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Original Research Article

Audit of caesarean deliveries in a tertiary care rural hospital of Bangalore, Karnataka, India

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ABSTRACT

Background: Due to the rise in caesarean section rates Robsons classification system was adopted by WHO as a global standard to asses and audit the caesarean section rates within different hospitals, to reduce the caesarean section rates and the associated complications and also improve patient care along with it. The aim of the present study is to audit the number of caesarean deliveries in the hospital. Objective were to audit the caesarean deliveries in the institution using Robsons classification system as the starting point to find the contributing factors responsible for the caesarean section rates.
Methods: This retrospective hospital-based study was conducted at MVJMC and RH. The study included all pregnant patients undergoing caesarean section during the period of one year from March 2023 to February 2024. All the data was entered into Microsoft excel, sheet, which was then classified according to Robson's classification system.
Results: In our study we noted that the highest percent of caesarean deliveries was noted among multigravida which contributed about 66.5 of the total caesarean deliveries and according to classification 35% of the caesarean deliveries was noted in group 3 with multiparous women of more than 37 weeks in spontaneous labour.
Conclusions: Globally accepted Robsons classification should be used for regular audits among hospitals to curb the caesarean section and its associated maternal and perinatal complications in order to improve patient care.

Keywords: Robsons classification, Caesarean section, Robson's ten group classification system, Obstetric score, Gestation age, Foetal lie, CS rates

INTRODUCTION

The caesarean section rate is one of the major indicators for measuring access to quality maternal health care services. The rates of caesarean section have shown a steady rise during the past three decades in many countries, mainly the developed countries.[1]

WHO stated that regional caesarean section rates should not exceed 10-15% in the year 1985.[2] Above 15% the caesarean rates are no longer associated in reducing maternal and neonatal mortality and morbidity.[3] The caesarean section rates in India was 8.5% in NFHS-3 and 17.2% in NFHS-4 with almost 9% increased over period of 10 years.[4] Every year there is a 16.7% raise in caesarean section cases in India.[5] Important maternal characteristics that have contributed to increase in caesarean section rate include increasing maternal age and higher rates of hypertension, diabetes, obesity, and multiple gestations. Caesarean section is associated with both immediate and long term risk of maternal and neonatal complications.[6] The WHO backed the Robson ten group classification system as a universal standard for assessing, auditing and comparing caesarean section rates within healthcare facilities.[2] The ten group classification system (TGCS) was proposed in 2001 by Robson that provides a

system to assess the caesarean section rate and, as stated by Robson, that it can be used as a starting point within which additional maternal and perinatal data , along with caesarean section can be analysed and audited.[7] Robson's classification system has been recommended by the WHO for audit of caesarean section rates and comparison of rates between various health care facilities and their trends over time.[8] The classification divides women into ten mutually exclusive groups based on following maternal and foetal characteristics: obstetric history (parity and previous caesarean section), onset of labour (spontaneous, induced, or caesarean section before onset of labour), foetal presentation or lie (cephalic, breech, or transverse), number of foetuses, and the gestational age (preterm or term).

Objectives

The objective of the study is to initiate collection of data and use ten group Robson's classification system as a starting point to audit caesarean deliveries in our hospital to find the cause of the increasing caesarean delivers and the assess the conditions leading to the increasing caesarean deliveries in order to improve patient care and curb the caesarean delivery in the upcoming years.

METHODS

This retrospective hospital-based study was conducted at MVJ medical college and research hospital. The study population contained 762 patients from March 2023 to February 2024. Ethical approval was taken from institution.

Inclusion criteria were all pregnant women undergoing caesarean section admitted at MVJ medical college and research hospital. Laparotomy done for ruptured uterus were excluded.

Administrative and health data was taken from labour room records. All relevant information such as obstetrics score, age, period of gestation, indication of caesarean section, elective/emergency, birth weight, NICU admissions, Apgar was entered into Microsoft excel sheet. Data extracted was classified according to Robson's TGCS. Results were calculated at end of period and tabulated.

