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Original Research Article

Evaluation of Factors Responsible For Delayed Baby Delivery in Caesarean Sections in a Tertiary Care Institute: A Cross-Sectional Observational Study

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Abstract

Background: There are several incidences where baby delivery seems to be difficult to the obstetrician who is then forced to change the technique, size or shape of the incision which increase the uterine incision to baby delivery interval. The objective of present study was to assess the incidence, common causes and neonatal outcome in caesarean section with a delayed baby delivery, also to study the ancillary methods adopted for baby delivery in difficult caesarean sections.
Methods: This was a cross-sectional observational study which was conducted in the Department of Obstetrics & Gynaecology at LTMMC & GH, Mumbai which is a tertiary care institute. Data of 150 caesarean sections was collected and analyzed for uterine incision to delivery interval along with the causes of delayed baby delivery and foetal outcomes.
Results: Total 150 caesarean sections had U-D interval more than 120 seconds with an incidence of 3.08%. The floating head and baby weight more than 2.5 kg and lack of surgical experience were found to increase U-D interval more than 120 seconds. 93.3% of the study group had head station at or above zero. 83% of the cases were operated by junior residents.64.7% of the cases had baby weight more than 2.5 kg. Patwardhan was used as ancillary method in 1.3% of the cases. APGAR at 5 minutes was more than 7 in 65.1% of the cases.
Conclusion: Delay in baby delivery can be avoided by training the resident doctors in a better way. A senior resident can take up the caesarean section if delay is anticipated in a case of foetal compromise, where baby might be affected if there is any further dely. However, since the study does not show any effect on APGAR at 5 minutes, we can conclude that surgeons have greater margin of safety and need not hurry just to deliver the baby faster.
Keywords: Caesarean Section, U-D Interval, APGAR score, Ancillary methods, Acidotic infant.

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1. Introduction

Caesarean section, defines the birth of a foetus via laparotomy and then hysterotomy [1]. Consistent increase has been observed in the rate of caesarean section deliveries in most of the developed countries and in many developing countries including India over the last few decades [2]. There are several incidences where baby delivery seems to be difficult to the obstetrician who is then forced to change the technique, size or shape of the incision which increase the uterine incision to baby delivery interval. A uterine incision to baby delivery interval of more than 2 minutes has been associated with a significantly higher rate of low APGAR score and increasingly acidotic infant [3,4]. For the outwardly routine case involving a foetus in a cephalic presentation, although the usual method of cranial delivery at a caesarean is simple manual extraction, this procedure is not always easy. A narrow lower uterine segment, a deeply engaged and molded head, or some unusual combination of factors can lead to difficulty in extracting the presenting part. There are several alternatives if the usual efforts at manual removal fail or prove difficult. There is difficulty in delivery of the fetal head, when it is usually deeply engaged

and molded into the birth canal, the original incision is too small or the head is in an occiput posterior position [5].

A prolonged U-D interval is often a result of difficult caesarean sections. Sometimes the incision might have to be extended to an inverted T or a J incision when the myometrial incision is inadequate. There might be difficulty in differentiating between oedematous lower segment, the cervix and the surrounding tissues. Similarly, a high free floating head poses difficulty in delivery and a podalic version by finding the anterior ankle might be required. A uterine fibroid or leiomyoma may present with a difficult baby delivery and there might be a need for a midline incision instead of a Pfannenstiel incision if the fibroid is large or multiple.

These are some instances where the surgeon is forced to adopt different techniques. There are other cases with obesity, preterm labour, caesarean with a previous caesarean section, shoulder dystocia, placenta praevia, twin gestation, foetal macrosomia, caesarean done in 2nd stage of labour, breech presentation, transverse lie ,deep transverse arrest and even skills and experience of the surgeon which present with difficulties in delivering the baby and increase the uterine incision to delivery time. Uteroplacental blood flow is decreased due to sympathetic block, and as the incision to delivery interval is prolonged, this further jeopardizes the placental blood flow leading to poor neonatal outcome [6]. This would be of special concern in situations where compromised foetal perfusion already exists. Through in this study, we try to understand the factors which are responsible for a difficult baby delivery and hence prolong the uterine incision to baby delivery time and the effects on APGAR at 5 minutes.

