Epidural Analgesia and Labor Outcome

By

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ABSTRACT

TITLE: **Epidural Analgesia and Labor Outcome**

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Background: It is a commonly accepted belief among obstetric practitioners that administering epidural analgesia (EA) to laboring women before active labor is well established will slow or arrest progress. Sixteen years experience as a labor and delivery nurse fails to support this assumption, as a significant number of cases respond to the administration of EA by increasing the rate of labor progress rather than slowing it. The purpose of this investigation was to explore and describe the relationship between: a) labor progress and EA, b) routinely collected psychosocial/biomedical variables and EA, c) and labor progress, psychosocial/biomedical variables, and EA.

Methods: This investigation was a retrospective, exploratory study. Prenatal and hospital delivery records of 406 randomly selected women who gave birth in 1996-1997 at a northwestern tertiary care hospital were reviewed.

Results: No adverse relationship was found between labor progress and the use of EA. Cervical dilation and station of the vertex at administration of EA was not found to be related to labor progress. A significant increase in the percentage of women that increased their rate of dilation after receiving EA was shown. Relationships between positive histories of childhood abuse, domestic violence or psychological disorders and labor progress and EA use was identified. These psychosocial variables are also significantly correlated to the choice of EA in labor, increased incidence of oxytocin

augmentation of labor, vacuum assisted vaginal deliveries, obesity, substance use, and low birth weight term infants.

Conclusions: The results of this study show that women with positive histories of childhood abuse, domestic violence or psychological disorders are significantly more apt to have prolonged and difficult labors. The exciting finding is that the provision of adequate pain relief during labor can in many cases potentiate a normal labor curve. Of equal importance is the association between positive histories of abuse and other biomedical variables. Most remarkable is the finding that these women are seven times more likely to deliver low birth weight infants. The delivery of low birth weight term infants to otherwise healthy mothers presents strong evidence of an effect mediated by abuse.

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Epidural Analgesia and Labor Outcome

CHAPTER ONE

It is a commonly accepted belief among obstetric practitioners that administering epidural analgesia (EA) to laboring women before active labor is well established will slow or arrest progress. Sixteen years experience as a labor and delivery nurse fails to support this assumption, as a significant number of cases respond to the administration of EA by increasing the rate of labor progress rather than slowing it. The purpose of this investigation was to explore and describe the relationship between: a) labor progress and EA, b) routinely collected psychosocial/biomedical variables and EA, c) and labor progress, psychosocial/biomedical variables, and EA.

There is an abundance of literature suggesting deleterious effects of EA administered prior to 5 cm of cervical dilation and prior to descent of the vertex to zero station. Review of current studies reveal data in support of prolonged labors, increased incidences of oxytocin use, assisted deliveries, cesarean sections, and malposition of the vertex (1-8). Physiological mechanisms believed to increase risk of cesarean delivery and prolongation of labor include decreased uterine activity, relaxation of the pelvic musculature, and decreased maternal urge or ability to push during second stage (5). To confuse these results there are also studies that failed to demonstrate similar findings (9-11). Interestingly, there are incidences in which the increased use of EA within institutions has not been associated with a corresponding increase in cesarean deliveries (12-13).

Several design faults can be identified in these studies. Many study samples combined women of mixed parity, women in spontaneous labor, and women being

induced or augmented with oxytocin. Variation in the stage of labor at the time of placement of EA adds to the difficulty in interpreting the results of these studies. There are numerous known variables that directly impact the duration and outcome of labor. There have been no published studies designed to incorporate any of the psychosocial or biomedical variables. No alternative potential causes for prolonged or arrested labor have been investigated or controlled. Research has generally focused on the differences between epidural use and non-use, or epidural use versus narcotic pain relief.

Epidural Analgesia and Relief of Labor Pain

The one consistent uncontested outcome from the use of epidural analgesia is its unsurpassed superiority at pain relief. Several authors have noted that childbirth is the one physiologic process in which pain is considered normal, but pain cannot be overlooked simply because of its physiologic 'naturalness.' It is normal for women to experience some degree of pain during labor due to the physiologic processes of uterine contractions, cervical dilation, and distention of tissue. What must not be overlooked is the importance of the maternal response to these stressors. They can affect her perception of childbirth and can contribute to uterine dysfunction, vascular constriction, and fetal hypoxia (14-17). Dystocia and failure to progress are associated with more maternal emotional distress, greater fetal and maternal morbidity, and higher rates of operative delivery than normal labor (18-21).

