

Epidural Pain Relief in Obstetrics: Başkent University Experience

OBSTETRİKDE EPİDURAL ANALJEZİ: BAŞKENT DENEYİMİ

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Summary-

Objective: Evaluation of the effects of epidural pain relief on certain obstetric and neonatal parameters.

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Material and Methods: Of the patients delivered in our clinic between September 1995 and May 1997, 129 were matched according to the age, gravidity, parity, gestational age and birthweight of the neonate. Epidural analgesia had been administered to 75 of them on patient request. Main outcome measures were duration of various stages of labor, rate of operative vaginal delivery, 5 minute Apgar score and umbilical arterial pH of the neonate. Patients were grouped according to cervical dilatation at the time epidural analgesia was initiated. Statistical analyses were done on a personal computer by student's *t* and Mann-Whitney *U* tests.

Results: Of the various stages of labor, only the duration of second stage was significantly longer than controls in epidural group ($p<0.005$). Neither the rate of operative vaginal delivery, nor were neonatal parameters affected. However, when epidural bolus injection was made with a cervical dilatation of <2 cm, first stage of labor was significantly longer than that of patients receiving the bolus with cervical dilatations of >2 cm ($p<0.001$).

Conclusion: Epidural analgesia is a safe method in obstetric patients. Although it may lengthen second stage of labor, it does not necessarily increase operative vaginal delivery rate. It has minimal effect on fetus, if any. The timing of the initiation of epidural analgesia should be done when cervical dilatation is >2 cm, not to prolong the first stage of labor. Further studies are needed for further investigation of the effects of epidural analgesia in obstetric population.

Key Words: Epidural analgesia, Labor, Delivery, Cervical dilatation

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Ozet

Amaç: Epidural analjezinin obstetrik ve yenidoğan parametrelerine etkisinin incelenmesi

Çalışmanın Yapıldığı Yer: Başkent Üniversitesi Tıp Fakültesi, Kadın Hastalıkları ve Doğum Anabilim Dalı

Materyal ve Metod: Eylül 1995, Mayıs 1997 tarihleri arasında 75'i epidural analjeziyle olmak üzere doğum yapan, yaş, gravidite, parite, gebelik yaşı ve yenidoğanın doğum ağırlığı açısından eşleştirilmiş 129 hasta retrospektif olarak incelendi. Temel parametreler olarak doğumun çeşitli evrelerinin süreleri, operatif doğum hızı, yenidoğanın 5. Dakika Apgar skoru ve umbilikal arter pH'sı alındı. Hastalar, ayrıca, epidural analjezinin puşe dozunun verildiği andaki servikal dilatasyonlarına göre gruplandırılarak, epidural analjezinin başlama anı ile eylem, evrelerinin süreleri arasındaki ilişki belirlenmeye çalışıldı, istatistiksel analiz, kişisel bilgisayarda Student *t* ve Mann-Whitney *U* testleriyle yapıldı.

Bulgular: Doğum eyleminin evreleri arasında yalnızca ikinci evre, epidural grubunda kontrol grubuna oranla anlamlı olarak uzundu ($p<0.005$). Operatif doğum hızı ve yenidoğan parametrelerinin, epidural analjeziden etkilenmediği belirlendi. Epidural analjezinin puşe dozunun, servikal dilatasyon <2 cm iken verildiği hastalarda doğum eyleminin birinci evresinin anlamlı olarak uzadığı saptandı ($p<0.001$).

Sonuç: Epidural analjezi, obstetrik hastalarda güvenli bir yöntemdir. Eylemin ikinci evresi epidural analjeziye bağlı olarak uzayabilmekle birlikte, operatif doğum hızı artmaz. Epidural analjezinin fetus üzerine etkileri, varsa bile minimaldir. Analjezinin başlatılması, servikal dilatasyonun >2 cm olmasıyla eşzamanlı olduğunda, eylemin birinci evresi uzumaz. Obstetrik popülasyonda epidural analjezinin etkilerinin daha da aydınlatılabilmesi için yeni çalışmalara halen gereksinim vardır.

