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Original Research Article

Changing trends and determinants of caesarean section using robson criteria in a government tertiary level hospital

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ABSTRACT

Background: Robson Ten group classification system (TGCS) was proposed by World Health Organisation in 2014 for assessing, monitoring and comparing caesarean section rate between and within healthcare facilities. This tool was used in this study to analyse the determinants of caesarean section and compare with data of past.
Methods: This observational comparative study was conducted at tertiary level hospital and included in study group A, 300 women delivered by caesarean section from November 2018 to November 2019 and in study group B, 300 women delivered by caesarean section from November 2015 to December 2016. The caesarean sections were classified as per TGCS to determine relative and absolute contribution made by each group to the overall caesarean section rate. The results were analysed to for determinants and change in trend.
Results: In this study, the caesarean section rate in group A was 29.32% and group B was 28.03%. Group 2, 5, 1, 10 made the maximum contributions to overall caesarean section rate in both study groups. Group 2 was the largest contributor (25.00%) in study group A and 27.33% in study group B to overall caesarean sections.
Conclusions: Implementing Robsons TGCS can help in comparing caesarean in an institution over a period of time and also among different institution at national and international level as a method of internal auditing, paving a way to rationalise and decrease Caesarean rate.

Keywords: Caesarean section, Changing trend in caesarean rate, Robson criteria

INTRODUCTION

The crude rate of caesarean section is an important global indicator for measuring approach to obstetric services and determinants of rising caesarean section worldwide are controversial. After systematic reviews (2011 and 2014), WHO recommended Robson Ten-group classification system (TGCS) as global standard for assessing, monitoring and comparing caesarean section rate.

This classification classifies women into ten groups that are mutually exclusive and totally inclusive. Robson classification has been now used to analyse trends and determinants.[1-5] This study was done to analyse the determinants and compare the current caesarean section with trends in past using TGCS in our tertiary level Government Hospital.

METHODS

This observational comparative study was conducted in labour room and maternity ward in Department of Obstetrics and Gynaecology, Dr. RML Hospital, New Delhi. The two groups were:

Group A

A total 300 consecutive women (prospective) underwent caesarean section (elective/emergency) from November 2018 till November 2019 fulfilling inclusion criteria.

Group B

A total 300 consecutive women (retrospective) who underwent caesarean section from November 2015 to December 2016.

Table 1: Classification of caesarean in TGCS.

Group 1 - Nulliparous, singleton, cephalic, term, in spontaneous labour.
Group 2 - Nulliparous, singleton, cephalic, term, induced labour or Caesarean section before labour.
2a - Nulliparous, singleton, cephalic, term, induced labour.
2b - Nulliparous, singleton, cephalic, term, caesarean section before labour.
Group 3 - Multiparous, singleton, cephalic, term, without a previous caesarean section, Spontaneous labour.
Group 4 - Multiparous, singleton, cephalic, term, without a previous uterine scar, induced labour or by CS before labour.
4a- Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, term, induced labour.
4b- Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, term, caesarean section before labour.
Group 5 - Multiparous, singleton, cephalic, term with a previous caesarean section.
5.1- Multiparous, singleton, cephalic, term with a previous 1 caesarean section.
5.2- Multiparous, singleton, cephalic, term with a previous 2 caesarean section.
Group 6 - Nulliparous, singleton, breech.
Group 7 - Multiparous, singleton, breech (including previous caesarean section).
Group 8 - Multiple pregnancy (including previous caesarean section).
Group 9 - Singleton, transverse or oblique lie (including those with previous caesarean section).
Group 10 -Singleton, cephalic, preterm (including previous caesarean section).

Distributions of all caesarean sections in both groups was classified as per Robson's TGCS as shown in Table 1. Total number of deliveries, caesarean section and normal vaginal deliveries were noted during the two study periods in group A and group B respectively to calculate caesarean section rate and overall contributions of caesarean section rate. The retrospective data of 2015-16 was collected from hospital records

Statistical analysis

Percentage of patients in each group of Robson's criteria of caesarean section in both study groups were noted, compared and analysed. The data were entered in MS Excel sheet and Statistical analysis was done using statistical package for social sciences (SPSS) version 21.0. A chi-squared test was used and p value of <0.05 was considered statistically significant. The following definitions with calculation were used in our study. Group size (%) = number of women in each group /total no of women delivered ×100. Relative contribution of each group to overall caesarean section rate (%) = number of caesarean sections in each group / total no of caesarean section × 100.

