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RESEARCH ARTICLE

Indications and feto-maternal outcome of cases under Robson's group 1 caesarean section in a tertiary health care centre in Assam

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ABSTRACT

Objectives: To evaluate the indications and feto-maternal outcomes of Robson's group 1cases undergoing caesarean section. **Materials and methods:** A time bound, prospective and observational study conducted from 1st July 2021 to 30th June 2022 at Gauhati Medical College and Hospital. All nulliparous women, singleton pregnancy, cephalic presentation, gestational age of more than or equal to 37 weeks with spontaneous onset of labour (Robson's group1) undergoing caesarean section were recruited in the study. **Results:** During this period, there were 15,859 deliveries, among them 7,024 were born by caesarean section out of which 1,636 belonged to Robson's group 1. The most common indication of caesarean section was meconium stained liquor (24.7%) and the least common was precious pregnancy (2.1%). In intra-operative maternal complications, most common was atonic postpartum haemorrhage (10.3%), the least common being fetal scalp injury (0.5%). In immediate maternal complications, most common was spinal headache (12.9%) and the least common was atelectasis and thromboembolic event (1.5% each). In early maternal complication, most common was surgical site infection (11.3%) and the least common was lower respiratory tract infection (4.1%). Regarding fetal complications, 19.1% had hyperbilirubinemia and still births were 2.6%.**Conclusion:** Patients who are in spontaneous labour should undergo caesarean section only for absolute indications for better recovery of the mother and fetus. It is the need of the hour to intervene and decrease the caesarean section rate especially in Robson's group 1 which will lead to reduction in primary and further subsequent caesarean section rates.

Keywords: Caesarean section, indications, feto-maternal outcome.

Caesarean section is defined as the surgical procedure of delivery of fetus, membranes and placenta through an abdominal and uterine incision. Globally, it is the most commonly performed major surgical procedure[1]. At present, the global rate of caesarean section is 15% which is unevenly distributed.[1] In India, over the last 21 years, the caesarean rate has increased from 2.9% in 1992-93 to 7.1% in 1998-99 and further to 8.5% in 2005-06. Indian Demographic Health Survey NFHS-4 (2015-16) reported that caesarean deliveries have increased to 17.2% that in NFHS-5 (2019-20), unexpectedly rose to 29.9%. Public health facilities accounted for 23.6% of the total caesarean section where as private health facilities accounted for 79.2% of the same in NFHS-5 (2019-20).[2]

In order to understand this trend and to propose effective measures to ensure that it is not being used unnecessarily, WHO proposed a tool to monitor and compare caesarean section rates in a same setting over time and between different settings, named as Robson's classification, first described by Michael Robson in 2001, also known as the Ten Group Classification System (TGCS)[3], is a system for classifying pregnant women who undergo childbirth. Pregnant women are categorized into ten groups based on their basic obstetric characteristics of parity, gestational age,

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mode of onset of labour, fetal presentation, number of fetuses and previous caesarean section. These groups are structured in such a way that they are mutually exclusive and totally inclusive. It has been praised for its simplicity, robustness, reproducibility and flexibility and has been recommended by both WHO in 2014 and FIGO in 2016 for monitoring rates over time as well as between facilities.[4,5] Robson's group 1 includes nulliparous women with singleton pregnancy, cephalic presentation and gestational age more than or equal to 37 weeks who go in spontaneous labour, which will be the sample population in the present study. As per previous research in this field the most common indications for caesarean section in order of frequency are meconium stained liquor, cephalopelvic disproportion, oligohydramnios, prolonged labour, cervical dystocia, placenta praevia, cord prolapse, abnormal fetal heart rate tracing, precious pregnancy and suspected fetal macrosomia. Maternal intra-operative complications include bleeding, injury to base of urinary bladder, atonic uterus and post-operative complications being postpartum hemorrhage, rectus sheath haematoma, fever, urinary tract infection, surgical site infection, puerperal sepsis etc. One should not forget the longer hospital stay, thromboembolic events or spectrum of anaesthetic complications associated with it. The neonatal complications include still birth, birth asphyxia, transient tachypnea of newborn, hyperbilirubinemia, hypoxic ischemic encephalopathy, sepsis, low APGAR score, NICU admission and neonatal death.

Aims:

1. To assess the indications for caesarean section in patients belonging to Robson's group 1.
2. To evaluate the incidence of feto-maternal outcome based on clinical and diagnostic tools.
3. To assess other demographic variables in women of this group such as age, religion and locality etc.

Objectives:

To prevent unnecessary primary caesarean section and further reduce the rate of subsequent ones.