The International Association for the Study of Pain (22) and the gate control theory (16,23) define pain as a multidimensional subjective experience of discomfort composed of both sensory and affective components. The gate control theory of pain identifies psychological factors as important variables in pain perception. Background

factors, expectations, and maternal emotional state all function in the pain experience (16). Several studies provide evidence that third trimester anxiety is related to complications and duration of labor (24-26). Researchers found that cognitive concerns assessed prenataly are predictive of catecholamine output, which is known to attenuate uterine contractility and length of labor (27-29). Studies in which the significance of pain and cognitive activity in all stages of labor were evaluated found the power of pain and cognitive activity during latent labor to be highly predictive of the efficiency of labor (30). Their finding that labor efficiency is strongly related to psychological influences in latent labor is consistent with previous research (31,32).

Labor Progress and Psychosocial/Biomedical Variables

History of abuse. Childhood sexual abuse is defined as any sexual activity between a child less than eighteen years of age and a person of power or authority over them. The National Center on Child Abuse and Neglect (33) and other researchers (34) report the prevalence of sexually abused females to be one in every three to four. Pearson (35) reports that one to two of every ten females has been traumatized by childhood abuse. The shocking thing about these statistics is that they represent only the cases that are remembered and reported by survivors. It is common for survivors to repress memory of their abuse until their thirties and forties (35,36). Sexual abuse is frequently brought to conscious awareness only following other significant life events, such as childbirth or another assault (37).

The effects of childhood abuse cause problems with sexuality, sexual identity, self-concept, social functioning, feelings of helplessness, anxiety, and powerlessness (36-39). Common psychiatric sequela of childhood abuse is posttraumatic stress disorder

(PTSD). PTSD is a response to uncontrollable, terrifying, and overwhelming life events and is characterized by flashbacks, avoidance of trigger events or places, and increased emotional arousal states (40).

Ethnographic methodologies have provided much insight into the coping and survival strategies employed in labor by childhood sexual abuse survivors (37,41-42). Many works describe the association between a history of sexual abuse and the trauma of labor and delivery for survivors. The main focus of the majority of this literature is on diagnostic criteria and suggestions of appropriate interventions. Unfortunately there has been no study of the impact on duration and outcome of labor in this group of women. Most significantly however, the efficacy of pain relief has not been examined.

Domestic Violence. For the purpose of this study, domestic violence is defined as the physical, emotional, or sexual abuse of women by their significant other. The prevalence of domestic violence during pregnancy is reported to be anywhere from a low of 8% to a high of 42% (43-50). The National Crime Survey (51) estimates that 43% of abuse cases go unreported suggesting that reported statistics are only the tip of the iceberg.

There is evidence supporting adverse pregnancy outcomes in the form of sexually transmitted diseases, chronic pelvic pain, low birth weight infants, miscarriage, other stress mediated responses of the body, and maternal mortality (47,52). Research acknowledges the effects of violence on maternal psychological well being as well as on her physical health (52). There are no published studies on research designed to study the effect of domestic violence on labor and delivery outcomes. Based on the known effects of abuse on multiple other areas of a woman's life and health, it would seem appropriate

to assume a relationship to labor and delivery as well. These questions require further research.

Biomedical variables. Maternal age, height, weight and race are variables understood to be associated with cesarean deliveries (53-55). Combinations of these biomedical variables are thought to interact and interfere with labor progress. Parity is a variable that has psychological and physiological implications for the perception of pain during labor. Studies using a single observation of pain during labor report that nulliparas express higher pain scores than multiparas (56,57). One study took serial measures of pain and found that nulliparas reported significantly higher pain in early labor and significantly lower pain in the second stage than multiparas did. There were no significant differences in the active or transitional phases of the first stage of labor (58). This suggests that the stage of labor may be an important consideration when examining the differences in pain by parity.

Labor support. Many researchers have studied childbirth education as a mediator of pain during labor with conflicting results. One study found that childbirth education contributed significantly to the explained variance of pain in nulliparas but not in multiparas (56). Others have been unable to find a significant correlation between childbirth education and perceived pain during labor using various study designs (57-59).

The importance of social support in pregnancy and labor is widely reported. Research suggests that support from the significant people in a woman's life and from her care provider during labor is associated with a more positive birth experience, a shorter labor, and positive maternal attitudes (60-64).

