THE IMPACT OF MATERNAL AGE AND PARITY ON THE CESAREAN SECTION RATE

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ABSTRACT

Objective: To study the impact of maternal age and parity on cesarean section rate.

Methods: Fifteen thousand three hundred and forty two women delivered at Prince Hashim Hospital between the 1st of January 1998 and 31st of December 2001. One thousand four hundred thirty four cesarean sections were performed in the same period. Patients underwent cesarean section were divided into three age groups: <25 yr. (n=280), 25-35 (n=462), and >35 yr. (n=692), and into five parity groups (P0 (n= 170), P1 (n=136), P2 (n=166), P3 (n=212), and >P3 (n=750). Information abstracted included maternal characteristics and indications for cesarean section. Statistical analysis was performed using Pearson Chi-Square test to evaluate the association between age parity, and cesarean section.

Results: Out of the 15342 deliveries conducted during the study period, 1434 cesarean sections were performed, with incidence of 9.3%. The cesarean section rate in the three age groups was 5.2%, 6.9%, and 20.9%, respectively. The rate in the various parity groups was 8.5%, 7.1%, 7.4%, 6.3% and 12.9%, respectively. According to the indications, a statistically significant increase in cesarean section rates with increasing maternal age and parity ($p<0.05$ and $p<0.02$, respectively) was observed.

Conclusion: Maternal age and parity are two factors that affect significantly the cesarean section rate.

Key words: Cesarean section, Maternal age, Parity.

Introduction

The problem of increasing family size still exists in many developing countries where early marriage and attempts to achieve a higher number of children at a younger age are habitual. In this situation, factors such as religion, culture, and low socioeconomic status are predominant [1,2]. Increasing age and parity are reported to be associated with an increased risk of adverse pregnancy outcome, and cesarean section has been found to be consistently increased in these studies [1-7]. However, older multiparous are reported to have a higher incidence of diabetes, pregnancy induced hypertension, macrosomia, placental problems, and intrapartum complications [4-8]. Several studies [8-11] have examined the effect of age on the cesarean section rate, but few examined the effect of parity [6,7]. We conducted this study to examine the effect of both age and parity on cesarean section rate.

Methods

This study was conducted retrospectively at Prince Hashim Hospital (PHH) during the period from 1 January 1998 to 31 December 2001. There were 15342 births in the study period; out of them 1434 cesarean sections were performed. The data were obtained from the delivery logbook and patients' files of those who underwent cesarean section. The information abstracted comprised the number of deliveries, age, parity, mode of delivery, stated indication for each cesarean section, fetal presentation, and fetal birth weight. Patients who underwent cesarean section were classified into three age groups; <25 yr., 25-35, and >35 yr., and into five parity groups; P0, p1, p2, p3, and >P3. The data regarding cesarean section were analyzed for maternal characteristics and the indications for the procedure according to age and parity. Dystocia includes failure to progress, cephalo-pelvic disproportion, and failed forceps delivery and vacuum extraction.

Malpresentation and abnormal lie includes breech, face, brow presentation, and transverse lie. Fetal electronic monitoring was applied in high-risk pregnancies. Non-reassuring fetal condition was defined as the presence of repetitive late deceleration, persistent fetal Brady, or tachy-cardia, or decreased beat-to-beat variability. Group "other" includes previous uterine scar (cases having two or more previous scars and cases with one previous scar that had failed a trial of labor for vaginal delivery), cord prolapse, genital herpes and malformations, and others. Statistical analyses were performed with the Pearson Chi-Square test. Differences were considered statistically significant at P<0.05.

Results

Table I summarizes the maternal age and parity subgroups. Women aged more than 35 years and parity of more than 3 deliveries accounted for 21.6% and 37.9%, respectively, of the total deliveries. Cesarean section rates were 20.9% and 12.9%, respectively and were significantly higher when compared with the other groups. Out of 15342 deliveries, which were conducted during the study period, 1434 cesarean sections were performed, with an overall incidence of 9.3%. Pre-eclampsia was responsible for 11.6% of cesarean sections, placenta previa 6.8%, abruptio placenta for 6%, and non-reassuring fetal condition for 13.8% of cases (repetitive late deceleration 5.4%, persistent fetal bradycardia 5.1%, persistent fetal tachycardia 1.3%, and decreased beat-to-beat variability 2%) in whom electronic fetal monitoring was applied. Uterine scar was present in 1070 (6.9%) of total deliveries. Of these 856 (80%) were delivered vaginally and 214 (20%) underwent a repeat cesarean section for various indications.

