



## Original Research Article

## Analysis of cesarean sections using Robsons classification system in a tertiary hospital in New Delhi

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## ABSTRACT

**Objective:** To analyze cesarean section rates using Robsons 10 group classification system in a tertiary hospital over a period of five years (July 2014-Dec 2018).

**Main outcome:** To analyze the main contributors of cesarean sections based on the ten groups under Robsons classification and to further analyze the main indications of cesareans in the relevant groups.

**Results and Discussion:** All women with one or more previous cesareans with cephalic presentation (group V) contributed to the maximum number of cesareans, (32.5%), closely followed by group I (22.86%) and group IIA (10.25%). 31.65% of the total cesareans were elective cases, 17.23% were in women with inductions and 51.1% of the cesareans were in spontaneously laboring women.

Robsons Ten Group Classification system (TGCS) found to be easy to understand, clear, mutually exclusive, reproducible system for classifying cesareans in all levels of Institutions. Among women who had elective cesareans, maximum were done in those in Group V who were not willing for TOLAC or those who has previous two cesareans. In spontaneously laboring women, 34% were due to meconium stained liquor and 32.9% were due to fetal distress, thus leaving a huge scope for reduction in cesarean rates.

**Conclusion:** All institutions should routinely monitor cesareans based on Robsons TGCS to monitor time trends and for interinstitutional comparisons. Interventions should be targeted at maximizing normal deliveries, reducing primary cesareans and offering TOLAC where possible. There should be institutional protocols for defining indications like fetal distress, nonprogress of labour, failed induction and protocols for their managements.

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### 1. Introduction

The Cesarean delivery rates have been on the rise in the last few decades throughout the world going upto 50-60% in many centers.<sup>1-4</sup> It is well known that an increase in cesarean deliveries (CD) does not necessarily improve maternal and neonatal outcome, whereas the number of maternal and neonatal complications has a huge economic fallout.<sup>5</sup> With the WHO focus on reducing cesareans, it has been recommended to classify all delivering women in a uniform, standard, reliable grouping system. Of the many proposed classification systems, WHO and FIGO have identified Robsons Ten Group Classification

System (TGCS) to be the most appropriate classification system to be used globally for monitoring, comparing and understanding cesarean rates over time and between different institutions.<sup>6-9</sup>

The aim of this study is to analyze cesareans using Robsons Ten Group Classification system (TGCS) and determine the groups which contribute the most to cesareans and the common indications within these groups. This will subsequently enable initiation of interventions in the identified groups to reduce the cesarean rates.

### 2. Materials and Methods

This retrospective study was carried out from Jul 2014 to Dec 2018 in a tertiary hospital attached to a private medical

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college of North India. The data was compiled according to Robson's TGCS of cesarean section. Gestational age was assessed using last menstrual period or early prenatal ultrasound where there was a doubt.

### 2.1. Data collection

For each cesarean done, data was entered from the Cesarean Delivery Register, maintained in the Labour ward and checked by the first author. Data pertained to maternal characteristics - age, history of CS, parity and gravidity, pregnancy-related information (gestational age, fetal presentation, number of fetus and onset of labour), indication of induction and the final indication of cesarean. Details were entered into Microsoft excel and analyzed. Cases with incomplete information were excluded. A total of 1990 records were analyzed.

### 3. Results

From May 2014 to Dec 2018 there were a total of 7994 deliveries, of which 2495 had cesareans accounting for an overall cesarean delivery rate of 31.29%. Of the 2495 cesarean deliveries, 1990 had complete documentation and were therefore included in the study. Of the 1990 cesareans, 630 were elective (31.65%).

Table 1 shows the distribution of cesareans in Robsons TGCS. All women with one or more previous cesareans (group V) had the maximum number of cesareans, (32.5%), closely followed by nulliparous women with spontaneous onset of labour at >37 weeks (group I), 22.86% and nulliparous women more than 37 weeks who were induced (group IIA), 10.25%. Demographic analysis showed that most of the women were from lower middle class and majority had some level of education ranging from 5<sup>th</sup> standard to graduation. Of these, 90.6% women were in the age group of 21-35 years of age.

