FACTORS AFFECTING THE OBSTETRICIAN DECISION ON THE ROUTE OF DELIVERY IN HIGH RISK PREGNANCIES

Hussein Qublan, MD, Mohammad El-Qudah, MD**, Mohammad Al-Taani, MD^, Ziad Al-Shraideh, MD [O], Daif Bani-Khaled, MD***

ABSTRACT

Objective: To determine factors which affect the obstetricians decision on the route of delivery in the high-risk pregnancies.

Methods: This study was conducted during the period from 1 January 1998 to 31 December 1998 at four military hospitals. Comparison was made between two groups of hospitals. Group I comprised Prince Rashed and Prince Hashim Hospitals and group II comprised Prince Zaid and Princess Haya Hospitals. The number and reasons for cesarean section were analyzed. A designed questionnaire regarding labor management in high-risk pregnancies, hospital facilities and obstetrician characteristics was used.

Results: Cesarean section rates ranged from 8.5% to 8.6% in group I compared with 10.5% to 11.8% in group II. A statistically significant difference in cesarean section rate between both groups was observed ($p<0.05$). There were no patients and fetal demographic differences between the two hospital groups, while significant physician and hospital demographic differences were noted. No significant difference in the neonatal outcome with the different cesarean section rates was observed.

Conclusion: The high cesarean section rate is not necessarily a manifestation of poor decision-making. Obstetrician's age, experience and practice settings play an important role in cesarean section decision.

Key words: Cesarean section rate, Indications, Neonatal outcome.

JRMS Dec 2003; 10(2): 32-37

Introduction

The cesarean section rate has risen dramatically in most countries in the last two decades [1,2]. Factors commonly associated with this increase include trends in delivery, pregnancy, and labor complications such as pre-eclampsia, post-term pregnancy, multiple pregnancies, previous cesarean delivery, fetal weight, and abruptio placenta. Several studies suggested that nonclinical factors may influence the use of cesarean section as a method of delivery [3-5]. These factors include hospital characteristics such as ownership and the presence of special facilities [4,5]. They also include the physician's characteristics such as training and experience, age, gender, and board certification [1,3-5].

The overall increase in cesarean section noted in the literature reflects a change in medical practice that may partially be related to physician bias. Further studies about the significance of other causes for physician's bias, such as financial incentives and legal fears were considered [6,7]. There is general agreement that the most important obstetric indications responsible for the increase in cesarean section rate are; repeat cesarean, dystocia, breech presentation and fetal distress; all of which could potentially be influenced by physician bias [8-10].

Because there are regional differences in cesarean section rates because of differences in patient, physician and hospital characteristics, this study was undertaken to

From the Department of Obstetrics and Gynecology:
*Prince Zaid Hospital
** Prince Rhashed Hospital
^ Prince Ali Hospital
[O] Prince Hashim Hospital
Correspondence should addressed to Dr. H. Qublan, P. O. Box 97 Aidun - Irbid – Jordan
Manuscript received December 27, 1999. Accepted November 5, 2000

assess the effect of these factors on obstetrician decision for the route of delivery in high risk pregnancies taking four military hospitals which were divided into two groups.

Methods

The cesarean section rate was studied over a one-year period, from 1 January 1998 to 31 December 1998 at four military hospitals in Jordan. Group one comprised Prince Rashed (PRH) and Prince Hashim Hospital (PHSH), which serve nearly 1.5 million population in middle and north Jordan, and have more facilities, qualified intensive care units (NICU), adequate number of qualified medical staff, and surrounded by other hospitals and many private centers. Group II comprised Prince Zaid (PZH) and Princess Haya Hospital (PHH) which serve nearly 500,000 population in the south of Jordan, and have small neonatal units, medical staff, and not surrounded by other hospitals or private centers.

The information abstracted from the delivery logbook in each hospital comprised the number and route of deliveries. Also background data were collected on each patient such as age, gravida, parity, mode of delivery, indication for cesarean section, fetal weight, gestational age, and the midwife or obstetrician who assisted the delivery.

