Analysis of primary cesarean sections in NTSV (Nulliparous, Term, Single, Vertex) in a tertiary care hospital in South India

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Abstract

Introduction and Aim: Globally, rising caesarean section rates have become public health concern. Cesarean section analysis and audits using Robson ten group classification system have identified the main drivers of Cesarean section rates (CSR) are the gravidas with previous CS and the nulliparous with term singleton foetus with vertex presentation (NTSV).[1-10] Given the low rates of vaginal birth after a cesarean section, once a woman undergoes her first CS, she is extremely likely to have repeat CS in subsequent pregnancies. This increases the burden of high risk pregnancies and increased CS rates subsequently. Reducing primary cesarean sections in NTSV is the key for improving overall health statistics of the institutions. Hence, this one year prospective study was conducted to know the factors contributing to CS in NTSV population in a tertiary care hospital in South India.

Materials and Methods: The study is prospective observational study which is conducted in labour wards of department of Obstetrics & Gynaecology at teaching hospital attached to KLE Academy of Higher Education's Jawaharlal Nehru Medical College, Belagavi, from January 2016 to December 2016.

Results: Total number of gravidas who delivered during study period, were 6236, out of which 2494 (40%) were NTSVs. The CS among NTSVs were found to be 849(34.01%). The main indications for emergency cesarean sections in NTSV were fetal distress, non-progress of labour, failed induction i.e. 44.76%, 16.65% and 15.31%, respectively.

Conclusion: The primary cesarean sections among the NSTV is an important contributor to the overall cesarean sections of the health institute. The main indications of CS were fetal distress, non-progress of labour and failed induction. There is a need to develop standard clinical protocols for management of these conditions and emphasise vaginal delivery in NTSVs. Also strategies like training the obstetricians in interpretation and management of suspicious and non-reactive CTG traces, use of cervical ripening agents prior to induction, use of partogram in monitoring patients in labour, should be included in routine practice to improve vaginal birth rates in this low risk population.

Keywords: Cesarean section, Low risk pregnancy, Nulliparous, Singleton pregnancy, Term pregnancy, Vertex presentation, Induction.

Introduction

Cesarean section (CS) is an important surgery to save life of pregnant patient as well as foetus. However, CS are associated with increased risk of maternal and perinatal morbidity and mortality. It is associated with PPH, sepsis, peripartum hysterectomy in present pregnancy and adherent placenta, uterine rupture and death in future pregnancies.[11] Cesarean section rates are increasing all over the world to an extent that in certain centres in Brazil it has reached to 70-80%.[12] According to WHO (1985), cesarean section rates higher than 10% are not associated with reductions in maternal and new-born mortality rates.[13] The main groups of gravidas contributing to increase in CS rates are multiparous with previous CS and NTSV (Nulliparous, Term, Single, vertex presentation),who underwent elective CS, and emergency CS in labour, either following spontaneous or induced labour. Therefore size of each of these groups and CS in each of these groups will influence overall CS rates. Hence women who are nulliparous, at full term, with a singleton pregnancy in vertex presentation (NTSV) have been established as a standard population and used as a target group for reducing the cesarean birth rate.[14,15] The diagnosis and standard management of labour in these patients require review in this low-risk group.[16] Vaginal delivery in this low risk group is highly desirable as it affects the mode of delivery in future pregnancies as obstetric character of the gravidas impose limitations for vaginal birth in previous CS. Thus to avoid further increase in CS rates as well to prevent complications in future pregnancies, the focus should be delivering NTSVs through vaginal route. NTSV caesarean section analysis provides a good basis for comparison of CS in the health facility as well as among different units. Hence, this study was conducted to identify and analyse the factors associated with increasing rate of CS in NTSV at a tertiary care hospital in South India.

Materials and Methods

The study is a hospital based descriptive observational study conducted in the labour wards of department of Obstetrics & Gynaecology at teaching hospital attached to KLE University's Jawaharlal Nehru Medical College, Belagavi, from January 2016 to December 2016.

Inclusion Criteria: All nulliparous women with gestational age at or >37wk with cephalic presentation who underwent CS either electively, or on emergency basis following either spontaneous or induced labour. Nulliparous-patients who never delivered a baby of >24 weeks or >500gms, Term-pregnancies ≥37 completed weeks, Singleton with Vertex presentation (NTSV) were included.

Exclusion Criteria: Nulliparous patients with abnormal lie and non-vertex presentations, preterm & multiple pregnancy.

Statistical Analysis

Data was entered using Microsoft Excel 2010 version and analysed using Epi- Info version 7. Data was summarized in percentages. Diagrammatic representation of the data was represented by pie charts and tables. Chi square test was used to determine any association between variables with significance level at 5% ($p<0.05$ considered to be statistically significant).