Absolute contribution of each group to overall caesarean section rate (%) = number of caesarean sections in each group / total no of women delivered in study group × 100. Caesarean section rate (%) = number of caesarean sections in each group / total no of women in group× 100.

RESULTS

Maternal characteristics of the two groups

We found similar age groups in our study groups A and B, mean age being 28.31 and 28.63 years respectively (p value not significant). Literacy level above 10 th class was 97 % and 90 % respectively and 42 % and 45 .33% of patients were primigravida (p value not significant) in both study groups respectively.

TGCS in study population A

In our study population, study group A had 1023 total deliveries and out of which 300 women (retrospective) underwent caesarean section from November 2018 – November 2019.

Group size in study group A was maximum for group 2, 4, 3 and 5 forming 64%. In decreasing order the size was group 2 (19.06%), 4 (18.77%), 3 (17.89%), 5 (17.3%), 1 (11.63%), 10 (9.38%), 6 (2.54%), 7 (1.76%), 8 (1.08%), 9 (0.59%) (Table2).

Caesarean section rate in in study group A: In TGCS group 2b, 4b, 5. 2 and 9, it was 100% (would always remain so) and the following in decreasing order 6 (88.46%), 8 (81.82%), 7 (72.22%), 5 (39.55%), 2 (38.46%, 10 (30.21%,), 1 (29.41%), 4 (12.50%), 3 (8.74%) (Table2). In group 5.1 it was 87.14 %(Table3)

Relative contribution to overall caesarean section rate, in decreasing order was as follows; group 2 (25%), 5 (23.33%), 1 (11.67%), 10 (9.67%), 4 (8.00%), 6 (7.67%), 3 (5.33%), 7 (4.33%), 8 (3%), 9 (2%) (Table 2)

Absolute contribution to overall caesarean section rate in decreasing order was as follows: group 2 (7.33%), 5 (6.84%), 1 (3.42%), 10 (2.83%), 4 (2.35%), 6 (2.25%), 3 (1.56%), 7 (1.27%), 8 (0.88%), 9 (0.59%) (Table 2).

Table 2: Distribution of caesarean section rate (%), group size (%), relative and absolute contribution made by each TGCS group to overall caesarean section rate in study group A (November 2018 – December 2019).

Robson's group	Total number of caesareans in each group	Total Number of women in each group	Group size (%)	Group caesarean rate (%)	Relative contribution made by each group to overall caesarean section rate (%)	Absolute contribution made by each group to overall caesarean section rate (%)
1	35	119	11.63	29.41	11.67	3.42
2 (2a+2b)	75	195	19.06	38.46	25.00	7.33
2a	60	180	17.59	33.33	20.00	5.87
2b	15	15	1.47	100.00	5.00	1.47
3	16	183	17.89	8.74	5.33	1.56
4 (4a+4b)	24	192	18.77	12.50	8.00	2.35
4a	19	187	18.28	10.16	6.33	1.86
4b	5	5	0.49	100.00	1.67	0.49
5 (5.1+5.2)	70	177	17.30	39.55	23.33	6.84
5.1	61	168	16.42	36.31	20.33	5.96
5.2	9	9	0.88	100	3.00	0.88
6	23	26	2.54	88.46	7.67	2.25
7	13	18	1.76	72.22	4.33	1.27
8	9	11	1.08	81.82	3.00	0.88
9	6	6	0.59	100.00	2.00	0.59
10	29	96	9.38	30.21	9.67	2.83
	300	1023	100		100	29.32

Table 3: Comparison of TGCS group 5.1 and 5.2 in the two study groups.

