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Original Research Article

The Decision to Delivery Interval in Emergency Cesarean Sections and its Perinatal Outcome in A Tertiary Care Institute

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Abstract

Introduction: A 30 to 75 minutes decision to delivery interval (DDI) is widely recommended for emergency cesarean sections. Our aim is to study the decision to delivery interval (DDI) and its effect on the neonatal outcome. According to NICE guidelines there are 4 categories for the urgency of cesarean sections (CS), depending on the indication. The '30 minute rule' for a decision to delivery interval (DDI) states that category 1 CS should be done within 30 minutes, but due to various factors like non-availability of blood or blood investigations, the DDI might get delayed. The study has been done to find out whether a delay in the decision of CS and the delivery time is the only factor involved for neonatal outcome or not.

Objectives: To find out whether a delay of more than the specified time given, has any effect on the neonatal outcome.

Materials and Methods: It is a prospective observational study conducted over 6 months in the department of obstetrics & gynaecology in a tertiary care teaching hospital.

Results: A total of 201 emergency caesarean sections have been reviewed. Average DDI was 79.52±112.37 minutes which was more than the recommended time, however there was no significant neonatal morbidity associated with the DDI.

Conclusion: Decision to delivery interval is important in category 1 and 2 CS. However, in this study we conclude that there is no significant correlation between DDI of less than 30 minutes and the perinatal outcome. This time limit should be reconsidered especially in developing countries where infrastructure and manpower are severely limited. Also, DDI is not the sole factor responsible for neonatal outcome.

Keywords: Cesarean Section, Developing Countries, Neonatal Morbidity, Obstetrics.

Introduction

Cesarean sections are the most common obstetric surgery as well as a lifesaving intervention. According to American College of Obstetrics & Gynecology (ACOG -1989), decision to delivery interval should be less than 30 minutes in case of an emergency cesarean sections.[1] In 2011, NICE guidelines suggested that the urgency of cesarean sections should be classified into 4 categories for clear

communication between all the healthcare professionals.[2]

Categories:

1. Immediate threat to the life of the woman or fetus.
2. Maternal or fetal compromise which is not immediately life-threatening.
3. No maternal or fetal compromise but needs early delivery.
4. Delivery timed to suit woman or staff.

To measure the overall performance of an obstetric unit, decision-to-delivery interval (DDI) should be used as 30 min for Category 1 Cesarean section (CS) (immediate threat to life of women or fetus) and 75 min for Category 2 CS (maternal and fetal compromise that is not necessarily life-threatening).[2]

In the absence of maternal and fetal compromise, a delay over 30 minutes may not be considered substandard practice. This time limit has not been questioned with respect to the place of practice. In developing countries like India, with limited resources, we need to audit our decision to delivery interval. Our objective was to study the DDI in our hospital; the reason for any delay and if there is any association with fetal or maternal morbidity.

Materials and Methods

This a prospective observational study done in tertiary care teaching hospital in Western Maharashtra, India. Ours centre caters to mostly the rural population. The hospital has approximately 1500 deliveries annually. The obstetric unit has the labour room and operation theatre in the same floor. The study was approved by the Institutional Ethics Committee.

This study was done over 6 months, between November 2019 till April 2020. The study subject consists of indoor antenatal patients who underwent emergency cesarean sections over this period. The patients who were posted for elective cesarean sections were excluded.,

For the study, a proforma was filled for all the patients where decision to do an emergency cesarean section was taken. The demographic profile of the patient was noted, her complete history along with obstetric history was taken. Time of decision was noted, indication for emergency lower segment cesarean section (LSCS) and time of delivery were noted. Any reason for delay in the procedure was also noted. DDI was defined as the time between decision to conduct a cesarean section to the actual time to deliver the baby.

The patients were divided into Category 1(Urgent)-immediate threat to the life of the mother or fetus (n=47). Category 2(Emergency)-Maternal or fetal compromise but no immediate threat to the life of the mother or fetus (n=154). Perinatal outcome was measured as Apgar score <7 at 1minute and 5 minutes and admission to neonatal intensive care unit (NICU) was also studied.

Results and Discussion

Total number of deliveries during this period was 902. Total number of LSCS done was 429 out of which, 201 (22.2%) were emergency LSCS. Informed consent was taken from all the patients for this study.

A total of 201 women who underwent emergency cesarean sections were included in this study. Mean age of the patient was 24.80±4.04 years.

The average gestational age of the patients in our study 37.93 ±2.50 weeks. The mean birth weight of the baby was 2.6±0.04 kg. Average DDI in our study group was 79.52±112.37 minutes. The average DDI in category 1 (n=47) LSCS was 48.08±81.12 minutes and for category 2(n=154) was 89.11 ±112.37 minutes.

The most common reason for delay in cesarean sections was delay in obtaining consent from the patient and relative (39.30%), followed by delay in getting the

blood reports from the laboratory (23.38%).

DDI by indications of emergency caesarean section

There were various indications of emergency cesarean sections, but the most common indication was previous cesarean with complications (n=50).

The shortest DDI in our study was for cesarean section done for patient in the second stage of labour (30.4±71.12 minutes) taken in Category 1. DDI for various indications for LSCS in shown in Table-1.