Results

The data obtained was coded and entered into the Microsoft Excel spreadsheet. The data was analyzed and the final results and observations were interpreted as follows. Total number of patients delivered during study period, were 6236, out of which 2494 (40%) were NTSV (Fig. 1). Table 1 depicts age distribution of NTSVs. Maximum number NTSVs belong to 20-24years.Incidence of elderly pregnancies in the study was 87 (3.5%). Total number of vaginal deliveries in NTSV during the study period were 1645(66%) and CS were 849(34.01%) (Fig. 2). Total number of CS were 2782 (44.6%) and contribution of NTSV to overall CS rate was found to be 849(13.6%) (Fig. 3). Fig. 4 depicts number of elective LSCS in NTSV as 85(10%) and emergency LSCS as 764(90%). Among emergency LSCS 595(77.87%) were following spontaneous labour and 169(22.12%) were from induced labour (Fig. 5). Table 2 depicts different indications for elective LSCS. The indications for elective LSCS were precious pregnancy (conceived with infertility treatment/subfertility) 23 (27.05%), and IUGR with Doppler abnormalities 15(17.64%), anamnios 14 (16.47%), Macrosomia 12 (14.11%), placenta previa 11 (12.94%), BOH 10 (11.76%). Among 764 emergency CS, the commonest indication was fetal distress 342 (44.76%) followed by non-progress of labour 117(16.65%) and failed induction 112(15.3%). Other indications for emergency LSCS were severe pre eclampsia 47(6.15%), CPD 42(5.49%), antepartum eclampsia 25(3.27%), DTA19 (2.48%), abruptio placenta 16(2.09%), maternal disease 14 (1.83%), oligohydramnios 13(1.7%), prolonged PROM 7 (0.9%), persistent OP 5(0.65%), face presentation 3 (0.03%), cord presentation 1(0.13%) and obstructed labour 1 (0.13%).

Table 1: Age distribution of NTSVs

Age (yrs.)	Number of women (N=2494)	%
18-20	789	31.63
20-24	942	37.77
25-29	676	27.10
>30	87	3.5

Table 2: Indications of LSCS in elective LSCS (N=85).

Indications	n	%
Precious pregnancy (conceived with infertility treatment)	23	27.05
IUGR with Doppler abnormalities	15	17.64
Anamnios	14	16.47
Macrosomia	12	14.11
Placenta previa	11	12.94
BOH	10	11.76

Table 3: Indications of emergency LSCS-n=764.

Indications of Emergency LSCS	n	%
Fetal distress	342	44.76
Non progress of labour	117	16.65
Failed induction	112	15.31
Severe preeclampsia	47	6.15
CPD	42	5.49
Antepartum eclampsia	25	3.27
DTA	19	2.48
Abruptio placentae	16	2.09
Maternal diseases	14	1.83
Oligohydramnios	13	1.70
Prolonged PROM	7	0.91
Persistent OP	5	0.65
Face presentation	3	0.03
Cord presentation	1	0.13
Obstructed labour	1	0.13

