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Caesarean Section -Incidence, Indications and Outcome at Tertiary Care Hospital

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Abstract | **Original Research Article**

Introduction: Caesarean section (CS) rates have been increasing worldwide and have caused concerns. For meaningful comparisons to be made, World Health Organization recommends the use of the Ten-Group Robson classification as the global standard for assessing CS rates. ***Objectives:*** To find out the incidence, indications for C-Section (Robsons's classification) and associated maternal& perinatal outcome. ***Methods:*** A prospective longitudinal study of 2 years period from 1st September 2017 to 30 August 2019 .One thousand cases of cesarean sections performed at Rural Medical College , Loni were compiled using Robsons's classification and analyzed. ***Results*:** Out of total 19,566 deliveries, 6093 were total caesarean sections of which 4108 were primary caesarean sections,resulting in overall rate of caesarean section of 31% and that of primary caesarean section of 21%.Previous LSCS (32.1%),Pre-eclampsia (10.8%), CPD (9.6%), and Breech (6.2%) were the common indications for caesarean section. Majority (48.24%) of women in the study belonged to Robson's group I. Robson's group V contributed highest number of CS in the present study (32.1%).Maternal Mortality was (0.4%) and maternal morbidity was (3.1%) in the study group.Neonatal morbidity was (11.9%) and neonatal mortality was (2.1%). ***Conclusion:*** High rate of Caesarean deliveries was attributed to repeat caesarean section, cephalo-pelvic disproportion, severe pre-eclampsia ,abnormal presentations, failed induction.Proper selection of cases for caesarean section, judicious induction, trial of vaginal delivery in previous caesarean section and breech presentation, careful intra-partum monitoring using partograph, use of labour protocols, practice of evidenced-based obstetrics and caesarean audits in the institution can help in reducing the caesarean section rates.

Keywords: Caesarean section, Robson's classification, Maternal Mortality, Perinatal outcome.

INTRODUCTION

Cesarean section remains the most commonly performed obstetric surgery. Earlier it used to be done for health of the mother but now fetal interest has played a major role [1]. The increasing trends for Caesarean section (CS) in India and worldwide have been a cause of concern. Now a days, cesarean section is done for multivarious indications viz., fetal distress, cephalopelvic disproportion and others in order to reduce the perinatal morbidity and maternal morbidity. Worldwide there has been an increase in the rate of caesarean delivery due to multiple factors [2]. Auditing c section rates can be done using Robson's classification, which in turn helps achieve a uniform basis for comparison across centers and across various countries. This classification would help understand the internal structure of the CS rates at individual health facilities identify key population groups, indications in each group and formulate strategies to reduce these rates [1]. With the increase advances in anaesthetic services and improved surgical techniques, the morbidity and mortality of caesarean section has decreased considerably [3]. The objectives of the present study were to find out the incidence, indications for C-Section using Robson's classification and associated maternal outcome and perinatal outcome.

MATERIAL AND METHODS

A prospective longitudinal study was carried out in a 1250 bedded tertiary care teaching hospital located in rural area of central India for a period of two years. Approximately 10,000 deliveries take place per

year in hospital. This multi-specialty hospital gets referral of high risk Obstetric cases from neighboring villages and townships. A Sample size of 1000 pregnant women who had undergone caesarean section during study period were analyzed using Robson's criteria. The Study population included pregnant women as per below mentioned inclusion and exclusion criteria, avail hospital services during study period. Inclusion criteria-All pregnant women irrespective of age and parity, booked status, medical and obstetric high risk factors who had undergone caesarean section at Pravara Rural Hospital. Exclusion criteria-Pregnant women, who were not willing to participate in the study,

Patient data was collected using a pre-validated and pre-tested study tool, from women, who had undergone caesarean section during a study period of September2017toAugust2019. Women taking antenatal care were asked to come for regular follow-up and were advised for institutional delivery. Women were delivered following the obstetric protocol and using electronic partograph for intrapartum labour monitoring.