Materials and methods

The present study is time bound, prospective, observational study conducted in the department of obstetrics and gynaecology, Gauhati Medical College and Hospital, Guwahati during the period from 1st July, 2021 to 30th June,2022.

Inclusion criteria - All nulliparous women undergoing caesarean section with singleton pregnancy, cephalic presentation and gestational age of more than or equal to 37 weeks going in spontaneous labour (Robson's group 1) were included.

Exclusion criteria -

1. Patients not in labour or who had induction of labour.
2. Multigravida or multiparous patients.
3. Gestational age less than 37 weeks.
4. Malpresentation, multiple pregnancies, congenital fetal anomalies.
5. Pregnancy with scarred uterus and secondary abdominal pregnancy.

Sample size is calculated as 194 based on the following formula: $N= Z^2 *p*(1-p)/E2$ where, 'N' is the sample size. 'Z' is 1.645 for a confidence level (alpha) of 90%.'p' is the prevalence of Robson's group 1 caesarean section in Gauhati Medical College & Hospital in a period of one year, which came out to be 23.3% as per hospital records. 'E' being margin of error of around 5%.

All the patients included were grouped according to the Robson's classification and those who belonged to group 1 based on subject's clinical history, physical examination, partographic findings and appropriate investigations were included in this study. The patients were informed regarding the aims and objectives of the study and a detailed informed written consent in the patient's own language was obtained. Their demographic information (name, age, religion and locality) were recorded. The patients were examined for regular uterine contractions corresponding to cervical dilatation and effacement, amniotic fluid assessment (volume and colour), status of the membranes (intact or ruptured) and fetal heart rate. All vitals of both mother and baby were plotted on the partograph once the cervix was more than 4 centimeters dilated. Duration of labour was noted in hours.

Indications of caesarean section in these patients were documented as meconium stained liquor, cephalopelvic disproportion, prolonged labour, oligohydramnios, placental abruption, cervical dystocia, placenta praevia and cord prolapse.

With all the preoperative investigations, assurance of blood and blood products (if required) and an informed consent, caesarean section was conducted and all the intra-operative findings were documented. Following caesarean section, these patients along with the neonate were followed up for a period of 6 weeks with daily check-ups on post-operative days till they were discharged and subsequently on day 15, 30 and 42. Complaints, if any, between these days were also entertained and documented accordingly.

They were evaluated for maternal and fetal outcomes based on the following variables -

Maternal Outcomes:

Intra-operative: Anaesthetic complications like spinal hypotension, difficult intubation, failed anaesthesia and aspiration of gastric contents; atonic PPH; traumatic PPH; fetal scalp injury; bladder injury and hysterectomy.

Immediate (upto 72 hours): Post partum hemorrhage; abdominal distension; rectus sheath haematoma; post-operative fever; atelectasis; spinal headache and thromboembolic event.

Early (after 72 hours): Post partum hemorrhage; surgical site infections; urinary tract infection; lower respiratory tract infection; puerperal fever.

Fetal outcomes: Transient tachypnea of newborn; sepsis; hyperbilirubinemia; hypoglycaemia; hypoxic ischemic encephalopathy; still birth.

Fetal weight, APGAR score at 1 and 5 minutes and incidence of NICU admission were also recorded. Maternal and neonatal mortality were also recorded.

Statistical analysis - Data from the case record proforma was entered into Microsoft Excel spreadsheet version 2021 and analyzed using IBM-SPSS version 26.0. Normality of the data were determined using Kolmogorov– Smirnov test. Categorical data were expressed as frequency and proportion (percentages). Numerical data was represented with mean and standard deviation for parametric data, median and IQR in case of non-parametric data. For determining the statistical correlation in categorical data, a Chi-square test or Fisher Exact test was applied.

Results

In the present study, the overall incidence of caesarean section was 44.29% (7024/15859) during the study period of one year. Robson's group 1 accounts for 10.31% out of the total number of deliveries and 23.29% of total caesarean section. Most of the patients were of the age of 25-29 years(44.24%) followed by the age group of 20-24 years (27.84%). Majority of them belonged to rural locality (72.69%) and Hindu by religion (59.3%).

From the above tables we can conclude that the most common indication for caesarean section was meconium stained liquor (table 1). Maternal complications found during the study were classified as intra-operative, immediate and early (table 2, 3, 4). Amongst all the operative complications, the most common intra - operative complication was atonic PPH, spinal headache was the most common immediate complication and SSI was the most common early maternal complication. So far as the maternal mortality is concerned only 1 patient expired during the study due to cardio-pulmonary collapse following sepsis, severe anaemia and thromboembolism.

