

Cesarean section rate: much room for reduction

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Summary

Objective: To examine the indications and rate of cesarean section in referral hospitals.

Methods: Between January 2003 and December 2005, a total of 11,506 women delivered at King Hussein Medical Center, of which 2,075 cesarean sections (CS) were performed. Patients who underwent cesarean section were divided into three age subgroups: < 25 yr (n = 3,118), 25-35 (n = 6,147), and > 35 yr (n = 2,241), and two parity subgroups - primiparous (n = 3,326) and multiparous (n = 8,180). Information abstracted included maternal characteristics and indications for CS. Statistical analyses were performed using the Pearson chi-square test and Fisher's exact test to evaluate differences between the various subgroups.

Results: From a total of 11,506 deliveries that took place, 2,075 cesarean sections were performed with an incidence of 18%. According to age, the CS rate was 11.85%, 20.5% and 19.9%, respectively, in the three age subgroups. According to parity, the CS rate was 16.3% and 18.7% in the primiparous and multiparous women, respectively. When matched to age, the indications for CS showed no significant difference among the three age subgroups. When matched to parity, the indications also showed no significant difference between the two parity subgroups except for dystocia which was significantly higher in the primiparous compared to multiparous women ($p < 0.01$), and for repeated CS which was significantly higher in the multiparous compared to primiparous women ($p < 0.0001$).

Conclusion: Some indications for cesarean section such as dystocia and fetal distress were over-utilized resulting in a high CS rate. Proper management of labor and precise interpretation of fetal heart tracing might be effective in reducing the cesarean section rate.

Key words: Cesarean section; Maternal age; Parity; Dystocia; Fetal distress; Labour abnormalities.

Introduction

There are some absolute indications for cesarean section (CS) [1]. In these instances (dystocia, transverse lie and severe abruption), the mother or fetus would inevitably die or suffer damage if vaginal delivery was attempted. However, most cesarean deliveries are undertaken for relative indications where the risks to mother or fetus are less if delivery is by CS rather than vaginally. Here, the evidence for one choice over another is less clear. For the infant, the increased risk of respiratory distress and for the mother, the extended and unpredictable recovery time associated with CS are among those factors to be considered in deciding on mode of delivery. In fact, many of the indications for CS have been over-diagnosed leading to a sharp rise in the cesarean section rate world wide [2-7]. This study was conducted to examine the indications and rate of cesarean sections in referral hospitals.

Patients and Methods

This study was conducted retrospectively at King Hussein Medical Center between January 2003 and December 2005. There were 11,506 births in the study period, out of which 2,075 cesarean sections were performed. The data were obtained from the delivery logbook and files of patients who underwent cesarean section in each hospital. The information abstracted comprised the number of deliveries, age, parity, mode of delivery and the stated indication for each cesarean section. Patients who underwent cesarean section were classi-

fied into three age groups; < 25 years, 25-35, and > 35 years, and into two parity subgroups - primiparous and multiparous. 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, cephalopelvic disproportion, and failed forceps delivery and vacuum extraction. The term malpresentation includes breech, transverse lie, face and brow presentation. Fetal electronic monitoring was applied in high-risk pregnancies. Fetal distress was defined as the presence of repetitive late deceleration, persistent fetal brady or tachycardia, or decreased beat-to-beat variability. Group "other" includes cord prolapse and presentation, genital herpes and malformations, preeclampsia, placenta previa and abruption. Repeated cesarean section was considered in cases that had two or more previous scars and cases with one previous scar that had failed a trial of labor (for vaginal delivery). Statistical analyses were performed with the Pearson chi-square test and Fisher's exact test. Differences were considered statistically significant at $p < 0.05$.

Results

Table 1 summarizes the maternal characteristics. Maternal age ranged from 16-49 years. Out of 11,506 deliveries conducted during the study period, 2,075 cesarean sections were performed, with an overall incidence of 18%. According to age, the CS rate was 11.85%, 20.5% and 19.9%, respectively, in the three age subgroups. According to parity, the CS rate was 16.3% and 18.7% in primiparous and multiparous women, respectively.

When matched to age, the indications for CS including repeated CS, malpresentation, dystocia, fetal distress, and the diagnosis "other" showed no significant difference

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Table 1. – Maternal characteristics.

