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ANALYSIS OF CESAREAN SECTION RATES, INDICATIONS AND COMPLICATIONS IN PREVIOUS CESAREAN SECTION AT TERTIARY CARE TEACHING HOSPITALS IN INDIA (AN ICMR TASK FORCE STUDY)

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ABSTRACT

Background: Cesarean section is one of the most common surgeries that is widely performed in modern obstetrics worldwide. It was mainly evolved as a lifesaving procedure for mother and fetus. The objective of this study was to determine the rate, indications and complications of previous cesarean section. **Methods:** Prospective data was recorded on management practices, associated complications, morbidity and mortality for a period of 8 months in 2005-2006 on 15664 consecutive cases of previous cesarean section reporting at 30 medical colleges/teaching hospitals. **Results:** A total of 155863 deliveries occurred during the study duration. There were 28.1% (n=43824) cesarean section, out of which 35.7% (n=15664) were the number of previous cesarean section. 41.9% of cesarean cases had come from rural areas, 88.8% were the booked cases and 17% were referred. The leading cesarean indications were cephalopelvic disproportion (39.1%), previous 2 cesarean section (15.8%), foetal distress (11.5%), doubtful scar integrity (6.9%), malpresentation (5.5%), non-progress of labor (5.3%), severe pregnancy induced hypertension/eclampsia (5.2%). Anesthesia complications (0.9%), surgical complications (3.6%), post-operative complication (5.9%) and blood transfusion (7.4%) were required. There were 27 (0.17%) maternal deaths and 253 (1.6%) perinatal deaths. **Conclusions:** A high rate of cesarean section was observed in the tertiary care hospitals. There is a need to conduct hospital and community based studies to monitor the cesarean section rates and further evaluate the common indications for cesarean section in India. Individualization of the indication and careful evaluation, following standardized guidelines, practice of evidence-based obstetrics can help to limit cesarean section rate.

KEYWORDS: Cesarean Section, Rate, Indications, Complications, India.

INTRODUCTION

Cesarean section (CS) is one of the most common surgeries widely performed in modern obstetrics worldwide. It is normally performed when a vaginal delivery would put the mother and baby's life at risk and thus has been regarded as a lifesaving procedure for mother and foetus during the difficult delivery. In recent years, the cesarean section rate has increased in different parts of the world, both in developed and developing countries. The recommendation for optimal cesarean section rate of more than 15% recommended by WHO is not justified.[1] There is no evidence to show any benefit either to mother or to infant when the procedure is not medically indicated.[2] Over the past three decades, the overall cesarean section rates has been rising steadily worldwide.[3,4] In developing countries, improvement of maternal and perinatal health strongly depends on strengthening of health system.[5] Developing countries like India faced the challenge to improve the health of women and children making the best use of possible limited resources. As per recently published WHO report, at population level, cesarean section rates higher than 10% are not associated with reductions in maternal and new-born mortality rates.[6] The increase in the rates of cesarean section has been an area of concern as the rise has not contributed to an improved pregnancy outcome. Even though the common indications of cesarean section have not changed so far and these still remains previous cesarean, foetal distress, malpresentation, non-progress of labor and cesarean section on demand. Current available data from developed countries revealed morbidity and mortality from cesarean section is more than vaginal delivery for both mother and the fetus. Keeping in view the above facts, the present study was undertaken by Indian Council of Medical Research to determine the rate, indications and complications of previous cesarean section at tertiary care teaching hospitals in India.

