

## **The Decision to Delivery Interval in Emergency and Non-Urgent Caesarean Sections at King Abdulaziz University Hospital**

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**Abstract.** The aim of this study is to assess the decision to delivery interval in our obstetric unit in comparison to current recommendations. A retrospective study included an analysis of consecutive non-elective caesarean sections performed at King Abdulaziz University Hospital, Jeddah, Saudi Arabia from January to June 2008. The decision to delivery interval was compared between emergency and non urgent caesarean sections. During the study period, 213 non-elective caesarean sections were performed, 164 were classified as non urgent caesarean (Group 1) and 49 as emergency caesarean (Group 2). The median and inter-quartile ranges in the decision to delivery interval were 62.5 min (45-80) and 41 min (27-68) in Group 1 and 2, respectively ( $p < 0.001$ ). In the Group 1, 10.3% delivered within 30 min compared to 30.6 % in the Group 2 ( $p < 0.05$ ). No correlation was found between the decision to delivery interval and the Apgar score at 1 minor 5 min in both groups. It's believed that all centers should set a standard of decision to delivery interval of 30 min. that needs to be achieved in order to reduce maternal anxiety and physician's liability.

**Keywords:** Caesarean sections, Decision to delivery interval.

### **Introduction**

The American College of Obstetricians and Gynecologists (ACOG) recommend that the decision to delivery interval (DDI) for emergency

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caesarean section (C/S) should not exceed 30 min<sup>[1]</sup>. However, this recommendation does not appear to be sustained by evidence based data<sup>[2-6]</sup>, and is probably drawn from medico-legal grounds. In practice, the DDI is mainly influenced by the facilities and staff availability<sup>[7]</sup>.

Primarily, our study was performed to assess how close our obstetric unit was to achieving the target of 30 min in emergency caesarean sections. Secondly, the requisite to evaluate the DDI in non-urgent caesarean sections performed during labor. Finally, the necessity to appraise the influence of DDI on fetal outcome reflected by 1 and 5 min Apgar score.

### **Materials and Methods**

This retrospective study included an analysis of consecutive non-elective caesarean sections performed at King Abdulaziz University Hospital in Jeddah, Saudi Arabia from January to June 2008. The delivery ward is fully equipped with maternal and fetal monitoring facilities. Two operating theaters (emergency operating room) are located within the delivery ward and are few meters from the nurses' station. All non elective caesarean sections are performed in the emergency operating room within the delivery ward.

An emergency C/S was defined as one, which required prompt delivery to reduce the risk to the pregnant women or their infants. The pre-operative diagnoses included fetal distress, substantially heavy vaginal bleeding in suspected placental abruption, heavily bleeding placenta previa, or suspected ruptured uterus and a prolapsed umbilical cord. A non-urgent C/S was defined as one performed during labor for other indication (Table 1). The DDI was defined as the time between the decision to perform the C/S and the delivery of the infant. The operation was performed either under general or spinal anesthesia, depending on the urgency.

### **Statistical Analysis**

Statistical analysis was performed by "student's" *t*-test, Pearson's chi-square ( $\chi^2$ ) test and Spearman's correlation analysis (*r*). As indicated, the distribution of difference in time of delivery was tested for normality using the Kolmogorov-Smirnov (K-S) test and was found to be Non-

parametric. Mann-Whitney u-test was used for Non-parametric data significance set at  $p < 0.05$ .

**Table 1. Indication for non elective caesarean section (January – June 2008).**

<b>Group 1 (n = 164)</b> <b>Non urgent Caesarean</b>		<b>Group 2 (n = 49)</b> <b>Emergency Caesarean</b>
<b>Indications</b>	<b>No (%)</b>	<b>Indications</b>
Breech in labor	35 (21.3%)	Fetal distress
Previous one CS. refuse VBAC	5 (3.04%)	Cord prolapsed
Severe pre-eclampsia	16 (9.75%)	Severe Ante partum hemorrhage
Failure to progress	23 (14%)	Rupture uterus
Failure VBAC	18 (10.9%)	
Multiple pregnancy in labor	12 (7.3%)	
Mild ante-partum hemorrhage	10 (6.09%)	

## Results

During the study period, 213 non-elective caesarean sections were performed, 164 were classified as non urgent caesarean (Group 1) and 49 as emergency caesarean (Group 2).

The parturients' characteristics of both groups are presented in Table 2.

**Table 2. Parturients' characteristic of emergent and non-urgent caesareans.**

	<b>Group 1</b> <b>(n = 164)</b>	<b>Group 2</b> <b>(n = 49)</b>	<b>p Value</b>
Age (years)	30.54 ± 6.34	30.06 ± 6.47	0.46
Gravity (N)	4 ± 2	3.0 ± 2.0	0.76
Gestational week (weeks)	37.02 ± 3.39	37.04 ± 4.24	0.97
Birth weight (g)	2796 ± 811.7	2508 ± 751.22	0.024*
VBAC no (%)	19 (11.6%)	4 (8.2%)	0.35
Number of Apgar score of < 7 at 1 min	51 (31.1)	25 (51)	0.009
Number of Apgar score of < 7 at 5 min	9 (5.5)	6 (12.2)	0.10

The data is expressed as mean ± S.D or as number (%)

"Student's" t test for quantitative data

Chi-square for qualitative data

\*Statistically significant

The operation was performed under general anesthesia in 36 (29.1%) and 15 (69.4%) women, and under spinal anesthesia in 118 (71.9%) and 34 (30.6%) women in Group 1 and 2, respectively ( $p < 0.05$ ).