2. Materials and Methods

This was a cross-sectional observational study, conducted in the Department of Obstetrics and Gynaecology at a Tertiary Care Institute for a period of 18 months. Ethical clearance for this study was obtained from the hospital's ethics committee. All cases whether booked or unbooked and with U-D interval more than 120 seconds were included in the study. Total 150 patients fulfilling the inclusion criteria were studied. Time interval between uterine incisions to baby delivery (U-D interval) was noted with the help of a stop watch. All patients with U-D interval less than 120 seconds were excluded from the study.

Baseline maternal parameters like age, gestational age, BMI, parity, previous abdominal surgeries and previous caesarean sections were noted. Surgical parameters studied were previous scar on the skin, previous uterine incision, indication of caesarean section, type of incision, anaesthesia, surgeon designation, uterine anomalies, ancillary methods for baby delivery, extensions on the uterus, injury to bowel/bladder and U-D interval. Foetal parameters studied were station, AFI, placental location, presentation, gender, baby weight, injuries to the baby and APGAR at 5 minutes.

The data was entered in Microsoft Excel 2007 and was analysed using SPSS version 20.0. The qualitative data was represented as frequency and percentage, and quantitative data was analysed by mean and standard deviation.

3. Results and Observations

There were 4897 Caesarean sections during the 18 months study period, out of which, 150 cases had uterine incision to delivery interval more than 120 seconds. Hence, the incidence of prolonged U-D interval at our institute was found to be 3.06%.Most of the patients (47.3%) with prolonged U-D interval were in the age group 23-27 years. The mean age was 25.3 years, (Table 1).

Table 1: Distribution of cases as per age group

Age group	No.	Percent	Median
18-22 years	40	26.7	25.3 years
23-27 years	71	47.3	
28-32 years	38	25.3	
>32 years	1	0.7	
Total	150	100.0	

82% of the patients with prolonged U-D interval i.e. more than 120 seconds had normal BMI, (Table 2). The average BMI was 22.7 which can be explained as the study was conducted in a centre serving majority of the lower socio economic group of population.

Table 2: Distribution of cases as per BMI

BMI group	No.	Percent
Normal	124	82.7
Obese	6	4.0
Overweight	17	11.3
Undernourished	3	2.0
Total	150	100.0

Most of the patients (57.3%) with U-D interval greater than 120 seconds were primi gravidas as shown in table 3.

Table3: Distribution of cases as per duration of gestation

Parity group	Frequency	Percent
0	86	57.3
1	52	34.7
2	12	8.0
Total	150	100.0

Most of the patients (86%) with prolonged U-D interval had gestational age more than 37 weeks, (Table 4).

Table 4: Distribution of cases with prolonged U-D interval as per gestational age

Gestation age	No.	Percent
<34 weeks	10	6.7
>37 weeks	129	86.0
34-37 weeks	11	7.3
Total	150	100.0

Most of the patients (92.7%) had no previous abdominal surgeries whereas 7.3% of the patients with U-D interval more than 120 seconds had previous abdominal surgeries. Out of 150 patients with prolonged U-D interval, 16.0 % had one, and 2.7 % had two caesarean sections previously. Maximum number i.e. .81.3% had no prior caesarean section. Out of all the patients with U-D interval more than 120 seconds, 93.3% had foetal head station at or above zero, which shows prolonged U-D interval in cases with floating head whereas 6.7% had foetal head station more than zero. In our study, labour dystocia/CPD and foetal compromise together comprise of 60% of cases of prolonged U-D interval, (Table 5).

Table 5: Distribution of the study group in relation to indication of caesarean section

Indication group	No.	Percent
APH/Preeclampsia	14	9.3
Dystocia/CPD	43	28.7
Fetal Compromise	47	31.3
Malpresentation	24	16.0
Previous LSCS	22	14.7
Total	150	100.0

82 % of the caesarean sections with U-D interval more than 120 seconds were done by junior residents which show lack of surgical skills as a factor for prolonged U-D interval, (Table 6).