Table II shows the indications for cesarean section according to age. There was a statistically significant increase in cesarean sections that were performed for malpresentation (p<0.01), dystocia (p<0.01), macrosomia (p<0.01), non-reassuring fetal condition (p<0.01), pre-eclampsia (p<0.05), placenta previa (p<0.05) and abruptio placenta (p<0.05) in the age subgroup > 35 when compared with the other age subgroups. Cesarean section rates in the three age groups were 5.2%, 6.9%, and 20.9%, respectively. A statistically significant increase in cesarean section rate for the same indications in the parity subgroup ≥ P3 when compared with the other parity subgroups was noted (p<0.01 for the whole indications), as shown in Table III. This significant increase in the rate of cesarean section also was noted when all patients were divided into two age (25 to 35 and ≥ 35), and two parity subgroups (P0-P3 and >P3) with an odd ratio of 2.2 and 1.4, respectively as shown in Tables IV and V.

Discussion

Although the relationship between maternal age, parity, and the rate of cesarean section appears to be remarkably consistent over several studies [3,4,6], the explanation for this remains elusive. Various studies [12-14] have suggested that some physicians might consider older multiparous to have a greater risk of adverse pregnancy outcome from vaginal delivery, and they also suggest that these women tend to have dysfunctional labor patterns, and therefore they may be inclined to use cesarean section. Many studies have reported a significant increase in cesarean section rate with advancing maternal age [5,8-11] and high parity [1,2,15,16]. The interaction between age and parity and their effect on cesarean section rate was reported in a few studies [3,4,6]. Our study indicated a significant increase in cesarean section rate with increased age and parity. Women older than 35 years with high parity (≥ P3) underwent more cesarean sections (20.9% and 12.9%, respectively). Dystocia, non-reassuring fetal condition, pre-eclampsia, placenta previa, abruptio placenta, malpresentation, and macrosomia were significantly higher in older mothers with high parity (Table II, III). These findings are generally consistent with other previous studies [4,8,16-19]. It seems that the impact of parity on cesarean section rate is independent of that of age. In our study, 25.4% with high parity (≥ P3) were under the age of 35. With increasing age and parity, the normal muscle in the wall of the myometrial arteries is replaced by collagen and the development of sclerotic lesions. This will result in decrease utero-placental perfusion; reduce fetal oxygenation and deterioration in myometrial function [11,16]. Both hypoperfusion and hypofunction of the myometrium are important factors, which may lead to increased rates of non-reassuring fetal condition, placenta previa [17] and dystocia [18]. One theory for the increased cesarean section rate in older women is the increased number of older women with dysfunctional labor patterns postulated by Peiper et al [13]. On the other hand, Berkowitz et al [20] found an association between a prolonged second stage of labor and maternal age greater than 35, with a subsequent increased incidence of maternal and fetal distress that resulted in increased performance of cesarean section. In our study, 40.7% of patients in whom the fetal heart rate was monitored during labor, underwent cesarean section because of non-reassuring fetal condition (13.8% of total cesarean sections). The diagnosis of this category was based on abnormal cardiotocography (CTG) findings. The limited use of fetal scalp blood sampling (FSS) and possible misinterpretation of the cardiotocogram may have led to the over utilization of this diagnosis in our study. Naeye et al [16] reported that pre-eclampsia is increased with advancing age and parity, because of progressive vascular endothelial damage. Our findings

are in agreement with the observations reported in these studies. In a similar study, Abu-Heija *et al* [4] reported that the incidence of fetal malpresentation, placenta previa, and macrosomia is increased with increasing age and parity. The same was reported for abruptio placenta by other investigators [8,19], with results that support our study. In summary, on the basis of our findings, older mothers with high parity are of greater risk for certain complications of pregnancy and labor that require abdominal delivery, therefore cesarean section is more frequent.