The median and inter-quartile range (IQR) of DDI were 62.5 min (45-80) and 41 min (27-68) in the Group 1 and 2, respectively ( $p < 0.001$ ). In the Group 1, 10.3% delivered within 30 mins compared to 30.6 % in the group 2 ( $p < 0.05$ ). The mean DDI  $\pm$  SD was  $73.18 \pm 75$  and  $50 \pm 31.86$  in Group 1 and 2, respectively (Table 3). No correlation was found between the DDI and Apgar score at 1 min or 5 min in both groups. During the study period, 23 patients required C/S that had come to the delivery room in labour with history of previous one caesarean section, four of them were in Group 2 with median DDI 41 min (IQR = 37-82) and mean  $\pm$  SD  $53.5 \pm 28.44$ .

**Table 3. Performance time sheet.**

Time (min)	Group 1 (n = 164) N (%)	Group 2 (n = 49) N (%)
< 15	3 (1.8)	3 (6.1)
< 30	14 (8.5)	12 (24.5)*
< 40	16 (1.8)	8 (16.3)
< 50	25 (15.2)	6 (12.2)
< 60	22 (13.4)	4 (8.2)
> 60	84 (51.2)	16 (32.7)

*Chi-square with linear trends  $p < 0.001$ \* highly significance  
Mann-Whitney U test was used as the time difference is non-parametric*

**Table 4. DDI related to anesthesia type in emergency caesarean section (Group 2).**

DDI	Emergency Caesarean Section (N = 49)	
	GA (N = 15)	Spinal (N = 34)
$\leq 30$ min	3/15 (20.0%)	12/15 (80.0%)
> 30 min	12/34 (35.2%)	22/34 (64.8%)

$p = 0.23$

In emergency C/S (Group 2), type of anesthesia was not found to influence the DDI with p-value 0.23 (Table 4).

### Discussion

In our study, the goal of 30 min DDI was achieved in 30.6% of emergency caesarean sections with a mean of 50 min. In comparison, the previously reported range was between 44 and 71%<sup>[3-6,8-10]</sup>. The factors that may influence the DDI in our institute included, the type of

anesthesia and the experience of the staff. Regional anesthesia was associated with longer intervals than general anesthesia<sup>[4]</sup>. Furthermore, it was previously shown that the DDI may be significantly shortened with improvement in experience of the staff<sup>[10]</sup>. Although the rates of general and spinal anesthesia were statistically different ( $p < 0.05$ ) in emergency and non-urgent caesareans in our study, it was found that this difference did not influence the DDI in emergency caesarean section group. The question is whether different degree of urgency in the response of the staff will have a positive effect on perinatal outcome. Intuitively, the longer is the decision to delivery interval, the poorer the perinatal outcome should be. No correlation was found between Apgar score and the decision to delivery interval. Similar results were obtained by other investigators<sup>[2,3,6,11]</sup>. Finally, the question is whether a more lenient standard should be recommended for the decision to delivery interval. Helmy *et al.*<sup>[10]</sup> argued that since the 40 min DDI could be achieved in 90% of emergency caesareans, the 40 min standard is more realistic. A close to 70% achievement was made with a 60 min standard in our center in emergency caesarean section. It's believed, that once a decision to perform a caesarean was made, every effort should be made in order to accomplish it as soon as possible. Even if it is not associated with better perinatal outcome, it may reduce maternal anxiety and physician's liability. Setting the standard at 60 min may result in lowering of the degree of urgency by the staff as evident from the DDI in non-urgent caesarean. Therefore, the arbitrary 30 min DDI in emergency caesareans still seems valid, especially in setting of trial of labour after one caesarean section. Although this was not achieved in our center, great benefit was accomplished from our review by promoting increased awareness of this delay and educate our staff in order to improve the quality of work.

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## الزمن المستغرق للقيام بإجراء العمليات القيصرية الطارئة من لحظة اتخاذ القرار في مستشفى جامعة الملك عبدالعزيز

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**المستخلص.** الهدف من هذه الدراسة هو تقييم الزمن الذي يستغرق من لحظة القرار بالتوليد بالعملية القيصرية وحتى لحظة خروج الجنين، ومقارنتها بالزمن المفترض حسب التوصية العالمية. هي دراسة بأثر رجعي تضمنت مراجعة بيانات جميع حالات الولادات القيصرية التي أجريت بدون موعد مسبق في مستشفى جامعة الملك عبدالعزيز، جدة، المملكة العربية السعودية، في الفترة الواقعة ما بين يناير إلى يونيو ٢٠٠٨م. وتم مقارنة الزمن المذكور بين حالات القيصرية الإسعافية وغير الإسعافية. خلال الفترة التي تمت عليها الدراسة كان هناك ٢١٣ عملية قيصرية بدون موعد مسبق ١٦٤ منها غير إسعافية (المجموعة ١). و ٤٩ إسعافية (المجموعة ٢) القيمة الوسطية للزمن المطلوب من الدراسة كانت حوالي ٦٢,٥ دقيقة (٨٠-٤٥) للمجموعة الأولى. ( $p < 0.001$ ) و ٤١ دقيقة ٢٧ (٦٨-) للمجموعة الثانية. ( $p < 0.05$ ) في المجموعة الأولى ٣,١٠ بالمئة من الحالات ولدت خلال ٣٠ دقيقة بالمقارنة مع ٦,٣٠ بالمئة للمجموعة. الثانية لم نجد هناك أية علاقة بين الزمن من القرار إلى الولادة ودرجة الابهار عند الجنين لا في الدقيقة الأولى ولا في الدقيقة الخامسة بعد

الولادة وذلك في المجموعتين. نحن نعتقد أن كل المراكز يجب أن  
تحدد أن الزمن القياسي المطلوب الالتزام به من وقت اتخاذ القرار  
إلى لحظة الولادة هو ٣٠ دقيقة وذلك للتقليل من قلق الأم والمسؤولية  
الملقاة على الطبيب.