Collected data about labor characteristics comprised cases where decision for cesarean section or vaginal delivery was considered, such as all types of breech presentation, noncephalic presentation of the first fetus of multiple pregnancies, trial of scar, estimated fetal weight more than 4 Kg, fetal distress and fetuses of premature gestational age in addition to pre-eclampsia and abruptio placenta.

In order to assess factors that affect obstetrician's decision, we designed a questionnaire (Appendix 1), which was completed by 19 board certified obstetricians in the four hospitals at the completion of the one year study period.

Statistical analysis was largely descriptive. Student-t -test and Chi-Square test were used for all variables of interest. Differences were considered statistically significant when $P<0.05$.

Results

During the study period, a total number of 5801 deliveries were conducted at PRH, 3345 at PHSH, 1870 at PZH, and 1449 at PHH, out of which 497, 284, 220, and 153 cesarean sections were performed, respectively. The age group ranged from 15-49 years in all women. Deliveries of gestational age less than 28 weeks were excluded.

Table I summarizes the information included in the questionnaire distributed among the obstetricians in the four hospitals. Obstetricians in group II were prone to perform cesarean sections more frequently than group I, because of the absence of consultation, and limited resources for blood products and laboratory tests, and they had more claims filed against them.

Table II summarizes the delivery characteristics. A statistically significant increase in cesarean rate in group II hospitals compared with group I was observed ($p<0.05$). Increase in rate of operative vaginal delivery in group I hospitals was noted, but not found to be statistically significant. Also, there was no statistically significant difference in the conduction of delivery by midwives in group I hospitals compared with group II. Delivery conduction in group II hospitals was more likely performed by obstetricians and midwives than in group I hospitals.

Table III shows the demographic characteristics of patient, fetus, physician, and hospital. There was no statistically significant difference in patients' characteristics (age, parity and gravidity), and fetal characteristics (gestational age and birth weight) between the two hospital groups. A statistically significant difference in physician's age between the two groups was found ($p<0.001$). Obstetricians working in group I hospitals were more in number, taking decisions in group and had more experience than those working in group II hospitals. A significant difference regarding hospital characteristics was observed. There was a statistically significant increase in the performance of cesarean section for breech presentation on the account of primigravidas, repeat cesarean, macrosomic babies, fetal distress, abruptio placenta, preeclampsia, and post-term pregnancy in group II hospitals compared with group I, as shown in Table IV. However, neither cesarean section, nor destructive vaginal delivery was performed when the fetus was already dead.

Table V presents the neonatal outcome in the four hospitals. No significant difference in the number of neonatal deaths, admission to NICU, and the low Apgar score at 1 min and 5 min noted between the two hospital groups.

Discussion

The results indicate that the major determinant factors of route of delivery depend on the physician and hospital. The variation in cesarean rates among obstetricians in the various hospitals is not attributable to the patient obstetric factors, socioeconomic status or fetal condition. It appears that the obstetricians in group I hospitals were more at ease with operative vaginal delivery than their colleagues in group II with a subsequent decrease in the performance of cesarean section.

In the present study, we noted that most of the deliveries were conducted by midwives in group I hospitals compared with group II, because these hospitals had adequate number of qualified midwives. For that reason, the supervision in group II hospitals was done by physicians rather than midwives. These observations are in agreement with those reported by other investigators [11-13] who reported that the assisted

vaginal delivery by vacuum or forceps, and where the midwife delivery predominates, would decrease the cesarean rate.

Guillemette *et al* [14] reported that the availability of consultation would change the decision regarding the operative procedure including operative vaginal delivery and cesarean section. This was clear in our study where 100% of obstetricians in group II hospitals claimed that one of the most important reasons to perform cesarean section in high-risk pregnancies was the absence of consultation. Increasing age and experience are two physician characteristics that may simply represent differences in management based on techniques acquired in training at a time where forceps and breech extraction deliveries were more commonly performed. Our observation that the lower cesarean section rate which was found in group I hospitals, who were more in number, older and more experienced participating in group practice is supported by the study of Berkowitz *et al* [3] who recommended the need for second opinion consultation before surgery.