CHAPTER TWO

Methods

This investigation was a retrospective, exploratory study designed to explore and describe the relationship between: a) labor progress and EA, b) routinely collected psychosocial/biomedical variables and EA, c) and labor progress, psychosocial/biomedical variables, and EA. Prenatal and hospital delivery records of 406 randomly selected women who gave birth in 1996-1997 at a northwestern tertiary care hospital were reviewed. The facility was selected because of the large and varied population it serves and because of the ready availability of EA to all patients. Uniformity of the prenatal medical record forms used in outpatient satellite clinics affiliated with the hospital increased the likelihood of obtaining consistent data.

The records of all women admitted to the obstetrical unit in active labor with uncomplicated term pregnancies were considered for inclusion. Systematic random sampling was done in an attempt to eliminate selection bias. The sampling frame was approximately two thousand four hundred medical records. The targeted number of four hundred records was divided into the sampling frame indicating that the selection of every sixth vaginal birth would result in a random sample over a one-year period. The selection of charts reviewed began with the second delivery record (decided by the roll of a die) recorded in the unit's logbook beginning June 1st, 1996. From that point forward every sixth chart was reviewed until the sample requirements for each group were satisfied. An attempt was made to obtain an equal number of subjects in all groups.

Subjects were divided into groups via stratified random sampling techniques. Group one, which was subdivided into a pre-group and a post-group, consisted of women

that received EA during labor (N=186). Group two (non-EA group) consisted of women that did not receive EA (N=196). All groups were further subdivided into a nulliparous group (N=186) and a multiparous group (N=196). Statistical calculations determined the placement of each chart reviewed in one of three divisions: a) slow progression of labor, defined as < 1.2 cm/hr for nulliparas or < 1.5 cm/hr for multiparas; b) normal progression of labor, defined as ≥ 1.2 cm/hr but < 3.5 cm/hr for nulliparas or ≥ 1.5 cm/hr but < 5.9 cm/ hr for multiparas; c) rapid progression of labor, defined as ≥ 3.5 cm/hr for nulliparas or ≥ 5.9 cm/ hr for multiparas. (see Table 1).

Table 1

Sample Groups and Progression Result

	Pre-Group		Post-Group		Non-EA Group	
	Women before epidural		Women after epidural		Women without epidurals	
	Nullips	Multips	Nullips	Multips	Nullips	Multips
Slow progress	N=68	N=69	N=19	N=33	N=37	N=39
Normal progress	N=20	N=11	N=37	N=26	N=29	N=24
Rapid progress	N=8	N=10	N=40	N=31	N=24	N=43
TOTAL	96	90	96	90	90	106

First stage progression rates were calculated for all subjects. The rates for the non-EA group were based on the total length of first stage labor. The pre-rates for the epidural group were calculated from the onset of active labor to the administration of EA. The

post-rate, from administration of EA to onset of stage two, was then calculated. These rates were then cross-tabulated to multiple variables in an attempt to explore and describe the relationship and impact of EA on labor progress.

Standardized chart data on demographic, psychosocial and biomedical variables were cross-tabulated with the rate of dilation for all groups of women in an attempt to identify significant correlations. All data were gained from self-report methods and documented on the medical record. Labor variables of dilation and station at time of epidural placement, use of oxytocin, amniotomy, and use of medications prior to delivery as measured by the physician, midwife, or nurse during labor and recorded on the medical record were evaluated for relationships to progression of labor. Infant weight and the one and five minute apgar scores were used to assess fetal outcomes contrasted to a number of variables. These variables and the frequency in which they occurred in this sample may be viewed in Table 2.

All appropriate forms and applications were submitted to OHSU Committee on Human Research. An exemption was claimed based on 45 CFR 46.101 (b) #4 because of the retrospective design and methodology of this research. No consent forms were required as no direct contact was made with subjects, thus eliminating any concern of harm. Benefits may be derived indirectly from findings of this research and the subsequent impact on practice.

Limitations of this design can be identified, as retrospective studies are always subject to selection bias. An attempt was made to overcome this by randomizing the selection of charts over a one-year period. A more serious limitation of this study is that all data collected was dependent on documentation of the required information on the

medical record. Measures of dilation and station are subject to error due to the subjective assessment by examiners of various skill levels. Disclosure issues are a problematic feature in any study of psychosocial variables. Patients may fear reprisal or embarrassment. In the case of childhood abuse, many women do not have conscious memory of the abuse and therefore, can not report it to anyone.