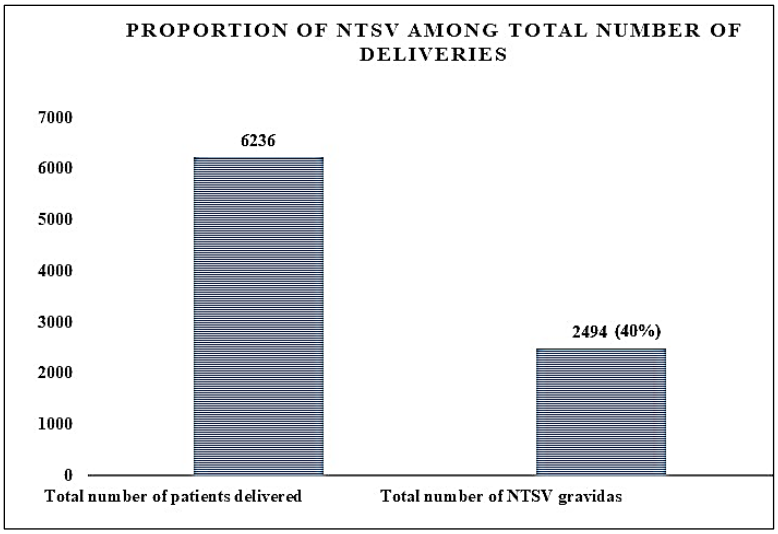

Fig. 1: Proportion of among total number of deliveries

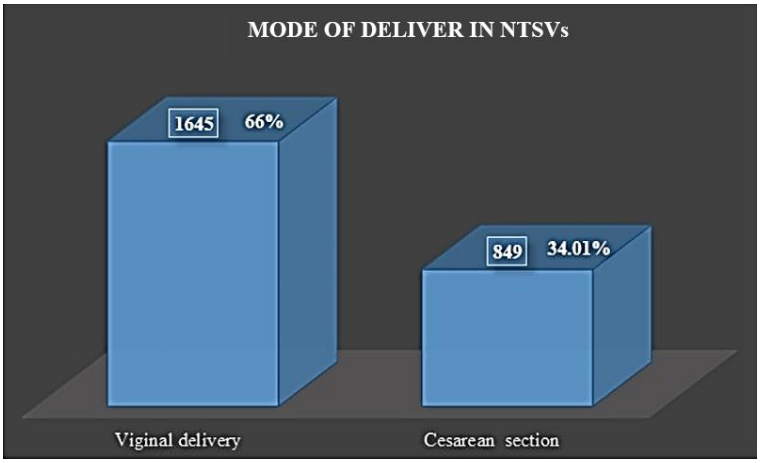

Fig. 2: Mode of delivery in NTSVs

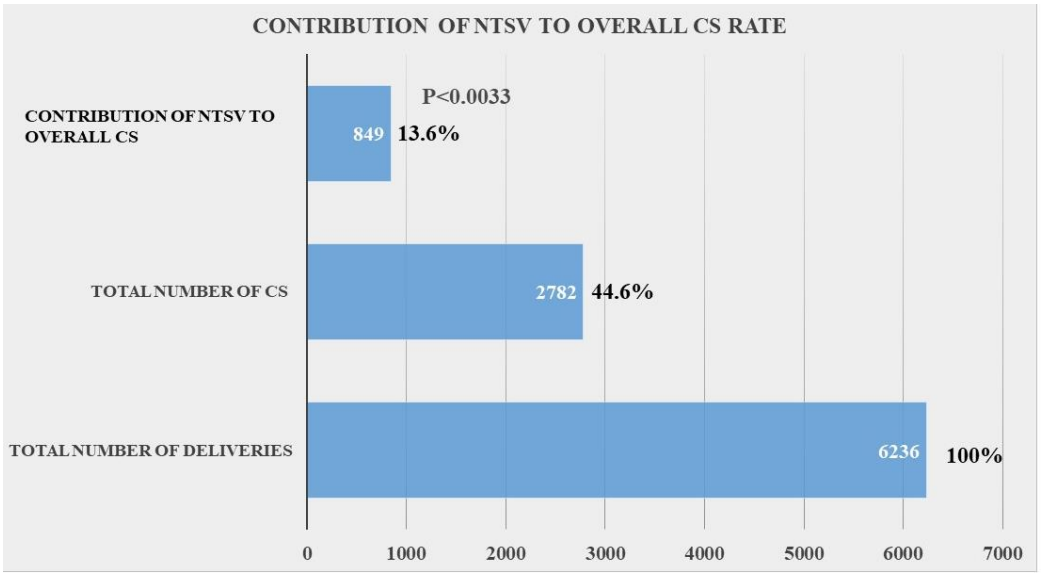

Fig. 3: Contribution of NTSV CS to overall CS rate

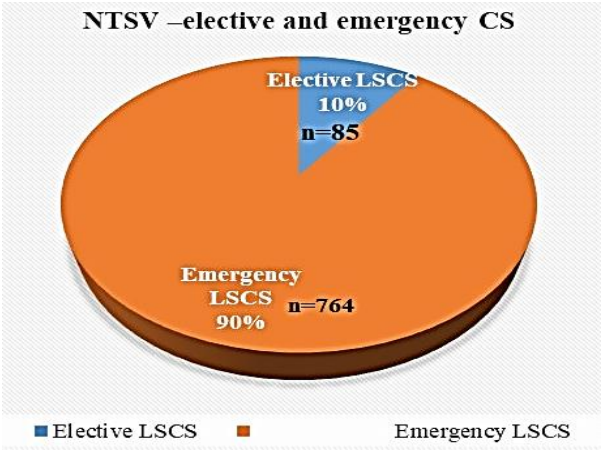

Fig. 4: Types of LSCS in NTSV

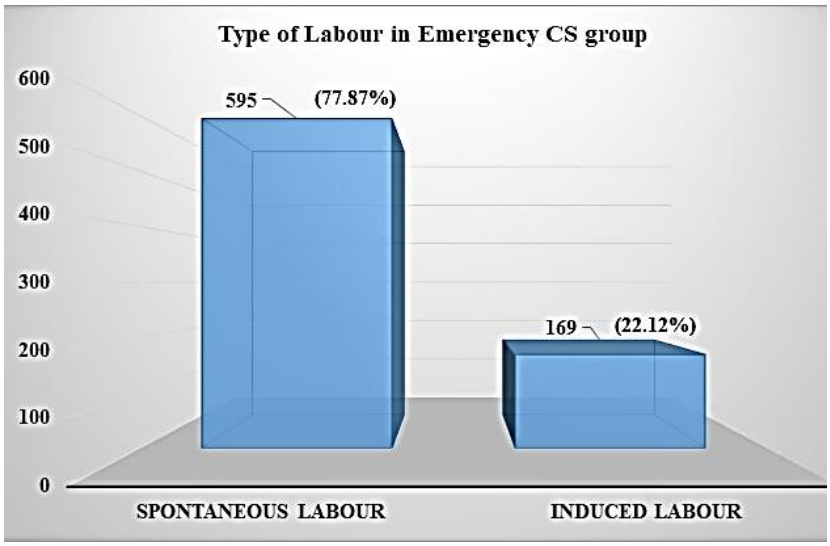

Fig. 5: Type of labour in emergency CS group

Discussion

A total of 6236 gravidas delivered during the study period "between" January 2016 to December 2016. Nulliparous patients at term with single pregnancy and vertex presentation were 2494(40%) of total obstetric population, and they constituted major group. This is similar to other studies where NTSV contribution to obstetric population is maximum i.e. 53.3%, Prameela et al.,[5] 76% Malik et al.[10] These are first time mothers (Nulliparous), bear a single child, at full term (Term Singleton), and have cephalic presentation (Vertex). They constitute the most important group in any obstetric population because they have the most variation in terms of management and outcome. Also the mode of delivery in this low risk group influences outcomes in future pregnancies. The contribution of elderly NTSV (age > 30yrs.) is 87 (3.5%). More of cesarean sections are performed in elderly primi gravida in view of precious pregnancies.[17]

Among 2494 NTSVs, the NTSV CS were 849(34%). It means almost 1 in 3 NTSV have undergone CS for some indication. The NTSV CS rate in other studies was, 25% Malik et al,[10] 21%, Kazmi et al,[7] 51% Ray et al.[4]