METHODS

The Indian Council of Medical Research (ICMR) has a network of Human Reproduction Research Centre (HRRC) located in the department of obstetrics and gynecology of 30 medical colleges/teaching hospitals in various parts of the country. Prospective data was recorded through proforma on management practices, associated complications and mortality for a period of 8 months in 2005-2006 on 15664 consecutive cases of previous cesarean section reporting at 30 medical colleges/teaching hospitals for delivery. Information on the patient's characteristics including age, parity, booked, non-booked status, past obstetric medical and surgical history, history of present pregnancy and complication was collected. The mode of delivery was recorded as VBAC (vaginal birth after caesarean), elective repeat cesarean section (El-RCS) or emergency repeat cesarean section (Em-RCS). In case of vaginal delivery it was recorded whether it was spontaneous vaginal delivery, forceps or ventouse. Maternal complications developed during or after the labor was noted e.g. uterine rupture, blood transfusion, hysterectomy scar tenderness, scar dehiscence etc. Inclusion criteria were that all the women with history of previous cesarean section at tertiary care teaching hospitals were included in the study after obtaining informed consent**.** The women were followed up from admission to discharge from the hospital. The data collected were coded and fed into the computer using Epi-Info. Statistical analysis was performed using SPSS 19.0 for Windows and various descriptive statistics were used to calculate frequencies, percentages, means and standard deviation.

RESULTS

A total of 155863 deliveries occurred during the study duration. There were 28.1% (n=43824) cesarean section, out of which 35.7% (n=15664) were the number of previous cesarean section which forms the study sample (Table 1). A trial of labor was planned in 4035 (25.8%) women. In 84% (n=13151) had repeat cesarean delivery and 2513 (16%) delivered vaginally.

The age of the patients ranged between 16 and 49 years with a mean age of 26.1±3.9. Maximum cesarean section was done in age group of 25-29 years followed by age group of 20-24 years. A majority of the cesarean section (79.3%) were between 20 and 29 years of age. 41.9% of cesarean cases were referred from rural areas to avail tertiary care as compared to urban (42.9%) and urban slum (15.2%). On the whole 88.8% were booked cases. A total of 2640 (17%) of the cesarean cases were referred from govt. hospital (8.4%), SC/PHC/CHC (4.8%), private hospital (2.5%) and maternity hospital (1.3%). The period of gestation was less than 37 weeks in 17.9% of the cesarean section cases. More than half of the women (55.1%) were in labor at the time of admission to the hospital including 1.7% cases with a history of attempted delivery. Delivery had been attempted by traditional birth attendants (0.2%), family members in 0.04%, a female paramedical worker in 0.4% and a doctor in 1.1%. Presentation was longitudinal in 93.8% of these women. (Table 2).

The leading cesarean indications were cephalopelvic disproportion (39.1%), previous 2 cesarean section (15.8%), foetal distress (11.5%), doubtful scar integrity (6.9%), malpresentation (5.5%), non-progress of labor (5.3%), severe pregnancy induced hypertension/ eclampsia (5.2%), pregnancy loss (2.1%), placenta previa (1.6%), failed induction of labor (0.9%), obstructed labor (0.9%), multiple pregnancy (0.7%), abruptio placenta (0.7%), cervical dystocia (0.3%) and uterine dysfunction (0.1%). Others (5.8%) included cesarean section for high-risk situations like PROM (Premature rupture of membranes), post-dated pregnancy, precious pregnancy, previous bad obstetric history. (Table 3).

(Table 4) showed the elective cesarean section was in 34.5% and emergency caesarean section was performed in 49.5% of the cases while in 16% the delivery was vaginal after trial of labor was performed in 4035 cases. General anesthesia was administered in 8.1%, spinal anesthesia (91.0%) of cases, epidural (0.6) and local (0.3%) of cases. Outcome of delivery was live birth in 98.8% and still birth in 1.2% of previous cesarean section. Anesthesia complications were reported in 0.9%, surgical complications in 3.6%, post-operative complication in 5.9% of cases and blood transfusion was required in 7.4% cases. There were 27 (0.17%) maternal deaths and perinatal deaths were 253 (1.6%) in previous cesarean section.

Table 1: Rate (%) of cesarean sections and the previous cesarean section in 30 medical colleges/teaching hospitals.