Table 2

Frequency Distribution of Variables Under Investigation

Demographic Variables	N
Relationship status	
1. Partner	307
2. No Partner	76
Planned pregnancy	
1. Yes	155
2. No	225
Attended childbirth education classes	
1. Yes	105
2. No	278
Economic status	
1. No Health Insurance (Ins.)	41
2. Public Health Ins.	150
3. Private Health Ins.	192
Health care provider	
1. Doctor	298
2. Midwife	85
Biomedical Variables	
Age at delivery	
1. ≤ 17 years old	42
2. 18 – 34 years old	314
3. ≥ 35 years old	27
Nationality / Ethnicity	
1. Caucasian	161
2. Hispanic	158
3. Black	15
4. Asian	9
5. Other	40
Height	
1. ≤ 5'	54
2. > 5'	212
Weight	
1. ≤ 100 #	6
2. 101-199 #	306
3. > 200 #	55
Parity	
1. Nulliparous	186
2. 1-5 births	187
3. > 5 births	10

Psychosocial Variables	N
History of childhood abuse	
1. No	232
2. Yes – Sexual	56
3. Yes – Physical	9
4. Yes – Emotional	1
History of domestic violence	
1. No	243
2. Yes - Sexual	12
3. Yes - Physical	39
4. Yes - Emotional	4
History of psychological problem	
1. Yes	53
2. No	247
History of taking Rx for problem	
1. Yes	15
2. No	285
History of counseling	
1. Yes	29
2. No	272
Tobacco use during pregnancy	
1. Yes	84
2. Never	267
3. Quit	30
ETOH use during pregnancy	
1. Yes	38
2. Never	305
3. Quit	38
Illicit drug use during pregnancy	
1. Yes	23
2. Never	335
3. Quit	23

Interventions & Outcomes	N
Dilation of cervix @ EA placement	
1. 1 cm	2
2. 2 cm	14
3. 3 cm	46
4. 4 cm	54
5. 5 cm	39
6. 6 cm	23
7. 7 cm	6
8. 8 cm	4
Station of vertex @ EA placement	
1. < 0 station	149
2. ≥ 0 station	39
Pain medications taken during labor	
1. None	148
2. Before EA / without EA	235
Amniotomy	
1. SROM before EA/ without EA	186
2. SROM after EA	7
3. AROM before EA/ without EA	124
4. AROM after EA	66
Use of oxytocin during labor	
1. None	271
2. Augment before EA	39
3. Augment after EA	24
4. Augment without EA	49
Type of delivery	
1. Spontaneous vaginal delivery	357
2. Vacuum assisted delivery	19
3. Forceps assisted delivery	7
One minute apgar score	
1. < 7	50
2. ≥ 7	333
Five minute apgar score	
1. < 7	6
2. ≥ 7	377
Infant birth weight	
1. ≤ 2500 gm	11
2. 2501-3000 gm	50
3. 3001-3999 gm	280
4. ≥ 4000 gm	42

CHAPTER THREE

Results

A total of 406 charts were reviewed. Twenty three charts were excluded for the following indications: insulin dependent diabetes (1), preeclampsia (8), intrauterine fetal demise (1), known fetal anomalies (2), less than 37 weeks gestation (5), multiple gestation (3), a history of previous cesarean birth (3). A total of 96 nulliparas and 90 multiparas comprised the epidural group sample and 90 nulliparas and 106 multiparas comprised the non-EA group. All findings were first subjected to cross-tabulation with the rate scales for progress of labor and were then evaluated for correlation to women with positive histories of childhood abuse, domestic violence or psychological problems. Delivery by cesarean section was excluded from this study since the focus of this study was the relationships between epidural analgesia, labor progress, and routinely collected psychosocial/biomedical variables.

Malposition of the vertex as reported in the literature was not found in this study. Support was found for an increased incidence of prolonged second stage labor (23.7% were slow in the EA-group versus 7.1% in the non-EA group) and assisted vaginal deliveries in women who receive epidural analgesia. There was an 8.6% incidence of vacuum assisted deliveries and a 3.2% incidence of forceps assisted deliveries in the EA group versus 1.5% vacuum and 0.5% forceps assisted deliveries in the non-EA group. Incidences of increased use of oxytocin in the EA group (42% in EA group / 16% in non-EA group) was noted as well.