Group 5 distribution	Study group A	Study group B
Group 5.1. Previous 1 caesarean section	61/70 (87.14%)	60/73 (82.19%)
Group 5.2. Previous2 or more caesarean section	9/70 (12.86%)	13/73 (17.80%)

Table 4: Distribution of caesarean section rate (%), group size (%), relative and absolute contribution made by each TGCS group to overall caesarean section rate in study group B (November 2015 – December 2016).

Robson's group	Total number of caesareans in each group	Total Number of women in each group	Group size (%)	Group caesarean rate (%)	Relative contribution made by each group to overall caesarean section rate (%)	Absolute contribution made by each group to overall caesarean section rate (%)
1	36	120	11.21	30	12.00	3.36
2 (2a+2b)	82	198	18.50	41.41	27.33	7.66
2a	64	180	16.82	35.56	21.33	5.98
2b	18	18	1.68	100	6.00	1.68
3	10	240	22.44	4.17	3.33	0.94
4 (4a+4b)	17	142	13.27	11.97	5.67	1.59
4a	11	136	12.71	8.09	3.67	1.03
4b	6	6	0.56	100	2.0	0.56
5 (5.1+5.2)	73	185	17.29	37.46	24.33	6.82
5.1	60	172	16.07	34.89	20.00	5.61
5.2	13	13	1.22	100	4.33	1.21
6	21	30	2.80	70	7.00	1.96
7	9	15	1.40	60	3.00	0.84
8	10	16	1.50	62.50	3.33	0.93
9	5	5	0.47	100	1.67	0.47
10	37	119	11.12	31.09	12.34	3.46
	300	1070	100		100	28.03

TGCS in study population B

In study group B total no of deliveries were 1070 and caesarean were 300. The Caesarean section rate in study groups B was 28.03%. Group size in decreasing order was 3 (22.44%), 2 (18.5%), 5 (17.29%), 4 (13.27%), 1 (11.21%), 10 (11.12%), 6 (2.80%), 8 (1.50%), 7 (1.40%) followed by 9 (0.47%) (Table 4). Comparison of group size, caesarean section rate, relative contribution and absolute contribution made by each TGCS group of study group A (November 2018 – November 2019) to study group B (November 2015 – December 2016):

The largest group size was seen in Robson TGCS group 2 (19.06%) in study group A and group 3 (22.44%) in study group B. Second largest group size was seen in group 4 (18.77%) in study group A and group 2(18.50%) in study group B (Figure 1).

