Predictors of Recommendation and Acceptance of Intrapartum Epidural Analgesia

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We conducted this prospective study to characterize the obstetric and sociodemographic variables that predict physicians' recommendations and patients' acceptance of intrapartum epidural analgesia. The study population consisted of 447 consecutive, low-risk parturients in early active labor. Epidural analgesia was recommended to 393 patients (87.9%), however only 164 (41.7%) consented to receive it. A multiple logistic regression analysis demonstrated that the severity of pain, as assessed by the medical staff (odds ratio [OR] = 1.5, 95% confidence interval [CI] 1.13, 1.93), low parity (OR = 0.57, 95% CI 0.44, 0.74), and low maternal age (OR = 0.89, 95% CI 0.79, 0.99) were significant factors affecting recommendations of epidural analgesia. In a multivariate analysis, severity of subjective pain (OR = 1.39, 95% CI 1.16, 1.68), low parity (OR = 0.80, 95% CI 0.73, 0.99), high education (OR = 90.09, 95% CI 27.02,257.06), and the patients' being secular compared with religious (OR = 2.14, 95% CI 1.08,4.21) were found to be independent predictors of acceptance of epidural analgesia. There are differences between patients offered and those not offered epidural analgesia and between parturients who accept and those who do not accept this analgesia. **Implications:** We studied the factors that influence the recommendation of epidural analgesia by obstetricians, as well as its acceptance by the laboring patients at a university hospital in Israel. Epidural analgesia was recommended more often to low parity, younger women exhibiting more pain. Parturients who perceived greater pain were more secular, had low parity, and had a higher level of education were more likely to accept it.

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An important factor in the care of pregnant women is analgesia during labor. The use of epidural analgesia has increased greatly in the last decade. Most studies have shown that epidural analgesia provides better pain relief than other methods (1–5).

There is a large disparity in the use of epidural analgesia among hospitals. Some departments use it for most women [approximately 80% in France (6)], while others hardly use it [6%–23% reported in five hospitals in the US (7) and 4.6% in a rural hospital in Canada (8)]. Recently, the number of patients given epidural analgesia during labor was reported to be more than 50% in many institutions in the US (9).

Little information is available about socioeconomic and obstetric factors that influence parturients' decisions to accept or reject recommendations to use intrapartum epidural analgesia and concerning patients who are offered this mode of analgesia. Huston et al. (7) reviewed 8229 deliveries at five hospitals in the US in order to characterize women who used epidural analgesia during labor. They found epidural analgesia to be associated with nulliparity, higher maternal age, Caucasian ethnicity, and those who have private insurance. Thompson et al. (10) found that women receiving epidural analgesia were more likely to be Caucasian and to be receiving care from an attending physician.

In the present study, we aimed to define the obstetric and sociodemographic factors characterizing parturients who were offered and who accepted epidural analgesia. In addition, we attempted to assess if the severity of pain, as exhibited by patients and their subjective perception of it, predicts physicians' recommendations and patients' acceptance of intrapartum epidural analgesia.

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Methods

The study population consisted of 447 consecutive, low-risk laboring women in early active labor (i.e., 4–5 cm cervical dilation with regular contractions). All parturients were at term (38- to 42-wk gestation), with a singleton fetus in cephalic presentation who had begun to deliver during the day shifts. Patients were excluded from the study on the basis of the following criteria: clinical evidence of cephalopelvic disproportion, placental insufficiency, scarred uterus, or advanced labor. The deliveries took place in the delivery room of the Soroka University Medical Center between May 1, 1997, and November 30, 1997. Women were interviewed before the administration of any type of analgesia.

Data were collected prospectively by one of the authors (ES). Information was obtained regarding ethnic origin (i.e., Jewish or Bedouin Arab), maternal age, number of pregnancies and deliveries, marital status (i.e., married, separated, or divorced), degree of religious practice (religious, traditional, or secular), level of education, and participation in antenatal childbirth preparation classes. In addition, the presence of a husband or any significant other during labor was noted. All parturients were asked if the option of epidural analgesia was offered to them after admission to the delivery ward and if they wanted to use this mode of analgesia. In addition, they were asked about the degree of pain by using a visual analog scale (VAS). The VAS is easy to use and is a sensitive, reliable method for pain measurement (11,12). One obstetrician and the midwife attending the birth estimated the degree of pain experienced by the parturients, using the same scale. When two different scores were given (by the obstetrician and midwife), the mean score was calculated.