Analysis of the elective cesareans (Table 2) showed that more than half (56.5%) were those who had one or more previous cesareans (Group V). 22.8% of elective cesareans were women not willing for Trial of Labour after cesarean (TOLAC) and 18.4% were those with two previous cesareans (Table 2). The second highest contribution (17.8% of elective cesareans) was by women with breech presentation (Group VI, VII).

Cesareans following inductions of labour accounted for 17.18% of the total cesareans and 25.14% of the nonelective cesareans (Table 3). Maximum inductions (27%) were done in view of medical disorders of pregnancy like gestational diabetes, Preeclampsia, Intrahepatic cholestasis of pregnancy (28.65%) etc, closely followed by prelabour rupture of membranes and preterm prelabour rupture of membranes (PROM, PPRM). In this group undergoing inductions the two most common indications of cesarean were failed induction of labour and fetal distress.

Analysis of the nonelective cesareans showed that in spontaneously laboring women, 34% of cesareans in Group I were due to meconium stained liquor and 32.9% were due to nonreassuring fetal heart patterns. Of the 291 women with previous cesarean who went into labour (spontaneously labouring Group V), there were 69 (23.7%) women who had signs and symptoms of imminent dehiscence like scar tenderness. However scar dehiscence was detected per operatively in only 16 women (approximately 5%). Other common indications in Group V were persistent tachycardia or bleeding per vaginum with fetal distress.

### 4. Discussion

Among the various classification systems for analysis of cesareans, the one by Robson and Denk has been found to be easy to understand, clear, mutually exclusive, reproducible and while also allowing prospective identification of categories.<sup>7</sup> After 2015, there have been many studies world over using the Robsons Ten Group Classification system (TGCS) to analyze cesareans. This is one of the first few studies in North India conducted in a medical college and associated hospital.

The maximum contributors of cesareans in this study were by Groups V,I and II in that order. This is similar to a study in Brazil which is comparable to India in terms of socioeconomic development. Women with a history of previous cesarean at term with cephalic babies (group V) and primiparous mothers, cephalic presentation and >37 weeks gestation (group I, IIA, IIB) were identified as a priority for three specific goals. First was the goal of achieving maximum natural births as it is a physiological event, second to avoid the first cesarean for better future obstetric implications and third to motivate more number of TOLACs (Trial of labour after cesareans).<sup>10</sup>

A study in Australia similarly noted highest rates of cesareans in Group V (previous cesarean with term cephalic babies) followed by I (primiparous mothers in spontaneous labour). The overall cesarean rate in the study was 23.5%. Women with previous cesarean (Group V) accounted for almost 46.3% of the total cesareans compared to 32% in the present study.<sup>4</sup> Women, beyond 37 weeks with cephalic presentation in spontaneous labour onset and women having previous cesareans (Groups I,III,V) were the primary contributors of cesareans in African countries, with a variation in the orders. The common indications were major APH and obstructed labour.<sup>11-13</sup> Inductions were low in many low income settings due to inadequate cesarean facilities.<sup>14</sup> In contrast, hospitals catering to high income groups had more cesareans in Group V (women with previous cesareans).<sup>15,16</sup> Most studies show that Group V is a major contributor in both low resource and high resource settings.<sup>17</sup> This emphasizes the importance of preventing primary cesareans.

