



ANALYSIS OF CAESAREAN SECTION USING ROBSON TEN GROUP CLASSIFICATION SYSTEM IN A TERTIARY CARE HOSPITAL OF KOLKATA

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ABSTRACT

Introduction:-Caesarean section is the procedure in which an incision is given into the abdomen and uterus through which the babies are extracted.

Aims and Objectives- To analyze Caesarean section (CS) rates using Robson Ten Group Classification System (TGCS) at the National Medical College And Hospital, Kolkata.

Material and Methods:-A cross sectional Analytical study was done among 1704 patient delivered either vaginally or caesarean section during a year (May 1, 2012, to April 31, 2013) in Obstetrics and Gynaecology department of National Medical College And Hospital.

Result-During May-2012 to April 2013 there were 1704 women who gave birth in unit-II of CNMCH of whom 96(56.87%) had a vaginal delivery and 735 had caesarean section (40.4%).

Conclusion:-Overall Caesarean section rate is 40.4%. The rates of caesarean section did not vary significantly among booked and referred cases. According to Robson TGCS Group 1, 3, and 5, forms the largest group

KEYWORDS : Caesarean Section , Robson Ten Group Classification, Analysis of Caesarean Section

INTRODUCTION

Caesarean section is the procedure in which an incision is given into the abdomen and uterus through which the babies are extracted. The origin of the word caesarean is unclear. It is likely that the term comes from the law called lex caesarea under the ruling of caesars. This law proclaimed that women who died before delivering their infant, had to have the infant removed through the abdomen before burial.[1] Zaandam and Holland in 1647 reported a case in which a bull attacked a farmer and his wife tearing open her abdomen and uterus with its horn. The woman and her husband died later but the infant survived. [2] In Northern Ireland in 1738 Mary Donnelly carried out the first Caesarean section with survival of the mother in the British Isles.[3] Jeremias Trautmann in Wittenberg, Germany in 1610 was first physician to performed Caesarean section.[1] Munro Kerr was first to performed transverse lower segment caesarean section in 1911.[4]

As techniques such as a low transverse scar, that increased the safety of caesarean delivery were used more often, new features of foetal monitoring and ultrasound diagnostics were introduced and medico-legal pressures on physicians increased, indication for caesarean birth were liberalized. But its inappropriate use can be a direct and avoidable cause of maternal mortality and morbidity. After declining for many years in the 1990s the caesarean rate peaked at 28% in 2006, the highest percentage ever reported in the USA. [5] Caesarean section rates vary worldwide with rates ranging from 21.5% in Britain [5] to 31.1% in 2006 in USA [6] with some Latin American [7, 8] countries going as high as 40%. Similar trends have also been documented in India, according to ICMR study conducted in 30 teaching hospitals in India; there is an increase in Caesarean section rates from 21.8% in 1993-1994 to 25.4% in 1998-1999.[9] In National Family Health Survey caesarean section rate increases from 2.9% (1992-1993) to 10.6% (2005-2006) in India. The mean caesarean section rates in Asia and the Oceania regions are estimated to be 15.9 and 14.9% respectively, with Nepal having the lowest estimated rate of 1% and Sri Lanka having an estimated caesarean section rate of 30.6%. [7, 10] Caesarean section rates have been found to vary from 20 to 38% and 47% in public, charitable and private sector clinics in India.[11] In Latin America the median caesarean section rate in private hospitals was found to be 51% (quartile range 43-57). In certain centres in Brazil, caesarean section rates of 70 to 80% have been reported.[12]

To address concerns over rising rates of caesarean section and to provide a mechanism for audit and feedback, our aim is to use Ten

group classification system (TGCS) to examine caesarean section within mutually exclusive groups of women with particular obstetric characteristics.

AIMS AND OBJECTIVES

To analyze Caesarean section (CS) rates using Robson Ten Group Classification System (TGCS) at the National Medical College And Hospital, Kolkata

MATERIAL AND METHODS

A cross sectional Analytical study was done among 1704 patient delivered either vaginally or caesarean section during a year (May 1, 2012, to April 31, 2013) in Obstetrics and Gynaecology department of National Medical College And Hospital.