Table I. Age and Parity among the study groups.

Characteristics	No. of patients 15342	%	Cesarean section n=1434	%
Age (Year)				
<25	5344	34.8	280	5.2
25-35	6680	43.6	462	6.9
>35	3318	21.6	692	20.9
Parity				
P0	2010	13.1	170	8.5
P1	1900	12.4	136	7.1
P2	2246	14.6	166	7.4
P3	3364	21.9	212	6.3
≥P3	5822	37.9	750	12.9
Total	15342	100	1434	9.3

Table II. Indications for cesarean section according to age.

Indications	< 25 n= 5344	%	25-35 n= 6680	%	≥ 35 n= 3318	%	P- value
Malpresentation	54	1	92	1.4	130	3.9	< 0.01
Dystocia	46	0.9	94	1.4	118	3.5	< 0.01
Macrosomia	34	0.6	70	1	108	3.3	< 0.01
Non-reassuring fetal condition	30	0.5	70	1	98	2.9	< 0.01
Pre-eclampsia	30	0.5	40	0.6	96	2.8	< 0.05
Placenta previa	24	0.4	32	0.5	42	1.3	< 0.05
Abruptio placenta	8	0.1	24	0.3	52	1.6	< 0.05
Others	54	1	40	0.6	46	1.4	NS*
Total	280	5.2	462	6.9	692	20.9	

NS= not significant

Table III. Indications for cesarean section according to parity.

Indications	P0 n=1005	%	P1 n=950	%	P2 n=1123	%	P3 n=1682	%	≥ p3 n=2911	%	P- value
Malpresentation	12	1.2	10	1	19	1.7	22	1.3	75	2.6	< 0.01
Dystocia	18	1.8	11	1.1	15	1.3	19	1.1	66	2.7	< 0.01
Macrosomia	14	1.4	15	1.5	14	1.2	16	1.4	47	2.4	< 0.05
Non-reassuring fetal condition	11	1.1	7	0.7	9	0.8	14	0.8	58	2	< 0.01
Pre-eclampsia	13	1.3	10	1	7	0.6	10	0.5	43	1.5	< 0.05
Placenta previa	3	0.3	3	0.3	4	0.3	6	0.4	33	1.1	< 0.01
Abruptio placenta	3	0.3	2	0.2	3	0.2	6	0.4	29	1	< 0.01
Others	11	1.1	10	1	12	1.1	13	0.8	24	0.8	NS
Total	85	8.5	68	7.1	83	7.4	106	6.3	375	12.9	

Table IV. Cesarean section by indication according to age (years).

Indications	<25 - 35 n=12024	%	≥ 35 n= 3318	%	Odds Ratio
Malpresentation	146	1.2	130	3.9	3.25
Dystocia	140	1.16	118	3.5	3.01
Macrosomia	104	0.86	108	3.5	3.8
Non-reassuring fetal condition	100	0.83	98	2.9	3.5
Pre-eclampsia	70	0.56	96	2.8	5
Placenta previa	56	0.46	42	1.3	2.8
Abruptio placenta	32	0.26	52	1.6	6
Others	94	0.78	46	1.4	1.8
Total	742	6.11	690	20.9	3.4

Table V. Cesarean section by indication according to parity.

Indications	P0 – P3 n=4760	%	> P3 n=2911	%	Odds Ratio
Malpresentation	63	1.3	75	2.6	2
Dystocia	63	1.3	66	2.7	2.1
Macrosomia	59	1.24	47	2.4	1.9
Non-reassuring fetal condition	41	0.86	58	2	2.3
Pre-eclampsia	40	0.86	43	1.5	1.78
Placenta previa	16	0.3	33	1.1	3.7
Abruptio placenta	14	0.29	29	1	3.4
Others	46	0.96	24	0.8	0.83
Total	342	7.18	375	12.9	1.8

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