HRRC	No. of Deliveries	No. of Cesarean Section		No. of Previous Cesarean Section	
		N	%	N	%
Medical College, Jammu	9781	2690	27.5	711	26.4
PGIMER , Chandigarh	2711	780	28.8	367	47.1
K.H., New Delhi	7879	1131	14.4	373	33.0
S.J.H., New Delhi	14121	2252	15.9	683	30.3
A.I.I.M.S., New Delhi	1511	465	30.8	245	52.7
S.P. Medical College, Bikaner	4291	862	20.1	253	29.4
K.G. Medical College, Lucknow	2222	983	44.2	292	29.7
M.L.N. Medical College, Allahabad	383	225	58.7	85	37.8
G.S.V.M. Medical College, Kanpur	667	277	41.5	95	34.3
L.L.R. Medical College, Meerut	1400	162	11.6	40	24.7
S.M.S. Medical College, Jaipur	7924	2300	29.0	525	22.8
I.O.G., Chennai	11835	5093	43.0	2005	39.4
Kilpauk Medical College, Chennai	5313	1793	33.7	729	40.7
K.G.H. Chennai	7415	2774	37.4	1229	44.3
Madurai Medical College, Madurai	8442	1372	16.3	1111	81.0
S.A.T. Medical College, Thiruvanantpuram	10651	3133	29.4	1388	44.3
R.S.R.M., Chennai	8602	2501	29.1	1100	44.0
J.L.N. Medical College, Belgaum	2830	663	23.4	292	44.0
Patna Medical College, Patna	3478	1000	28.8	317	31.7
R.G.Kar, Kolkatta	8932	2705	30.3	870	32.2
Eden Hospital, Kolkatta	5510	2404	43.6	439	18.3
Medical College, Guwahati	5371	2155	40.1	335	15.5
S.C.B.Medical College, Cuttack	4349	1621	37.3	304	18.8
S.S.K.M. Hospital, Kolkatta	1003	558	55.6	110	19.7
S.S.G.S. Medical College, Baroda	2803	480	17.1	336	70.0
K.E.M. Hospital, Mumbai	5373	1139	21.2	512	45.0
K.E.M .Hospital, Pune	978	403	41.2	169	41.9
J.J. Hospital, Mumbai	1483	307	20.7	88	28.7
B.J. Medical College, Pune	5116	747	14.6	320	42.8
Goa Medical College, Goa	3489	849	24.3	341	40.2
Total	**155863**	**43824**	**28.1**	**15664**	**35.7**

Table. 2: Socio demographic profile of previous cesarean section (N=15664).

Age Number Percentage		
<20	129	0.8
20-24	5767	36.8
25-29	6658	42.5
30-34	2455	15.7
≥35	655	4.2
Mean±S.D. 26.1±3.9		
Gravida		
2	9756	62.2
2+	5908	37.8
Place of residence		
Rural	6574	41.9
Urban	2377	15.2
Urban slum	6713	42.9
Type of cases		
Booked	13905	88.8
Unbooked	1734	11.1
Not known	25	0.1
Place of referral		
Not referred	13009	83.0
Referred from		
SC/PHC/CHC*	721	4.8
Govt. Hospital	1320	8.4
Maternity hospital	202	1.3
Private hospital	387	2.5
Not known	10	0.1
Delivery attempted by		
Family/relative/neighbour	7	0.04
Traditional birth attendant	24	0.2
Female paramedical worker	61	0.4
Doctor	180	1.1
Not attempted	15392	98.3
Status at admission		
Antenatal	7033	44.9
In labor	8631	55.1
Period of gestation		
<37 weeks	2811	17.9
≥37	12475	79.6
Not recorded	378	2.4
Lie		
Transverse	477	3.0
Longitudinal	14696	93.8
Oblique	140	0.9
Others	351	2.2

* Sub Center/Primary Health Center/Community Health Center

Table. 3: Indication for cesarean section in women with previous cesarean section (N=13151)

Indication category Number Percentage		
Cephalopelvic disproportion	5140	39.1
Previous 2 cesarean section	2076	15.8
Foetal distress	1515	11.5
Doubtful scar integrity	907	6.9
Malpresentation	719	5.5
Non progress of labor	693	5.3
Severe pregnancy induced hypertension/eclampsia	690	5.2
Pregnancy loss	273	2.1
Placenta praevia	212	1.6
Failed induction	118	0.9
Obstructed labor	114	0.9
Abruptio placenta	87	0.7
Multiple pregnancy	97	0.7
Cervical dystocia	33	0.3
Uterine dysfunction	9	0.1
Others	768	5.8

Table. 4: Procedure, maternal complications and outcome of Previous cesarean section.