Inclusion criteria:-

- A. Category of pregnancy
 - a. Single (cephalic, breech, oblique or transverse lie)
 - b. Multiple pregnancy
- B. Previous obstetrics records
 - a) Nulliparous
 - b) Multiparous (with and without Previous Caesarean section)

Detailed obstetrics and medical history taken relating to age, parity, menstrual history, contraceptive history, drug history, personal history and family history, history of present complaint, any complication during present pregnancy. A thorough general clinical and obstetric examination was done to find out any risk associated. Ultrasonography done if required. Type and outcome of delivery noted. Data were collected in every post admission day and arranged in two groups - vaginal delivery and caesarean delivery according to Robson TGCS, and compiled every month after taking written informed consent. Maternal and neonatal status were recorded during discharge. Template was generated in MS Excel and was analysed using SPSS Version 20.

RESULT

During May-2012 to April 2013 there were 1704 women who gave birth in unit-II of CNMCH of whom 969 (56.87%) had a vaginal delivery and 735 had caesarean section (40.4%). Total women admitted electively from antenatal clinic and emergency obstetrics unit of this department.

Table 1 : Distribution of patient according booking status

	Booked case	%	Unbooked case	%	Referred case	%
Vaginal delivery	477	27.99	66	3.87	426	25
Caesarean section	362	21.24	27	1.58	346	20.3
Total	839	49.23	93	5.45	772	45.3

Total women in this study were 1704, total CNMCH booked case were 839 (49.23%), out of which vaginal delivery (assisted and operative) was 477 (27.99%) and caesarean section was 362 (21.24%).[Table.1].

Unbooked case (who were neither referred nor booked case of other institution and attending first time in emergency obstetric of this department) were 93(5.45%), out of which vaginal delivery (assisted and operative) was 66 (3.87%) and caesarean delivery was 27 (1.58%).[Table.1].

Referred case was 772 (45.3%), out of which vaginal delivery (assisted and operative) was 426 (25%) and caesarean section was 346 (20.3%)[Table.1]

Table 2: Robson TGCS showing number of vaginal and caesarean delivery

Group	Classification	Number of vaginal delivery	%	Number of caesarean delivery	%
1	Nulliparous, single cephalic, ≥37 weeks, in spontaneous labour	378	22.18	271	15.9
2	Nulliparous, single cephalic, ≥37 weeks induced (including prelabour Caesarean section)	45	2.64	69	4.04
3	Multiparous (excluding previous Caesarean section) , single cephalic, ≥ 37 weeks, in spontaneous labour	296	17.37	96	5.63
4	Multiparous (excluding previous Caesarean section) , single cephalic, ≥ 37 weeks, induced (including prelabour Caesarean section)	37	2.17	19	1.11
5	Previous Caesarean section , single cephalic, ≥37 weeks	7	0.41	155	9.09
6	All nulliparous breech	11	0.64	21	1.23
7	All multiparous breech (including previous Caesarean section)	10	0.58	13	0.76
8	All multiple pregnancies (including previous Caesarean section)	12	0.7	18	1.05
9	All transverse / oblique lies (including previous Caesarean section)	0	0	7	0.41
10	All preterm single cephalic, < 37 weeks, including previous Caesarean section	173	10.15	66	3.87

Table 2 showing number of vaginal and caesarean delivery in Robson TGCS, Group 1 is the largest contributor- vaginal delivery (22.18%) and caesarean delivery (15.9%), group 3 and group 10 is the second and third largest contributor, where vaginal delivery is more than caesarean section than in group 1. Fourth largest

contributor is Group 5, where VBAC is negligible. In induced group (nulliparous & multiparous) contribution of caesarean section is more in group 2 and vaginal delivery is more in group 4. In group 6, 7 and 8 caesarean delivery is more than vaginal delivery and in group 9 there is 100% caesarean delivery.

