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Analysis of caesarean section rates according to Robson's ten group classification system at a tertiary care teaching hospital in South India

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Abstract
Background: Robson's ten-group classification system (RTGCS) is recommended by WHO as an analytical tool for effective monitoring of caesarean section (CS) rates. The overall CS rates are high but seldom, women are classified based on CS.
Methods: Data was collected and reviewed retrospectively. All the pregnant women who delivered from January 2016 to December 2017 in the labour ward were classified according to RTGCS.
Results: Total of 2951 women delivered- 1598 (54.15%) vaginally and 1353 (45.84%through CS. In this study, Group 5 was the largest contributor (30.08%), group 1 was second (28.15%).
Conclusion: Reviewing the definition of failure to progress in labour and changing norms of fetal distress may lower CS rates in groups 1, 2 and5. RTGCS proves to be an effective tool that allows standardized comparison of data, time point and identifies the groups responsible for rising CS rates.

Keywords: Rate of caesarean section, Robson's classification system, obstetrics, mode of delivery

Introduction

The caesarean section delivery rate in the India has steadily increased over last 20 years. The crude rate of caesarean section surgery is an important global indicator for measuring access to obstetric services [1]. World Health Organization recommends that Caesarean Section (CS) rates should not be more than 15% as CS performed in the absence of clinical justification does not reduce maternal or infant death rates [2, 3].

There is significant differences in the crude rate of CS performed in different countries and regions and also between different hospitals in the same region. There is no nationally established system that can monitor the use of caesarean section due to decentralized structure of health system. There is growing concern about the higher incidence of long-term complications following one or more CS such as adherent placenta, retained placenta, uterine rupture with possible need for peripartum hysterectomy, cost issues and inequity in access [4–6].

Reducing maternal and infant mortality and morbidity is one of the main objective of World Health Organization for 2030. This can be achieved by ensuring safe outcome for mother and baby as well as avoiding unnecessary caesarean [7]. There was a lack of a classification system that would be feasible worldwide that allows audit feedback and set an optimal CS rate over countries. Robson in 2001, proposed of a classification system that would provide an understanding regarding the rate of CS and to group them such that necessary interventions could be done for avoidable CS interventions. The Ten-Group Robson classification has been praised for its simplicity, robustness, reproducibility and flexibility and has been recommended for both the monitoring rates over time as well as between facilities by both WHO in 2014 and FIGO in 2016 [8-10].

Adichunchanagiri institute of medical sciences is a tertiary referral center conducting approximately 2000 deliveries annually. Besides the increase in CS for medical indications due to greater access to hospital based care, there has been a significant increase in CS for not very good accepted medical indications which include greater safety for the baby, less pelvic floor trauma, avoidance of labour pains and convenience. Since few years, our hospital has 40-50% of CS rate, this figure is now of a public health concern, in order to decrease this rate this study now classifies CS occurring and tries to intervene as much as possible where there are modifiable causes.

This present study is aimed at classifying the CS into various groups of Robson's classification to analyse the changing trends over time and to shed light on how changes in clinical practice can optimize caesarean rates, thus ensuring excellence in maternal and perinatal care.

Materials and Methods

All the relevant clinical information and data of all pregnant women who delivered from January 2016 to December 2017 over 24 months, were collected retrospectively from medical record section, Dept. of OBG in Adichunchanagiri institute of medical sciences, BG Nagara, Mandya and classified according to Robson's Ten Group Classification System (RTGCS).

Before proceeding, approval was sought from hospital ethical and research committee. Women who gave birth were categorized into 10 groups based on their basic obstetric characteristics of parity, previous CS, gestational age (term or preterm), mode of onset of labour (spontaneous, induced, or caesarean section before the onset of labour), fetal presentation(cephalic, breech or transverse) and number of fetuses. These groups are structured in such a way that they are mutually exclusive and totally inclusive. Other socio demographic data and obstetric characteristic of the pregnant women: country of origin, age, newborn's gender, and birth weight was recorded. The study population involved women giving birth during the study period to live babies after at least 28 weeks, or to a live born baby weighing more than 1kg.

From this data, after entering in to MS Excel sheet, it has been classified into Rob sons ten group classification system [11].