Anahtar Kelimeler: Epidural analjezi, Doğum, Eylem, Servikal dilatasyon

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Various techniques and drugs are employed for relief of pain during labor and delivery (1,2). Among those, epidural block is a very useful method of producing analgesia and anesthesia, and

it matters little whether delivery is accomplished vaginally or abdominally. The first use of lumbar epidural anesthesia in obstetrics was reported by Graffagnino and Seyler in 1938 (3). Epidural anesthesia has been shown not to prolong the duration of first stage of labor, but it does prolong the second stage (4). This effect is particularly prominent in nullipara and may be associated with a high rate of instrumental delivery, due to failure of the descending head to rotate. However, the association has never conclusively been shown to be causal. Some studies have shown little or no association between the use of epidural anesthesia and an increase in forceps delivery rates (5,6).

In this retrospective case control study, we evaluated several obstetric and fetal parameters of the patients who underwent epidural analgesia during labor.

Materials and Methods

Of the patients who delivered between September 1995 and May 1997 in Baskent University Hospital, 129 were matched according to the age, gravidity, parity, gestational age and birthweight of the neonate. Data were collected retrospectively from the records of patients. Out of 129 patients, 75 were underwent epidural analgesia during labor. Main outcome measures were duration of various stages of labor, rate of operative vaginal delivery, 5 minute Apgar score and umbilical arterial pH of the neonate.

As soon as the patient requested epidural analgesia, 1000 ml Ringer's Lactate i.v. rapid infusion was started. After the patient was placed in left lateral decubitus position, epidural catheter was placed through 2nd and 3rd lumbar vertebrae and after insertion of the tip 5 cm in epidural space, it was

fixed. A test dose of 0.25% bupivacaine 3 ml was given. The bolus injection of 10 mL 0.25% bupivacaine and 0.05 mg fentanyl was administered when the patient was in active phase of labor. The maintenance dose of 0.125% bupivacaine and 0.025 mg/mL fentanyl 8-12 mL per hour was obtained via an infusion pump.

Patients who underwent epidural analgesia were grouped according to cervical dilatation at the time epidural bolus was given. Thus, the relationship between initiation of epidural analgesia and duration of various stages of labor were also studied.

At the time of delivery, Apgar scores were recorded and umbilical cord arterial blood samples were taken according to the criteria of American College of Obstetricians and Gynecologists (ACOG), to assess the fetal acid-base status.

Statistical analyses were done on a personal computer by student's t and Mann-Whitney U tests.

Results

The demographic characteristics of both groups of patients are listed in Table 1. As mentioned before, they were similar in aspect of age, gravidity, parity, gestational age and birthweight of the neonate.

The obstetric and neonatal parameters, including the duration of stages of labor, operative vaginal delivery rate, 5 minute Apgar score, umbilical arterial pH for both study and control groups were shown in Table 2. Briefly, only the duration of second stage of labor was significantly longer in epidural group ($p < 0.005$). No other significant difference was noted between the study and control groups.

Table 1. Demographic characteristics of patients

	Epidural Group*	Control Group*	p
Age	27.7±4.3	27.7±4.9	NS
Weight (kg)	72.4±8.9	71.6±7.8	NS
Height (cm)	163.4±5.3	164.4±4.6	NS
Gravidity	1.7±1.1	1.8±1.0	NS
Parity	0.3±0.5	0.5±0.5	NS
Gestational age (weeks)	38.7±1.4	38.5±1.7	NS
Birthweight (g)	3280±1396	3209±1519	NS