During the study period, there were six obstetricians practicing in this delivery room. The epidural analgesia was offered to the laboring women by the obstetric team during rounds, which were performed every hour. Individual provider bias in offering epidural analgesia was not likely to occur because a team approach was fostered. The patients were given an explanation regarding the two options of analgesics available in our medical center, epidural analgesia or IV opioids. A written form explaining the technique of epidural was provided to those who were interested in receiving epidural analgesia, and an anesthesiologist was called when further information was required. It is noteworthy that patients attending antenatal classes are made aware of the risks and benefits of the two available analgesic techniques. In our study population, we found that only primiparas had participated in the antenatal classes. The study was approved by the ethics committee of the hospital.

Statistical analyses were performed with the SPSS package (SPSS, Chicago, IL). χ^2 or Fisher's exact test for comparison of proportions and Student's *t*-test for comparison of means were used. $P < 0.05$ was considered statistically significant. Logistic regression was used to investigate the multivariate regression relationship of patients' sociodemographic characteristics or pain perception, and physicians' offer of intrapartum epidural analgesia, as well as its use during labor. Odds ratios (OR) with 95% confidence intervals (CI) were calculated from the regression coefficients.

Results

Of the 447 parturients interviewed, epidural analgesia was offered to 393 patients (87.9%). One hundred sixty-four patients consented, but it was administered to only 131. Twenty patients did not receive epidural analgesia because of the unavailability of an anesthesiologist to administer it, while the other 13 were not given epidural analgesia because of technical and medical reasons.

Table 1 compares the characteristics of the 393 women who were offered an intrapartum epidural analgesia with the 54 women who were not. Patients who were offered epidural analgesia compared with those who were not were significantly younger (26.5 vs 32.8 yr, repectively, $P < 0.001$), were of Jewish ethnicity (63.4% and 11.1%, respectively, $P < 0.001$), and had fewer pregnancies and deliveries (2.7 vs 7.8 pregnancies, respectively, $P < 0.001$; 2.3 vs 7.1 deliveries, respectively, $P < 0.001$). In addition, they were better educated than parturients who were not offered epidural analgesia (none of the latter group had more than 12 yr of schooling), were more likely to have participated in a childbirth preparation course (none of the latter group had participated), tended to be more secular (45.8% vs 3.7%, respectively, $P < 0.001$), and were more likely to have a close relative present during labor (61.8% vs 14.8%, respectively, $P < 0.001$). The degree of pain exhibited was found to be significantly higher in those parturients who were offered epidural analgesia (mean VAS score = 8.11) as compared with those who were not (mean VAS score 5.72, $P < 0.001$).

A multiple logistic regression model assessed the independent contribution of each of the factors that were found to be significantly associated with the recommendation of intrapartum epidural analgesia by the medical staff. The model included the following variables: maternal age, parity, ethnic origin, degree of religious adherence, presence of a known person during labor, level of education, and the degree of pain as perceived by the medical staff. The severity of pain as assessed by the medical staff (OR = 1.5, 95% CI 1.13, 1.93, $P = 0.004$), as well as low parity (OR = 0.57, 95%

Table 1. Characteristics of Parturients Who Were Offered Intrapartum Epidural Analgesia and Parturients Who Were Not

	Offered (n = 393)	Not offered (n = 54)	P Value
Maternal age (yr)	26.5 (5.45)	32.8 (5.43)	<0.001
Ethnic origin			
Jewish	249 (97.6%)	6 (2.3%)	
Bedouin	144 (75.0%)	48 (25.0%)	<0.001
Gravity	2.7 (1.95)	7.8 (2.72)	<0.001
Parity	2.3 (1.66)	7.1 (2.36)	<0.001
Nulliparity	139 (100%)	—	<0.001
Marital status, married	386 (87.9%)	53 (12.1%)	0.97
Religious practice			
Secular	180 (98.9%)	2 (1.1%)	
Traditional	60 (81.1%)	14 (18.9%)	
Religious	153 (80.1%)	38 (19.9%)	<0.001
Education			
Fewer than 5 yr	41 (53.9%)	35 (46.1%)	
Elementary	65 (84.4%)	12 (15.6%)	
High school	181 (96.3%)	7 (3.7%)	
Academic	106 (100%)	—	<0.001
Companion present, yes	243 (96.8%)	8 (3.2%)	<0.001
Participation in childbirth preparation classes, yes	28 (100%)	—	0.04
VAS scored by medical staff	8.11 (1.88)	5.72 (1.76)	<0.001

Values are mean (SD) or n (%).
VAS = visual analog scale.

CI 0.44, 0.74, $P < 0.001$) and low maternal age (OR = 0.89, 95% CI 0.79, 0.99, $P = 0.045$) were statistically significant factors affecting an offer of epidural analgesia (Table 2). After adjustment for parity and maternal age, ethnicity no longer predicted physicians' tendency to offer epidural analgesia.