RESULTS

The data collected was analysed and documented. All the patients who underwent C-section were grouped according to Robsons ten group classification system on basis of five parameters: obstetric score, foetal lie, gestational age, onset of labour and number of foetus as shown in Table 1.

Among the 10 groups the highest rates of caesarean section were seen in group 3, and group 4 which contributed 35% and 33% respectively. Following these are group 1 and 2 being the second highest contributors of caesarean section rates contributing 16% each.

The rate of caesarean section was more among multigravida being 66.8% when compared with primigravida which comprised of only 33.20% of the total caesarean section conducted in the hospital as shown in Table 2. There are multiple indications for this increase in the caesarean section rates among multigravida among which the highest contributors are foetal distress, previous caesarean section, and scar tenderness.

In this study 41.60% constituted women between the age of 23-27 years and the least number of women were above the age of 32 years making up only 4.86% of the total. Though pregnancy in age above 32 is considered high-risk the percent it contributes to caesarean section is less compared to age groups 23-27 and 18-22 years due to less number of pregnancy in total in that age group compared to any other as depicted in Table 3.

Table 1: Robson's classification.

Groups	Description	Relative size of group	Percentage (%)
1	Nullipara, single, cephalic, >37 weeks, in spontaneous labour	120	16
2a	Nullipara, single, cephalic, >37 weeks, induced	90	12
2b	Nullipara, single, cephalic, >37 weeks, caesarean section before labour	28	4
3	Multipara, single, cephalic, >37 weeks, in spontaneous labour	260	35
4a	Multipara, single, cephalic, >37 weeks, induced	100	14
4b	Multipara, single, cephalic, >37 weeks, caesarean section before labour	138	19
5a	Previous caesarean section, single, cephalic, >37 weeks, spontaneous labour	40	6
5b	Previous caesarean section, single, cephalic, >37 weeks, induced	0	0
5c	Previous caesarean section, single, cephalic, >37 weeks, caesarean section before labour	107	15
6a	All nulliparous breeches, spontaneous	4	0.52
6b	All nulliparous breeches, induced	5	0.65

Continued.

Groups	Description	Relative size of group	Percentage (%)
6c	All nulliparous breeches, caesarean section before labour	10	1.31
7a	All multiparous breeches, spontaneous labour	5	0.65
7b	All multiparous breeches, induced	2	0.26
7c	All multiparous breeches, caesarean section before labour	4	0.52
8a	All multiple pregnancies, spontaneous labour	3	0.39
8b	All multiple pregnancies, induced	0	0
8c	All multiple pregnancies, caesarean section before labour	0	0
9a	All abnormal lies, spontaneous labour	2	0.26
9b	All abnormal lies, induced	0	0
9c	All abnormal lies, caesarean section before labour	2	0.26
10a	All single cephalic <37 weeks, spontaneous labour	26	4
10b	All single cephalic <37 weeks, induced	4	0.52
10c	All single cephalic <37 weeks, caesarean section before labour	11	2

Table 2: Obstetric score.

Obstetric score	N	Percentage (%)
Primigravida	253	33.20
Multigravida	509	66.80

Table 3: Maternal age group.

Age group (in years)	N	Percentage (%)
18-22	217	28.48
23-27	317	41.60
28-32	191	25.07
>32	37	4.86

One of the most important and greatest contributing agents for caesarean section is foetal distress accounting for 45.54% indicated by decreased foetal movement, abnormal NST, vaginal bleeding, abnormal amniotic fluid level, high maternal blood pressure, insufficient or excessive maternal weight gain, etc. Following foetal distress, the second most common and highest cause is previous caesarean section, this is because of the increased risk of scar rupture in patients with previous caesarean section especially if 2 consecutive pregnancies are less than 3 years apart.