Table.3 Monthly number of CS in each Robson group (% contribution)

Month	TCGS 1(%)	TCGS 2(%)	TCGS 3(%)	TCGS 4(%)	TCGS 5(%)	TCGS 6(%)	TCGS 7(%)	TCGS 8(%)	TCGS 9(%)	TCGS 10(%)	Total CS(%)	Total delivery
May	14(14.52)	6(5.12)	8(6.83)	1(0.85)	11(9.4)	1(0.85)	1(0.85)	1(0.85)	1(0.85)	2(1.7)	49(41.88)	117
June	36(19.35)	6(3.22)	12(6.45)	6(3.22)	12(6.45)	2(1.07)	1(0.53)	2(1.07)	1(0.53)	9(4.83)	87(46.77)	186
July	22(14.56)	8(5.29)	13(8.6)	2(1.32)	14(9.27)	3(1.98)	3(1.98)	0	0	6(3.97)	71(47.01)	151
August	26(15.02)	3(1.73)	9(5.2)	1(0.57)	20(11.56)	2(1.15)	3(1.73)	4(2.31)	0	6(3.46)	74(42.77)	173
September	30(20.97)	1(0.69)	8(5.59)	0	11(7.69)	0	2(1.39)	1(0.69)	0	5(3.49)	58(40.55)	143
October	26(18.05)	8(5.55)	6(4.16)	0	9(6.25)	1(0.69)	0	1(0.69)	0	9(6.25)	60(41.66)	144
November	18(10.4)	5(2.89)	12(6.93)	1(0.57)	18(10.4)	6(3.46)	0	4(2.31)	2(1.15)	5(2.89)	71(41.04)	173
December	21(12.88)	12(7.36)	7(4.29)	5(3.06)	17(10.4)	0	0	2(1.22)	1(0.61)	5(3.06)	70(42.94)	163
January	18(14.75)	8(6.55)	5(4.09)	2(1.63)	9(7.37)	4(3.27)	0	0	2(1.63)	7(5.73)	55(45.08)	122
February	20(19.23)	4(3.84)	6(5.76)	1(0.96)	8(7.69)	1(0.96)	1(0.96)	1(0.96)	0	6(5.76)	48(46.15)	104
March	17(17.52)	2(2.06)	7(7.21)	0	13(13.4)	0	1(1.03)	1(1.03)	0	4(4.12)	45(46.39)	97
April	20(15.26)	6(4.58)	3(2.29)	0	13(9.92)	1(0.76)	1(0.76)	1(0.76)	0	2(1.52)	47(35.87)	131

Table 3. shows the total number of deliveries occurring from May 2012 to April 2013 were varying from (minimum) 97 – (maximum) 186, with caesarean section rate varying from 35.87% (April) to 47.01% (July).The caesarean section performed in group 1,2,3 and 10 are likely to result in a larger group 5 in the future if those women

have further pregnancies. Therefore unnecessary caesarean section in group 1, 2 and 3 must be avoided .Caesarean section rate rising in the month of July, then making a dip and plateau and again rising from the month of December, making peak at march.

Table 4: Rate of Caesarean section by Robson classification group

Robson Group	A Delivery	B Number of caesarean delivery	C Relative size of the group (A/Total obstetrical population) × 100%	D Caesarean section rate in each group (B/A) × 100%	E Contribution of each group to overall CS rate (B/Total obstetrical population) × 100%
1	649	271	38.08	41.75	15.9
2	114	69	6.69	60.52	4.04
3	392	96	23	24.48	5.63
4	56	19	3.28	33.92	1.11
5	162	155	9.5	95.7	9.09
6	32	21	1.87	65.62	1.23
7	23	13	1.34	56.52	0.76
8	30	18	1.76	60	1.05
9	7	7	0.41	100	0.41
10	239	66	14.02	27.61	3.87

Table 4 gives full view of relative size of each group and caesarean section rate within each group and contribution of each group to the overall caesarean section rate. Of these ten groups relative size of the group in descending order were Group 1 (38.08%), Group 3 (23%), Group 10 (14.02%), Group 5 (9.50%) and Group 2 (6.69%).