**Table 1:** Robsons Ten Group Classification System (TGCS)

Class	Description	Total no. of patients N=1990	% contribution to the total CD (1990)
I	Nulliparous, single cephalic, >37 weeks in spontaneous labor	455	22.86
IIA	Nulliparous, single cephalic, >37 weeks induced	204	10.25
IIB	Nulliparous, single cephalic, >37 weeks, CS done before labour	41	2.06
III	Multiparous (excluding previous cs), single cephalic, >37 weeks in spontaneous labor.	147	7.39
IVA	Multiparous (excluding previous cs), single cephalic, >37 weeks induced	55	2.76
IVB	Multiparous (excluding previous cs), single cephalic, >37 weeks, CS before labour	24	1.20
V	Previous CS, single cephalic, >37 weeks	647	32.52
VI	All nulliparous breeches	101	5.08
VII	All multiparous breeches (including previous CS).	77	3.87
VIII	All multiple pregnancies (including previous CS).	45	2.261
IX	All abnormal lies (including previous CS).	28	1.41
X	All single, cephalic, <37 weeks (including previous CS).	166	8.34

**Table 2:** Distribution of elective Cesareans in different Robsons categories

Robson group	Description	No. of patients	% of total CD	% total elective CD (630)
IIB	Nulliparous, single cephalic, >37 weeks, CS done before labour	41	2.06	6.51
IVB	Multiparous (excluding previous cs), single cephalic, >37 weeks, CS before labour	24	1.21	3.81
V Elec	Previous CS, single cephalic, >37 weeks	356	17.89	56.51
VI Elec	All nulliparous breeches	71	3.57	11.27
VII Elec	All multiparous breeches (including previous CS)	42	2.11	6.67
VIII Elec	All multiple pregnancies (including previous CS)	28	1.41	4.44
IX	All abnormal lies (including previous CS).	28	1.41	4.44
X Elec	All single, cephalic, <37 weeks (including previous CS).	40	2.01	6.35
Total electives (A)		630	31.65829146	100

A study in a community center in India has examined cesareans over a decade. In it 10093 cesareans were analyzed and all deliveries were grouped under the Robsons TGCS. The largest contributor to total cesareans was I, V and III (37.62 %, 17.06 % and 15 %). This high numbers of Group V and less number of IIAs can be explained by the fact that the community centers usually cater to low risk women and have few inductions and TOLACs as in India referrals are more common in case of high risk mothers.<sup>18</sup>

In the present study 20% of all cesareans were done for non reassuring fetal heart patterns and 14.27% were done for meconium stained liquor. A lot of focus needs to be given in managing labour ward protocols at an institutional level keeping in mind the available manpower and technical resources. All meconium stained liquors or all nonreassuring fetal heart patterns do not necessarily need a cesarean. At the same time delay may increase

neonatal mortality and morbidity especially if skilled and adequate monitoring facilities are not available. Repeated training of residents on labour management and CTG interpretation needs to be done along with sensitization of all staff to reinforce normal delivery in patients. Fetal scalp blood sampling may help in decision making in cases of suspicious CTGs, though its availability is scarce. Fetal scalp stimulation may be used instead.<sup>19</sup> Use of infusion pumps help in correct titration of oxytocin dose and avoids hyper stimulation. Patients need to be sensitized about the advantages of normal deliveries, need for antenatal exercises and the need to avoid inductions unless indicated.

Women with previous cesareans accounted for almost a third (32.5%) of all cesareans. The most common indication in women with previous cesarean was refusal of TOLAC. These women and their families need to be educated about the success of TOLAC in selected cases.

**Table 3:** Percentage of spontaneously laboring patients and induced patients in different groups (excluding elective deliv) [All CD except elective CD (B) = Total CD- Elec CD(A).] =1990-630=1360

<b>Robsons with spontaneous labour</b>	<b>Description</b>	<b>No. of patients</b>	<b>% contribution to nonelective CD (B)=1360</b>
I	Nulliparous, single cephalic, >37 weeks in spontaneous labor	455	33.45
III	Multiparous (excluding previous cs), single cephalic, >37 weeks in spontaneous labor.	147	10.81
V	Previous CS, single cephalic, >37 weeks	242	17.79
VI	All nulliparous breeches	30	2.20
VII	All multiparous breeches	35	2.57
VIII	All multiple pregnancies	17	1.25
X	All single, cephalic, <37 weeks (including previous CS).	92	6.76
Total		1017	74.83
<b>Robsons with inductions</b>	<b>Description</b>	<b>No. of patients</b>	<b>% contribution to nonelective CD (B) =1360</b>
IIA	Nulliparous, single cephalic, >37 weeks induced	204	15
IVA	Multiparous (excluding previous cs), single cephalic, >37 weeks induced	55	4.04
V(induced)	Previous CS, single cephalic, >37 weeks	49	3.60
X(induced)	All single, cephalic, <37 weeks (including previous CS).	34	2.5
Total		343	25.14