Table 1: Robson's ten group classification system [11]

Number	Group
1.	Nulliparous, single cephalic, >37 weeks in spontaneous labor
2.	Nulliparous, single cephalic, >37 weeks, induced or CS before labor
3.	Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labor
4.	Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labor
5.	Previous CS, single cephalic, >37 weeks
6.	All nulliparous breeches
7.	All multiparous breeches (including previous CS)
8.	All multiple pregnancies (including previous CS)
9.	All abnormal lies (including previous CS)
10.	All single cephalic, <36 weeks (including previous CS)

Statistical Analysis: Data collection followed a structural format and included all relevant clinical information. Data were entered into a computer database using Microsoft Excel software. Windows SPSS version 21 was used for analysis. Results were presented as percentages, mean, frequencies.

Results

Total number of vaginal delivery and CS in the study institute over 24 months was 2951, out of which, 1353 was cesarean section. The incidence of cesarean section inSri Adichunchanagiri hospital and Research center was 45.84% during January 2016 to December 2017 (Table 2).

Table 2: Percentage of cesarean section in all group

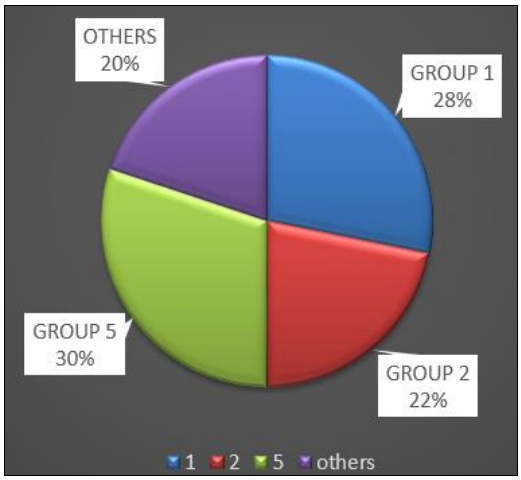
Groups	Total Cesarean Sections	Percentage
1	381	28.15
2	296	21.87
3	92	6.79
4	45	3.32
5	407	30.08
6	37	2.73
7	20	1.47
8	15	1.10
9	9	0.66
10	51	3.76
Total	1353	100

Previous CS patients undergoing a repeat CS Group 5 was highest among all groups with 30%, followed by Nulliparous with spontaneous onset labour group 2 with 28%, third being group 3 with 21%. Last being group 9 with 0.66%.

Table 3: Incidence of Cesarean in each Group

Groups	Incidence
1	12.91
2	10.03
3	3.11
4	1.52
5	13.79
6	1.25
7	0.67
8	0.50
9	0.30
10	1.72
Total	45.84

In AIMS, Bellur, Mandya incidence of cesarean section during 2016-17 is 45.84%. Incidence of primary CS is tremendously increasing with 12.9 and 10.0 totally accounting for 22.9. Hence inthe same line, repeat CS for previous CS is high with incidence 13.7(table – 3). Therefore only group 1,2 and 5 contribute to nearly 75% of overall CS rates. (Graph 1)



Graph 1: Percentage of cesarean sections in each group

Table 4: Total number of cesarean and vaginal delivery in each group

Groups	Total Women	Total Cesarean Sections	Total Vaginal Deliveries
1	1003	381	622
2	523	296	227
3	531	92	439
4	167	45	122
5	417	407	10
6	49	37	12
7	29	20	9
8	19	15	4
9	9	9	0
10	204	51	153
Total	2951	1353	1598

Around 97.6% patients with previous CS underwent repeat CS. Around 56% of nulliparous group 2 patients underwent CS. 100% CS for all abnormal lie group 9. (Table 5)

Table 5: Ranking of group contributions to overall cesarean section rate

Rank	Percentage	Classification Group
1	100	9
2	97.6	5
3	78.94	8
4	75.51	6
5	68.98	7
6	56.5	2
7	37.98	1
8	26.94	4
9	25.0	10
10	17.32	3

Discussion

Table 6: Similar Studies

Other studies	Over all CS rate (%)	Highest contributions
Samba A *et al.* [12]	46.9	Group 5
Dhodapkar SB *et al.* [13]	32.6	Group 5
Bhatt M *et al.* [14]	31	Group 5
Present study	45.8	Group 5