Cervical dilation and station of the vertex at administration of EA was not found to be related to labor progress. EA was administered to 80.1% of the sample before the

vertex was at zero station and at cervical dilations from one to eight centimeters (cm). A significant percentage of women increased their rate of dilation after receiving EA, regardless of the dilation or station at the time of EA administration. (see Tables 3-4) An exception to this general finding was that two of three women progressing normally slowed their rate of dilation after receiving EA at eight cm dilation.

Distribution of demographic and biomedical variables between the epidural and non-epidural groups were similar. A correlation between the demographic variables of race, economic status and choice of provider was shown, and all three correlated to the choice of EA for pain relief. The EA group was comprised of 62% of the Caucasian sample, 36% of the Hispanics, 60% of African Americans, 22% of Asians, and 45% of other nationalities. Caucasians were found to have the highest percent of private health insurance with Hispanics having the highest percentage of no health insurance and African Americans the highest percent of public health insurance. Hispanics comprised 51.8% of the sample that obtained care from midwives.

A weight of less than 100 pounds is the only variable that was not associated with an increased rate of progress in the post-group. Of the greater than 200 pound variable, 80.6% fell in the slow pre-group but decreased to 25.8% in the post group which was similar to the non-EA group findings. An association of a positive history of substance use was found in 41.9% of the EA group as opposed to 30.1% in the non-EA group. None of the other independent variables achieved any level of significance when contrasted singularly to the rate of progression. Throughout these findings, with the one noted exception, there is a consistent increase in the rate of dilation from the pre-group to the

post-group. It is also noteworthy that the post-group rates are equal to or greater than the non-EA rates of progress.

Table 3

Cervical Dilation at Time of Epidural Administration Cross-tabulated to Rate of Progression Pre/Post EA

	Pre-Epidural Group					Post-Epidural Group			
Dilation at Time of EA	Fast Progress	Normal Progress	Slow Progress	**Row Total**	**Dilation at Time of EA**	Fast Progress	Normal Progress	Slow Progress	**Row Total**
	0	0	1			0	1	0	
1 cm	0.0	0.0	100.0	1	1 cm	0.0	100.0	0.0	1
	0.0	0.0	0.7	0.5%		0.0	1.6	0.0	0.5%
	0.0	0.0	0.5			0.0	0.5	0.0	
	1	1	11			6	4	3	
2 cm	7.7	7.7	84.6	13	2 cm	46.2	30.8	23.1	13
	5.6	3.2	8.0	7.0%		8.5	6.3	5.8	7.0%
	0.5	0.5	5.9			3.2	2.2	1.6	
	1	6	39			19	18	9	
3 cm	2.2	13.0	84.8	46	3 cm	41.3	39.1	19.6	46
	5.6	19.4	28.5	24.7%		26.8	28.6	17.3	24.7%
	0.5	3.2	21.0			10.2	9.7	4.8	
	4	9	41			16	21	17	
4 cm	7.4	16.7	75.9	54	4 cm	29.6	38.9	31.5	54
	22.2	29.0	29.9	29.0%		22.5	33.3	32.7	29.0%
	2.2	4.8	22.0			8.6	11.3	9.1	
	6	7	26			20	10	9	
5 cm	15.4	17.9	66.7	39	5 cm	51.3	25.6	23.1	39
	33.3	22.6	19.0	21.0%		28.2	15.9	17.3	21.0%
	3.2	3.8	14.0			10.8	5.4	4.8	
	4	5	14			7	5	11	
6 cm	17.4	21.7	60.9	23	6 cm	30.4	21.7	47.8	23
	22.2	16.1	10.2	12.4%		9.9	7.9	21.2	12.4%
	2.2	2.7	7.5			3.8	2.7	5.9	
	1	0	5			2	3	1	
7 cm	16.7	0.0	83.3	6	7 cm	33.3	50.0	16.7	6
	5.6	0.0	3.6	3.2%		2.8	4.8	1.9	3.2%
	0.5	0.0	2.7			1.1	1.6	0.5	
	1	3	0			1	1	2	
8 cm	25.0	75.0	0.0	4	8 cm	25.0	25.0	50.0	4
	5.6	9.7	0.0	2.2%		1.4	1.6	3.8	2.2%
	0.5	1.6	0.0			0.5	0.5	1.1	
Col. Total	18	31	137	186	Col. Total	71	63	52	186
	9.7%	16.7%	73.7%	100.0%		38.2%	33.9%	28.0%	100.0

Note: first row in each square = frequency, second row in each square = row %, third row in each square = column %, fourth row in each square = table %