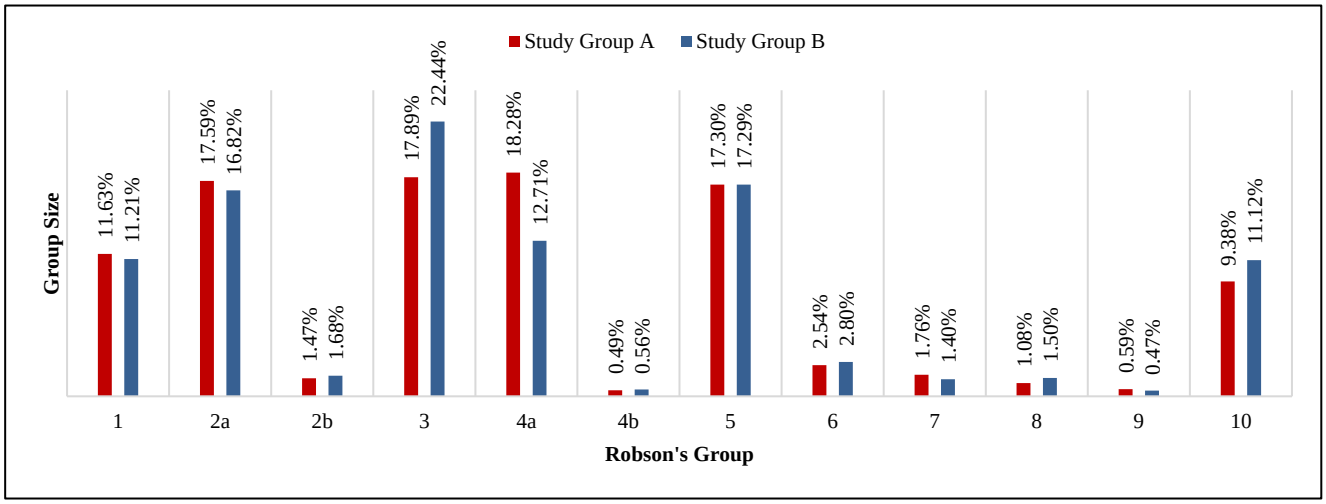

Figure 1: Comparison of group size in study group A (November 2018 - November 2019) and B (November 2015 - December 2016).

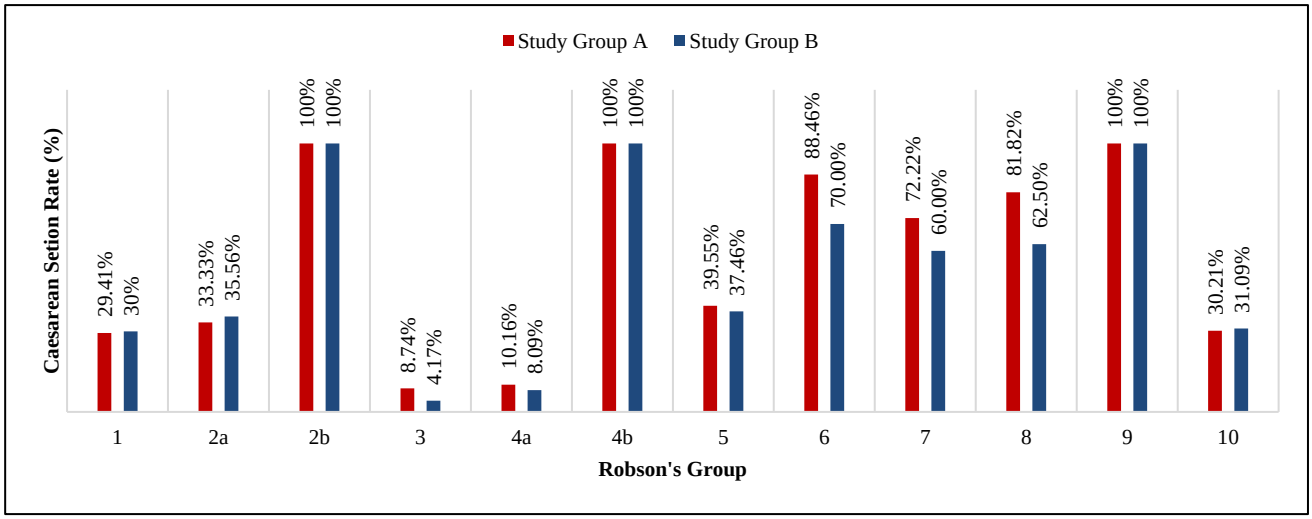

Figure 2: Comparison of caesarean section rate in study Group A (November 2018 – November 2019) and B (November 2015 – December 2016).

The caesarean section rate in study groups A and B was found to be 29.32% and 28.03% respectively. The caesarean section rate in group 1 and group 3 was less as they came in spontaneous labour as compared with group 2a and 4a where the labour was induced in both study groups (Figure 2).

Maximum relative contribution to overall caesarean section was made by TGCS group 2 (2a+ 2b) in both study groups which were 25% in study group A and 27.33% in study group B. The second contributor was TGCS group 5 in both study groups which were 23.33% in study group A and 24.33% in study group B. Third major contribution was made by TGCS group 1 (11.67%)

in study group A and group 10 in study group B (12.34%). Fourth contributor was TGCS group 10 (9.67%) in study group A and group 1 (12.00%) in study group B.

Fifth contributor was TGCS group 4 (8.00%) in study group A and group 6 (7.00%) in study group B. Sixth contributor was TGCS group 6 (7.67%) in study group A and group 4 (5.67%) in study group B. TGCS groups 3, 7, 8 and 9 with total 14.66% in study group A and TGCS Groups 8, 3, 7 and 9 with total 11.33% in study group B made the minor contribution to overall caesarean section in study groups A and B respectively (Figure 3).

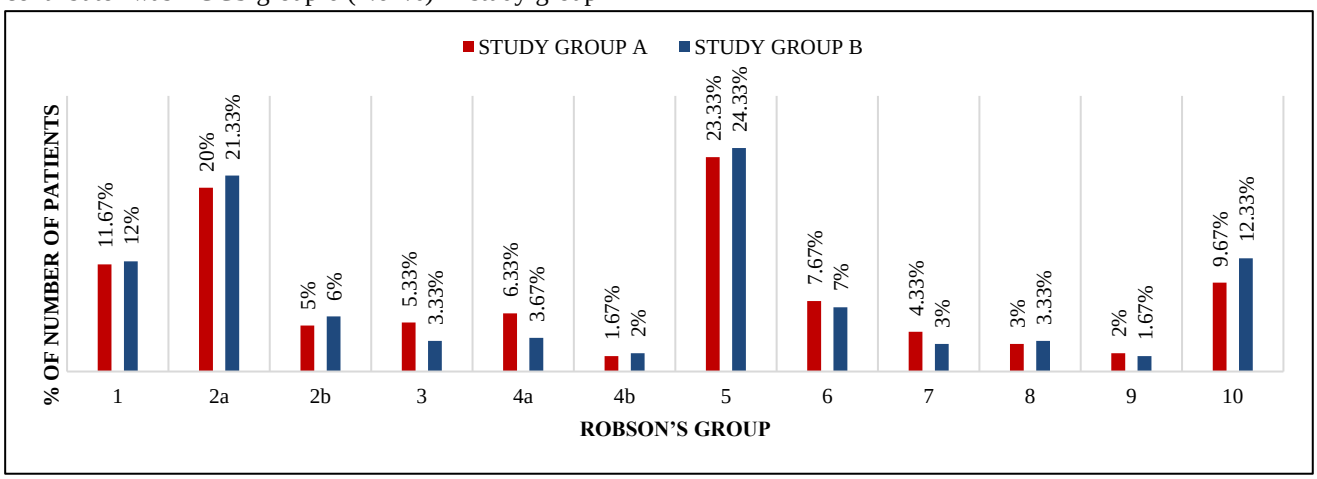

Figure 3: Comparison of relative contribution made by each TGCS group to overall caesarean section rate in study group A (November 2018 - November 2019) and study group B (November 2015 - December 2016).

The most significant absolute contribution to overall caesarean section rate was made by TGCS group 2 (2a + 2b) in both study groups which were 7.33% in study group A and 7.66% in study group B. The second largest contributor was TGCS group 5 in both study groups which were 6.84% in study group A and 6.82% in study group B. Third major contribution was made by TGCS group 1 (3.42%) in study group A and group 10 in study group B (3.46%). Fourth contributor was TGCS group 10 (2.83%) in study group A and group 1 (3.36%) in study group B. Fifth contributor was TGCS group 4 (2.35%) in study group A and group 6 (1.96%) in study group B. Sixth contributor was TGCS group 6 (2.25%) in study group A and group 4 (1.59%) in study group B. TGCS groups 3, 7, 8 and 9 with total 4.3% in study group A and TGCS Groups 8, 3, 7 and 9 with total 3.18% in study group B made the minor contribution to overall caesarean section rate in study groups A and B respectively (Figure 4).

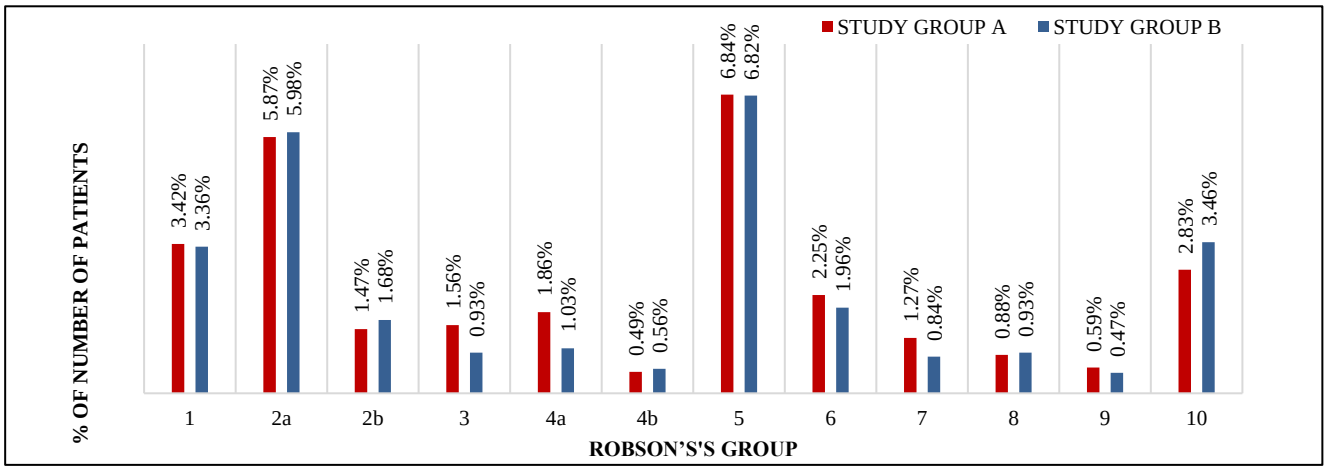

Figure 4: Comparison of absolute contribution of TGCS group A (November 2018 - November 2019) to study group B (November 2015 - December 2016).

Caesarean section rate in group 2b, 4b, 5.2 and 9, it was 100 % followed by these groupsin decreasing order: 6 (70%), 8 (62.50%), 7 (60 %), 2 (41.41%), 5 (37.46%), 10 (31.09%), 1 (30%), 4 (11.97%), 3 (4.17%) (Table3). In 5.1 groups it was 82.19% (Table 3). Relative contribution to overall caesarean section rate in decreasing order in study group 2 (27.33%), 5 (24.33%), 10 (12.34%), 1 (12.00%), 6 (7.00%), 4 (5.67%) and group 3 (3.33%) and 8 (3.33%) were equal followed by group 7 (3.00%) then 9 (1.67%) (Table 4). Absolute contribution to overall caesarean section rate in decreasing order was group 2 (7.66%), 5 (6.82%), 10 (3.46%), 1 (3.36%), 6 (1.96%), 4 (1.59%), 3 (0.94%), 8 (0.93%), 7 (0.84%) followed by group 9 (0.47%) (Table 4).

DISCUSSION

According to the NFHS-4 (2015–2016), the CS rate of the country is 17.2% in comparison with 10.6% according to NFHS-3 (2005–2006). In USA, caesarean section rate has risen from 20 to 31.3% (National Vital Statistics, 1989–2011). National Health Statistics from England has shown an increase from 11 to 15.5% (2006–2007 to 2016–2017). The CS Rate in National Capital Territory (NCT) of Delhi according to NFHS-4 (2015–2016) has also risen from 12 (according to NFHS-3) to 23.7%.[6].In our study, the caesarean section rate in our hospital was 29.32% in study group A and 28.03% in study group B. The Caesarean rate has been found in other studies as 37.65% by Koteshwara et al, 40% by Patel et al. and in another teaching hospital in Delhi as 22.4%, 23.5% and 25.5% for each year from 2015-17.[7-9]

In our study, in both study groups spanning a period of 5 years there was no change in predominant relative contribution groups, group 2, 5 and 1 predominated in both. The maximum relative contribution to caesarean rate was made by group 2 (nulliparous, singleton, cephalic, term, induced labour or Caesarean section before labour) to overall caesarean section which is 25% (2a+2b) and 27.33% (2a+2b) in study group A and B respectively, followed by group 5 then group 1.However , in another study conducted by Mittal et al in Delhi government hospital found largest relative contribution of group 5 followed by group 2 then 1.[9] Similar to our study, Rafael et.al in Spain from January 2010 to December 2018 found maximum relative contribution to overall caesarean section was in group 2 with 29.4%.[10] Roberge et al. in the year 2017 in Quebec , found group 2 to be the major contributor group with 17.7% contribution to overall CS rate.[11] Group 5 (multiparous, singleton, cephalic, term with a previous caesarean section) was the second major contribution in both study groups with contributions 23.33% in study group A and 24.33% in study group B. 35.71% (60/168) were offered TOLAC (Trial of labour after caesarean) in study group A and 18.60% (32/172) in study group B. This finding was of positive significance as more patients in current group were offered TOLAC than in past. 16.67% (28/168) in study group A and 10.46% (18/172) in study group B had successful VBAC (Vaginal birth after caesarean), this was also a positive significant finding (Table 3). Third major contribution was made by TGCS group 1 (11.67%) in study group A and group 10 in study group B (12.34%). Fourth contributor was TGCS group 10 (9.67%) in study group A and group 1(12.00%) in study group B. Fifth contributor was TGCS group 4 (multiparous, singleton, cephalic, term, without a previous uterine scar, induced labour or by CS before labour) (8.00%) in study group A and group 6 (nulliparous, singleton, breech) (7.00%) in study group B. Thus, combining TGCS groups 2, 5 1 and 10 had an overall contribution of more than 60%.

In study group A and B, caesarean section rate in group 6 of TGCS were 88.46% and 70% respectively which was a positive finding as more successful ECV were being done in our institution compared to past. The point to be noted are that group 2b, 4b, 5.2 and 9 will always be 100 % in TGCS and therefore in all comparisons group 2,4 and 5 will dominate as those who do not go in labour cannot deliver vaginally and transverse lie and previous 2 CS will have caesarean delivery Comparing two time periods showed a favourable trend not statistically significant but clinically significant as less multi parous patients were induced, less patients in spontaneous labour in multi had caesarean(group 3), there were less repeat caesarean group 5.1 (Figure 2) however, group 1 and 2-a, had increased which needed our attention, though the increase was not statistical significance. On analysing our data, TGCS Group 2, 5, and 1were the groups which we had to focus on. The groups with nulliparous patients (Group 1 and 2a) in labour room needed more attention. Correct interpretation of FHR (Fetal heart rate) monitoring and decreasing unsuccessful/failed induction of labour plays a major role in increasing CS rate. There must be a clear evidence-based indication for induction as well as for elective CS. All centres must have critical review and appraisal of induction protocols from time to time. Second Group is the patients with previous one LSCS (group 5a) for non-recurrent indications. Increased TOLAC (Trial of labour after caesarean) should be attempted in these patients. If we focus on cutting down the number of primary CS (caesarean section), it would automatically result in lowering of repeat caesarean delivery rate) which contributed second maximum to the overall CS rate. Future efforts to reduce the overall caesarean rate should be focussed on increasing VBAC (Vaginal birth after caesarean) and reducing caesarean rates in nulliparous women (groups 1 and 2), which in turn will reduce the number of pregnant women with previous caesarean section.

No significant difference was found in our study in group size, relative or absolute contribution in both groups A and B, possibly because of similar type of patients reaching our hospital. Periodic internal Audit of cases for Caesarean Indication is a good monitoring practice. Teaching the residents practice of external cephalic version (ECV) and assisted breech delivery,

operative vaginal delivery and correct interpretation of CTG will also help in lower the size of caesarean section rate. ECV is now being recommended even in previous caesarean which was a contraindication till now.[12]

Limitation

The limitations of our study were that for convenience a fixed sample size was taken instead of annual data. The audit using TGCS gave us a lot of clarity as well as insight of determinants and trend in our institution. Robson TGCS had been applied for the first time in our institute and would continue in the future.

CONCLUSION

Implementing Robson TGCS can help in comparing caesarean in an institution over a period of time and also among different institution at national and international level as a method of internal auditing, paving a way to rationalise or decrease Caesarean rate. Future efforts to reduce the overall caesarean rate should be focussed on decreasing primary caesarean and increasing TOLAC.

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