Analysis of Cesarean Section Rate - According To Robson's 10-Group Classification

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Abstract
Background
Over the past few decades, there has been a rise in the rates of caesarean section in both the developing and developed nations. This is a matter of international public health concern as it increases the cesarean section related maternal morbidity. The aim of the present study was to audit the increasing rate of caesarean section.
Methods
This retrospective study aimed to analyze the rate of LSCS in our institution and was conducted over a period of six months. The total number of patients who delivered in our hospital during the defined study period was recorded and categorized as per the WHO accepted Robson's 10-group classification. A statistical analysis of various parameters was done to identify the leading group contributing to the caesarean section rate.
Results:
The total number of women delivered over the study period was 2000, out of which caesarean sections (CS) were 644. The overall caesarean rate calculated was 32.2%. Previous LSCS was the leading indication to the CS rate. There was a trend of increased percentage of cesarean section in group 5 and 2 respectively in present study. Increasingly sedentary lifestyle and poor tolerance to pain are adding to cesarean delivery on maternal request.
Conclusions
We should judiciously make use of vaginal birth after cesarean section but not at the cost of maternal or fetal health.
Keywords
Caesarean section, Robson classification system

I. Introduction

There has been an increase in rate of cesarean section over last five decades. It has increased from a rate of 5% in 1940s and 1950s to 15% in 1970 and 1980s. However there has been a dramatic increase in the cesarean section rate globally, even beyond 30% in some areas. High cesarean birth rates are an issue of international public health concern.[1]

Worries over such increases have led the World Health Organization to advise that Cesarean Section (CS) rates should not be more than 15%,[2] with some evidence that CS rates above 15% are not associated with additional reduction in maternal and neonatal mortality and morbidity.[3] Hence arose the need of standardization of classification of cesarean section through Robson criteria within the healthcare facilities as proposed by MS Robson in the year 2001. The 10 group Robson classification of caesarean section has been appreciated by WHO in 2014 and FIGO in 2016.[1,4] This study was done at a tertiary hospital in western rajasthan to know the pattern of caesarean section and areas where needs to be taken care to decrease the rate of caesarean.

Table 1: Robson's classification of cesarean section.[5,6]

GROUPS	CLINICAL CHARACTERISTICS
1	Nulliparous, singleton, cephalic, ≥37 weeks, spontaneous labor
2	Nulliparous, singleton, cephalic, ≥37 weeks, induced labor or cesarean section before labor
3	Multiparous without previous cesarean section, singleton, cephalic, ≥37 weeks, spontaneous labor
4	Multiparous without previous cesarean section, singleton, cephalic, ≥37 weeks, induced

	labor or caesarean section before labor
5	Multiparous with prior cesarean section, singleton, cephalic, ≥37 weeks
6	All nulliparous breeches
7	All multiparous breeches (including previous cesarean section)
8	All multiple pregnancies (including previous cesarean section)
9	All pregnancies with transverse or oblique lie (including those previous cesarean section)
10	Singleton, cephalic, ≤36 weeks (including previous cesarean section)

II. Methods

This cross sectional study was conducted for a period of 6 months from sep 2019 to feb2020 at MDM Hospital, a tertiary care hospital in jodhpur , rajasthan. All the women delivered during this period in the labor ward were included. All relevant obstetric information (parity, mode of previous deliveries, previous CS and indications, gestational age, onset of labor, spontaneous or induced labor) was entered on a questionnaire and then into Microsoft excel. Results were calculated at the end of this period. Before proceeding, approval was sought from hospital ethical and research committee.

criteria

• Patients delivered by caesarean section during the given period were recorded and classified according to Robson's 10 group classification system as given in Table 1.

The parameters considered were according to the classification system

• Parity (with/ without previous CS); • Gestational age (>37/<36 weeks), • Fetal presentation (cephalic/ breech / abnormal lie) • Number of fetuses (singleton/ multiple) • Onset of labour (spontaneous/ induced / prelabour CS). (Table I)

(Article 3) The Ten-Group Robson classification hasbeenpraisedforitssimplicity,robustness,reproducibility, and flexibility [7] and has been recommended for both the monitoring rates over time as well as between facilities by bothWHOin2014andFIGOin2016[8,9].

Robson's criteria	Total no. of deliveries in each group	Total no of cesarean in each group	Contribution made by each group to overall CS rate of 32.2%	Relative size of group	CS rate in each group (%)
1. Nulliparous, single cephalic, >37 wks in spontaneous labor	520	92	4.6(92/2000)	26(520/2000)	14.2(92/644)
2. Nulliparous, single cephalic, >37 wks, induced or CS before labor	280	151	7.55	14	23.45
3. Multiparous (excluding previous CS), single cephalic, >37 wks in spontaneous labor	540	21	1.05	27	2.26
4. Multiparous (excluding prev CS), single cephalic >37 wks, induced or CS before labour	100	27	1.35	5	4.19
5. Previos CS, single cephalic, >37 wks	310	246	12.3	15.5	38.12
6. All nulliparous breeches	60	46	2.3	3	7.14
7. All multiparous breeches (including previous CS)	18	9	0.45	0.9	1.4
8. All multiple pregnancies (including previous CS)	14	7	0.35	0.7	1.08
9. All abnormal lies (including previous CS)	8	8	0.4	0.4	1.24
10. All single cephalic, <36 wks (including previous CS)	150	37	1.85	7.5	5.74
	2000	644	32.2		