Caesarean section rate in group 9, shows 100% caesarean section as its represent transverse or oblique lie where caesarean section is necessary, most patient in this Group are referred case. Caesarean section rate of 95.67% in Group 5 revealing negligible VBAC. In induced labour group, group 2 (nulliparous) is of concern as caesarean section rate in this Group is 60.52% and in group 4 is 33.92% [Multiparous (excluding previous Caesarean section), single cephalic, ≥ 37 weeks, induced (including prelabour Caesarean section)].

The largest contributing group was Robson Group 1 (nulliparous women with a term, singleton, cephalic- pregnancy who had spontaneous labour) accounted for 38.08% of the total obstetric population (Table 5). Caesarean section rate in this group is 41.75%, with CS rates contributing to the overall caesarean section rate 15.9%, with caesarean section rate ranging from (maximum in the month of September) 20.97% - (minimum in the month of November) 10.40% Table 3. Thus this is the largest group making large contribution to the overall CS rate. Robson Group 5 (Previous Caesarean section, single cephalic, ≥ 37 weeks) made the second largest contribution to the overall caesarean section rate-9.09%. This group accounted 9.50% (Table 5) of the total obstetric population, with caesarean section rate ranging from (March) 13.40% - (October) 06.25%. (Table 4). Caesarean section rate in this group is 95.67%.

Robson Group 3 (Multiparous (excluding previous Caesarean section), single cephalic, ≥ 37 weeks, in spontaneous labour) made the third largest contribution to the overall rate of Caesarean section - 5.63% This group accounted for 23% (Table 5) of the total obstetric population, with caesarean section rate ranging from (July) 08.60% - (April) 02.29%. (Table 4)

Robson Group 2 (Nulliparous, single cephalic, ≥ 37 weeks induced (including prelabour Caesarean section) is fourth contributor - 4.04% to the overall caesarean section, accounting 6.69% of the total obstetric population (Table 5), with caesarean section rate ranging from - (December) 07.36% - (August) 01.73%. (Table 4).

Robson Group 10 (All preterm single cephalic, < 37 weeks, including previous Caesarean section) is fifth - 3.87% to overall caesarean section, accounting 14.02% of the total obstetric population (Table 5), with caesarean section rate ranging from (October) 06.25% - (April) 01.52%. (Table 4)

Relative size of Robson Group 6 (nulliparous women with breech presentation, irrespective of gestational age) is 1.87% with caesarean section rate contributing to group is 65.62%, but overall contribution in caesarean section rate is 1.23%, its because of study published showing reduction in maternal and fetal outcome is better if we do caesarean section.

Group 6, 7, 8, and 9 contribution to overall caesarean section rate is very less and thus influence to caesarean section rate are not relevant.

DISCUSSION

Present study done at the department of Obstetrics and Gynaecology in a tertiary care teaching hospital run by the Department of Health and family welfare, government of West Bengal, India. This hospital is situated in southern part of Kolkata. This hospital provides service to women free of cost & most of the patients attending this hospital, residing in suburbs and north and south 24 parganas district. This study showed - rate of caesarean delivery was significantly more commonly among booked cases than among un-booked cases ($z = 2.51$ $p = 0.012$). The rate of

caesarean section was also significantly higher among referred cases than among un-booked cases ($z = 2.80$ $p = 0.005$). However the rates of caesarean section did not vary significantly among booked and referred cases ($z = 0.64$ $p = 0.524$).

Availability of good quality emergency services in the management of these women, probably is the only explanation for comparable obstetric outcome in both the groups. Majority of booked cases attending this hospital were high risk group, therefore they ended in caesarean section. Similarly majority of referral cases admitted through emergency needed immediate operative delivery. These shows antenatal clinic may not be the absolute care centre in pregnancy unless emergency obstetric care is available. Caesarean section rate in the present study is 40.4% (May 2012 - April 2013). This rate is similar and comparable to Latin America (35.4%) [13], Brazil (45.9%), Iran (41.9%) [14], Italy (38.2%), Dominican Republic (41.9%) [15].