* All values are mean±standard deviation

Table 2. Various obstetric and neonatal parameters of patients

	Epidural Group* n=73	Control Group* n=56	P
First stage of labor (min)	268.7±124.2	228.2±135.0	NS
Second stage of labor (min)	63.1 ±60.0	32.7±21.2	0.001
Third stage of labor (min)	6.9±5.7	6.0±2.7	NS
Instrumental delivery rate (%)	33.9	22.0	NS
5 minute Apgar score	9.8±0.6	9.9±0.5	NS
Umbilical arterial pH	7.2±0.1	7.2±0.1	NS

*All values are mean±standard deviation

Table 3. Duration of various stages of labor according to the cervical dilatation at the beginning of epidural analgesia

	Cervical Dilatation		P
	<2 cm	>2 cm	
First stage of labor (min)	432.5±116.0	236.6±189.9	<0.001
Second stage of labor (min)	115.0±92.8	56.4±53.2	NS
Third stage of labor (min)	5.0±10.2	7.2±16.1	NS
Instrumental delivery rate (%)	33.3	32.7	NS
5 minute Apgar score	9.8±0.4	9.8±10.6	NS
Umbilical arterial pH	7.2±10.1	7.2±10.1	NS

*All values are mean±standard deviation

The patients who underwent epidural analgesia during labor were also grouped according to cervical dilatation at the time of epidural bolus injection. When 2 cm of dilatation was taken as a cut-off point, a significant difference appeared between two groups regarding the duration of first stage of labor (Table 3). Those, with cervical dilatation of <2 cm at the time epidural bolus injection was made had longer lasting first stage than that of patients with >2 cm of cervical dilatation at the beginning ($p<0.001$). No other significant difference was found between two groups. These two groups were also similar with regard to age, gravidity, parity, gestational age and birthweight of the neonate.

There was only one baby born with an umbilical arterial pH < 7.00 (pH=6.99), who had an Apgar score of 10 at the 5th minute postpartum with no significant clinical signs of perinatal hypoxia. All of the infants had a 5 minute Apgar score > 7.00.

Discussion

Several studies are present regarding the effect of epidural analgesia on the kinetics of labor (7,8).

To date, there is no consensus about the influence of epidural analgesia on the first stage of labor

(9,10). In this study, there was no difference in duration of the first stage of labor between epidural and control groups. However, within epidural group, the first stage of labor was significantly prolonged when epidural analgesia has been initiated before cervical dilatation exceeded 2 cm, despite active contractions were present. Such a cut-off point for cervical dilatation should be taken into account before starting epidural analgesia, not to prolong the first stage of labor.

Likewise, the effect of epidural analgesia on the second stage of labor is still controversial. Some authors do not believe that epidural analgesia has a negative effect on the second stage of labor (4). On the other hand, some reports indicate a longer duration of second stage, and a higher rate of instrumental delivery (11). This tendency is explained by a possible loss of bearing down reflex which sometimes may be accompanied by motor block, due to epidural analgesia. In our study, the second stage of labor in epidural group was nearly twice as much as the control group. Instrumental delivery rate was also increased in epidural group, although not significantly. This lack of significance may be related to the number of patients which may be less than required to make significance.

As far as the early neonatal outcome is concerned, no adversity due to epidural analgesia is expected (12,13). A previous study from the same center indicates a mean umbilical arterial pH of 7.20 ± 0.09 in patients who did not undergo epidural analgesia during labor (15). In the current study, the mean umbilical arterial pH was found to be similar and all of the infants had a 5 minute Apgar score >7 . No infant had a significant clinical sign due to perinatal hypoxia. From this point of view, our study shows no perinatal hypoxia in patients with epidural analgesia during labor and delivery.

In conclusion, epidural analgesia is a well-known and appropriate option for the obstetric patient. It may influence the first stage of labor especially when epidural analgesia is initiated before cervical dilatation exceeds 2 cm. It may also prolong second stage of labor and increase the rate of instrumental delivery. The interactions between epidural analgesia, kinetics of labor and the rate of instrumental delivery needs further investigation to be clarified. We believe that the early neonatal outcome does not seem to be adversely affected by epidural analgesia.

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