The overall CS rate during the study period was 2782 (44.6%). The contribution of NTSV to overall caesarean section rate in the study is 849 (13.6%) and statistically significant, p value<0.0033. NTSV CS rates varies widely, from 10.3% to 34.2%, in different studies globally.[18-21,3,5] This may be due to variation in clinical practices, in different parts of the world, affecting mode of delivery in NTSVs. This indicates that despite of being low risk group i.e., women who are nulliparous, single, cephalic, ≥ 37 weeks are the major contributors for primary CS.

The total elective LSCS in NTSV were 85(10%).It is comparable to other studies i.e., in cesarean section audit by Malik et al[10] in Sri Lanka, the elective LSCS among NTSV population was 14%. The indications of elective LSCS in the study being precious pregnancy (conceived with infertility treatment/subfertility) 23 (27.05%), IUGR with Doppler abnormalities 15 (17.64%), anamnios 14(16.47%), macrosomia 12(14.11%), placenta previa 11(12.94%), BOH10 (11.76%). Women with precious pregnancy, (either

conceived after infertility treatment or having BOH) prefer cesarean section over vaginal delivery considering cesarean section to be safer for the baby. Ultrasonography done in third trimester to screen growth abnormalities has been associated with increased cesarean sections with no neonatal benefit.[22] So ultrasonography to assess fetal growth in the third trimester, should be used with clear indications.