Subsequently, comes scar tenderness with 11.55%, eclampsia/per-eclampsia with 4.20%, breech presentation with 3.94%, CPD or the CDMR and non-progression of labour constituting 2.62% and IUGR and tubectomy only 1.31% and rest of indications occupy less than 1 percentages of total women as outlined in Table 4.

Most of the patients are term at the time of caesarean section contributing about 88% as illustrated in Table 5. When preterm and post term are considered and compared the percentage of preterm is more than post term.

According to the study, most of the delivered foetuses are of normal birth weight only 12.86% of them are underweight requiring NICU admission.

Table 4: Indications of caesarean section.

Indication of C-section	N	Percentage (%)
Foetal distress	347	45.54
Previous C-section	149	19.55
Scar tenderness	88	11.55
Eclampsia/pre-eclampsia	32	4.20
Breech presentation	30	3.94
CPD	21	2.76
CDMR	20	2.62
Non progression of labour	20	2.62
IUGR	10	1.31
Tubectomy	10	1.31
Abruptio placentae	6	0.79
Placenta previa	4	0.52
Arest of dilation	2	0.26
Obstructed labour	2	0.26
Oblique lie	1	0.13
Deep transverse arrest	1	0.13
Failed induction	1	0.13
Transverse lie	1	0.13
ICT positive with doppler changes	1	0.13
Arrest of labour	1	0.13
Arrest of descent	1	0.13
Cord prolapses	1	0.13
Elderly pregnancy	1	0.13

Table 5: Gestational age.

Gestational age	N	Percentage (%)
Pre-term (<37 weeks)	78	10.24
Term (>37 weeks)	672	88.19
Post term (>40 weeks)	12	1.57

Table 6: Birth weight.

Birth weight (kg)	N	Percentage (%)
<2.5	98	12.86
2.5-3.5	647	84.91
>3.5	17	2.23

DISCUSSION

When there is absolute indication, caesarean section can be life saving for both mother and newborn, but in cases where it is carried out solely on maternal request or due to other causes is not appropriate nor justified.

To reduce the caesarean section rates Robson's ten group classification was introduced, in the past, caesarean sections had to be classified based on the reason for surgery which made it difficult to compare as same terms were not used everywhere. But with the introduction of Robson's classification, caesarean section could be classified easily and also could be used to compare data between institutions, regionally, nationally and internationally.

Robson's ten group classification system can be used as starting point for baseline data for auditing caesarean deliveries with the objective to monitor the change in the caesarean section ratio and improve patient care. Use of Robson's classification allows comparison of data between various healthcare facilities across the globe.

Increased rate of caesarean section surgery occurred in women with previous caesarean section. Use of the Robson criteria can help manage caesarean section rates in health care facilities, and allows to identify how various interventions affect caesaren section rates and helps us adopt and design interventions and policies that help reduce caesaren section rates as well as maternal and foetal mortality and improve their care.[9]

Our findings show that the necessary data collection and application of the Robson classification can be done quite simply and effectively. The Robson classification can also be used for routine monitoring and assessment purposes at a national and international levels. Robson classification is not only used to monitor C-section rates and trends but the data collected for classification can be used to assess different maternal and foetal parameters in order to improve the quality of patient care.

The overall caesarean section rates are 38.95% i.e., 762 out of 1956 total number of deliveries, similarly high rates were observed in the study conducted by Saharan et al with a caesarean section rate of 35.14% and a caesarean section rate of above 40% was observed in study conducted by Patel et al and a rate of 25.7% in the study conducted by Katke et al.[9-11] The largest contributor in the institution belonged to group 3 which included multipara single cephalic more than 37 weeks in spontaneous labour which accounted for 35% of total caesarean sections, similarly high rates of caesarean section of about 21.4% of the total caesarean section was observed in the study conducted by Taura et al.[12] The present figures of this group are higher compared to the previous study conducted by Saxena et al which included only 5.1% of total delivers, similar to the study conducted by Akadri et al which also showed that only 5.1% of the total deliveries belonged to group 3.[13,14]

One of major reason other than the number of women presenting for CS in group 3 was foetal distress, declining for augmentation of labour and maternal request.