III. Results

The total number of women delivered over the study period were 2000, out of which CS deliveries were 644. Overall, caesarean rate calculated for our institution in the specified period was 32.2%. On analysis of data according to Robson's classification, caesarean rates of each group were calculated to determine their contribution to the overall CS rate. Group 5 (previous CS group) made the greatest contribution (12.5%) to the total CS rate. Group 2 (Nullipara, Term, elective CS or after failed induction) had the second highest contribution (7.5%) to the CS rate & Group 1 [Nulliparous, single cephalic, >37 wks in spontaneous labor] then placed third at 4.6% to the overall CS rate. There was a 100% caesarean rate in Robson group no.9 i.e. all abnormal lies (8/8 cases), inclusive of all other lies apart from longitudinal lie (i.e. vertex and breech).

IV. Discussion

There has been a steady increase in the rates of CS in both developed and developing countries.In our study, the overall caesarean rates were 32.2%, much higher than the "ideal rate" for CS as considered by the WHO - between 10% -15%. New studies reveal that when caesarean section rates rise towards 10% across a population, the no. of maternal and newborn deaths decreases. But when the rate goes above 10%, there is no evidence that mortality rates improve.Despite this, cesarean delivery rates in many countries are substantially higher.[10,11]

The CS rate reported in India for the year 2013-2014 is 16.4%[12] ; this is near the ideal range n proposed by the WHO, suggesting a rise in access to comprehensive healthcare.In the Asian countries, the average CS rate reported was 27.3%, lower than that reported in the USA (31.1%)[13,14] Another study from Iran reported an increase from 35% to 40%,[15] while in the United Kingdom & Italy, the CS rates were 24.4% and 36.8% respectively.[16]This study gave the rate of 32.2%, which is lower compared to other reports, but still above the WHO criteria. It may be difficult to contain the rates in tertiary institutes, catering to a large population of referred cases. Also a significant rise in CS could be attributed to electronic foetal monitoring.Caesarean rates have increased rapidly over the past decade in most of Organisation for Economic Cooperation and Development (OECD) countries, with the average rate across countries going up from 20% in 2000 to 27% in 2011. Among OECD countries, caesarean section rates were highest in Mexico and Turkey (over 45%), followed by Chile, Italy, Portugal and Korea (with rates ranging between 35% and 38%).[17]

Increases in the first births among older women and the rise in multiple births resulting from assisted reproduction have also contributed to the overall rise in caesarean deliveries. The previous CS group (group 5) made the greatest contribution to the total CS rate contributing to 246of 310 cases. The reason for the larger contribution of group 5 towards the total CS rate is the larger size of families and repeat high order CS due to an alteration in physician and patient choice and unavoidable obstetric indications in cases of previous ceasarean. Vaginal Birth After Cesarean (VBAC) was offered to the women who fit in the inclusion criteria as per the American College of Obstetricians &Gynecologists.[18]

Clinical guidelines aimed at reducing non-medically indicated cesarean delivery and induction of labor under 39 completed weeks have recently been released by the American College of Obstetricians and Gynecologists.[19,20] Efforts to reduce such births include initiatives at the state level to improve the quality of perinatal care, policy changes at the hospital level to disallow elective delivery prior to 39 weeks, and education of the public.[21,22,23]

The caesarean rates in Jodhpur, India have been investigated according to the Robson's classification in an attempt to ascertain which clinically relevant groups were contributing to the increasing caesarean rate over time. However, the pregnant women included in the study those who delivered in our institution and might not reflect the situation in the rest of the country, or even reflect on the cesarean rate in the state of Rajasthan, India. It is also possible that caesarean section rate may have been overestimated since vaginal deliveries at home may have been under-reported. Limitations of the study are that this classification system does not account for analysis of elective caesarean on maternal request or planned caesarean section for specific conditions (example-placenta previa) or pre-existing medical conditions.[24]

Target Reduction of CS Rates

Robson classification gives opportunity to identify the main contributor group and thus can help to formulate strategies to reduce the CS rate. It has been found through

Robson4 and other international studies [25-29] that Group 5(previous CS, term, singleton, cephalic) makes the largest contribution to the overall CS. For repeat CS, Robson group 5 is the main contributor. The best way to reduce the overall CS rate is by preventing the first CS. Whereas for Primary CS, Robson groups 1 & 2 are the main contributors. It is thus suggested that improved case selection for labour induction and pre-labour Cesarean section can also reduce Cesarean section rates. Implementation of evidence based strategies to avoid unnecessary sections and to encourage the safe and appropriate use of VBAC is the need of the hour.

V. Conclusion

Robson classification is easily implementable and a robust tool for ongoing surveillance. The results can be compared between institutions, countries and regions. All hospitals and health authorities can use the Robson classification system as part of a quality improvement initiative to monitor Caesarean Section rates. It is suggested that this classification can be introduced as a routine tool to report the Caesarean delivery trends .Common classification of CS rates and indications allows evaluation and comparison of the contributors to the CS rate and their impact. The determination of the most important contributors for CS guides the health care providers about where to focus because reducing CS rates is difficult in presence of so many contributing factors. Results can be used to identify the target areas for interventions and resources to reduce CS.

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