Pregnant women were evaluated during antenatal period for evidence of any high risk factor. All high risk pregnancies were admitted and managed at appropriate gestational periods. Decision about need for caesarean section was taken by consultant Obstetrician on duty. Women were either operated as elective caesarean section or emergency caesarean section. Informed written consent was obtained from women and her relatives before surgery. All women received prophylactic antibiotics in the form of Cefotaxim one gram intravenously and Injection Metronidazole intravenously in peri operative period. Antibiotics were continued for total seven days period. Caesarean section was carried out under general or regional anaesthesia. Delayed absorbable suture (Vicryl 1) was used for closure of the uterus and pfannenstiel skin incision was closed by sub-cuticular suturing technique using (Vicryl 2 0) delayed absorbable suture or (Ethilon 2 0) non absorbable suture. Women were observed for post-operative morbidity or surgical site infection till discharge from the hospital. Women were discharged on 5th post-operative day. They were advised to come for follow up visit after seven days.

RESULTS

Out of total 19,566 deliveries, 6093 were total caesarean sections of which 4108 were primary caesarean sections, resulting in overall rate of caesarean section of 31% and that of primary caesarean section of 21%.Previous LSCS (32.1%), CPD (9.6%),and Preeclampsia(9.5%) were most common indications for cesarean sections (Table 1).Group 1 and 2 (nulliparous, singleton, cephalic, ≥37 weeks' gestation, in spontaneous labour/ induced labour or caesarean section before labour) comprised almost half (57.17%) of the study population. Group 3 (multiparous, without previous caesarean section, singleton, cephalic, ≥37 weeks' gestation and in spontaneous labour) was the third largest with (10.58%) of total obstetric population. Women with previous CS, singleton term pregnancy (Group 5) comprised (9.99%) of the total population. Group 4 included (2.73%) women who were multiparous without a previous uterine scar, with singleton, cephalic term pregnancy, and induced or caesarean section before labour Out of 74 (3.00%) women with breech presentation, 49 (3.00%) were nulliparous (group 6) and the remaining 25 (2.00%) were multiparous (group 7). 58 women (01.86%) had multiple pregnancies (Group 8) and 13 (0.40%) women had abnormal lies (Group 9). Group 10 comprised of 482 (15.00%) women with preterm singleton pregnancy with cephalic presentation. All the deliveries in group 5 (previous caesarean section), group 7 (multiparous, single breech) and group 9 (transverse or oblique lie) were caesarean deliveries. Relatively high caesarean delivery rates were seen in group 6-nulliparous, single breech (75.00%), group 8-multiple pregnancies (67.20%), group 2-full term, nulliparous, singleton, cephalic (33.00%), the other groups in descending order of caesarean deliveries were group 10 (23.00%), group 1 (19.30%) and group 4 (18.80%). Least caesarean delivery rate was observed in group 3 (9.40%)-multiparous women without previous caesarean section, singleton, cephalic, ≥37 weeks' gestation and in spontaneous labour (Table 2).

The overall rate of caesarean delivery in the present study was (31.00%). Group 5 (10%) and group 1 (9.5%) were the leading contributors to the overall rate of surgical delivery in relation to total number of deliveries. Rest all groups contributed to around 3% or less of caesarean deliveries in relation to total deliveries. Group 5 (32.1%) and group 1 (30.9%) contributed maximum (60%) to the total caesarean deliveries. Each of the remaining groups contributed to less than 10% of total caesarean deliveries.

Maternal morbidity was 3.1 % (Table 3) there were 4 maternal deaths .Cause of maternal death was acute pulmonary edema in rheumatic mitral stenosis, acute renal failure following severe accidental haemorrhage, thrombocytopenia due to HELLP syndrome and septic shock .Maternal mortality was 0.4% in the study. (Table 4)The incidence of low birth weight babies was 35%.Neonatal morbidity was 11.9% (Table 5) and Neonatal mortality was 2.1% in the study (Table 6). The neonatal morbidity and mortality was mainly observed in very low birth weight babies.