The second largest contributor right behind group 3 belong to group 1 which is traditionally the largest contributor with 16% of the total caesarean sections done on nulliparous women with cephalic presentation and more than 37 weeks of pregnancy. This group was the highest contributor with 26% of the total deliveries in the previous study conducted by Saxena et al and was also one of the most prevalent groups according to the study conducted by Parveen et al accounting for 11.4% of the cases.[13,15] This high percentage in group 1 which traditionally has the largest number of CS rates underwent CS for foetal distress, arrest of labour, non-progression of labour was one of the major causes among other causes.

Group 2 is dived into 2 A and 2 B which accounts for a total of 16% of total C sections carried out. Of which group 2A which includes nulliparous women with cephalic presentation and more than 37 weeks of labour with labour induced accounted for 12%, in the study conducted by De et al group 2A contributed 10.25% of the total deliveries and was one of the largest contributors in that study.[16] In majority of the cases postdates was one of the major reasons for induction of labour. Whereas group 2B which included primigravida who underwent CS before labour contributed 4% of the total CS rates, while 2A contributed 11.2% and 2B contributed 6.2% to the overall CS rates in the studies conducted by Jacob et al.[17]

Group 4 included all multiparous women with cephalic presentation and more than 37 weeks with labour induced or CS before labour accounted for 2.4% in the study conducted by Kant et al in contrast to the present study which accounted for 33% of the total caesarean sections performed in the institution and major cause of CS in this group is due to postdates, pre labour rupture of membranes and hypertensive disorders.[18]

Group 5 comprises of women who have undergone previous CS, and these women are further divided into 3 categories i.e., previous CS with spontaneous labour, previous CS with induced labour, previous CS with C section before labour. About 6% of the women were in spontaneous labour and about 15% underwent CS before labour none of the women in the institution were willing for induction of labour. A high percentage of women who underwent previous CS opted for CS before labour only a few were willing for VBAC, though it is considered a safe option most women do not opt for VBAC, due to the fear of uterine rupture and other untoward events post VBAC. In the study conducted by Tanaka et al group 5 was the largest contributor to the overall CS rates but in both the present study and Tanaka study CS before labour was the highest contributor under group 5.[19]

Group 6 and group 7 includes all breech presentations among both primigravida and nulliparous women which

accounts for 3.73% of total CS carried out in the institutions in contrast to the study conducted by Saxena et al in which these groups contributed 3.1% to the total deliveries.[13] Most preferred methods by many hospitals in a breech presentation is CS and hence all the women presenting with breech at term are considered for CS, though trial of labour is still a possibility they do not opt this method due to the untoward complications that can occur to the mother and the baby during the process.

Group 8 comprises of all twin pregnancies. This accounted for just 0.39% of the total deliveries. Which is lesser than the percentage contributed by this group in the study conducted by Tanaka et al which contributed 0.8% the total delivers. The institution recorded only 3 twin CS in the period of study and they were all in spontaneous labour.[19]

There were only 4 CS for malpresentation in group 9 of which 2 were in spontaneous labour and 2 underwent CS before labour.

All pregnancies less than 37 weeks are included in group 10, which are further divided into women with spontaneous labour, induced labour and CS before labour. Most of the women were in spontaneous labour in this group which constituted about 4% of the total CS rates and only 2% women underwent CS before labour. This group also had the greatest number of NICU admissions due to premature delivery of the baby and low birth weight and other foetal causes.

Limitations

Since the study was retrospective study, the investigators could not get any additional information about the comorbidities the patients had and the blood profiles of the subjects.

The time period of the study of 1 year also was a short time period in analysis the changing trends in Robsons classification at our institution.

CONCLUSION

Study is conducted to audit all the caesarean sections in maternity suits. Authors have used Robson's classification for the audit of CS in present institution and authors intend to repeat the audit over time to monitor the change in caesarean section rates and help improve patient care.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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