Table 4

Station of Vertex at Time of Epidural Administration Cross-tabulated to Rate of Progression Pre/Post EA

Pre-Epidural Group					Post-Epidural Group				
Station at Time of EA	Fast Progress	Normal Progress	Slow Progress	**Row Total**	**Station at Time of EA**	Fast Progress	Normal Progress	Slow Progress	**Row Total**
	11	23	115			55	50	44	
< 0	7.4	15.4	77.2	149	< 0	36.9	33.6	29.5	149
station	61.1	74.2	83.9	80.1%	station	77.5	79.4	84.6	80.1%
	5.9	12.4	61.8			29.6	26.9	23.7	
	7	8	22			16	13	8	
≥ 0	18.9	21.6	59.5	37	≥ 0	43.2	35.1	21.6	37
station	38.9	25.8	16.1	19.9%	station	22.5	20.6	15.4	19.9%
	3.8	4.3	11.8			8.6	7.0	4.3	
Col. Total	18	31	137	186	**Col. Total**	71	63	52	186
	9.7%	16.7%	73.7%	100.0%		38.2%	33.9%	28.0%	100.0%

Note: first row in each square = frequency, second row in each square = row %, third row in each square = column %, fourth row in each square = table %

Relationships were identified between the psychological variables and labor progress. Among the subjects in this sample that had documented histories of childhood abuse (23% of N), domestic violence (18% of N) or psychological disorders (17% of N) 55%-58% of them chose to have EA as compared to 45% in the groups that had negative histories. (see Table 5)

Incidences of various psychosocial variables as reported by ethnicity and culture are summarized in Table 6. Analysis of correlation between sociodemographic and biomedical variables with the psychosocial variables reveals three main areas of interest: childhood abuse, domestic violence, and psychological disorders. Obesity was significantly correlated with the psychosocial variables, with 27.9% - 30.8% with positive histories weighing greater than 200 pounds as compared to 12.1% - 12.8% of those with negative histories. Substance abuse had significant findings of 73.5% - 76.8% in subjects with positive histories compared to 24.1% - 28.2% in those with negative histories of the

psychosocial variables. Those women with a positive abuse history received oxytocin augmentation almost twice as frequently (13.0% versus 7.3%) before receiving EA than those with no history of abuse. Vacuum assisted deliveries were significantly more frequent in those with a positive history of childhood abuse (10.1% Vs 3.9%), domestic violence (7.3% Vs 4.5%) and psychological disorders (7.5% Vs 4.8%). The sample having forceps assisted deliveries was too small to statistically assess. Low birth weight infants were born more frequently to women with positive histories (7.2%-7.5% Vs 0.9%-1.2%) of the psychosocial variables under investigation as well.

Table 5

History of Psychosocial Variables Cross-Tabulated With Progression Rates of Labor

	Pre-Group				Post-Group				Non-Epidural Group			
Variable	Fast	Norm	Slow	**Total**	Fast	Norm	Slow	**Total**	Fast	Norm	Slow	Total
+ Hx of	2	5	31		13	13	12		11	7	13	
childhood	5.3	13.2	81.6	38	34.2	34.2	31.6	38	35.5	22.6	41.9	31
abuse	15.4	18.5	30.4	26.8	25.0	25.5	30.8	26.8	20.8	15.9	21.3	19.6
	1.4	3.5	21.8		9.2	9.2	8.5		7.0	4.4	8.2	
- Hx of	11	22	71		39	38	27		42	37	48	
childhood	10.6	21.2	68.3	104	37.5	36.5	26.0	104	33.1	29.1	37.8	127
abuse	84.6	81.5	69.6	73.2	75.0	74.5	69.2	73.2	79.2	84.1	78.7	80.4
	7.7	15.5	50.0		27.5	26.8	19.0		26.6	23.4	30.4	
Col.	13	27	102	142	52	51	39	142	53	44	61	158
Totals	9.2	19.0	71.8	100.0	36.6	35.9	27.5	100.0	33.5	27.8	38.6	100.0
+ Hx of	3	1	27		11	9	11		6	8	10	
domestic	9.7	3.2	87.1	31	35.5	29.0	35.5	31	25.0	33.3	41.7	24
violence	23.1	3.8	26.5	22.0	21.2	17.6	28.9	22.0	11.5	18.2	16.7	15.4
	2.1	0.7	19.1		7.8	6.4	7.8		3.8	5.1	6.4	
- Hx of	10	25	75		41	42	27		46	36	50	
domestic	9.1	22.7	68.2	110	37.3	38.2	24.5	110	34.8	27.3	37.9	132
violence	76.9	96.2	73.5	78.0	78.8	82.4	71.1	78.0	88.5	81.8	83.3	84.6
	7.1	17.7	53.2		29.1	29.8	19.1		29.5	23.1	32.1	
Col.	13	26	102	141	52	51	38	141	52	44	60	156
Totals	9.2	18.4	72.3	100	36.9	36.2	27.0	100	33.3	28.2	38.5	100.0
+ Hx of	4	3	24		9	9	13		9	5	8	
psycho-	12.9	9.7	77.4	31	29.0	29.0	41.9	31	40.9	22.7	36.4	22
logical	30.8	11.1	23.3	21.7	17.0	17.6	33.3	21.7	17.0	11.4	13.3	14.0
problems	2.8	2.1	16.8		6.3	6.3	9.1		5.7	3.2	5.1	
- Hx of	9	24	79		44	42	26		44	39	52	
psycholog	8.0	21.4	70.5	112	39.3	37.5	23.2	112	32.6	28.9	38.5	135
ical	69.2	88.9	76.7	78.3	83.0	82.4	66.7	78.3	83.0	88.6	86.7	86.0
problems	6.3	16.8	55.2		30.8	29.4	18.2		28.0	24.8	33.1	
Col.	13	27	103	143	53	51	39	143	53	44	60	157
Totals	9.1	18.9	72.0	100.0	37.1	35.7	27.3	100.0	33.8	28.0	38.2	100.0