The fear of professional liability claims produces a subsequent impact on delivery decision [15]. Many of the obstetricians in group II hospitals have had one or more liability claims filed against them. The major legal threat to obstetrician is the allegation of failure to perform or delay in performance of cesarean section. The infant's later cerebral palsy is attributed to asphyxia or trauma resulting from alleged failure of the physician. The three major indications (fetal distress, failure to progress, and breech delivery) for primary cesarean section fall within this legal risk group. Furthermore, other investigators [6,8,15] found a positive relationship between the fear of malpractice and the probability of cesarean section, a condition that could influence obstetrician's decision in group II hospitals; therefore, they were more prone to perform cesarean section.

Hospital characteristics also appear to influence the cesarean section rates. Clark *et al* [10] reported that the availability of full-time in-house obstetric anesthesiology coverage, high delivery volume, urban location, a teaching institution, and the presence of qualified medical staff and neonatal intensive care unit; all are associated with reduction in cesarean rates, which support our findings in group I hospitals. Some researchers offered improved neonatal outcomes as a justification for the increase in the rate of cesarean sections [11]. Keeping in mind, the small numbers of neonatal outcome, we observed a slight decrease in the incidence of neonatal death and the need for resuscitative procedures among cesarean deliveries in group I hospitals. However, our data clearly demonstrate that no differences were observed in the neonatal outcome from cesarean births, which were performed in the two groups of hospitals. Other authors have reported similar findings [9,11].

In summary, the obstetrician's decision for the route of delivery in high-risk pregnancies is influenced by self-related characteristics (age and experience) and hospital characteristics (adequate NICU and qualified medical staff). Of most interest are the practice settings (in solo or in group practice) in addition to fear of professional liability claims in hospitals, especially where obstetricians work in solo. Therefore, solo practitioners need help to the presence of not only theoretically, but also practically apt senior obstetricians to reduce the effects of physician characteristics on perinatal decision-making and thus including a mandatory second-opinion consultation before operative delivery whether abdominal or vaginal.

Table I. Summary Information included in the designed questionnaire which was distributed among all obstetricians in the four hospitals.

- Management of labor in high-risk pregnancies (breech presentation, multiple pregnancy, previous scar, postterm pregnancy, preeclampsia, abruptio placenta, macrosomic babies, and premature labor) in both primipara and multipara.
- Availability of consultation.
- Adequate qualified midwives.
- Availability of laboratory tests.
- Availability of blood products.
- Availability of anesthesia and surgical theaters if more than one emergency case was present.
- If they ever had any claims filed against them for malpractice? If yes, the number of recent and pending claims.

Table II. Delivery Characteristics in the hospitals understudy.

Characteristics	Group I hospitals				Group II hospitals				P-value
	PRH N= 5801		PHSH N= 3349		PZH N=1870		PHH N=1449		
	No.	%	No.	%	No.	%	No.	%	
Mode of delivery									
NVD*	5081	87.6	2946	87.9	1603	85.7	1266	87.4	NS^{o}
Operative vaginal delivery^	223	3.8	119	3.6	47	2.5	30	2.1	NS
Cesarean section	497	8.6	284	8.5	220	11.8	153	10.5	<0.05
Conductor of delivery									
Obstetrician	820	14.5	452	13.5	477	25.5	356	24.6	NS
Midwife	4981	85.5	2897	86.5	1393	74.5	1093	75.4	NS

*NVD= Normal vaginal delivery.
^Operative vaginal delivery = Vacuum and Forceps delivery
NS^{o}= Not significant.

Table III. Demographic characteristics (Patient, Fetal, Obstetrician, and Hospital) of the different hospitals.

Hospital	Group I hospitals				Group II hospitals				P-value
	PRH		PHSH		PZH		PHH		
	Mean	± SD^{xx}	Mean	± SD^{xx}	Mean	± SD^{xx}	Mean	± SD^{xx}	
Patient:									
Age	24.8	± 5.3	24.5	± 5.5	24.6	± 5.5	26.5	± 4.9	NS^{o}
Gravidity	7.3	± 5.4	7.6	± 4.8	6.9	± 4.7	5.8	± 4.3	NS
Parity	5.1	± 3.4	5.3	± 3.6	4.6	± 3.5	4.2	± 3.1	NS
Infant:									
Gestational age	39.9	± 1.7	39.6	± 1.7	39.7	± 1.6	39.6	± 1.5	NS
Birth weight	3400	± 393	3390	± 397	3350	± 389	3400	± 383	NS
Physician:									
Age > 35 years	43.6	± 5.3	41.9	± 6.2	35.6	± 4.2	36.2	± 3.1	<0.001
Board certified obstetrician	9		6		2		2		
Experience>10 years	5		4		0		0		
Practice sitting	In group		In group		In solo		In solo		
Hospital:									
Geographic location									
Large city	Yes		Yes		-		-		
Second large city	-		-		Yes		Yes		
Bed size	200		210		87		100		
Available NICU*	Yes		Yes		No		No		
Delivery volume/ year	5000-7000		3000-4500		1500-2000		1500-2000		