Table 6: Distribution of study group according to the surgeon's designation

Surgeon Designation	Frequency	Percent
JR1 andJR2	85	56.7
JR3	38	25.3
SMO AND AP	27	18.0
Total	150	100.0

80% of the patients with prolonged U-D interval had AFI in the range of 5-18, 18.6% had AFI less than 5 and 1.3% had AFI more than 18.In current study, 64.7% of the cases with U-D interval more than 120 seconds had baby weight more than 2.5 kg which suggests greater baby weight as a factor for prolonged U-D interval, (Table 7).

Table 7: Distribution of study group as per the baby weight

Baby Weight Group	Frequency	Percent
<2.5 Kg	53	35.3
2.5 -3.49 Kg	84	56.0
3.5 KG and More	13	8.7
Total	150	100.0

Above data shows that 86% of the cases with prolonged U-D interval, had foetus in cephalic presentation and 13.9 were in presentations other than cephalic, (Table 8). Patwardhan method for baby delivery was used in 1.3% of cases with prolonged U-D interval.6% of the cases in the study group had either J or T shaped extensions of the uterine incision whereas majority (94%) did not have any extensions. Skin laceration was the only type of injury in the baby during baby delivery and was found in 1.3% of cases with prolonged U-D interval. Majority of the cases (92.7%) of the cases in the study group had a U-D interval of less than or equal to 150 seconds whereas7.3% had a U-D interval of more than 150 secs.

Table 8: Distribution of study group according to the foetal presentation

Presentation	Frequency	Percent
Cephalic	129	86.0
Breech	11	7.30
Face	2	1.30
Footling	2	1.30
Shoulder	6	4.00
Total	150	100.0

65.1 % of the babies had APGAR value at 5 minutes more than 7, which depicts that neonatal outcome, is not affected by the U-D interval, Table 9.

Table 9: Distribution of study group in relation to the APGAR at 5 minutes

APGAR (5 Min)	Frequency	Percent
7 And Less	52	34.9
More Than 7	97	65.1
Not Applicable	1	0.7
Total	150	100.0

4. Discussion

Caesarean delivery is the most commonly performed surgical procedure in obstetrics. Several factors can impact surgical time. Factors leading to prolonged incision-to-delivery time may influence neonatal outcomes after caesarean delivery and should be taken into account when choosing the level of care. The aim of this study was to find the factors responsible for prolongation of uterine incision to delivery interval (U-D interval) and its effect on APGAR at 5 minutes. A total number of 150 women between the age groups of 18- 35 years who underwent caesarean section and had a prolonged uterine incision to delivery interval i.e.; > 120 seconds were studied.

Majority of the patients undergoing caesarean section at our institute had normal BMI. Few studies have investigated the influence of obesity on delivery times. Rouw *et al* [7] found that obesity is a factor which prolongs the skin incision to delivery time. Girsen *et al* [8] found that increasing BMI is related to increased incision-to-delivery interval. However, all the above stated studies include the skin incision to delivery interval, while the present study calculates the U-D interval which is not found to be affected by BMI.86% of the patients had gestational age more than 37 weeks. Hogberg *et al* [9] in their study on all women with gestational age <28 weeks undergoing caesarean sections at Umea University Hospital in 1997-2003 found that 33.3% of preterm caesarean sections were difficult. However, lesser gestational age was not found to be a significant factor for prolonged U-D interval in the present study.

81.3% of cases had no previous caesarean sections. Gasim *et al* [10] found increase in operative times in patients with previous caesarean deliveries, but no effect on neonatal morbidity was found. Khashoggial [11] also concluded that there was longer operating time in repeat caesarean sections with no effect on APGAR.93% of the patients with prolonged U-D interval, had head station at or above zero. Cebekulu *et al* [12] concluded that incision to delivery time was more in caesarean sections in 2nd stage of labour. Levy *et al* [13] compared the push and the pull method of foetal extraction in impacted foetal head and found that the pull method had lesser incidents of extensions of uterine incision than the push method. Chopra *et al* [14] also got similar results. Khosla *et al* [15] found the Patwardhan technique as a faster and safer method of extraction of wedged head in caesarean section. Veisi *et al* [16] also found that pull technique of foetal extraction decreases mean operative time.