Table 1: Distribution of indications of caesarean section

Indications	Frequency	Percentage
Meconium stained liquor	48	24.7%%
Gross oligohydramnios	25	12.90%
Prolonged labour	21	10.80%
Placental abruption	21	10.80%
Cervical dystocia	18	9.30%
Cephalopelvic disproportion	17	8.80%
Abnormal FHR	16	8.20%
Placenta praevia	14	7.20%
Cord prolapse	10	5.20%
Precious pregnancy	4	2.10%
Total	194	100.00%

Table 2: Distribution of intra-operative maternal complications

Intra-operative complications	Frequency	Percentage
None	145	74.74%
Atonic PPH	20	10.30%
Traumatic PPH	13	6.70%
Anaesthetic complications	9	4,60%
Bladder injury	4	2.10%
Hysterectomy	2	1.00%
Fetal scalp injury	1	0.50%
Total	194	100.00%

Table 3: Distribution of immediate maternal complications

Immediate complications	Frequency	Percentage
Non	114	58.76.%
Spinal headache	25	12.90%
Abdominal distension	20	10.30%
Post-operative fever	13	6.70%
PPH	11	5.67%
Rectus sheath haematoma	5	2.57%
Atelectasis	3	1.50%
Thromboembolic event	3	1.50%
Total	194	100.00%

Table 4: Distribution of early maternal complications

Early complications	Frequency	Percentage
None	130	67.07%
SSI	22	11.30%
Puerperal fever	20	10.30%
UTI	13	6.70%
PPH	5	2.60%
LRTI	4	2.10%
Total	194	100.00%

In the present study majority of the newborns i.e. 103 (53.09%) weighed between 2.5 kg to 3.4 kg, with the mean fetal weight being 2.7 kg. The APGAR score of all newborns was calculated at one and five minutes following caesarean section. At one minute, 94 (48.45%) neonates were moderately depressed with a score of 4-6, whereas at five minutes 127 (65.46%) neonates had a score of 7-10. About 89 (45.8%) neonates were admitted in Neonatal Intensive Care Unit (NICU).

According to table 5 most common fetal outcome following caesarean section was found to be hyperbilirubinemia found in 37 (19.1%) neonates, followed by HIE in 27 (13.9%) and the least common outcome was still birth in 5 (2.6%) neonates, amongst which the most common reason was cord prolapse. The incidence of neonatal mortality was 3.6%.

Table 5:Incidence of fetal complications

Complications	Frequency	Percentage
None	69	35.60%
Hyperbilirubinemia	37	19.10%
HIE	27	13.90%
Sepsis	24	12.40%
Transient tachypnea of new born	17	8.80%
Hypoglycaemia	15	7.70%
Still birth	5	2.60%
Total	194	100.00%

Discussion

The caesarean section plays an important and vital role as some of the deliveries are never possible through the vaginal route without threatening the life or health of the mother or baby[6]. It is also one of the best indicators of the quality of maternal health services[7].

Rising caesarean section rates is a global concern. Most countries have exceeded the limit (10-15%) set by World Health Organization (WHO) in 1985. In India, caesarean section rate has increased from 10.6% to 29.9%[2]. These growing figures clearly point towards an urgent need to investigate this global upward shift. After systematic reviews (2011 and 2014), WHO recommended Robson Ten-Group Classification System (TGCS) as easily interpretable and implementable global standard for assessing, maintaining and comparing caesarean section rates both within and between healthcare facilities[8,9]. It enables institution specific monitoring, auditing and can be a powerful tool to practice across different settings[3,10,11]. It is a well standardized system of reporting caesarean section and is universally accepted[6].

The present study focuses on calculating the incidence of indications and evaluating the feto-maternal outcome of cases under Robson's group 1 caesarean section in a tertiary health care centre in Assam i.e. Gauhati Medical College and Hospital, with an objective to prevent a primary caesarean section and further reduce the rates of subsequent ones by the better use of tools like partograph, CTG monitoring and fetal scalp blood pH sampling in order to improve labour monitoring and augment quick decision making whenever indicated.

The caesarean section rate in our institute is 44.29%, which is comparable to the studies by Jamwal D et al[12] (46.12%) and Jose J et al[13] (46.8%). On the contrary Ahmed N et al[6] from Bangladesh and Wahane A et al.[14] from Central India reported highest caesarean section rate of 81.8% and 63.89% respectively. In the present study Robson's group 1 contributes to 10.31% of the total number of deliveries (absolute contribution) which is comparable to a study by Tognon F et al[15] (10.3%) and Sukmanee J et al[16] (12%). In contrast to our study, Abubeker FA et al[7] reported group 1 caesarean section rate as 3.7%. Relative contribution of Robson's group 1 among the total number of caesarean section in the present study was reported as 23.29%, which is comparable to Sukmanee J et al[16](24.8%) and Kankoon N et al[17] (20.5%).