The mode of delivery should be discussed antenatally in the third trimester. As spontaneous onset of labour is the best predictor of success of TOLAC, selected women may be convinced for TOLAC in case of spontaneous onset of labour and to wait till 41 weeks before termination. A careful supervision in both antepartum, intrapartum and postpartum periods and availability of adequate CTG monitoring are very important in women of Group V.

Cesareans accounted for 5% and 3.8% of the total cesareans done in primiparous and multiparous breech (groups VI and VII) respectively. While most obstetricians have a guarded attitude regarding vaginal delivery in primiparous breech, a trial can be given in selected cases of multiparous women. In this study however more than half (54.54%) of multiparous breech cesareans (group VII) were elective. Majority of the elective cases in this group (32.4% of cesareans in multiparous breech) were done in view of previous cesarean with breech and the rest 22% were done in view of indications like fetal distress, non progress of labour and footling breech.

Cesareans done for breech presentation can be reduced by training residents in the art of breech delivery and external cephalic versions in the antenatal period. A reasonable attempt of vaginal delivery can be given to late preterm breech as well.

Multiple studies have shown that labour inductions directly increase the likelihood of cesarean deliveries. In the present study, 17.1% of the cesareans were those with inductions. The most common indication of cesarean

in this group was failure of induction. This highlights the importance of weighing the risk of continuation of pregnancy versus the risk of cesarean in case of induction. Inductions need to be done only when indicated. Induction for postdatism should be done at 41 weeks. In order to reduce cesareans in this class it is more important to review the indications of inductions rather than indications of cesareans alone.

Classification under the Robsons TGCS is the first step on the path to reduce cesarean rates. It is only through periodic analysis using the classification that relevant group specific measures can be introduced and after the changes are implemented, subsequent audit should analyze the impact. The major pitfall of Robsons TGCS is that it does not take into account the neonatal morbidity or any maternal high risk factors like a history of infertility, recurrent pregnancy losses or medical disorders like preeclampsia, GDM and others. Thus analysis of the cesareans need to go beyond the numbers and take into account the additional maternal and neonatal morbidity. In this era of informed decision taking by the patient, the concept of cesarean on demand comes in grey zone. A system where a second opinion or a second counselling by another obstetrician is available within the department has been found to reduce cesareans on demand and motivating women for TOLAC.<sup>20</sup>

The strength of the study is that the study has been conducted over few years thus balancing out seasonal variations. This study also documented the number of inductions in Group V and X, thus enabling a further insight

into how to reduce cesareans in these subgroups.

Weakness of the study is that this study does not have the total number of patients in each subgroup, thus a group specific cesarean rate has not been calculated, which may have been more informative and specific. Moreover any analysis without accompanying perinatal data is incomplete.

Future studies should focus on group specific cesarean rates. A prospective study will be more informative than a retrospective one. Interventions to reduce cesareans should be implemented and then followed by evaluating change.

## 5. Conclusion

All deliveries and cesareans should be universally categorized by the Robsons TGCS. Groups contributing most to cesareans should be analysed regularly and interventions initiated. Those interventions should be targeted at reducing primary cesareans and convincing patients for TOLAC where possible. Institutional protocols for defining situations like fetal distress, non progress of labour and failed induction should be available. Inductions should be done only when necessary. A regular audit should be done in all institutions to rationalize cesarean rates. Impact of interventions to reduce cesarean rates should be studied and documented.

## 6. Source of funding

None.

## 7. Conflict of interest

None.

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