RESEARCH ARTICLE

Retrospective Analysis of Second Stage of Cesarean Section and Pregnancy Outcomes: An Observational Study

Prachi Dahiya[1], Shubhra Agarwal[2], Rehana Najam[3]

Abstract

Background: A cesarean section (CS) at second stage occurs when mother requires delivery at full dilatation of cervix, which poses a risk to mother and the fetus. In the present obstetric practice, one of the huge challenges is to make a firm decision regarding CS during the second stage of labor periods. The present study was done for the retrospective analysis in regard to second stage in terms to the CS along with its association with the pregnancy outcomes.

Materials and methods: It was an observational and retrospective study that depended on some clinical records related to more than 37 weeks' gestation. The neonatal as well as maternal outcomes have been evaluated for CS among those who were observing the second stage in their labor period. Dichotomous variables were compared to that of the χ^2 test, and the Mann–Whitney *U* test was applied to analyze differences in continuous variables.

Results: The most common indications for the cesarean category was arrest in the second stage of their labor (56.1%), and the most common technique of delivery of engaged head was modified Patwardhan method (28.3%). The most common intraoperative complications reported was extension of uterine incision (16.0%), and postoperative complications were febrile illness (14.1%). The neonatal complications that required NICU admission were birth asphyxia (16%), meconium aspiration (14.1%), neonatal jaundice (4.7%), respiratory distress syndrome (11.3%), and fresh stillbirth (5.6%).

Conclusion: CS's that have been performed during the second stage of the labor period reflect to be a very undesirable phenomenon which is linked to the maternal as well as fetal complications.

Keywords: Cesarean section, Labor, Second stage.

Journal of South Asian Federation of Obstetrics and Gynaecology (2022): 10.5005/jp-journals-10006-1991

Introduction

The two obstetric procedures that are related to some huge advantages and complications for newborn babies and women are as follows:

- Cesarean section (CS)
- Assisted vaginal delivery (or AVD, i.e., vacuum extraction).

Any type of intervention which is performed at the second stage of the labor period in terms of the fetal and maternal indications ranges from that of a very long second stage followed by the fetal distress or some type of maternal medical issues or medical exhaustion.[1,2]

CS at second stage occurs when mother requires delivery at full dilatation of cervix, which poses a risk to mother and the fetus. The increasing trend of CS at the second stage is of major concern in modern obstetrics. Incidence of second-stage CS has increased from 0.9 to 2.2%.[3] The second stage of the CS has been identified to have a major concern because of its rise in trend across the developing rate of CS.[4,5]

The reports from Royal College of Obstetricians and Gynecologists (RCOG) has identified that on an average around 6% of the CS is carried out because of the poor supervision that is provided by the junior staff or due to some absence in the training especially in the decision-making time of this crucial second stage. In fact, the absence of the expertise in terms of some complications which are related to the vaginal delivery along with some complications which are correlated to that of the litigious tissues results in the neonatal and maternal morbidity.[6–9]

It has been observed that the neonatal morbidity which is actually correlated to the second-stage CS can give rise to some admissions in the NICU or neonatal intensive care unit that may have the birth asphyxia, hypoxic-ischemic encephalopathy, poor birth sufferings, or even death in the neonatal stage.[10,11]

Decision-making for CS during the second stage of labor period has still remained as one of the major challenges which prevails in the present obstetric practice. Due to a limited literature regarding this topic in the Indian scenario, the present study was done for the retrospective analysis regarding the second stage related to the CS along with the correlation of the outcomes of pregnancy.

[1–3]Department of Obstetrics and Gynaecology, TMMCRC, Moradabad, Uttar Pradesh, India

Corresponding Author: Prachi Dahiya, Department of Obstetrics and Gynaecology, TMMCRC, Moradabad, Uttar Pradesh, India, Phone: +91 9599135832, e-mail: drprachidahiya@gmail.com

How to cite this article: Dahiya P, Agarwal S, Najam R. Retrospective Analysis of Second Stage of Cesarean Section and Pregnancy Outcomes: An Observational Study. J South Asian Feder Obst Gynae 2022;14(1):54–58.

Source of support: Nil

Conflict of interest: None

Materials and Methods

Study Population

The study included primi- or multigravida women with singleton pregnancy, period of gestation >37 weeks, cephalic presentation, and full dilatation of cervix. Around 106 patients were being

encompassed in the study. The study excluded multiple pregnancies, preterm deliveries, malpresentation, and maternal comorbid conditions.

Study Procedure

It has been an observational and retrospective study that is dependent on the medical documents of CS of more than 37-week incubation conducted in our medical hospital. The study included records from the department of OBG and Gynae, Teerthankar Medical College and Hospital, Moradabad, from January 2017 to December 2019.

Ethical Clearance

The research ethics committee approval was obtained for this study.

Statistical Analysis

The statistical calculation has been conducted through the 25.0 SPSS edition of Windows (IBM Corp., the Armonk, New York, USA), along with the 2010 Microsoft Office Excel (Microsoft, Seattle, Washington, USA). The dichotomous variables have also been compared to that of the Mann–Whitney *U* test, and χ^2 test has been pertained to evaluate discrepancies in the continuous variables. The application of logistic regression for identifying the risk factors correlated with elevated modified odds ratios (ORs) in terms of UCD in the first- and second-stage labor, during the time of the apparent confounders and its control.

Discussion

CS at second stage occurs when mother requires delivery at full dilatation of cervix, which poses a risk to mother and the fetus. Coming to a decision for CS during the second stage of the labor period has been a major challenge in terms of the recent obstetric procedure. According to WHO, Robson classification of CS aid in optimization of the CS use, assessment of the strategies aimed to decrease the CS rate and thus improve the clinical practices and quality of care in various healthcare facilities.[12] The present study was done for the retrospective analysis of second stage of CS and its association with the outcomes of pregnancy.

During our study period, CS was performed for 1,996 deliveries out of 10,642. Of these, 106 (5.3%) were performed at the time of full dilatation at >37-week gestation. Majority of the subjects belonged to the 31–35 years age-group (36.8%). There were 75.5% primi- and 24.5% multigravida cases (Table 1).

Table 1: Distribution of study population

	Number	*%*
Age-groups		
21–25 years	20	18.9%
26–30 years	26	24.5%
31–35 years	39	36.8%
>35 years	21	19.8%
Antenatal care		
Booked	11	10.4%
Unbooked	95	89.6%
Gravida		
Primigravida	80	75.5%
Multigravida	26	24.5%

Previously, some of the studies have identified that the guidelines in terms of the new labor are actually effective for preventing the primary CD among all pregnant women. But somehow there have been some controversial results: One study carried out in Pennsylvania, USA, found a decreased rate of CD from 26.9 to 18.8% for the nulliparous patients after the application of new labor guidelines.[13]

On the other hand, Zipori et al. also notice fall in the rates of CD from 23.3% to 15.7%, among the nulliparous as well as multiparous females that be included in the research study.[14] Contrastingly, another study that comprises of 7,845 patients notified that the rates of CD got increased after the usage of those newly formed labor guidelines as it rose from 15.8–17.7%.[15]

In our study, most common indication for second-stage CS was arrest in the second stage of labor (28.8%) followed by fetal distress (9.4%), unsuccessful forceps (5.6%), and unsuccessful ventouse (3.8%) (Table 2). In the study by Goswami et al.,[16] nonprogress of labor associated with fetal distress was the most common indication for LSCS in second stage of labor accounting for 38% cases followed by deflexed head (16%) and deep transverse arrest (14%). Khaniya et al.[5] came up with the results that the most significant indication in the CS of second stage is usually the head of the nondescent which was 93%. Another study by Belay et al.[17] came up with the results that the commonest indication regarding the second stage of CS is usually the cephalopelvic disproportion which in their study was around 48.5%.

With the increase in the duration of the second stage, there is a difficulty in delivery of head because of edematous lower portion the lower segment gets thinned and overstretched and there is a greater amount of impact over the part in the pelvis that is being presented.[16] Operative time was also increased due to difficulty in delivery of engaged head. Delivery of engaged head is challenge to the obstetrician, this can be accomplished by numerous techniques as Vertex procedure, pull procedure i.e. Patwardhan's Method, push procedure in this method head is pushed vaginally and then head is delivered through uterine incision. In our study group, engaged heads delivered by modified Patwardhan method were 28.3%, by Patwardhan were 26.4%, by vertex methods were 28.3%, by reverse breach were 4.7%, and by push method were 5.6% (Table 3). This is similar to the study by Goswami et al.,[16] which stated that deeply

Table 2: Indications of cesarean section

Indications of CS	*Number*	*%*
Arrest in second stage of labor		
Nondescent of head	30	28.8%
Cephalopelvic disproportion	16	15.1%
Deep transverse arrest	13	12.2%
Fetal distress	10	9.4%
Unsuccessful forceps	06	5.6%
Unsuccessful ventouse	04	3.8%

Table 3: Technique of delivery of engaged head

Technique	*Number*	*%*
Modified Patwardhan	31	28.3%
Patwardhan	28	26.4%
Vertex	30	28.3%
Reverse breech extraction	05	4.7%
Push method	06	5.6%

engaged heads delivered by Patwardhan method were 50%, by vertex methods were 36%, and by push method were 6%.

It can be identified from one of the retrospective studies of Canada that the woman carrying out their delivery through the CS having a full dilatation of their cervix was 2.6 times responsible for causing some intraoperative trauma.[16] Prolonged labor can lead to the increase attenuation in the lower portion of uterine along with the infection in terms of fatal head that would give rise to a easily created and thin segment of lower uterine as well as the cervix. As a proxy in the abnormal labor, the oxytocin can be used which would produce a higher attenuation in the lower segment of uterine. The intraoperative complications reported in our study were atonic PPH among 9.4%, uterine incision extension among 16%, bladder injury among 1.8%, vaginal injury among 0.94%, angle hematoma among 3.8%, hematuria among 7.5%, and blood transfusion among 10.4% cases (Table 4).

Our findings opposed to the findings of the researchers Allen et al.[18] who identified a correlation between the intraoperative trauma at the time of cesarean delivery of second stage and that of the first stage. But the correlation is not present at the time of a prolonged labor period of second stage that is less than 4 hours while being compared to that of more than 4 hours. Sung et al. found that elongated period of second-stage labor is usually correlated to that of the hysterotomy extensions which are unintentional.

Atonic postpartum hemorrhage was reported among 5.54% cases in the study by Khaniya et al.[5] which was lesser than our study, but similar results were identified with the research that was carried out by Babre et al.; as for them, the rate was 11.5%.[19]

In current study, uterine incision extension was reported among 16.0% cases which was quite similar to the findings by Khaniya et al.,[5] uterine incision extension was reported among 13.88% cases, that was a bit more while compare to some other studies which can be because of the head delivered through the assistant by push procedure. It can also be due to the nondescent in terms of the head having some significant caput along with the formation of molding which creates the fetal head delivery to be very challenging.[18]

Vousden et al. identify that the UCD at the time of second stage was 4.7, while in the first stage, it was 2.9, and the adjusted value of OR was 1.7. Vitner et al.[20] found out that for the second stage, the rate of UCD was 9.7 %, while it was very less as 3.8% during the first stage of UCD. Some other researches, however, have not found any significant statistical difference between the first stage and second stage as for their requirement of blood transfusion. Some studies have only examination into the CD that has been carried out during terms.[20,21]

Most common postoperative complications in our study were febrile illness (14.1%), wound infection (8.7%), prolonged catheterization (5.3%), abdominal distension (3.4%), and wound resuturing (2.4%) (Table 5).

We have found some similar results to that of the study carried out by Mukhopadhyay et al., where they came to the conclusion that the prolongation of the incision in the uterine and some injuries occurring around the structure surrounding at the time of LSCS can be commonly observed for the unobstructed labor as the hand is introduced forcibly inside the pelvis for delivering the head, that gets impacted besides getting jammed inside the pelvis because the lower segment of uterine is fragile and edematous.[22]

At the second stage of labor, UCD is being significantly correlated along with the very serious maternal complications which has high fever and excessive hemorrhage, while being compared to that of the first stage for the multiparous women but it has some increased rates of admission in the NICU that is associated with the functionality of UCD carried out during the first stage of the labor period.[23]

Khaniya et al.[5] reported that the maternal operative complications were hematuria (38.88%), febrile illness (27.77%), prolong catheterization (38.88%), and prolonged hospitalization (13.88%).

The neonatal complications that required NICU admission (46.1%) were birth asphyxia (16%), meconium aspiration (14.1%), neonatal jaundice (4.7%), respiratory distress syndrome (11.3%), and fresh stillbirth (5.3%) (Table 6). Various new studies have identified that the prolonged period of labor in the second stage is not responsible for affecting the rate of neonatal morbidity despite the method of delivery.[24–26] Sung et al. reported that the increased number of the infants that are usually being admitted in the NICU is usually due to the routine practice of admitting all the newborns for carrying out the diagnosis related to chorioamnionitis in regard to the evaluation of NICU. The infants which are born through the CS of second stage has higher incidences of forming asphyxia at birth due to the elongated second stage of labor.[11,18,27]

Vitner et al.[20] and Pergialiotis et al.[21] have identified in the systematic review of their study that an increased rate in the scores of 5 minutes Apgar is less than or equal to 3 or 7, respectively, for the neonates, who are born through the CD during the time of full dilation. But in this paper, we have not identified any such crucial differentiation between the pH value of the umbilical artery which

Table 4: Intraoperative complications

Complications	*Number*	*%*
Atonic PPH	10	9.4%
Uterine incision extension	17	16%
Bladder injury	02	1.8%
Vaginal injury	01	0.94%
Angle hematoma	04	3.8%
Hematuria	08	7.5%
Blood transfusion	11	10.4%

Table 5: Postoperative complications

Complications	*%*
Febrile illness	14.1%
Wound infection	8.7%
Wound resuturing	2.4%
Prolonged catheterization	5.3%
Abdominal distension	3.4%

Table 6: Neonatal complications

Complications	*Number*	*%*
Birth asphyxia	17	16%
Meconium aspiration	15	14.1%
Neonatal jaundice	05	4.7%
Respiratory distress syndrome	12	11.3%
Fresh still birth	06	5.6%

was less than or equal to 7.1 or the 5 minutes Apgar score which was less than or equal to 7. Lipschuetz et al.[23] have identified some increased rates in the admission of NICU units who were born during the first stage of the CS that is unplanned, which is a very overwhelming upshot in accordance with the developed rate of the preterm deliveries for the group of first stage in UCD.

Khaniya et al.[5] reported that the commonest complication at the time of fetal issues was related to the stained meconium amniotic fluid that has been observed for 27.77% of the cases which can be comparable to another study carried out by Jayaram et al. where the result was 30.75%. It is due to the intraoperative fetal hypoxia that happens because of some contraction in the strong uterine which deeply impacts the fetal head along with the stimulated time period in the second stage of labor. The rate of NICU admission was 4.5% and that of the nursery was 15%, which was found by the study of Allen et al., and it has been similar to this one.[18,28]

The records of perinatal deaths along with fresh stillbirths were notified among 4.9 and 1.5%, respectively, in a study by Umbeli et al.[29] Khaniya et al.[5] found only one type of fresh stillbirth which accounted for 2.77%. Similar to that, around 6.6% of the cases having the Apgar score which was not more than 5 for 5 minutes and 12.8% of the infants having a 5 minutes Apgar score of less than 5 were being observed. It is not being able to be compared because of the limited size of samples in this study. A suggestion that has been provided by the Royal College of Obstetricians and Gynaecologists of UK which says that a consultant needs to be present during the second stage of LSCS for taking the informed decisions besides reducing the complications that arise from this type of operation.

Even this study conducted by us is also limited because of its retrospective manner. We have tried to create a control of the potential confounding but still some residual confounding might be existing. It is so due to the confounders for which we have not abstracted or considered from the clinical records.

Conclusion

CS in the second stage of labor period is correlated with considerably improved neonatal and maternal rate of morbidity along with expanded neonatal mortality. A proper judgment and skilled obstetrician are required to perform a second-stage CS.

References

1. Lawani LO, Anozie OB, Ezeonu PO, et al. Comparison of outcomes between operative vaginal deliveries and spontaneous vaginal deliveries in Southeast Nigeria. Int J Gynecol Obstet 2014;125(3): 206–209. DOI: 10.1016/j.ijgo.2013.11.018.
2. Opoku B. A review of vacuum deliveries at komfo anokye teaching hospital, Kumasi. Ghana Med J 2006;40(1):14–17. PMID: 17299558.
3. Vousden N, Cargill Z, Briley A, et al. Caesarean section at full dilatation: incidence, impact and current management. Obstet Gynaecol 2014;16(3):199–205. DOI: 10.1111/tog.12112.
4. Unterscheider J, McMenamin M, Cullinane F. Rising rates of caesarean deliveries at full cervical dilatation: a concerning trend. Eur J Obstet Gynecol Repro Biol 2011;157(2):141–144. DOI: 10.1016/j.ejogrb.2011.03.008.
5. Khaniya B. Fetomaternal outcome in second stage caesarean section. NMJ 2020;3(1):279–281. DOI: 10.3126/nmj.v3i1.28923.
6. Govender V, Panday M, Moodley J. Second stage caesarean section at a tertiary hospital in South Africa. J Maternal-Fetal Neonatal Med 2010;23(10):1151–1155. DOI: 10.3109/14767051003678002.
7. Sung JF, Daniels KI, Brodzinsky L, et al. Cesarean delivery outcomes after a prolonged second stage of labor. Am J Obstet Gynecol 2007;197(3):306.e1. DOI: 10.1016/j.ajog.2007.07.005.
8. Alexander JM, Leveno KJ, Rouse DJ, et al. National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units Network (MFMU). Comparison of maternal and infant outcomes from primary cesarean delivery during the second compared with first stage of labor. Obstet Gynecol 2007;109(4):917–921. DOI: 10.1097/01.AOG.0000257121.56126.fe.
9. Selo-Ojeme D, Sathiyathasan S, Fayyaz M. Caesarean delivery at full cervical dilatation versus caesarean delivery in the first stage of labour: comparison of maternal and perinatal morbidity. Arch Gynecol Obstet 2008;278(3):245–249. DOI: 10.1007/s00404-007-0548-5.
10. Murphy DJ, Liebling RE, Verity L, et al. Early maternal and neonatal morbidity associated with operative delivery in second stage of labour: a cohort study. Lancet 2001;358(9289):1203–1207. DOI: 10.1016/S0140-6736(01)06341-3.
11. Davis G, Fleming T, Ford K, et al. Caesarean section at full cervical dilatation. Aust NZ J Obstet Gynaecol 2015;55(6):565–571. DOI: 10.1111/ajo.12374.
12. Kant A, Mendiratta S. Classification of cesarean section through Robson criteria: an emerging concept to audit the increasing cesarean section rate. Int J Reprod Contracept Obstet Gynecol 2018;7(11): 4674–4677. DOI: 10.18203/2320-1770.ijrcog20184528.
13. Wilson-Leedy JG, DiSilvestro AJ, Repke JT, et al. Reduction in the cesarean delivery rate after obstetric care consensus guideline implementation. Obstet Gynecol 2016;128(1):145–152. DOI: 10.1097/AOG.0000000000001488.
14. Zipori Y, Grunwald O, Ginsberg Y, et al. The impact of extending the second stage of labor to prevent primary cesarean delivery on maternal and neonatal outcomes. Am J Obstet Gynecol 2019;220(2):191.e1–191.e7. DOI: 10.1016/j.ajog.2018.10.028.
15. Rosenbloom JI, Stout MJ, Tuuli MG, et al. New labor management guidelines and changes in cesarean delivery patterns. Am J Obstet Gynecol 2017;217(6):689.e1–689.e8.
16. Goswami KD, Parmar MM, Kunjadiya AN. Study of fetomaternal outcome in second stage caesarean section. Int J Reprod Contracept Obstet Gynecol 2019;8(6):2169–2171. DOI: 10.18203/2320-1770.ijrcog20192129.
17. Belay T, Yusuf L, Negash S. A comparative study on first stage versus second stage caesarean section on maternal and perinatal outcome. Ethiop Med J 2014;52(1):1–8. PMID: 25069208.
18. Allen VM, O'Connell CM, Baskett TF. Maternal and perinatal morbidity of caesarean delivery at full cervical dilatation compared with caesarean delivery in the first stage of labour. BJOG 2005;112(7): 986–990. DOI: 10.1111/j.1471-0528.2005.00615.x.
19. Babre VM, Bendre KR, Niyogi G. Review of caesarean sections at full dilatation. Int J Reprod Contracept Obstet Gynecol 2017;6(6): 2491–2493. DOI: 10.18203/2320-1770.ijrcog20172337.
20. Vitner D, Bleicher I, Levy E, et al. Differences in outcomes between cesarean section in the second versus the first stages of labor. J Matern Fetal Neonatal Med 2019;32(15):2539–2542. DOI: 10.1080/14767058.2018.1440545.
21. Pergialiotis V, Vlachos DG, Rodolakis A, et al. First versus second stage C/S maternal and neonatal morbidity: a systematic review and meta-analysis. Eur J Obstet Gynecol Reprod Biol 2014;175:15–24. DOI: 10.1016/j.ejogrb.2013.12.033.
22. Mukhopadhyay P, Naskar T, Dalui R, et al. Evaluation of Patwardhan's technic–a four year study in a rural teaching hospital. J Obstet Gynecol India 2005;55:244–246.
23. Lipschuetz M, Guedalia J, Cohen SM, et al. Unplanned cesarean delivery in the second stage of labor holds higher odds of complications than in the first stage, while similar in primiparas and multiparas. Fetal Diagn Ther 2020;47(7):565–571. DOI: 10.1159/000504573.
24. Saunders N, Paterson CM, Wadworth J. Neonatal and maternal morbidity in relation to the length of the second stage of labour. BJOG 1992;99(5):381–385. DOI: 10.1111/j.1471-0528.1992.tb13753.x.
25. Cheng YW, Hopkins LM, Caughey AB. How long is too long: does a prolonged second stage of labor in nulliparous women affect maternal and neonatal outcomes? Am J Obstet Gynecol 2004;191(3):933–938. DOI: 10.1016/j.ajog.2004.05.044.

26. Janni W, Schiessl B, Peschers U, et al. The prognostic impact of a prolonged second stage of labor on maternal and fetal outcome. Acta Obstet Gynecol Scand 2002;81(3):214–221. DOI: 10.1034/j.1600-0412.2002.810305.x.
27. Cebekulu L, Buchmann EJ. Complications associated with caesarean section in second stage of labor. Int J Obstet Gynecol 2006;95(2): 110–114. DOI: 10.1016/j.ijgo.2006.06.026.
28. Jayaram J, Mahendra G, Vijayalakshmi S. Fetomaternal outcome in cesarean sections done in second stage of labor. International Journal of Gynecology and Obstetrics 2016;3(1):51–54.
29. Umbeli T, Ismail S, Kunna A, et al. Maternal and neonatal complications associated with cesarean section in the second stage of labour. Merit Res J Med Medical Sci 2014;2(10);225–228.