Table 3 summarizes the characteristics of the 164 patients who agreed to intrapartum epidural analgesia in comparison with the 229 women who refused this mode of analgesia. Women who agreed to the offer of epidural analgesia had experienced a higher degree of pain, as reported by VAS scores, than those who did not (9.0 vs 8.5, respectively, $P < 0.001$). In addition, women who complied were significantly older ($P = 0.033$), were more likely to be Jewish ($P < 0.001$), had fewer pregnancies and deliveries ($P < 0.001$), were more likely to be secular ($P < 0.001$), and had a higher educational level ($P < 0.001$) than those who refused. Also, patients who requested epidurals were more likely to have participated in a childbirth course ($P < 0.001$) and to have a companion present during labor ($P < 0.001$).

Again, a multiple regression model was constructed to correct for possible confounders in the above variables (Table 4). The model showed the degree of subjective pain reported by the patient to be associated independently with accepting intrapartum epidural analgesia (OR = 1.39, 95% CI 1.16, 1.68, $P < 0.001$). Other predictive factors were low parity (OR = 0.80, 95% CI 0.73, 0.99, $P = 0.05$), higher level of education (OR = 90.09, 95% CI 27.02, 257.06, $P < 0.001$), and being secular as compared with being religious (OR = 2.14, 95% CI 1.08, 4.21, $P = 0.02$).

Table 2. Factors Associated with the Offer of Intrapartum Epidural Analgesia

	OR	95% CI	P Value
Estimated pain (VAS score)	1.48	1.13, 1.93	0.004
Ethnic origin (Jewish/Bedouin)	0.41	0.08, 2.10	0.287
Maternal age (yr)	0.89	0.79, 0.99	0.049
Parity (number of births)	0.57	0.44, 0.74	<0.001
Religious practice			
Secular versus religious	0.48	0.07, 3.52	0.473
Traditional versus religious	0.47	0.16, 1.37	0.168
Education			
Elementary versus academic	0.16	0.014, 1.87	0.144
High school versus academic	0.37	0.034, 4.14	0.424
Companion present (yes/no)	2.77	0.840, 9.16	0.094

Results are from a multiple logistic regression analysis comparing 393 patients who were offered epidural analgesia to 54 patients who were not.
OR = odds ratio, CI = confidence interval, VAS = visual analog scale.

Discussion

The present study shows several sociodemographic and clinical factors to be associated with the tendency of medical staff to offer and of the patients to accept intrapartum epidural analgesia. Several studies conducted in the US have suggested that medical technology is not equally available to patients of different socioeconomic status or of different ethnicities. It was found that privately insured patients (7,13) and Caucasian patients (10,14) may receive better health services as compared with others.

In Israel, the basic health services are equally available to all patients, regardless of ethnicity or any sociodemographic factor, and epidural analgesia, as well as most other procedures in childbirth, are fully covered by the

Table 3. Characteristics of Women Who Accepted Intrapartum Epidural Analgesia as Compared with Those Who Did Not

	Accepted (n = 164)	Not accepted (n = 229)	P Value
Maternal age (yr)	27.2 (5.42)	26.0 (5.43)	0.033
Ethnic origin			
Jewish	135 (54.2%)	114 (45.8%)	
Bedouin	29 (20.1%)	115 (79.9%)	<0.001
Gravity	2.4 (1.73)	3.0 (2.05)	0.002
Parity	1.9 (1.41)	2.6 (1.76)	<0.001
Nulliparity	88 (53.3%)	77 (46.7%)	<0.001
Marital status, married	161 (41.7%)	225 (58.3%)	0.95
Religious practice			
Secular	108 (60.0%)	72 (40.0%)	
Traditional	19 (31.7%)	41 (68.3%)	
Religious	37 (24.2%)	116 (75.8%)	<0.001
Education			
Fewer than 5 yr	2 (4.9%)	39 (95.1%)	
Elementary	5 (7.7%)	60 (92.3%)	
High school	68 (37.6%)	113 (62.4%)	
Academic	89 (84.0%)	17 (16.0%)	<0.001
Companion present, yes	128 (52.7%)	115 (47.3%)	<0.001
Participation in childbirth preparation classes, yes	23 (82.1%)	5 (17.9%)	<0.001
VAS scored by parturients	9.0 (1.37)	8.48 (1.67)	<0.001

Values are mean (SD) or n (%).
VAS = visual analog scale.