Note: first row in each square = frequency, second row in each square = row %, third row in each square = column %, fourth row in each square = table %

Table 6

Distribution of Psychosocial Variables by Nationality / Ethnicity

	Caucasian	Hispanic	African American	Asian	Others	Row Total
Positive HX of Abuse	47 68.1	13 18.8	3 4.3	0 0.0	6 8.7	69 22.9
Positive HX of Domestic Violence	37 67.3	8 14.5	4 7.3	0 0.0	6 10.9	55 18.5
Positive HX of Psychologic Disorders	36 67.9	10 18.9	3 5.7	1 1.9	3 5.7	53 17.6

Note: first row in each square = frequency, second row in each square = row %.

CHAPTER FOUR

Conclusions

Epidural analgesia has been clearly associated with increased incidences of cesarean deliveries, assisted vaginal deliveries, malposition of the vertex, and prolonged first and second stages of labor in many previous studies. This study confirms some of those previous findings and challenges others. However, what must be pointed out is that none of these studies demonstrated a cause-and-effect relationship. There are more than a few possible explanations to account for these findings. For example, the reported increase in cesarean and instrumental deliveries is subject to clinician bias and obstetric management policies. Another potential explanation for this reported increase could be associated with clinicians strict adherence to expected progression curves based on the renowned works of Friedman (65). Even in mixed parity studies the majority of subjects were nulliparas, a group known to be associated with an increased risk of cesarean delivery (66). Current research fails to address women with prolonged or difficult labor who may be more likely to develop dystocia or failure to progress even without EA (67,68).

A variety of biomedical and psychosocial variables are clearly and independently associated with prolonged and difficult labors. Most noteworthy are the issues of childhood abuse, domestic violence, and psychological disorders. The results of a positive history of any of these on labor and delivery outcome are similar. Higher percentages of women with positive histories chose EA than those with negative histories. Prior to receiving EA 77.4% - 87.1% of these women were classified in the slow category. Following EA these percentages changed to a more normal labor curve,

similar to the non-EA negative history group. Interestingly this increase in labor progress, although not quite as dramatic, can be seen in women with a negative history following EA as well. This suggests that there may be a large percentage of the negative histories choosing EA that are not truly negative, but unconscious or unreported positive histories.

The results of this study show that women with positive histories of childhood abuse, domestic violence or psychological disorders are significantly more apt to have prolonged and difficult labors. The exciting finding is that the provision of adequate pain relief during labor can in many cases potentiate a normal labor curve. It is actually detrimental to the physical and mental well being of this group of women for clinicians to insist on waiting until a predetermined cervical dilation or station of the vertex. The issue is efficacy of pain relief and each woman must be assessed individually for her needs.