In the present study, the most common indication of caesarean section was found to be meconium stained liquor accounting for 24.7% which is comparable with a study by Baser et al[18] and Ahmed N et al[6]. On the contrary in a study by Onankapa B et al[19] cephalopelvic disproportion was the most common indication (39.8%) which is comparable with a study by Sukamanee J et al[16] who reported cephalopelvic disproportion as the most common indication (44.9%) followed by fetal distress (38.7%).

In our study amongst intra-operative maternal complications, maternal morbidity was 25.26% (49 patients). The most common complication was found to be atonic post partum hemorrhage (10.3%). Amongst immediate maternal complications, maternal morbidity was 41.23% (80 patients) where spinal headache was found to be the most common complication (12.9%) and amongst early maternal complications, maternal morbidity was 32.9% (64 patients) with surgical site infection (SSI) accounting for 11.3%. In a study by Gandhi K et al[20] the most common complication was fever (10.5%) followed by post partum hemorrhage (9.8%). Daniel S et al[21] in his study reported Urinary Tract Infection as the most common complication (27%) followed by surgical site infection (12.4%). Similar to our study, a study by Promila J et al[22]reported atonic post partum hemorrhage as the most common complication (13.6%) followed by hysterectomy (8.6%). In a study by Thakur V et al[23] surgical site infection was the most common complication (26.62%), followed by urinary tract infection (10.1%).

Regarding maternal mortality, the present study experienced the death of one patient amongst the sample size of 194 patients, due to cardiopulmonary collapse following

sepsis and severe anemia, complicated by thromboembolic event. Similarly, Tognon F et al[15] had one death, the reason for which was not mentioned.

Regarding fetal complications, APGAR score for all newborns were calculated at one and five minutes following caesarean section. Mean APGAR score in our study at 1min was 6±1.8 and at 5min was7±1.9 which is comparable with a study by Gandhi K et al[20] where at 1min the mean was 6.3 1± 1.02 and at 5min was 6.36 ± 0.67. The mean fetal weight in our study was 2.7 ± 0.6 kg which is incomparison with a study by Gandhi K et al[20] with mean fetal weight 2.7 ± 0.53 kg. Out of 194newborns in the present study, a total of 89 (45.88%) newborns were admitted in NICU which is comparable to study by Daniel S et al[21](39.4%). Neonatal morbidity rate in the present study was 64.4% (125) but on the contrary in a study by Tognon F et al[15] and Abubeker FA et al[7] the rate of neonatal morbidity were 27.7% and 5.5% respectively. The most common complication in our study was hyperbilirubinemia accounting for19.1% and the least common complication was stillbirth accounting for 2.6% which is in comparison to a study by comparison to a study by Gandhi K et al[20] where the most common morbidity was hyperbilirubinemia accounting for 32% and the least common being asphyxia at 0.22%.

In our study neonatal mortality was observed in 7 (3.6%) newborns admitted in NICU which is comparable to study by Gandhi K et al[20]i.e. 3.42%.

Strengths of the study:

1. The most important aspect of the present study is that it targets on Robson's group 1 which includes women who are already in spontaneous labour and are destined for normal vaginal delivery, hence evaluating the incidence of indications for caesarean section in this study group will help us better understand the causes of increasing trends in nulliparous women and propose steps to reduce it.

2. While dealing with the maternal morbidities, we defined the peri-operative period and classified it into intra-operative, immediate and early postoperative period, which helped us better analyze and audit our short comings during and after the procedure and where we can intervene in future to control the outcomes.

Limitations of the study:

1. The present study was performed in a small population for a short duration of time and the follow up period was only till puerperium. Ideally, a longer follow-up study would provide comprehensive knowledge on its long term outcomes and their influence on the quality of life of the patient.
2. The study was conducted in a tertiary care referral centre with maximum complicated cases referred from district level hospital, so the representativeness of the study findings to other parts of the country remains doubtful.

Conclusion

At the end of the study, after formulating all the indications of Robson's group 1 caesarean section and analyzing the feto-maternal outcomes, we can conclude that patients who are in spontaneous labour should undergo caesarean section only for absolute indications for better recovery of the mother and fetus. Robson's classification fulfills the purpose of identifying the group which requires optimization of caesarean section rates. It is the need of the hour to intervene and decrease the caesarean section rate especially in Robson's group 1. To do the same there is a need for reforming the protocols for labeling arrest of progression of labour, failed induction, fetal distress a. Further important measures include implementation of WHO partograph checklist and easy availability of epidural analgesia which can reduce caesarean section due to maternal distress.

Conflict of interest: None. **Disclaimer:** Nil.

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