Table-1: Indications of Caesarean Section

Indications of LSCS	Frequency	Percent
Previous LSCS	321	32.1
PIH	108	10.8
CPD	96	9.6
Breech	62	6.2
Meconium Stained Liquor	44	4.4
Abnormal labour	44	4.4
Fetal distress	43	4.3
Multiple gestation	39	3.9
Oligo-hydramnious and IUGR	39	3.9
Failure of induction	38	3.8
Prolonged PROM	35	3.5
APH	32	3.2
Mal presentations (hand , brow , face)	8	0.8
Oblique lie	8	0.8
Loops of cord	7	0.7
Precious pregnancy	7	0.7
Transverse lie	5	0.5
Deep transverse arrest	4	0.4
BOH	3	0.3
Maternal request	3	0.3
Cord prolapse	2	0.2
Others	20	2
Total	1000	100

Table-2: Distribution of cases as per Robson's classification

Group	Number of CS in group	Number of women in group	Group size (%)	Group CS rate (%)	Absolute group contribution to overall CS rate (%)	Relative contribution of group to overall CS rate (%)
1	309	1550	48.24	19.3	9.4	30.9
2	95	287	8.93	33.1	2.9	9.5
3	32	340	10.58	9.4	0.9	3.2
4	16	88	2.73	18.8	0.4	1.6
5	321	321	9.99	100	9.9	32.1
6	37	49	1.52	75	1.15	3.7
7	25	25	0.77	100	0.77	2.5
8	39	58	1.86	67.2	1.21	3.9
9	13	13	0.40	100	0.4	1.3
10	113	482	15.0	23.4	3.5	11.3
total	1000	3213	100	31.123	30.53	100

Table-3: Distribution of cases as per maternal morbidity

Maternal morbidity	Frequency (n=1000)	Percentage
Febrile illness	12	1.2
Surgical site infection	9	0.9
Post-partum hemorrhage	5	0.5
Obstetric hysterectomy	4	0.4
PRES	1	0.1

Table-4: Maternal deaths

Maternal deaths	Frequency (n=1000)	Percent
Acute pulmonary edema	1	0.1
Acute renal failure, jaundice	1	0.1
Septic shock	1	0.1
Thrombocytopenia, ARF	1	0.1

Table-5: Distribution of cases as per neonatal morbidity

Neonatal morbidity	Frequency (n=991)
VLBW	7.9%
IUGR	1.2%
HIE (stage 1 & 2)	0.7%
Fetal Congenital anomalies	0.7%
Sepsis	0.5%
Meconium aspiration syndrome	0.5%
Convulsions	0.2%
DCT positive	0.1%
Hypoglycemia	0.1%

Table-6: Distribution of cases as per cause of neonatal deaths.

Neonatal deaths	Frequency (n=991)
Neonatal sepsis	0.9%
Very low birth weight	0.7%
Hypoxic ischemic encephalopathy	0.5%
Pulmonary hemorrhage	0.2%
Respiratory distress syndrome	0.1%
Necrotizing entero-colitis	0.1%
Pulmonary hypertension	0.1%

DISCUSSION

Ten-Group Robson classification of caesarean sections [1] might allow us to look at CS rates in specific groups to help identify possible reasons for this variation. Women who give birth are categorized into 10 groups based on their basic obstetric characteristics of parity, previous CS, gestational age, mode of onset of labour, fetal presentation, and number of fetuses. These groups are structured in such a way that they are mutually exclusive and totally inclusive. The Ten-Group Robson classification has been praised for its simplicity, robustness, reproducibility, and flexibility [1] and has been recommended for both the monitoring rates over time as well as bet Najam R *et al*. [11] ween facilities by both WHO in 2014 and FIGO in 2016 [2,3].

Out of 19,566 deliveries during the two years, 4108 primary LSCS were done resulting in incidence of LSCS as (21 %). The observed incidence in our study is similar to that reported from sub-Saharan countries [4-7]. In Asia survey the overall cesarean rate was 27.3%. China had the highest overall cesarean rates (46.2%) followed by Vietnam, Thailand and Sri Lanka; Cambodia had the lower (14.7%) [8].

Previous LSCS (32.1%), CPD (9.6%) and Preeclampsiab(9.5%)were most common indications for cesarean sections. The results of present study were similar to other studies. In present study, LSCS done in view of previous LSCS was 32.1%. In the study conducted by Lulu *et al*. [9] ,Vesna E-G *et al.* [10] , Najam R *et al*. [11] LSCS done in view of previous LSCS was 69.5% 48.32%, 42.5%, respectively. The CS rate due to CPD in the present study was 9.5%. In the study by Klein *et al*. [12] rate of cesarean section was 14.5%. In the study conducted by Sarna P *et al*. [13], Jawa A *et al*. [14] , Nikhil A *et al*. [15], Osman BALCI *et al*. [16], G Singh *et al*. [17], G Singh *et al*. [17], the rate of LSCS done for preeclampsia was 12.9%, 11.6%, 1.94%, 4.40% and 4.80% respectively. In the present study LSCS done in view of preeclampsia was (9.5%).

