the mother does not effect the mode of delivery or in any way jeopardize the fetus.

Conclusion

Administering epidural analgesia for labor pain relief in an anemic mother with a Hb as low as 4 g/dL is safe. It does not jeopardize the mother or the baby. However one has to be alert regarding the volume of preload given, the highest level of analgesia reached, and the time taken for the drug to act as these can be different compared to nonanemic controls.

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