* NICU = Neonatal Intensive Care Unit ^{xx} SD = Standard Deviation NS^{o}= Not significant.

Table IV. Percentage of normal vaginal delivery and cesarean section for each labor characteristic among the different hospitals.

Labor characteristics	Group I hospitals				Group II hospitals				P-value
	PRH		PHSH		PZH		PHH		
	NVD %	C/S* %	NVD %	C/S* %	NVD %	C/S* %	NVD %	C/S* %	
Breech presentation	48	52	53.1	28.1	28.1	71.9	30.4	69.6	<0.05
Primigravidas	12	29.3	18.1	6.3	6.3	59.7	9.5	56.4	<0.05
Multigravidas	36	22.7	35	21.8	21.8	12.2	20.9	10.2	NS^{o}
Multiple pregnancy	48.6	51.4	51.2	42.1	42.1	57.9	41.2	58.8	NS
Trial of scar	75.4	24.6	68.7	54.3	54.3	45.7	54.9	45.1	<0.05
EFW**> 4000gm	85	15	82.3	66.9	66.9	33.1	61.7	38.3	<0.01
EFM$^{\blacklozenge\blacklozenge}$	63.9	36.1	65.6	47.7	47.7	52.3	47.5	52.5	<0.05
FGA$^{\blacklozenge}$< 30 weeks	87.7	16.3	81.5	76.5	76.5	23.5	80	20	NS
Abruptio placenta	51.7	48.3	57.1	33.4	33.4	66.6	27.3	72.7	<0.01
Pre-eclampsia	80.8	19.2	77.9	60.8	60.8	39.2	64.4	35.6	<0.01
Postterm pregnancy	79	21	80.9	68.7	68.7	31.3	67	33	<0.05

*C/S= Cesarean section. **EFW= Estimated fetal weight. NS^{o}= Not significant.
$^{\blacklozenge\blacklozenge}$EFM= Electronic fetal monitoring. $^{\blacklozenge}$FGA= Fetal gestational age.

Table V. The neonatal outcome among the different hospitals.

	Group I hospitals				Group II hospitals				P-value
	PRH N= 497		PHSH N= 284		PZH N=220		PHH N=153		
	No.	%	No.	%	No.	%	No.	%	
Neonatal death	16	3.2	12	4.2	9	4.1	8	5.2	NS^o
NICU	26	5.2	21	7.4	14	6.4	12	7.8	NS
Apgar score									
<7 at 1 min	21	4.2	17	6	15	6.8	12	7.8	NS
<7 at 5 min	12	2.4	10	3.4	6	2.7	5	3.2	NS

NS^o= Not significant.

Legend for all Tables:

PRH: Prince Rashed Hospital. PHSH: Prince Hashim Hospital

PZH: Prince Zaid Hospital PHH: Princess Haya Hospital

References

1. **Burns LR, Geller SE, Wholey DR.** The effect of physician factor on the cesarean section decision. *Med Care* 1995; 33: 365-382.
2. **Chambliss LR, Cornelia Daly, Medearis AL, *et al.*** The role of selection bias in comparing cesarean birth rates between physician and midwifery management. *Obstet Gynecol* 1992; 80: 161-165.
3. **Berkowitz GS, Fiarman GS, Mojca MA, *et al.*** Effect of physician characteristics on the cesarean birth rate. *Am J Obstet Gynecol* 1989; 161: 146-149.
4. **Stafford RS.** The impact of nonclinical factors on repeat cesarean section. *JAMA* 1991; 265: 59-63.
5. **Tussing AD, Wojtowycz MA.** The cesarean decision in New York State 1986, economic and noneconomic aspect. *Med Care* 1992; 30 : 529-540.
6. **Localio AR, Lawthers AG, Bengetson JM, *et al.*** Relationship between malpractice claims and cesarean delivery. *JAMA* 1993; 269: 366-373.
7. **Lagrew DC, Adashek JA.** Lowering the cesarean section rate in a private hospital: Comparison of individual physician's rates, risk factors, and outcome. *Am J Obstet Gynecol* 1998; 178: 1207-1214.
8. **Weisman CS, Morlock LL, Teitelbaum MA, *et al.*** Practice changes in response to the malpractice litigation climate. *Med Care* 1989; 27: 16-24.
9. **Gouert GI, Bottoms SF, Treadwell MG, Nehra PG.** The physician factor in cesarean birth rates. *N Eng J Med* 1989; 320: 706-709.
10. **Clark SL, Wu Xu, Porter TF, *et al.*** Institutional influences on the primary cesarean section rate in Utah, 1992 to 1995. *Am J Obstet Gynecol* 1998; 179: 841-845.
11. **DeMott RK, Sandomire HF.** The green bay cesarean section study. The physician factor as a determinant of cesarean birth rates. *Am J Obset Gynecol* 1990; 162: 1593-602.
12. **Bulter J, Abrahams B, Parker J, *et al.*** Supportive nurse-midwife care is associated with a reduced incidence of cesarean section. *Am J Obstet Gynecol* 1993; 168 : 1407-13.
13. **Williams MC, Knuppel RA, Obrien WF, *et al.*** A randomized comparison of assisted vaginal delivery by obstetric forceps and polyethylene vacuum cup. *Obstet Gynecol* 1991; 78: 789-794.
14. **Guillemette J, Fraser W.** Differences between obstetricians in cesarean section rates and the management of labor. *Br J Obstet Gynecol* 1992; 99: 105-108.
15. **Rock SM.** Malpractice premiums and primary cesarean section rates in New York and Illinois. *Public Health Rep* 1988; 103: 459-463.

APPENDIX 1

Items Included in the Questionnaire for Obstetrician's management*.

Cesarean Section decision in the following situations:

1. Breech presentation in case of:
   i. Primigravida
   ii. Multipara
   iii. Any medical problem
2. Twin pregnancy in case of:
   a. Primigravida – both cephalic
   - Both breech.
   - First cephalic.
   - First breech.

   b. Multipara – both cephalic
   - Both breech.
   - First cephalic.
   - First breech.
3. Previous uterine scar (one) in case of:
   i. Full term pregnancy.
   ii. Post date pregnancy.
   iii. Breech presentation.
   iv. Multiple pregnancies.
   v. Premature delivery.
   vi. Any associated medical problem.
4. Estimated fetal weight > 4 kg in case of:
   i. Primigravida.
   ii. Multipara.
   iii. Previous uterine scar.
   iv. Any associated medical problem.
5. Any change in the cardiotocography during monitoring
6. Gestational age <30 weeks in case of:
   i. Primigravida with cephalic presentation with breech presentation
   ii. Multipara with cephalic presentation with breech presentation
7. Abruptio placenta
   i. Mild.
   ii. Moderate.
   iii. Severe.
8. Pre-eclampsia
   i. Mild.
   ii. Moderate.
   iii. Severe.
9. Post term pregnancy in case of:
   i. Estimated fetal weight > 4 kg
   ii. Previous uterine scar.
   iii. Multiple pregnancies.
   iv. Breech presentation.
   v. Abnormal cardiotocogram.
   vi. Associated medical problem.
10. Obstetric staff:
   i. Adequate obstetrician number.
   ii. Availability of consultation.
   iii. Adequate number of nursing staff.
   iv. Adequate qualified midwives.
11. Hospital facilities:
   i. Anesthesia availability (if present more than one emergency case)
   ii. Theater availability.
   iii. Laboratory tests availability.
   iv. Blood products availability.
   v. Availability of referral, teaching and private hospitals.
12. Previous litigation process (if any show number).

*Responses were cited as yes, no or depends according to obstetrician view.