Characteristics	No. of patients n = 11,506 (%)	Cesarean section n = 2,075 (%)
<i>Age (Year)</i>		
< 25	3,118 (27.1)	367 (11.8)
25-35	6,147 (53.4)	1,262 (20.5)
> 35	2,241 (19.5)	446 (19.9)
<i>Parity</i>		
Primiparous women	3,118 (27.1)	542 (16.3)
Multiparous women	8,180 (71.1)	1,533 (18.7)
Total	11,506 (100)	2,075 (18)

among the three age subgroups (Table 2). Preeclampsia was higher in women in age group < 25 years compared to the other two age subgroups, but did not reach statistical significance. On the other hand, placenta previa, abruptio placenta and cord accidents had a non-significant increase in women who were older than 25 years compared to those under 25 years.

Table 2. – Indications for cesarean section according to age.

Indications	< 25 n = 367 (%)	25-35 n = 1,262 (%)	> 35 n = 446 (%)	p value
Repeat cesarean section	37 (10.1)	188 (14.9)	74 (16.6)	NS
Malpresentation	69 (18.8)	256 (20.2)	98 (22)	NS
Dystocia	111 (30.2)	349 (27.6)	117 (26.2)	NS
Fetal Distress	102 (27.8)	309 (24.5)	101 (22.6)	NS
Other	48 (13.1)	162 (12.8)	56 (12.5)	NS

NS = Non-significant.

When matched to parity, the indications also showed no significant difference between the two parity subgroups except for dystocia which was significantly higher in the primiparous compared to multiparous women (p < 0.01), and for repeated CS which was significantly higher in the multiparous compared to primiparous women (p < 0.0001) (Table 3). Placenta previa, abruptio placenta and cord accidents showed a non-significant increase in multiparous women compared to primiparous. In contrast, preeclampsia had a non-significant increase in primiparous versus multiparous women.

Table 3. – Indications for cesarean section according to parity.

Indications	Primiparous n = 542 (%)	Multiparous n = 1,533 (%)	p value
Repeat cesarean section	0	334 (21.8)	< 0.0001
Malpresentation	104 (19.2)	302 (19.7)	NS
Dystocia	183 (33.8)	308 (20.1)	< 0.01
Fetal Distress	134 (24.7)	297 (19.4)	NS
Other	121 (22.3)	292 (19)	NS

Discussion

The cesarean section rate has shown a marked rise worldwide. Some reasons such as medico-legal action and malpractice might be responsible [1, 5]. On the other hand, some indications for cesarean section such as labor abnormalities and fetal distress have been over-diagnosed leading to an increase in cesarean section rate [1-6]. Although the relationship between maternal age, parity and the rate of cesarean section appears to be remarkably consistent over several studies, the explanation for this

remains elusive. Various studies [8-14] have suggested that some physicians might consider older multiparous women 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 and high parity [7-13]. Our study indicated a significant increase in cesarean section rate with both increased age and parity, as women older than 25 years with high parity underwent more cesarean sections. Dystocia, fetal distress, preeclampsia, placenta previa, abruptio placenta, and malpresentation were higher in older mothers with high parity. These findings are generally consistent with other studies [8-16]. 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 that result in decreased uteroplacental perfusion with subsequent reduced fetal oxygenation and deterioration of myometrial function [8, 14]. Both hypoperfusion and hypofunction of the myometrium are important factors which may lead to increased rates of non-reassuring fetal conditions, placenta previa and dystocia [13, 14]. 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.* [10]. On the other hand, Berkowitz *et al.* [16] 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, 55% of patients in whom the fetal heart rate was monitored during labor, underwent cesarean section because of a non-reassuring fetal condition. The diagnosis of this category was based on abnormal cardiotocography (CTG) findings. The limited use of fetal scalp blood sampling and possible misinterpretation of the CTG may have led to the over-utilization of this diagnosis in our study. This finding is consistent with a recently reported study by Lamvu *et al.* [6]. Naeye *et al.* [11] reported that preeclampsia increases 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.* [8] reported that the incidence of fetal malpresentation, placenta previa, and macrosomia increases with increasing age and parity. The same was reported for abruptio placenta by other investigators [14, 15], with results that support our own. In summary, on the basis of our findings, older mothers with high parity are at greater risk for certain complications of pregnancy and labor that require abdominal delivery, therefore cesarean section is more frequent. Some indications for cesarean section such as fetal distress and dystocia have been over-diagnosed leading to a higher cesarean section rate. Good obstetrical experience and precise interpretation of fetal heart tracing may result in a significant decrease in the cesarean section rate.

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