Groups 1 and 2

"Groups 1 and 2 usually account for (35-40%) of all deliveries; Group 1 should be larger than Group 2 and a CS rate for Group 1 less than (10%) is desirable" Group 1 and group 2 included a total of (49.53%) women in the present study. Group 1 was 5.4 times larger than group 2 and the CS rate for group 1 was 19.3%. Several studies have proved that it is the groups 1 and 2 that contributed most to the overall CS rates [18-20]. It has been proved that 98% variation in institutional CS rates can be attributed to group 1 and 2 only [21]. The contribution of group 1 and 2 to overall CS rate in the present study was 52.4% which was in agreement with the findings of Pereira MN *et al*. [22].

Groups 3 and 4

"Groups 3 and 4 usually account for 30-40% of women; Group 3 should be larger than Group 4. The CS rate for Group 3 should be 2.5-3%. The CS rate in Group 4 should be below 20%." Group 3 and group 4 included a total of 13.3 % women in the present study. Group 3 was more than two times larger than group 4. The CS rates in group 3 and 4 were 9.4 % and 18.8% respectively. The CS rate in group 3 is small and is used as a quality check for data collection. If it is more than 3% probability of inaccurate data increases.

Group 5

"Group 5 should comprise no more than 10% of women. With good perinatal outcomes, a CS rate of 50-60% in Group 5 is excellent". The proportion of women in group 5 in the present study was 9.9%, which is within the suggested limit. All the women in group 5 were delivered by CS. This finding is in agreement with studies done by Kansara Vijay *et al.* (98.3%), Dhodapkar SB *et al*. [23] (89.6%) and Shirsath A *et al*. [24] (87.2%) where CS rates in group 5 were alarmingly high ."Groups 1, 2, and 5 usually account for two-thirds of all caesarean deliveries." In the present study group 1, 2 and 5 were responsible for 72.5% of all the CS.

Group 6 and 7

"Groups 6 and 7 should include 3-4% of all women, and Group 6 is usually twice the size of Group 7" The present study has 3 % women in group 6 and

group 7 combined. Group 6 was 2 times the size of group 7.

Group 8 and 9

"Group 8 should include 1.5-2% of women. Group 9 should comprise 0.2-0.6% of women with a CS rate of 100%." In the present study group 8 and 9 comprised of 1.86%, 0.40% of the study population. All the women in group 9 were delivered by CS.

Group 10

"Group 10 includes approximately 5% of women. If the CS rate in Group 10 is 15-16% it suggests a high proportion of women with spontaneous onset of preterm labour." The size of group 10 in the present study was 15 %, nearly three times the recommendation. The CS rate in group 10 was 23.4%.

In the present study, the maternal morbidity was found as 3.1%. Praagh *et al*. [27], Jacob *et al*. [26] in their studies reported maternal morbidity of 10.4 %, 18.6% [26] respectively.Maternal mortality was 0.4% in the present study. Klein *et al*. [12] Sen *et al*. [25], Jacob *et al*. [26] in their studies reported maternal mortality of 0.5 %, 2.12% and 6% respectively.

In the present study neonatal morbidity was 11.9% neonatal mortality is 2.1%. In study conducted by Praagh *et al*. [27], neonatal mortality was 7.1% .In study conducted by Klein et al [12] neonatal mortality was11.6%.

CONCLUSION

High rate of Caesarean deliveries was attributed to repeat caesarean section, cephalopelvic disproportion, severe pre-eclampsia, abnormal presentations, and failed induction. Proper selection of cases for caesarean section, judicious induction, trial of vaginal delivery in previous caesarean section and breech presentation, performing versions in abnormal presentations, careful intra-partum monitoring using partograph, use of labour protocols, practice of evidenced-based obstetrics and caesarean audits in the institution can help in reducing the caesarean section rates. To monitor the CS rates and take appropriate actions, it is recommended that Robson's TGCS be used continuously in all health institutions in reducing primary section rates.

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