Total emergency LSCS were 764 (90%), showing maximum LSCS in NTSV, following labour, which is either spontaneous in onset or induced for some indication. NTSV who underwent LSCS following spontaneous labour were 595 (77.87%) and induced labour were 169(22.12%). Those who underwent LSCS following spontaneous labour were 3.5 time more than the nulliparous who underwent LSCS following induced labour. It indicates less induction in nulliparous women. This is because the nulliparous with complicating factor either get delivered before 37 weeks or had elective CS at term. The main indications for emergency cesarean sections in NTSV in the study were fetal distress, non-progress of labour, failed induction. i.e. 44.76%, 16.65%, 15.31%, respectively. More number of CS are being performed for indications like fetal distress i.e.53% (Malik et al[10]), 53.2% (Siebles et al[23]). The high rate of CS in NTSVs for fetal distress, in the study, can be attributed to use of electronic fetal monitoring/CTG in the study set up. Being a tertiary care hospital, it receives majority of high risk cases who are monitored with fetal cardiotocography (CTG). CTG use can increase the rates of fetal distress as per abnormal or indeterminate Fetal heart rate trace (formerly, non-reassuring fetal heart rate tracing/NRFHT), A B Caughey et al.[24] According to the World Health Organization (WHO), the fetal heart rate should be monitored by intermittent auscultation during the first stage of labour i.e., for every 15 minutes and every 5 minutes in second stage of labour.[11] EFM should be used in carefully selected patients e.g. patients undergoing induction of labour, FGR, GDM. Training the obstetrician in interpretation and management of abnormal fetal heart rate pattern, and standardisation of practice can reduce the burden of emergency CS number for fetal distress indication. Based on the high rate of first cesarean deliveries performed for the indication of "non-reassuring CTG, this should be complemented with intrauterine resuscitation measures like amnioinfusion with normal saline to resolve variable fetal heart rate decelerations and reduce the incidence of cesarean delivery for a nonreassuring fetal heart rate,[25-27] supplemental oxygen,[28] intravenous fluid bolus[29] and tocolytic agents.[30]

These are easy to perform and do not require extensive resources, and can improve abnormal fetal heart trace.

NTSV have greater risk for non-progress of labour (16.65% in this study). Appropriate diagnosis and management of first and second stage of labour is key strategy in reducing cesarean sections in this group. The terminology for failure-to-progress is poorly defined in literature because of a lack of universally accepted obstetric terminology. Dystocia, dysfunctional labour, arrest of descent and arrest of dilatation are all terms that refer to failure-to-progress.[31] The important thing is to individualize every labour. If both mother and foetus condition is good, time limit for non-progress of labour should not be assigned in a tertiary center. Judicious administration of oxytocin to augment labour, use of partograph in active stage as well as the presence of a trained labour attendant and use of pre-induction cervical ripening agents decrease the risk of non-progress of labour. Presence of a supportive companion during labour not only shortens labour duration but also reduces the likelihood of emergency caesarean delivery.[32] Boyle et al[33] 2013, have suggested targets for decreasing primary cesarean rates in NTSV. First, they recommended that clinicians wait longer for labour to progress, by using 6 cm as the cut-off for active labour when assessing failure to progress. Second, they recommended that clinicians conservatively manage the second stage labour by allowing adequate time for descent to occur and considering operative vaginal delivery alternatives.

The next common indication in the study was failed induction, contributing to 15.31% of CS in NTSV. The research on the association between induction of labour and CS is divided. Some observational studies found no increase in the rate of CS following induction of labour[34-37] while others have found an increase in CS following induced labour.[38,40] However, a reduction in inductions in NTSV is associated with reduction in cesarean section rate.[42,17] Establishing pre-induction obstetric indication for IOL in NTSV, and use of cervical ripening agents in gravidas with poor cervical score is recommended. Numerous studies have found that the use of cervical ripening methods–such as misoprostol, dinoprostone, prostaglandin E2 gel, Foley bulbs, and laminaria tents–lead to lower rates of cesarean delivery than induction of labour without cervical ripening.[43,44] There is also data to support the use of more than one of these methods, such as misoprostol and a Foley bulb, to facilitate cervical ripening.[45] Also women should be counselled regarding the risks of CS prior to consenting for induction of labour.[46]

Other indications for emergency LSCS include severe pre eclampsia 47(6.5%),CPD 42(5.49%), antepartum eclampsia 25(3.27%), DTA 19(2.48%), abruptioplacenta 16(2%), maternal diseases 14 (1.83%) oligohydramnios 13(1.7%), prolonged PROM 7(0.9%), persistent OP 5(0.65%), face presentation 3(0.03%),cord presentation 1(0.13%).Other studies also proved that medical and obstetric complications increase the risk of CS.[47,48]

Conclusion

The primary cesarean birth rate among the NTSV population of women contributed significantly to the

overall CS rate. Analysis of CS in low risk NTSV has identified the grey areas like fetal distress, non-progress of labour and failed induction where universally accepted clinical guidelines should be advocated to decrease primary CS rate among NTSV, without causing adverse outcome to health of mother and baby. Also practices such as periodic training the obstetricians in interpreting suspicious and nonreactive CTG, skilled pelvic examination for diagnosing CPD, use of partogram for monitoring progress of labour, use of pre-induction cervical ripening agents to get successful outcome in induction of labour is recommended. Terminology for diagnosis of failure-to-progress and fetal heart rate patterns should be standardised to help improve the comparability of studies and better management of labour in NTSVs to reduce primary CS rates in this low risk group. This will lead to better quality care, improved health outcome and reduced costs.

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