Of equal importance is the association between positive histories of abuse and other biomedical variables. These women are two to three times as likely to be obese, to use substances, to require oxytocin augmentation, and to have vacuum assisted deliveries as women with negative histories. Most remarkable is the finding that they are seven times more likely to deliver low birth weight infants. It is thought that obese women are at risk of delivering large for gestational age infants. The delivery of low birth weight term infants to otherwise healthy mothers presents strong evidence of an effect mediated by abuse.

In light of the current movement to increase health care providers awareness of the issues of domestic violence and abuse it was surprising to find that 22.4% of the charts reviewed did not document assessment of these areas. It is essential to the care of these women and their infants that these issues are addressed at prenatal visits and in the

hospital. Another noteworthy point is that 11.1% of this sample were under eighteen years of age at the time of delivery and only a fraction of them reported abuse. By law, their age alone suggests abuse. There is a need to study this population in more detail.

In summary, no adverse relationship was found between labor progress and the use of EA. Findings suggest that a high percentage of women choosing EA were experiencing prolonged or difficult labor prior to its administration. Throughout this study, for all variables, there is a consistent increase in the rate of dilation from the pre-group to the post-group. It is also significant that the post-group rates are equal to or better than the non-EA rates of progress. For women with histories of abuse, violence, or psychological problems EA appears to stimulate a more normal labor curve.

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APPENDIX A

SOCIODEMOGRAPHIC DATA COLLECTION FORM

CHART # _____ CASE # _____

A. AGE			**F. PLANNED PREG.**		
1. ≤ 17 years old			1. Yes		
2. 18 – 34 years old			2. No		
3. ≥ 35 years old			3. Ambiguous		
B. RELATIONSHIPS			**G. CHILDHOOD ABUSE**		
1. Partner			1. No		
2. No Partner			2. Sexual		
C. RACE			3. Physical		
1. Caucasian			4. Emotional		
2. Hispanic			**H. PARTNER ABUSE**		
3. Black			1. No		
4. Asian			2. Sexual		
5. Other			3. Physical		
D. ECONOMIC STATUS			**I. PSYCH PROBLEMS**		
1. No Health Ins.			1. Yes		
2. Not Employed			2. No		
3. Public Health Ins.			**J. PSYCH MEDS**		
E. CBE CLASSES			1. Yes		
1. Yes			2. No		
2. No			**K. COUNSELING**		
			1. Yes		
			2. No		

MEDICAL FACTORS DATA COLLECTION FORM

L. HEIGHT			**R. GRAVITY**		
1. ≤ 5'			1. 1 Pregnancy		
2. > 5'			2. 2 – 5 pregnancies		
M. WEIGHT			3. > 5 pregnancies		
1. ≤ 100 #			**S. PARITY**		
2. > 200 #			1. 0 previous births		
N. TOBACCO USE			2. 1 – 5 previous births		
1. Yes			3. > 5 previous births		
2. Never			**T. DELIVERY HX**		
3. Quit			1. Vaginal delivery		
O. ETOH USE			2. Cesarean delivery		
1. Yes			3. Assisted delivery		
2. Never			**U. PLANNED EA**		
3. Quit			1. Yes		
P. ILLICIT DRUG USE			2. No		
1. Yes			**V. SUPPORT IN LABOR**		
2. Never			1. Present		
3. Quit			2. Absent		
Q. HC PROVIDER			**W. HX COMPLICATIONS**		
1. Doctor			1. Yes		
2. Midwife			2. No		
3. Other					

OUTCOME CRITERIA DATA COLLECTION FORM

X. DILATION			**cc. PAIN MEDICATIONS**		
1. < 5 cm			1. Before EA		
2. ≥ 5 cm			2. After EA		
Y. STATION			3. None		
1. < 0			4. Without EA		
2. ≥ 0			**dd. DELIVERY**		
Z. POSITION			1. SVD		
1. OA			2. Vacuum		
2. OP			3. Forceps		
3. OT			**ee. INFANT**		
4. Other			1. Apgar < 7 @ 1"		
aa. AMNIOTOMY			2. Apgar ≥ 7 @ 1"		
1. SROM before EA			3. Apgar < 7 @ 5"		
2. SROM after EA			4. Apgar ≥ 7 @ 5"		
3. AROM before EA			**ff. INFANT WEIGHT**		
4. AROM after EA			1. ≤ 2500 gm		
bb. PIT/PROSTAGLANDIN			2. 2501-3000 gm		
1. None			3. 3001-3999 gm		
2. Augment before EA			4. ≥ 4000 gm		
3. Augment after EA					
4. Augment without EA					