Table 4. Factors Associated with the Acceptance of Intrapartum Epidural Analgesia

Characteristics	OR	95% CI	P Value
Degree of pain (VAS score)	1.39	1.16, 1.68	<0.001
Ethnic origin (Jewish/Bedouin)	1.25	0.53, 2.95	0.610
Maternal age (yr)	0.97	0.916, 1.04	0.420
Parity (number of births)	0.80	0.73, 0.99	0.050
Religious practice			
Secular versus religious	2.14	1.086, 4.21	0.027
Traditional versus religious	1.37	0.127, 3.11	0.441
Education			
Elementary versus academic	0.012	0.004, 0.037	<0.001
High school versus academic	0.10	0.037, 0.201	<0.001
Companion present (yes/no)	1.19	0.610, 2.337	0.605

Results are from a multiple logistic regression analysis comparing 164 patients who accepted epidural analgesia with 229 patients who did not.
VAS = visual analog scale. OR = odds ratio, CI = confidence interval.

National Health Insurance. Despite this, epidural analgesia was not equally offered to all parturients. Actually, the univariate analysis demonstrated a large disparity between parturients who were offered this analgesia and those who were not, including ethnicity, as was found by Todd et al. (14). It is not clear whether the impact of ethnicity on the offer of epidural analgesia is the "chicken or egg," i.e., because Bedouin women were much less likely to accept epidural analgesia, providers lacked enthusiasm to suggest it. However, caution is required in interpreting those results because many of those variables are interrelated. Indeed, a multiple logistic analysis taking into account all the statistically significant univariate variables, showed only the degree of pain, parity, and maternal age to be independent factors responsible for this difference.

In a further analysis of our data, we compared patients' perception of their pain with that estimated by the healthcare provider. The caregiver tended to underestimate the pain of the Bedouin and the grandmultiparous women who tended to suffer stoically (15). Although the means of the self-assessments of pain intensity levels of Jewish and Bedouin parturients were similar (8.55 and 8.53, respectively, $P = 0.25$), the caregiver interpreted Bedouin women to experience less pain than the Jewish patients (6.89 vs 8.52, $P < 0.001$). Thus, it is important for the clinician to be aware of the wide spectrum of factors that might influence pain expression and interpretation.

The obstetricians might have assumed that older parturients with high birth order are candidates for shorter and, thus, less painful delivery as compared with those with low birth order. Although it was shown that the major independent determinant of labor pain is parity and that parity is negatively associated with the level of pain (16), Ranta et al. (17) examined the intensity of labor pain in grandmultiparas and found that a significant number felt that they had received insufficient pain relief during labor. None of those patients had received epidural analgesia. Thus, the option of epidural analgesia should be provided to grandmultiparous women as well. Low birth order was found to be an independent predictor of the offer and the acceptance of epidural. Almost all studies concerning epidural analgesia found nulliparity independently associated with this mode of analgesia (1,7,18) This trend may be a result of the higher rates of recommendation by the medical staff probably because of the knowledge that primiparous women tend to suffer more pain than multiparas (16,19) and maybe because of the exposure to this type of analgesia during participation in antenatal childbirth classes. Women who do not express pain during labor are more likely to undergo painful deliveries, because the staff is less attuned to their needs and, therefore, may be less likely to offer epidural analgesia to them.

Religious women are less likely to use epidural analgesia for various reasons. They might be less informed with regard to the benefits and the risks of this analgesia, and they might lack the support from their religious leaders to use it. The association between the level of education and the use of epidural is probably a result of the patients' being better informed about the benefits and risks of it; therefore, they might be less fearful of this type of analgesia. Finally, the degree of pain certainly influences parturients' acceptance of intrapartum epidural analgesia. It seems that patients who suffer extreme pain will accept intrapartum epidural analgesia regardless of their level of education.

This study was conducted in a delivery room that has approximately 1000 deliveries a month, with a relative shortage of anesthesiologists, although this service is available 24 hours a day. The fact that a particular patient may ultimately not receive epidural analgesia because of logistics did not affect the obstetrician's recommendation rate. At this institution, the obstetricians expect that the anesthesiologist will be available at all times. The 12% of the patients who consented to epidural analgesia but could not receive it are the exception and were offered an alternative method of analgesic, i.e., parenteral opioids. Because of the results of our study, the Division of Anesthesiology has improved the availability of the on-call anesthesiologists in order to provide the option of epidural analgesia to more laboring women.

This study demonstrates that there are differences between patients offered and those not offered epidural analgesia, and between parturients who accept and those who do not accept it. We believe that the options available to provide labor analgesia should be discussed with all patients, regardless of age, parity, socioeconomic, ethnic, or religious backgrounds.

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