Out of all the indications studied, labour dystocia, foetal compromise and lack of surgical experience were together found to prolong U-D interval in 60% of cases in the present study.16.7% of the patients had previous caesarean sections with previous Pfannenstiel scar. Puttanavijarn *et al* [17] conducted a study to evaluate operative complications, operative time, postpartum complications and neonatal outcome in repeat caesarean section between previous low midline and previous Pfannenstiel caesarean section at King Chulalongkorn Memorial Hospital on 320 pregnant women and they concluded that U- D interval and neonatal outcome were comparable between low midline and Pfannenstiel groups in repeated cesarean sections irrespective of the previous technique used.

Pfannenstiel incision was used in 98.7 % of the patients with previous caesarean section with prolonged U-D interval. Wylie *et al* [18] found that vertical skin incisions were associated with lesser operating time but no improvement in the neonatal outcome was seen. Hofmeyr *et al* [19] concluded that Joel – Cohen based caesarean had lesser operating time as compared to Pfannanstiel based sections. Also, Misgav- Ladach technique was faster as compared to the traditional method. Massimo Franchi *et al* [20] also observed that foetal extraction time was lesser in Joel -Cohen type of incision.

Type of uterine incision, i.e.; low transverse and low vertical and its effect on U-D interval, however no correlation was found. Luthra *et al* [21] also found no difference in Uterine Incision-to-Delivery interval between vertical and transverse incision.91.3% with prolonged U-D interval were given spinal anaesthesia. S. Ismail *et al* [22] found no difference between operating times of spinal or general anaesthesia. Rouw *et al* [7] found no difference in the intraoperative difficulties encountered and operating times with difference in surgical experience. In the present study, however, majority of the caesarean sections with prolonged U-D interval, were done by junior residents in 1st, 2nd year and 3rd year. The birth weight greater than 2.5 kg was found to prolong U-D interval to a greater extent in majority of the (64.7%) cases. Similarly, Maayen-Metzer *et al* [3] concluded that higher birth weight prolonged U-D interval more than 2 minutes, but did not affect the neonatal outcome.

An ancillary method like Patwardhan technique for deeply impacted head has been used to decrease the incision to delivery time. Khosla *et al* [15] concluded that no extension of the incision either laterally into broad ligament or upwards or downwards was noted when Patwardhan technique was used. Relationship between uterine incision to delivery interval and neonatal outcome was studied using APGAR at 5 minutes and U-D INTERVAL was not found to affect this neonatal outcome which is similar to the previous studies [21-24]. On the other hand, Danforth *et al* [25] found that Apgar scores are lower if the time from uterine incision to delivery is longer than three minutes. Abdissa *et al* [26] also concluded that prolonged U-D interval was associated with low APGAR score. Mohammad *et al* [27] concluded that uterine – delivery interval (>120 sec) had low and low to moderate Apgar scores. Similarly, Danylyshyn -Adams *et al* [28] found that longer uterine incision-to-delivery times were associated with major neonatal morbidity.

5. Conclusion

Incidence of prolonged U-D interval in present study was found to be 3.06%.Although there are many factors which might prolong uterine incision to baby delivery interval in caesarean sections such as floating head, lack of surgical experience and baby weight were found to increase U-D interval more than 120 seconds. It was also found that prolonged U-D interval does not affect APGAR at 5 minutes.

Delay in baby delivery can be avoided by training the resident doctors in a better way. A senior resident can take up the caesarean section if delay is anticipated in a case of foetal compromise, where baby might be affected if there is any further dely. However, since the study does not show any effect on APGAR at 5 minutes, we can conclude that surgeons have greater margin of safety and need not hurry just to deliver the baby faster.

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