The increase in the caesarean section rates in most part of the world has now become a subject of public health concern. When these being classified by Robson's ten group system, group 5 scored highest, Cragin's 1916 popular belief "once a cesarean, always a cesarean still holds good in many institutions. A repeat CS is chiefly indicated in case of established disproportion, contracted pelvis, after classical CS, h/o uterine rupture and if medical or obstetric complication that precludes vaginal birth (such as placenta previa).The fact that a patient had a cesarean section before is no excuse for inflicting this surgical insult a second time. Thus women at gestational age 37-40 weeks with previous CS performed for non-recurring indication, can be given a trial of labour provided there are no contraindications to vaginal delivery and where facilities for an immediate CS and an experienced obstetrician and anesthetist are available round the clock. Blood transfusion services should also be available.

From the Robson classification, groups 1, 2 and 5 contributed nearly three fourths (80%) of the overall caesarean section rate. There is clear evidence from this finding that unsuccessful induction of labor is the biggest contribution to the high caes area insection rate, elective caesarean sections for both groups 2 and 4 would have clear indications to avoid vaginal delivery. Therefore a critical review of induction protocols would have to be considered and probably modified or adhered to as much as possible.

Two commonest indications for a primary CS are failure to progress and fetal heart rate concern. Increasing maternal age, maternal and fetal weight, common obstetric interventions such as induction, epidural analgesia, and oxytocin use may have altered what would be normal progress of labour.

These criteria and management of abnormal labor have recently undergone a sea change. In 2014, the American College of Obstetricians and Gynaecologists and the Society for Maternal–Fetal Medicine issued their first Obstetric Care Consensus titled Safe Prevention of the Primary Cesarean Delivery. It was reaffirmed in 2016. This consensus statement was a response to concerns that cesarean delivery was overused in the United States. Namely, approximately one in three women who give birth each year undergoes this surgery. New recommendations from the Consensus Committee are based on "more recent data used to revise the definition of contemporary normal labor progress" and reflect a significant revision of the preexisting understanding of abnormal labor.

We need to be as evidence based as possible in recommending an IOL [15-17]. Limiting IOL for which there is no clear indication, especially those with an unfavourable cervix, would have a significant effect of the CS rate. The two recent reviews that concluded that IOL is not associated with an increase in CS rate [18, 19], are likely to encourage clinicians to be more liberal in recommending IOL, despite numerous weaknesses in many of the randomised controlled trials included in the reviews.

ECV is rarely practiced these days for the fear of transient abnormal fetal heart pattern, risks of vaginal bleeding, placental abruption, rupture of membranes leading to preterm labour but in the institutions where 24hrs emergency services are available ECV should be given a try for all breech at later weeks of gestation, skills should be taught and implemented for both ECV and for assisted breech delivery.

The application of Robson's classification is a crucial step in order to identify, analyze and shed light on the on-going CS rates, on how interventions can be applied among relevant groups at a given institution. Furthermore, this model can be used for comparison between institutions in the same region and likewise in the country such that necessary amendments can be

done at various levels to promote healthy mother and baby along with curbing the CS rates. After this study was conducted, regular audit and feedback using Robson's classification were implemented at our hospital in order to address the issues with existing obstetric practices.

As the numbers of interconnected issues are high, it has become difficult to address specific reasons responsible for rising CS rates. Increasing age, obesity, and nulliparity are not sufficient reasons which can attribute to CS rates. Increase in CS rates due to non-medical reason such as maternal request, social pressure, home delivery, midwifery continued model of approach differences owing to medical litigation need to be addressed. Research is required TPO evaluate the necessary interventions needed to be done in order to provide healthy mother and baby along with maintaining health care professional and health system demands.

Conclusion

In the AIMS, BG Nagara, Mandya, groups 1,2 and 5 were found to be the major contributors to the overall caesarean section rates according to Robson's ten group classification system. When primary CS rates are reduced by unnecessary intervention in the latent phase or early decision as failed induction, it automatically reduces the repeat CS rates and hence brings down the overall CS rates. Such a system can be used to identify the groups which project increase in the frequency, so that necessary interventions can be done and provide easy way of collecting information regarding CS rates.

Declarations

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Conflict of Interest: None Declared
Ethical Approval: Not required

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