In states like Andhra Pradesh, Kerala and West Bengal over 30 percent of the delivery in urban areas takes place through caesarean section. [16] A five-year audit from a large teaching hospital in Kolkata showing a caesarean section rate of 49.9 per cent. [17] West Bengal has the highest Caesarean section rate of 32.50 for the urban regions. [18] The high caesarean section rate in this hospital may be partially attributed to the fact that this being a referral hospital gets a larger proportion of complicated, neglected, unbooked pregnancies. Robson classification system has recently been used to make international comparisons in caesarean section rates. In multicentre studies in Latin America (120 hospitals in eight countries) [13] and North America, Europe, Australia, and New Zealand (nine hospitals in nine countries), [19] the classification system was easily implemented across different countries, hospital sites, and data collection systems, suggesting it is a robust and useful tool for ongoing surveillance. [19]

Table-4 showed that Groups 1 and 3 were the two largest groups of women admitted for delivery and contribute 50% (49.93%) to the overall caesarean section rate. Relative size of these group are in accordance to other studies while contribution to overall caesarean section rate is low. Group 1 (nulliparous women with a singleton fetus in the normal cephalic position entering labour spontaneously at term) constitutes the largest group among all delivering women representing, in this study 38.08% of the obstetric population and makes the biggest contribution to the overall caesarean section rates (15.9%), is consistent with the study done in Raipur, India (10%). [20] While this group ranked second (Latin America [13], Iceland), third (England, Australia, Canada), and fourth (Dublin) [19]. In this group, women are less likely to have medical indications for caesarean section, but it may be required for complications of labour such as dystocia, fetal distress, maternal disease or maternal request. The caesarean section rate in this group can be expected to be relatively low as its found in other study. Therefore this group should be focussed more in intrapartum period in an attempt to reduce caesarean section rate. Third largest contributor to the overall caesarean section rates (5.63%) is Group 3 (multiparous women with no previous Caesarean section, a term, singleton, cephalic-presenting pregnancy, and spontaneous labour), and fourth largest contributor in study done in Raipur, India (1.6%) and Latin America.

Compared with other groups, these women are less likely to have obstetric indications for caesarean section since they present very low risk in general. Hence, the caesarean section rate in this group can be expected to be low. If a rise in caesarean section rate is observed in this group, it could indicate that caesarean section is being performed without a medical reason or that women are being misclassified with regard to their history of caesarean delivery. In fact, group 3 is normally so low risk and such a standard management is usually applied that it could be used to assess the quality of the data collection regarding this classification. [13] Therefore this group also need attention in intrapartum period in an attempt to reduce caesarean section rate. Group 5, women

with a previous caesarean section and a single fetus in normal cephalic presentation at term is the second largest contributor to the overall caesarean section rate 9.09% and in terms of relative size of group its fourth largest. Caesarean section rate in this group is 95.67 % thus VBAC is negligible. This group is the most common overall indication for caesarean section worldwide.[21] This finding is similar to Raipur study and in contrast to other study where its largest contributor to overall cs rate. In the first half of the 20th century, a woman who had a caesarean section was likely also to deliver by caesarean section in subsequent pregnancies.[22]Currently, the rate of caesarean section is many times higher among women who have had a previous caesarean section (Table 6, Robson Group 5), and this group makes a substantial contribution to the overall rate of caesarean section. In a context of overall increase of caesarean section rates, this group 5 needs to be analysed critically because as caesarean section rates increase in the other groups, group 5 will increase its size and therefore it will become an even more important contributor to the overall caesarean section rate. However, reducing caesarean section in this group is likely to be most difficult because having a previous delivery by caesarean section increases the likelihood of caesarean delivery in the next pregnancy. Therefore, the best way to reduce the overall rate of caesarean section in these groups is to prevent the first caesarean section. For women who have had a previous caesarean section, a movement to prevent repeat caesarean section was largely driven by mothers supporting vaginal birth after Caesarean section. They helped to influence change in standard medical practice, and rates of VBAC rose in the 1980s and early 1990s.[23] A major turning point occurred in 1996 when a well-publicized Nova Scotia study reported that vaginal delivery after previous caesarean section resulted in more maternal complications than did repeat caesarean section. [24] Subsequent logistical and liability concerns led many hospitals to enact overt or de facto bans of VBAC. As a result, the rate at which VBAC was attempted fell from 28.3% in 1996 to less than 10% in 2010. [23] There were controversial findings on the risks and benefits of trial of labour and elective repeat caesarean section, and little or no evidence on short- or long-term neonatal outcomes after trial of labour compared to elective repeat caesarean section. [25] In contrast enhanced access to VBAC has been recommended based on current findings on the safety of VBAC compared to repeat caesarean section, indicating that 60% to 80% of women can achieve a safe vaginal delivery after a previous lower uterine segment caesarean section. [26]Fourth largest contributor to overall caesarean section is Group 2 (5.4%).Caesarean section rate in this group is 60.52 % , and it's a matter of concern .In other study these group is second and third largest. These high caesarean section rates indicate that a considerable proportion of women either had a high incidence of conditions that required labour induction (such as pre-eclampsia at term) or had elective labour inductions and pre-labour caesarean section for the sake of convenience or other potentially non-medical reason. Clearly, these groups would need to be investigated in more detail to understand the exact reasons of the high rates and take appropriate action. By reviewing the indications for ending the pregnancy before spontaneous labour (i.e. by caesarean section before labour and labour induction) and how labour induction was managed in these women, one could identify gaps in the application of evidence-based clinical practices and potentially reduce unnecessary caesarean section in these groups. Persistent demand of caesarean delivery by the women before labor, despite of informed counselling with risk benefit analysis. The consumer in this group were nursing staff, medical professionals and their close relation.