Procedure (N=15664) Number Percentage		
Elective CS	5399	34.5
Emergency CS	7752	49.5
Successful trial of labor	2513	16.0
Type of anesthesia (N=13151)		
General	1066	8.1
Spinal	11966	91.0
Epidural	80	0.6
Local	39	0.3
Maternal complications (N=13151)		
Anesthesia	117	0.9
Surgical	476	3.6
Post-operative	781	5.9
Blood transfusion	975	7.4
Outcome of pregnancy (N=15664)		
Live birth	15470	98.8
Still birth	194	1.2
Mortality (N=15664)		
Maternal	27	0.17
Perinatal	253	1.6

DISCUSSION

Cesarean section rates are rising at an alarming rate both in the developed as well as the developing world.[3] The rates of both primary and repeat cesarean delivery have been on the rise.[4] A study by Indian Council of Medical Research in 30 tertiary care medical colleges/teaching hospitals noted that average CS rate increased from 21.8% in 1993-94 to 25.4% in 1998-99.[7] In our study, from all the deliveries, the rate of cesarean section has further increased to 28.1% in 2005-06 from same set of medical colleges/teaching hospitals. One of the studies which were conducted by ICMR in the same set of hospitals/medical colleges showed that the cesarean section rate was 32.2%.[8] A rapid increase in cesarean

section rate has occurred in these tertiary care hospitals. However, the study was conducted in tertiary care hospitals where the cesarean section rate was comparatively higher as compared to other hospital settings due to the referral of high risk pregnancies in these hospitals. A five year audit in a large teaching hospital in Kolkata showed a cesarean section rate of 49.9%.[9], while a hospital in Chennai showed cesarean section rate of 47%.[10] The rate of caesarean section observed in our study are consistent with many independent studies conducted in India from various regions.[11-16] Increasing trends have also been observed in many other countries. Barber et al. in their study conducted in the United States showed an increase from 26% to 36.5 % between 2003 and 2009.[17] A study in Saudi Arabia on trends in cesarean section rates showed an increase from 0.6% in 1997 to 19.1% in 2006.[18] In a study conducted in Singapore by Chong et al., the cesarean delivery rate increased from 19.9 to 29.6 per 100 births from 2001 to 2010.[19] Exponential increase in cesarean section rates was observed by Litorp et al, rising from 19% in 2000 to 49% in 2011.[20]

The emergency cesarean section (49.5%) in our study is higher than elective cesarean section (34.5%). This is probably because our hospital is a referral hospital and most cases were unbooked (88.8%). The figures provided are hospital-based and do not necessarily reflect the community. The people attending these hospitals are not a representative of the overall population.

Tertiary care hospitals with high rates of cesarean section must critically analyse the reasons for high rates and develop appropriate guidelines to reduce the rates. An increase in the rates of cesarean section is a burden on the health system that works with limited resource. There is a further need to obtain standardized information to help policy makers. Therefore, health authorities, professional associations, medical colleges, the public and the media should work together towards containing the rates of cesarean section. More research is needed to understand the health effects of cesarean section on immediate and future outcomes.

CONCLUSIONS

A high rate of cesarean section was observed in the tertiary care hospitals. There is a need to conduct hospital and community based studies to monitor the cesarean section rates and further evaluate the common indications for cesarean section in India. Individualization of the indication and careful evaluation, following standardized guidelines, practice of evidence-based obstetrics can help to limit cesarean section rate.

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