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Original Research Article

Evaluation of Fetomaternal Outcome in Caesarean Section Done in Second Stage in Primi Gravida versus Multi Gravida: A Comparative Study

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Conflict of interest: Nil

Abstract:

Objectives: To evaluate maternal and neonatal complications in Primigravida and Multigravida who had undergone caesarean section in the second stage of labor.

Materials and Methods: Time bound prospective observational hospital study undertaken from September 2021 to August 2022 at Gauhati Medical College & Hospital. Singleton pregnancy irrespective of parity with period of gestation ≥37 weeks, which had undergone LSCS in the second stage of labor, was recruited in the study. Complete obstetrical investigations with maternal and neonatal outcome were documented.

Results: During this 1 year study period, there were 15859 deliveries, a total of 7830(49.3%) were born by LSCS. Out of all LSCS cases, 123(1.57%) were performed in the second stage of labor. CPD was the most common indication which was high in primigravida (63.1%). Intra-operative maternal complications-uterine incision extension (48.3%), bladder injury (5.2%), uterine atony (41.4%) and PPH (72.4%), the need for blood transfusion (41.4%), intra-operative rupture(3.4%), the requirement of hysterectomy (1.7%), the mean duration of surgery(58.12 mins)-all were high in multigravida. Post-operative complications-wound infection(21.5%)-high in primigravida, postpartum pyrexia(5.2%), puerperal sepsis(8.6%), the mean duration of hospital stay (9.29days)- all were high in multigravida. Fetal complications- APGAR scores <5 at 5mins- (56.9%), the mean duration of NICU admission(5.6 days), the percentage of NICU admission(63.8%), fetal injuries(1.7%), need for resuscitation of babies(77.6%), fetal death((3.4%)- all were high in multigravida.

Conclusion: Caesarean sections done at full cervical dilatation with impacted fetal head are difficult and associated with increased incidence of maternal and fetal complications. The prompt decision for caesarean section should be taken especially when risk factors for failure to progress are present. Second stage CS can be avoided by improvement of antenatal care, pelvic assessment in early labor, by use of partogram for monitoring of labor and timely intervention, rational use of oxytocin, proper and selective instrumental delivery, and lastly but most importantly the presence of senior and expert obstetricians in decision-making.

Keywords: Feto-maternal outcome, Caesarean section in second stage of labor.

Introduction

The second stage of labor is a period from full cervical dilatation till the delivery of the fetus. The incidence of second-stage caesarean sections has increased remarkably over recent years. [1] The incidence has increased from 0.9- 2.2%. [2] In developing countries, tertiary healthcare centers have to deal with a large number of second-stage caesarean sections especially the cases referred from primary and secondary health centers due to delays in referrals from sub-centers, where redundant attempts have already been made for vaginal delivery by traditional birth attendants and poor implementation of available health services. In our countries, second-stage caesarean sections account for one-fourth of all primary caesarean sections. [3]

The reports from the Royal College of Obstetricians and Gynaecologists (RCOG) have identified that overall 6% of caesarean sections are being performed due to poor supervision provided by the junior staff or due to some lack of training, especially in the decision-making time of this crucial second stage. It appears that in fact, the absence of expertise in terms of some complications which are related to vaginal delivery along with some complications which are correlated to that disputatious issues result in the neonatal and maternal morbidity. [4-7]

The Caesarean section at full dilatation is scientifically a more challenging procedure than the Caesarean Section in early labor. [8] As it is associated with a deeply engaged fetal head, reduced liquor, and thinned-out lower uterine segment, which can lead to an increased risk of maternal complications such as the tearing of the lower uterine segment, uterine incision extension, bladder injury , postpartum pyrexia, prolonged catheterization and hospitalization. [4-7] Delivery of the impacted head at full cervical dilatation poses a technical challenge to the operating surgeon in terms of disengagement of the deeply engaged head by hand due to a lack of space between the muscular and bony maternal pelvis and the impacted fetal head which can be further compounded by the presence of moulding and caput succedaneum. [9] The most dreadful long-term complication is obstetrical urinary fistula which results from pressure necrosis due to prolonged labor caused by the impaction of the presenting part against pubic symphysis. [10,11] Neonatal morbidities associated with the second stage caesarean section are birth asphyxia, neonatal intensive care unit (NICU) admission, fetal birth injuries, hypoxic-ischemic encephalopathy, and even neonatal death. [12] Decision-making for Caesarean Section in the second stage of labor is one of the greatest challenges in current obstetric practice. The involvement of skilled obstetrician in the management of second-stage Caesarean Section aids in minimizing morbidity and mortality. Our Institution is an Apex Institution with a delivery load of more than 15000 per year with high incidence of CS where this study was being done to observe maternal and fetal complications among women undergoing caesarean section during the second stage of labor.

Aims and Objectives:

1. To evaluate maternal complications in Primigravida who had caesarean section in the second stage of labor.
2. To evaluate maternal complications in Multigravida who had caesarean section in the second stage of labor.
3. To find out neonatal complications in Primigravida and Multigravida who had undergone caesarean section in the second stage of labor.

Materials and Methods

This time-bound prospective observational hospital study was carried out in the Department of Obstetrics and Gynaecology, Gauhati Medical College and Hospital during the period from September 2021 to August 2022. The study was conducted among all patients admitted in the Department of Obstetrics and Gynaecology, GMCH who had undergone caesarean section in the second stage.

Inclusion criteria:

1. Singleton pregnancy irrespective of parity undergoing LSCS in the second stage of labor.
2. Period of gestation ≥37 weeks.

Exclusion criteria:

1. Pregnancies with major fetal abnormalities.
2. Intra-uterine fetal death.
3. Multi-fetal pregnancies.
4. Ruptured uterus already diagnosed.
5. Period of gestation <37 weeks
6. Elective LSCS. 7. LSCS in the first stage of labor.

Steps:

1. Data was collected and recorded in a preformed proforma among the in patients fulfilling the inclusion criteria in the Department of Obstetrics and Gynaecology, GMCH.

2. Investigations done were:

Hb%, Platelet, TLC, DLC, RBS, Serum Creatinine, TSH, HIV, HBsAg, Anti-HCV, VDRL, CRP, S. electrolytes etc

Ethical issue: Before conducting this study, a synopsis was submitted to the Institutional Ethical Committee of Gauhati Medical College and Hospital and clearance was obtained for the same. Written informed consent has been obtained from the subjects after a full explanation of the requirements of the study.

The maternal demographic proforma included:

1. Age
2. Parity
3. Gestational age
4. Indication for second stage LSCS

The maternal composite outcome in our study included one or more of the following complications for second-stage caesarean sections:

Intra-operative complications:

1. Uterine artery injury
2. Extension of uterine incision
3. Broad ligament hematoma
4. Bladder injury
5. Cervical laceration
6. Requirement of hysterectomy
7. Uterine atony
8. Postpartum Haemorrhage
9. Need for blood transfusion
10. Duration of surgery
11. Other genital tract trauma
12. Injury to surrounding structures

Post-operative complications:

1. Wound infection
2. Postpartum Pyrexia
3. Duration of hospital stay
4. Puerperal sepsis and
5. Urinary fistula
6. Maternal death

Neonatal outcome indicators

1. APGAR score of newborns at 5mins, respiratory distress
2. Admission and duration of stay in NICU
3. Fetal injuries
4. Resuscitation (Bag and mask ventilation, Intubation)
5. Death

Results from an analysis:

- All data were analyzed using Microsoft Excel, Graph Pad Prism and IBM SPSS V21.
- Tables, pie-charts and bar diagrams were used to show descriptive statistics.
- Chi-square and Fisher's exact test were used to evaluate the association between categorical variables.
- Data were checked for normality using Kolmogorov-Smirnova and ShapiroWilk test.
- An Independent T-test was used to compare the mean difference between the two independent groups on fulfilment of normality assumption for continuous variables.
- All data were analyzed using SPSS version 21.
- A p-value <0.05 is considered statistically significant at a 5% level of significance.

Results: During this 1 year of the study period, there were 15859 deliveries, a total of 7830 (49.3%) were born by lower segment caesarean section (LSCS). Out of all LSCS cases, 123(1.57%) were performed in the second stage of labor. The results of this study have been elaborated along with the tables and relevant figures in the following manner.

Table 1: Showing Maternal Demographic Details

Variables		Primi	Multi	Total	P value
Age distribution	19-23years	46(70.8%)	7(12.1%)	53(43.1%)	<0.001
	24-28years	15(23.1%)	28(48.3%)	43(35%)	
	29-33years	3(4.6%)	18(31%)	21(17.1%)	
	34-38years	1(1.5%)	5(8.6%)	6(4.9%)	
	Total	65(100%)	58(100%)	123(100%)	
Parity Distribution	Primigravida	Number	Percentage		
		65	52.8%		
	Multigravida	58	47.2%		
	Total	123	100%		
Gestational Age		Primi	Multi	Total	0.021
	<=37	1(1.5)	4(6.9)	5(4.1)	
	38-39	17(26.2)	29(50)	46(37.4)	
	39-40	23(35.4)	9(15.5)	32(26)	
	40-41	12(18.5)	10(17.2)	22(17.9)	
	41-42	6(9.2)	2(3.4)	8(6.5)	
	>=42	6(9.2)	4(6.9)	10(8.1)	
	Total	65(100)	58(100)	123(100)	

The incidence of caesarean section in the second stage of labor was higher in primigravida (52.8%) (n=65) than in multigravida (47.2%) (n=58). In this study, the percentage of caesarean sections occurring in the second stage of labor was highest in the age group between 19-23years i.e. 43.1% (n=53), out of which, 70.8% (n=46) of cases were primigravida and 12.1% (n=7)of cases were multigravida. On advancing age, the incidence increased in multigravida. The age distribution in both groups was considered statistically significant (p<0.001). In this study, the percentage of second-stage caesarean section was highest in the age group of 38-39 weeks (37.4%) (n=46), out of which, it was more in multigravida (50%) (n=29). In primigravida, the incidence was highest between 39-40 weeks (35.4%) (n=23) which was statistically significant. (p=0.021).

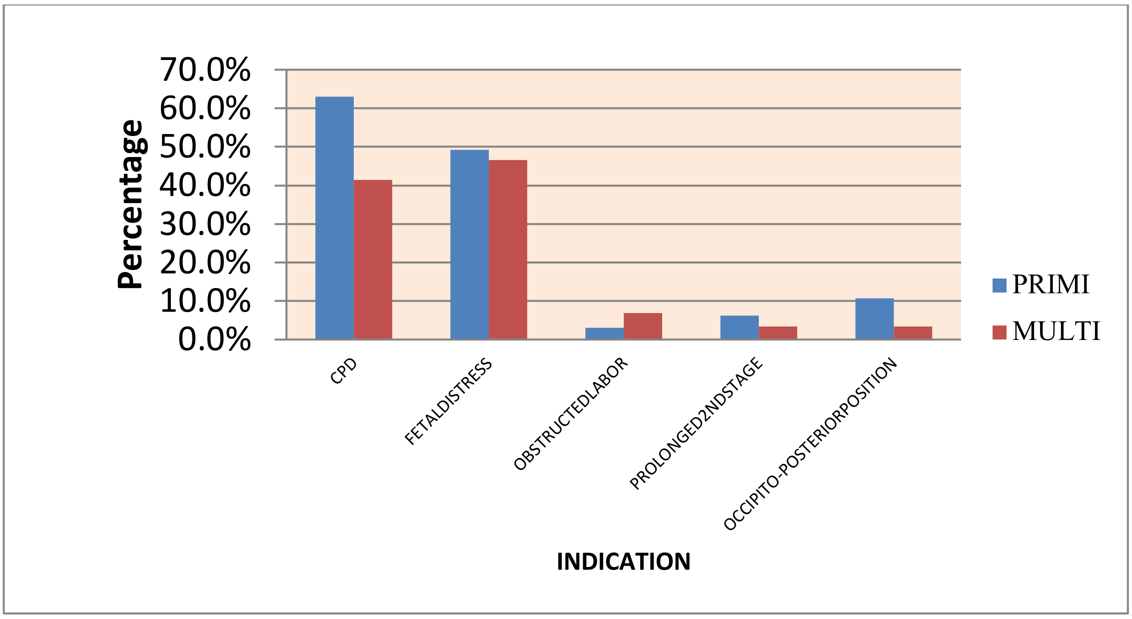

Figure 1: Showing the percentage of Indications of Caesarean Section in the second stage of labor in both groups

CPD was the most common indication of caesarean section in second stage of labor in primigravida (63.1%) (n=41), followed by fetal distress with failed instrumentation (49.2%) (n=32), occipito-posterior position (10.8%) (n=7), prolonged second stage (6.2%) (n=4), obstructed labor (3.1%) (n=2). Whereas fetal distress with failed instrumentation was the most common indication in multigravida (46.6%) (n=27) followed by CPD (41.4%) (n=24), obstructed labor (6.9%) (n=4), prolonged second stage and occipito-posterior position (3.4%) (n=2).

Table 2: Showing Percentage of intra-operative complications during caesarean section in second stage of labor

Extension of uterine incision	**Primi**	**Multi**	**Total**	**p value**
NO	55(84.6%)	30(51.7%)	84(68.3%)	<0.001
YES	10(15.4%)	28(48.3%)	38(30.9%)	
Total	65(100%)	58(100%)	123(100%)	
Uterine atony				
NO	58(89.2%)	34(58.6%)	92(74.8%)	
Yes	7(10.8%)	24(41.4%)	31(25.2%)	
Total	65(100%)	58(100%)	123(100%)	
Post-partum haemorrhage				
NO	52(80%)	16(27.6%)	68(55.3%)	
YES	13(20%)	42(72.4%)	55(44.7%)	
Total	65(100%)	58(100%)	123(100%)	
Need for blood transfusion				
NO	60(92.3%)	34(58.6%)	94(76.4%)	
YES	5(7.7%)	24(41.4%)	29(23.6%)	
TOTAL	65(100%)	58(100%)	123(100%)	

The percentage of extension of uterine incision following caesarean section in the second stage of labor was slightly higher in multigravida (48.3%) than in primigravida (15.4%) which was statistically significant. (p<0.001) The percentage of uterine atony during caesarean section in the second stage of labor was 25.2%. Out of which, atony occurred in 10.8% (n=7) of primigravida cases and 41.4% (n=24) of multigravida cases. (p<0.001) The percentage of postpartum haemorrhage during caesarean section in the second stage of labor occurred in 44.7% of cases. PPH occurred in 20% (n=13) cases of primigravida and 72.4% (n=42) cases of multigravida. (p<0.001) The percentage of need for blood transfusion following caesarean section in the second stage of labor was 23.6% (n=29). Out of which, 7.7% (n=5) of cases of primigravida and 41.4% (n=24) of cases of multigravida needed blood transfusion which was highly significant. (p<0.001)

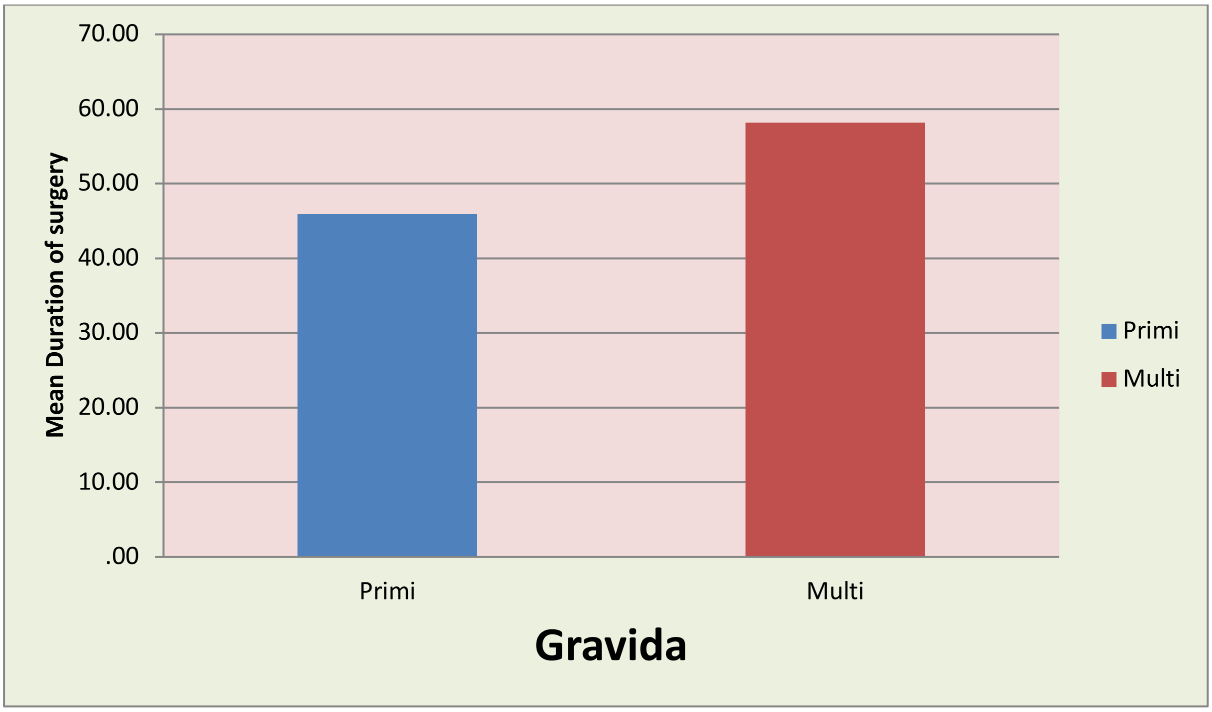

Figure 2: Showing the Mean duration of Surgery in both groups

The mean duration of surgery was higher in multigravida (58.12 mins) than in primigravida (45.94 mins) which shows a p-value of <0.001 which was statistically significant. The percentage of bladder injury (2.4%), broad ligament hematoma (3.3%), intra-operative rupture (1.6%) and the percentage of the requirement of hysterectomy (0.8%) following caesarean section in the second stage of labor was all higher in multigravida than in primigravida which was not statistically significant.

Table 3: Showing percentage of post-operative complications during caesarean section in second stage of labor

Wound infection	Primi	Multi	Total	p value
NO	51(78.5%)	46(79.3%)	96(78%)	0.7597
YES	14(21.5%)	11(19%)	25(20.3%)	
Total	65(100%)	58(100%)	123(100%)	
Puerperial sepsis				
NO	63(96.9%)	53(91.4%)	116(94.3%)	0.185
YES	2(3.1%)	5(8.6%)	7(5.7%)	
Total	65(100%)	58(100%)	123(100%)	
Post-partum pyrexia				
NO	63(96.9%)	55(94.8%)	118(95.9%)	0.557
YES	2(3.1%)	3(5.2%)	5(4.1%)	
Total	65(100%)	58(100%)	123(100%)	

The percentage of wound infection following caesarean section in the second stage of labor was non-significantly higher in primigravida (21.5%) than in multigravida (19%). (p=0.7597). The percentage of puerperal sepsis was non-significantly higher in multigravida (8.6%) than in primigravida (3.1%). (p=0.185). The percentage of postpartum pyrexia following caesarean section in the second stage of labor was non-significantly higher in multigravida (5.2%) than in primigravida (3.1%). (p=0.557)

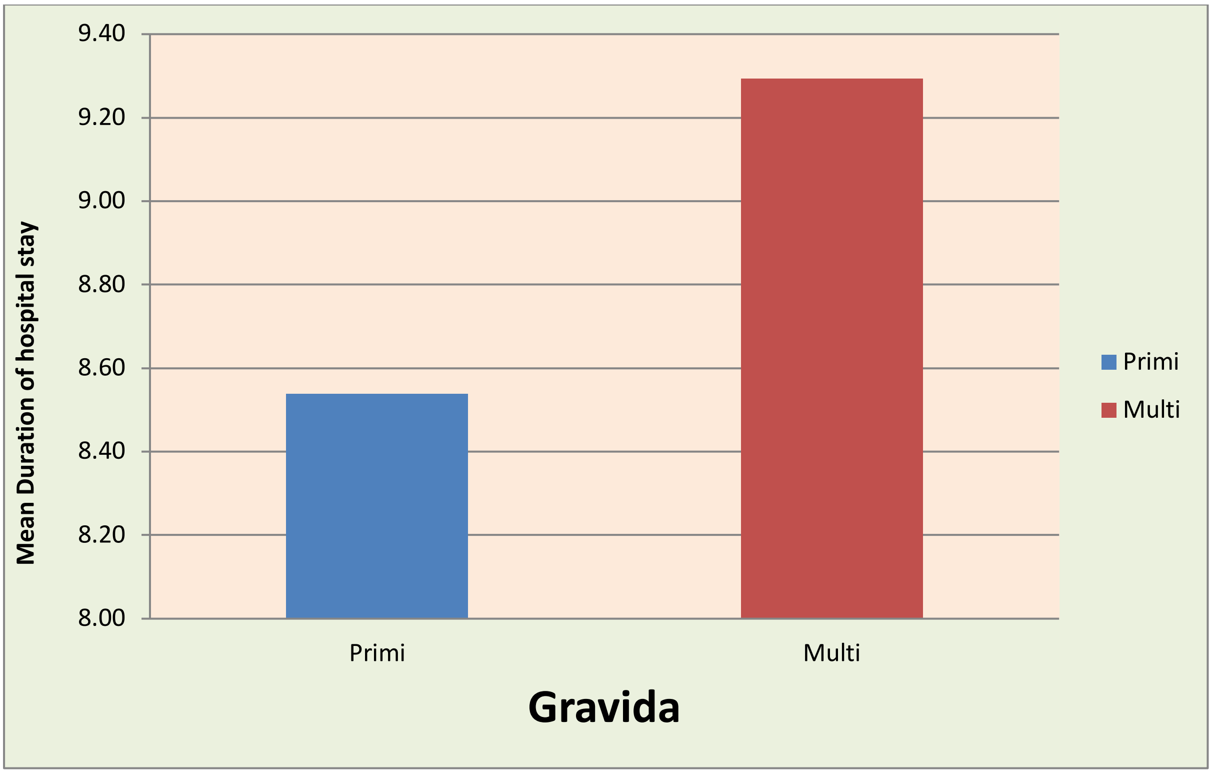

Figure 3: Showing the mean duration of hospital stay of patients in both groups

The mean duration of stay of patients in the hospital following caesarean section in the second stage of labor was non-significantly higher in multigravida (9.29 days) than in primigravida (8.54 days). (p=0.44).

Table 4: Showing percentage of Neonatal Complications during caesarean section in second stage of labor

APGAR score	Primi	Multi	Total	P value
<5	18(27.7%)	33(56.9%)	51(41.5%)	<0.001
>=5	47(72.3%)	25(43.1%)	72(58.5%)	
Total	65(100%)	58(100%)	123(100%)	
Admission and duration of stay in NICU				
NO	39(60%)	21(36.2%)	60(48.8%)	0.008
YES	26(40%)	37(63.8%)	63(51.2%)	
Total	65(100%)	58(100%)	123(100%)	
Resuscitation (BMV/ Intubation)				
NO	35(53.8%)	13(22.4%)	48(39%)	<0.001
YES	30(46.2%)	45(77.6%)	75(61%)	
Total	65(100%)	58(100%)	123(100%)	
Fetal Death				
NO	65(100%)	56(96.6%)	121(98.4%)	0.131
YES	0(0%)	2(3.4%)	2(1.6%)	
Total	65(100%)	58(100%)	123(100%)	

Percentage of APGAR scores <5 at 5mins was higher in multigravida (56.9%) than in primigravida (27.7%) while percentage of APGAR score>=5 at 5mins was higher in primigravida (72.3%) than in multigravida (43.1%) which was statistically significant. (p<0.001)

The percentage of admission of babies in NICU was higher in multigravida (63.8%) than in primigravida (40%) which was statistically significant. (p=0.008)

The percentage of need for resuscitation of babies was higher in multigravida (77.6%) than in primigravida (46.2%) which was statistically significant. (p<0.001)

The percentage of fetal death was not significantly higher in multigravida (3.4%) than in primigravida (0%). (p=0.131)

Discussions

Caesarean Section in the second stage of labor is a technically difficult operation with distortion of maternal pelvic anatomy and deeply impacted head in the maternal pelvis. The Present study was conducted among 123 patients (65: primigravida and 58: multigravida) pregnant women with a singleton pregnancy who had undergone caesarean section in the second stage of labor at Gauhati Medical College and Hospital, Guwahati, Assam from September 2021 to August 2022 with the objective to evaluate fetomaternal complications in primigravida and multigravida, who had undergone caesarean section in the second stage of labor. The inclusion criteria were pregnant women with a singleton pregnancy irrespective of parity undergoing LSCS in the second stage of labor with a period of gestation >= 37 weeks. An attempt has been made to compare our findings with other studies.

1. Incidence of Second Stage Caesarean Section:

The incidence of caesarean section done in the second stage of labor is 1.5% in our study. In our study, the incidence of second-stage caesarean sections is more seen in primigravida (52.8%)(n=65) than in multigravida (47.2%)(n=58) due to mild to moderate cephalopelvic disproportion, rigid perineum, lack of experience with previous labor in primigravida women. Similar incidence was found in a study by Dahiya P et al [13] where the majorities were primigravida (75.5%) and only few were multigravida (24.5%).

2. Indication of Second Stage Caesarean Section:

In our study, the most common indication of Caesarean section in the second stage of labor was CPD (63.1%) (n=41), followed by fetal distress (49.2%)(n=32) in primigravida while fetal distress(46.6%)(n=27) followed by CPD(41.4%) (n=24) in multigravida which was similar to the study conducted by Belay et al [14] where CPD was the most common indication (48.5%). Also, similar results were found in the study conducted by Khaniya B et al [15] (93%), Goswami KD et al [16] (38%), Dahiya P et al [13] (15.1%).

3. Intra-Operative Complications:

(A). Extension of Uterine Incision:

In our study, extension of the uterine incision during caesarean section in the second stage of labor was seen in 30.9% (n=38) of cases. Out of which, the percentage was higher in multigravida (48.3%) (n=28) than in primigravida (15.4%) (n=10). The p value was found to be (<0.001) making this study statistically significant. This intraoperative complication was slightly higher compared to other studies. Similar studies where uterine incision extension occurred are Khaniya B et al [15] (13.88%), Dahiya P et al [13] (16%), Baloch S et al [17] (5.4%), Goswami KD et al [16] (16%).

(b). UTERINE ATONY AND PPH

In our study, the percentage of uterine atony during caesarean section in the second stage of labor was 25.2% (n=31). Out of which, 10.8% (n=7) occurred in primigravida and 41.4% (n=24) occurred in multigravida. PPH was seen in all the cases of the atonic uterus, but not vice versa. In our study, the percentage of postpartum haemorrhage during caesarean section in the second stage of labor occurred in 44.7% (n=55) of cases. Out of which, 20% (n=13) occurred in primigravida and 72.4% (n=42) occurred in multigravida. Both were considered statistically significant as the p-value was <0.001. Development of uterine atony and requirement of compression of sutures for refractory PPH was found in this study and can be due to the longer duration of labor resulting in uterine inertia. Similar studies where atonic PPH was observed were Baloch S et al [17] (12.5%), Dahiya P et al [13] (9.4%), Goswami KD et al [16] (8%), Khaniya B et al [15] (5.54%).Compared to our study, these studies have less atonic PPH.

(C). Need For Blood Transfusion:

In our study, the percentage of need for blood transfusion following caesarean section in the second stage of labor was 23.6% (n=29) which was mainly due to postpartum haemorrhage. Out of which, 7.7% (n=5) of cases of primigravida and 41.4% (n=24) of multigravida needed blood transfusion which is considered statistically significant (p<0.001). Similar study was conducted by Babre et al [18] where the requirement for blood transfusion was 11.5%. The requirement for blood transfusion was higher in our studies.

4. Post-Operative Complications

(A). Wound Infection:

In our study, wound infection following caesarean section in the second stage of labor was seen in 21.5% (n=14) of cases of primigravida and 19% (n=11)of cases of multigravida which was higher in rate than the results studied by Goswami KD et al (16)(8%),Babre VM et al [18] (8.2%), Dahiya P et al [13] (8.7%).

(B). Postpartum Pyrexia:

In our study, the incidence of postpartum pyrexia following caesarean section in the second stage of labor was 3.1% (n=2) in primigravida and 5.2% (n=3) in multigravida which was less than the studies done by Goswami KD et al [16] (14%), Babre VM et al [14] (19.7%) and Dahiya P et al [13] (14.1%). In all these studies post-operative fever was higher than in our study.

5. Neonatal Complications

(a). APGAR SCORE AT 5 MINS:

In our study, the percentage of APGAR score<5 at 5mins was 27.7% (n=18) in primigravida and 56.9% (n=33) in multigravida. Whereas APGAR score >5 was 72.3% (n=47) in primigravida and 43.1% (n=25) in multigravida which is considered statistically significant (p<0.001). A similar study done by Khaniya B et al (15) showed the percentage of Apgar score<5 at 5 mins (13.88%).

(b). Admission of Babies in NICU:

In our study, the mean duration of admission of babies in NICU was 5.3days in primigravida and 5.6days in multigravida. The percentage of admission of babies in NICU was 51.2%, which is higher in multigravida (63.8%) than primigravida (40%) which is considered statistically significant (p=0.008). Similar studies conducted by Goswami KD et al [16] and Khaniya B et al [15] found (44%) and (5.55%) of babies respectively who required NICU admission.

(C). Need For Resuscitation:

In our study, the percentage of need for resuscitation of babies (birth asphyxia) is 46.2% (n=32) in primigravida and 77.6% (n=45) in multigravida which is statistically significant (p<0.001).The most common fetal complication in our study was meconium-stained amniotic fluid seen in 47% babies of primigravida, which is higher than the studies conducted by Khaniya B et al [15] (27.77%), Jayaram J et al [19] (30.75%) and Dahiya P et al [13] (14.1%).

(d). FETAL DEATH:

In our study 3.4% (n=2) of fetal deaths (stillbirths) had occurred in multigravida while no fetal deaths were reported in primigravida. A similar study done by Goswami KD et al [16] found fresh stillbirth of 10% and neonatal death (18%). Other similar studies were by Khaniya B et al [15] (2.77% still birth) and Dahiya P et al [13] (5.6% fresh stillbirth).

Conclusion

A Caesarean section at full cervical dilatation is associated with increased risk of adverse complications for both the mother and fetus. Intraoperative maternal complications include a greater risk of uterine artery injury, an extension of the uterine angle, bladder injury, broad ligament hematoma, injury to the surrounding structures, uterine atony, postpartum haemorrhage, need for blood transfusion and might end up in hysterectomy. Common post-operative complications include wound infection, postpartum pyrexia, puerperal sepsis and longer duration of hospital stay. Caesarean delivery performed during the second stage of labor increases the incidence of fetal respiratory distress, increase in admission of babies to the neonatal intensive care unit and fetal death due to impaction of the fetal head into the maternal pelvis and prolonged second-stage labor. Hence it is recommended that second stage caesarean should ideally be performed and supervised by a skilled obstetrician. The prompt decision for caesarean section should be taken especially when risk factors for failure to progress are present. Second stage CS can be avoided by improvement of antenatal care, pelvic assessment in early labor, by use of partogram for monitoring of labor and timely intervention, rational use of oxytocin, proper and selective instrumental delivery, and lastly but most importantly the presence of senior and expert obstetricians in decision-making.

The choice between a difficult caesarean section in the second stage of labor and instrumental delivery is a challenging one. Although second stage caesarean section is sometimes appropriate and indicated, many could be prevented by the presence of a more skilled obstetrician.

Better training in instrumental deliveries may reduce rates of second-stage caesarean sections, thereby reducing maternal complications without compromising fetal outcome. Alarming the neonatologist beforehand is recommended in all second-stage deliveries. Until a guideline and training programme is created, it is important that obstetric trainees have adequate supervised training opportunities to improve recognition of the necessity for CS at full dilatation, as well as competence and confidence in performing vaginal instrumental deliveries. Staff rotas need to allow quick access to senior clinicians at all CS deliveries in full dilatation.

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