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FACTORS ASSOCIATED WITH THE RATE OF CESAREAN SECTION(C SECTION) IN A TERTIARY CARE HOSPIITAL

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ABSTRACT

AIM: To study the factors associated with rate of cesarean section in a tertiary care hospital**. METHODS:** A prospective observational study was carried out in tertiary care hospital between Aug 2015 – Jan 2016. We included pregnant women who underwent Cesarean section of all age groups, all gravid with co-morbid conditions of in- patient department. We analyzed the collected data by using statistical method ANOVA windostat 9.2 version. The relative contribution of each indication to overall Cesarean section rate was determined. **RESULTS:** In this study, we found that the caesarean delivery rate was decreased from 40% to 38.6% between Aug 2014 –Jan 2015 and Aug 2015 – Jan 2016. Among the documented indications, extreme significance was noted for Oligohydramnios, preeclampsia, latent phase of labour, previous LSCS and PROM. The relative contributions of indication for Cesarean section rate: preeclampsia (28%); Oligohydramnios (26%); latent phase of labour (23%); previous LSCS (22%); PROM (17%). **CONCLUSION:** Cesarean section rate was found to be high in urban women when compared to that of rural women. Better pre and perinatal care will help in reducing Cesarean section rate in our setup.

KEY WORDS: Cesarean section, Preeclampsia, Oligohydramnios, Pre and perinatal care.

INTRODUCTION

CESAREAN SECTION: Delivery of a foetus through a surgical incision into the uterine wall after 28 weeks of gestation is known as C-section[1][1]

PREGNANCY: It is a sequence of events that initiates with fertilization, proceeds to Implantation, embryonic development, and fetal development, and normally culminates with birth about 38 weeks later, or 40 weeks after the last menstrual period. It is divided into three periods of three calendar months each, called trimesters**.** First trimester (week 1-week 12) is the most critical stage of development during which the rudiments of all the major organ systems appear, and also during which the developing organism is the most vulnerable to the effects of drugs, radiation, and microbes. Second trimester (week 13-week 28) is characterized by the nearly complete development of organ systems. By the end of this stage, the foetus assumes distinctively human features. