

Analysis of Cesarean Section by Robson's Ten-group Classification System: A Step toward Reduction in Rate of the Surgery

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ABSTRACT

Background: Increasing the cesarean section rate with its complications is a global concern now. High economical background, education, limited family size, comfort of both; the patient and the care provider as well as the availability of facility and advanced technology are the responsible factors for the high rate of the surgery. In an attempt to reduce the rate, World Health Organization (WHO) has introduced Robson's Ten-group Classification System (RTGCS) for auditing, analyzing, and finding the largest contributor to the surgery so that steps can be taken to limit it.

Aims: (i) Finding out the group contributing more to the total cesarean section. (ii) Discussing the possible remedial measures to reduce the rate of the surgery.

Materials and methods: This retrospective study was conducted in the Obstetrics and Gynaecology Department of Mamata Medical College, Khammam, Telangana State, India, over 5 years period, which included all the cesarean deliveries at and beyond 28 completed weeks of gestation.

Results: Total cesarean deliveries were 778 and the rate of cesarean section was 31.39% of total deliveries. Group X of RTGCS had a maximum contribution (31.10%) followed by group V (29.43%), group II (20.95%), and group I (06.68%) to the total cesarean deliveries.

Conclusion: Robson's ten-group classification system, as the preliminary step in reducing the rate of cesarean delivery, is good to find the maximum contributors to the surgery. Detailed auditing and analysis will help to limit the rate of surgery by taking necessary steps, without affecting the mother and the baby. The role of the institution and care provider is important in the success of the mission.

Clinical significance: Attempt to reduce the rate of the cesarean section without compromising pregnancy outcome.

Keywords: Analysis, Audit, Cesarean section, Robson's ten-group classification system.

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INTRODUCTION

The rate of cesarean section (CS) in a geographical region indicates the level of healthcare status and availability of maternal healthcare facilities as it comes under comprehensive services.¹ But the increasing rate of CS at present is a worldwide concern in relation to maternal morbidity and mortality. Though CS is performed as a lifesaving procedure for the mother and the fetus, a high rate over years has forced the WHO in 1985 to limit it to 10–15% of deliveries for any hospital.² Indication for CS varies between institutions depending on patient characteristics, resources available, and institutional protocol in the management of obstetric cases, which makes the difference in the rate of CS. It should be done for the safety of the mother and the fetus. Thus, a standardized and internationally accepted classification system was searched for in 2011, and Robson's ten-group classification system (RTGCS) was selected as the best by WHO in 2015³ and International Federation of Obstetrics and Gynecology (FIGO) in 2016.⁴ This system classifies the CS cases depending on six obstetric criteria like parity, history of CS, gestational age, number of fetuses, fetal presentation, and the onset of labor. The benefits are its simplicity of use, no requirement of extra documentation, and ease of auditing and analyzing. It does not include indications for CS. The 10 groups are analyzed to find the group having maximum contribution to total CS cases so that steps can be taken to reduce the rate of CS without compromising the maternal or fetal outcomes. It is easily reproducible and useful

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for standardized comparison, both inclusive over the different time periods in the same institution and exclusive with other institutions or at the national or international level. A study was conducted with the aims of (i) finding the group contributing maximum to total cases of CS and (ii) discussing steps to be taken to reduce the number of CS without affecting the pregnancy outcome.

MATERIALS AND METHODS

This retrospective cross-sectional study was carried out in a tertiary care hospital, attached to a medical college, in south India, from January 2017 to December 2021. Relevant information about all

the patients delivered here at 28 completed weeks or more of pregnancy by CS over these 5 years was collected from hospital records. The patients were classified into 10 groups of RTGCS as shown below:

- Group I – Nulliparous, single, cephalic gestation of ≥ 37 weeks, in spontaneous labor.
- Group II – Nulliparous, single, cephalic gestation of ≥ 37 weeks, who had labor induced or delivered by CS before labor.
- Group III – Multiparous, without uterine scar, with single, cephalic gestation of ≥ 37 weeks in spontaneous labor.
- Group IV – Multiparous, without uterine scar with single, cephalic gestation of ≥ 37 weeks who had labor induced or delivered by CS before labor.
- Group V – All multiparous women with single, cephalic gestation of ≥ 37 weeks and at least one previous uterine scar.
- Group VI – All nulliparous with a single, breech pregnancy.
- Group VII – All multiparous with a single, breech gestation including cases with a scarred uterus.
- Group VIII – All cases with multiple gestation, including those with a scarred uterus.
- Group IX – All cases with a singleton pregnancy with abnormal lie including those with a scarred uterus.
- Group X – All women with single, cephalic < 37 weeks including cases with a scarred uterus.

Laparotomy done for ruptured uterus cases was excluded from the study. All the data were compiled, and analysis was done by simple statistics and frequency tables. Data were discussed critically and compared with other studies in different institutions. As it is the first study in this institution, no inclusive analysis was done.

RESULTS

The hospital, being in a district headquarter, all most all patients were from the surrounding villages and belonged to low socioeconomic background. They were either illiterate or up to middle school education and either housewife or daily wager by occupation. There were 778 cases of CS out of 2,478 deliveries in the study period. The rate of CS was found to be 31.39%. Among the CS patients, 729 (93.70%) were of age group 20–35 years, and teenage pregnancy (< 20 years) was in 43 (5.53%) cases, as presented in Table 1. The majority of CS was found in group X (31.10%), the second contributor to total CS was group V (29.43%), and the next two in descending order were group II (20.95%) and group I (06.68%), as shown in Table 2. Detailed analysis of group X is shown in Table 3. Indication for CS of 363 (46.65%) cases was previous CS. The next major indications were the severe hypertensive disorder of pregnancy requiring urgent termination of pregnancy in 90 (11.56%), fetal distress in 78 (10.02%), and intrauterine fetal growth restriction with severe oligohydramnios in 72 (09.25%) cases, as shown in Table 4.

Table 1: Age distribution of cesarean patients

Age in years	No.	% (n = 778)
<20	43	05.53
20–35	729	93.70
>35–40	06	0.77

Table 2: Contribution of different RTGCS groups to total CS and total deliveries

Groups	No. of CS (n = 778)	% (n = 778)	% (n1 = 2,478)
Group – I	52	6.68	02.10
Group – II	163	20.95	06.58
Group – III	12	01.54	00.48
Group – IV	14	01.80	00.56
Group – V	229	29.43	09.24
Group – VI	28	03.60	01.13
Group – VII	21	02.70	00.85
Group – VIII	13	01.67	00.52
Group – IX	04	0.51	00.16
Group – X	242	31.10	09.77

n = total CS; n1 = total deliveries

Table 3: Analysis of indications of CS in Group X

Indication	No. of CS cases	% of total CS (n = 242)	% of Group X (n1 = 784)
Post CS	104	42.97	13.26
Severe HDP	54	22.31	6.88
PPROM	20	8.26	2.55
Severe oligo, IURG	24	9.91	3.06
FD	18	7.43	2.29
Placenta previa	09	3.71	1.14
Abruptio	06	2.47	0.76
Sickle-cell complication	07	2.89	0.89

n = total CS in group X; n1 = total deliveries in group X

Table 4: Indications for CS

Sl. no.	Indication	No. of cases (n = 778)	% (n = 778)
1	Post CS	363	46.65
2	Severe HDP	90	11.56
3	Fetal distress	78	10.02
4	IUGR, severe oligo	72	09.25
5	Failed Induction	40	05.14
6	Non-progress	30	03.85
7	Placental cause	33	04.24
8	Breech	32	04.11
9	CPD	17	02.18
10	Transverse lie	03	00.38
11	Multiple gestation	06	00.77
12	Fibroid uterus	05	00.64
13	Medical disorders	09	01.15

CPD, cephalopelvic disproportion; HDP, hypertensive disorder of pregnancy

DISCUSSION

Cesarean section is the major obstetrics operation done for improving fetomaternal and neonatal outcomes. Considering the risks involved in the surgery, anesthesia, both immediate and delayed complications, and economic burden, the rate of the procedure should be restricted without affecting the mother and the baby. In the present study, the rate of CS is 31.39% of the total deliveries. This rate may be explained by the fact that it is a tertiary care center and referral center for high-risk cases. Being a Medical College Hospital, treatment is free, and many previous cesarean cases with additional obstetrics or other complications report here for management. Most of the post-CS cases need tubectomy following delivery and in spite of adequate counseling, they do not give consent for trial of labor. Pravina et al. have reported the CS rate to be 38.16% in their study.⁵ Prabhavathi et al.⁶ found it 35.9%, whereas it was 21.8%, as reported by Murugesan and Rengaraj.⁷ Overall, CS rate of 17.2% by National Family Health Survey-4 (2015–16) has increased to 21.5% after 5 years (2019–21), as reported in NFHS-5.

The present study shows that RTGCS group X has the highest (31.10%) contribution to total CS, followed by group V (29.43%) and then group II (20.95%). The rate of CS in these three groups is 09.77%, 9.24%, and 6.58%, respectively, of the total deliveries during the study period. Group X includes preterm CS in both scarred and unscarred uterus. This group constitutes the cases with risk of prematurity, premature rupture of membrane, severe hypertensive disorder of pregnancy (HDP) requiring immediate termination of pregnancy, severe intrauterine growth restriction (IUGR) with oligohydramnios, abnormal lie and or presentation, antepartum bleeding with placenta previa, and scarred uterus. All these complications have led to an increased rate of CS in group X. This group had 784 parturients in total, constituting 31.64% of the total women delivered in the study period and contributing 31.10% to the total CS. Similar finding was reported by Abubeker et al. as group X having maximum contribution to total CS.⁸ Parveen et al. have reported group X as the highest (50.9%) contributor followed by group V (14.4%) and group I (11.4%).⁹ Table 3 shows the detailed analysis of group X, which has the maximum contribution to the total CS in our study period. In group X, post-CS pregnancy was the commonest indication (42.97%) with other complications or refusal of the patient for vaginal birth after CS (VBAC). Next in order was a

severe hypertensive disorder of pregnancy with maternal and or fetal complications requiring immediate termination (22.31%). Group V was found to be the second-highest contributor to total CS in the study. Except two, all the cases in this group underwent CS for various indications in addition to the scarred uterus. Many cases were being well selected for the trial of labor and counseled, but refused for it in favor of CS. Illiteracy, ignorance, and apprehension of labor pain and expected risk may be the cause behind this. Majority of them opted for tubectomy and that was one of the reasons to avoid the risk of VBAC. Group II was third in order as contributor to total CS in this study. Though its contribution to total CS was third in order, it was the main indirect contributor as primary CS making a scarred uterus. Avoidance of primary CS by proper analysis of indication, adequate counseling of patient and attendant, and labor analgesia may reduce the rate of repeated CS to a large extent. Pravina et al. have reported group V as the leading cause (34.97%), followed by group I (26.35%) contributing to total CS.⁵ Various studies have reported their findings about the contribution of different RTGCS groups to total CS as shown in Table 5.^{5,8-10} Groups I–IV, constituting cases with unscarred uterus, contributed 241(30.97%) cases to total CS in the present study. This was reported to be 40% by Kazmi et al.¹¹ and 49.30% as found by Abubeker et al.⁸ The top four contributor groups to total CS in the present study (groups – X, V, II, and I) constitute 88.16% of the total CS. A study by Abubeker et al. reported that the groups X, II, V, and IV as the top four contributors (70.30%) to total CS in their study.⁸

Indication for CS depends on clinical conditions as well as institutional protocol. The patient's opinion after counseling is the final step to decide for CS. In our study, scarred uterus was found to be the leading indication for CS (46.65%), followed by HDP (11.56%), and other indications were comparatively less frequent. High incidence of teenage pregnancy, hypertensive disorder in pregnancy, and IUGR with severe oligohydramnios were prevalent among these patients. Reduction of primary CS by proper analysis of indications, better counseling, and adequate labor analgesia will reduce the cases with scarred uterus and the total rate of CS. Proper selection of cases for VBAC and in-depth counseling in cases with scarred uterus is required for reduction in total CS. Modern obstetrics use cardiotocography (CTG) in labor for fetal assessment, and it has become mandatory in all

Table 5: Comparison of contribution of RTGCS groups to total CS in different studies

RTGCS	Present study	Abubeker et al. ⁸	Parveen et al. ⁹	Pravina et al. ⁵	Jogia and Mehta ¹⁰
G-I	06.68%	10.7%	11.4%	15.51%	13.93%
G-II	20.95%	18.3%	06.6%	26.35%	28.47%
G-III	01.54%	04.5%	06.6%	02.95%	02.61%
G-IV	01.80%	15.8%	02.4%	03.20%	02.52%
G-V	29.43%	17.1%	14.4%	34.97%	37.36%
G-VI	03.60%	03.3%	02.4%	04.18%	06.23%
G-VII	02.70%	03.8%	03.0%	02.71%	01.28%
G-VIII	01.67%	06.5%	01.2%	01.47%	01.06%
G-IX	0.51%	0.9%	01.2%	01.47%	00.93%
G-X	31.10%	19.1%	50.9%	07.14%	05.61%

institutional delivery. Abnormal CTG as an indication for CS has become very common. But studies have shown a false positive rate of 60% in this, and there is a difference in interpretation by different observers, which can be corrected by frequent workshops for technical staff.¹² Fetal electrocardiogram (ECG) with ST analysis (STAN) reduces this fault by getting information on fetal blood pH.¹³ Reduction in the feeling of fetal movement by the mother can be checked by a biophysical profile to find the fetal well-being before embarking on CS. Maintaining partogram in labor may reduce many cases of CS with the indication of failed induction and nonprogress. External cephalic version and vaginal breech delivery are gradually getting rarer in obstetric practice. Well-selected cases have to be accepted for it by experienced obstetricians for both the patient and the younger professionals to save the trick, and many CS cases can be avoided by this. Sick cell with or without Thalassemia cases with complications is being referred to this institution as there is a sickle-cell belt nearby. This adds to the rate of CS. Some studies have found the reason for high rate of CS as the fear of the patient for labor pain and genital changes after vaginal delivery, misinformation about the safety of the baby in vaginal delivery, convenience for the professional as well as the patient and family, and fear of litigation.¹⁴ Cultural factors like delivery at a particular time and date also increase the rate of CS.¹⁵ All these cases have to be managed to some extent with adequate counseling.

Above all, preconceptional counseling with regular antenatal care is very important to prevent, to detect at the earliest, and manage any complication arising in pregnancy so that many cases of CS can be avoided as maternal morbidity is four times higher in delivery by CS than by vaginal route.¹⁶ Adequate counseling of the mother and the family members regarding the mode of delivery during antenatal care in advanced pregnancy will help to alleviate their apprehension and also to incline the family's decision toward vaginal delivery.

CONCLUSION

Robson's ten-group classification system may be considered to be the primary step in the effort to reduce the rate of CS without affecting fetomaternal and neonatal morbidity and mortality. Analysis of the groups which are major contributors to CS and taking adequate steps to restrict the surgery for vaginal delivery will be the next step in reduction of total CS. Preconceptional counseling, adequate antenatal care, restricting the number of primary CS, restricting the family size, and effective counseling of the patient for VBAC in indicated cases will no doubt reduce the CS rate. Indication for CS has to be revised in the institutional protocol without affecting the maternal and perinatal outcomes. Inclusive auditing and analysis of CS by RTGCS in every institution over time is a very important step in reducing the rate at the institution, state, national, and international levels.

Strength of the Study

Being a retrospective study, the decision and indication of CS are not manipulated.

Weakness of the Study

- (i) As the study period included the period of COVID-19 pandemic, the number of cases is limited.

- (ii) Inclusive comparison is not possible as this is the first study in this institution.

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