Table 1: Distribution of DDI and indications of emergency cesarean sections

Indications	n	Average DDI (min)
Previous LSCS with complications	50	112.74±100.61
Nonprogress of labor	43	72.93±112.64
Fetal distress	41	41.31±81.34
Hypertensive disorder of pregnancy with complication	25	91.6±98.18
Malpresentation in labor	17	59.82±99.86
Fetal growth restriction with doppler changes	8	87.37±112.47
Antepartum hemorrhage	6	57.50±84.38
Second stage arrest	5	30.4±71.12
Previous 2 LSCS	3	99.0±25.63
Others	3	72.33±158.17

The reason for delay was documented in each case, if the DDI was more than 30 minutes as shown in Table-2.

Table 2: Distribution of the Reasons for delay

Reason for delay	n	Percentage (%)
Delay in giving the consent by the patient/relative	79	39.30
Delay in getting the blood reports	47	23.38
Arranging for blood and blood products	19	9.45
Availability of OT/ anaesthetist	23	11.44
Delay in giving anaesthesia	12	5.97
Delay in delivery due to adhesions	9	4.47
No delay	12	5.97

Maternal morbidities like requirement of blood transfusion, postoperative fever, stitch line infections were studied but these were not correlated with DDI.

We compared the different DDI with APGAR score less than 7 at 1 minute (Table 3.1) and 5 minutes (Table 3.2), for both category 1 and category 2 LSCS, however it was not statistically significant. 13 babies required NICU care and there was one neonatal death.

Table 3.1: DDI and Apgar score at 1 minute and 5 minutes in category 1 Caesarean section

DDI (Min)	Apgar at 1 min		Chi Sq	P value
	<7	>=7	1.0456	0.5929
<30	1	6		
30-75	2	34		
>=75	0	4		
DDI (Min)	**Apgar at 5 mins**		**Chi Sq**	**P value**

	<7	>=7	0.3122	0.8555
<30	0	7		
30-75	1	35		
>75	0	4		

Table 3.2: DDI and Apgar score at 1 minute and 5 minutes in category 2 Caesarean section

DDI (Min)	**Apgar at 1 min**		**Chi Sq**	**P value**
	<7	>=7	0.31231	0.8554
<30	1	11		
30-75	4	77		
>75	4	57		
DDI (Min)	**Apgar at 5 mins**		**Chi Sq**	**P value**
	<7	>=7	0.93316	0.6271
<30	0	12		
30-75	3	78		
>75	1	60		

Discussion

In our study the mean decision to delivery interval was 79.52±112.37 minutes amongst the emergency cesarean sections, which was more than the recommended DDI.

For category 1, DDI was 48.08±81.12 minutes and for category 2, DDI was 89.11±112.37 minutes which is more than the recommended 30 minutes and 75 minutes, respectively. Correlation of DDI with Apgar score at 1 minute and 5 minutes for both category 1 and category 2 were done, however it was not statistically significant. Although the DDI did not meet the requisite recommendations, it did not have a significant effect on the perinatal outcome.

The studies conducted in developing countries have a longer DDI as compared to studies in developed nations.[3] This may be due to lack of resources both physical and manpower. In our study also there was more delay in shifting the patient to operation theatre (OT) after decision, than any other. The most common reason for this was, delay in giving consent for cesarean section by the patient and relative (39.30%). As our institute is a tertiary care centre, most patients are unregistered, referred from the peripheral hospitals who need basic investigations like blood grouping, cross matching and hemogram, before surgery, which was another reason for delay (23.38%).

There are many studies evaluating the DDI, which was approximately 60 to 70 minutes and most of them do not report high incidence of neonatal morbidity. [4,5,6]

The indication of an emergency LSCS is the most important deciding factor in determining the DDI. In our study, the shortest DDI was 30.4±71.12 minutes for cesarean done for second stage arrest. Other studies have shown shortest DDI in Scase of LSCS done for fetal distress.[6]

To meet the 30 minutes guideline, various methods have been proposed. Helmy et al did an audit and proposed structured time sheet to meet the 30 minutes target.[7] Amankwah et al suggested calling a Code which could also achieve the recommended DDI especially in cases of a crash cesarean sections. [8,9]

Most of the studies found that it is difficult to meet the 30 minutes criteria for emergency cesarean sections.[10] No adverse neonatal outcome has been

reported by cesarean done beyond 30 minutes in many studies. [11,12] However, some studies from the European countries have reported poorer outcome of babies delivered after 75 minutes.[9]

There are many factors which influence the neonatal outcome in case of emergency cesarean sections and DDI is simply one aspect of this. This difference in neonatal outcome cannot entirely be attributed to DDI. There may be medico-legal implications based on prolonged DDI which may not be justified. The limitation of this study is that we did not study other factors which may affect the perinatal outcome.

Conclusions

Decision to delivery interval in emergency LSCS did not affect the neonatal outcome in our study. However, a guideline of 30 to 75 minutes time limit may result in litigations on the grounds of DDI, which is not justified. Better communication with the attendants and the team will also help in avoiding unnecessary delays in case of emergency.

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