Fifth largest contributor to overall caesarean section is Group 10 (3.87 %).cs rate in this group is 27.61 %. This is comparable to other study - Raipur, latin America, Dublin, Canada. They mainly present with PROM, Antepartum haemorrhage, loss of fetal movement, scar tenderness in a post/repeat caesarean section. In group 6, these women was either attending obs. emergency or referred lately were in advanced stage of labor and delivered vaginally safely. caesarean section rate contributing to group is 65.62%, but overall

contribution in caesarean section rate is 1.23%, its because of study published showing reduction in maternal and fetal outcome is better if we do caesarean section. Owing to their obstetric factors such as multiple pregnancies, breech presentation, transverse or oblique lie, women in the groups 6 to 9 can be expected to have higher caesarean section rates. However, the contributions of these groups to the overall caesarean section rate would be low, considering the size of this population. One further point in relation to group 9 is that by definition this group should have a caesarean section rate of 100% and therefore, it is also a group that can be used to assess the quality of data collection. Its interesting to note that in this study Group 1, 3, and 5, forms the largest group, whereas in other study group 5 forms the largest. May be in future if study carried out women in Group 1 and 3 are likely to result in a larger group 5. The present study has limitations, as the design of the study did not include intervention to see whether VBAC will reduce overall caesarean section in Group 5 as it is the second largest contributor in the study. This study revealed progressive rise in caesarean section in group 1 and 3 had direct impact in the rise of group 5.

The present study did not include further stratification of each of the 10 groups of women. However, this would be advisable in countries or institutions attempting to understand practices in certain obstetrics groups and their related levels of caesarean section. The classification presents the flexibility to allow for this stratification. Particularly, groups 2, 4, and 5 can benefit from subdivision into those women who had labour induced and those who were delivered by pre-labour caesarean section. Another useful subdivision would be in group 5, where women with previous uterine scars could be subdivided into those with only one previous caesarean section, and women with two or more previous caesarean section. Additionally, the study of outcomes and characteristics of women with multiple caesarean section could also provide evidence and assist to understand potential adverse effects of caesarean section in these women, a group that could be possibly growing in developing countries. Furthermore, this classification can embed the indications for caesarean section classification in the sense that indications can be applied within the different groups. Other in-depth analysis could also stratify women in each group by other risk factors or medical conditions, age, race, BMI, among others. 10-group classification has been used in different countries worldwide. It proved to be a practical and easy way of identifying the main groups of women who most contribute to the overall rate of caesarean section. Since this classification is based upon well defined parameters, inconsistencies in classification are very unlikely.

CONCLUSION

Overall Caesarean section rate is 40.4%. The rates of caesarean section did not vary significantly among booked and referred cases. According to Robson TGCS Group 1, 3, and 5, forms the largest group.

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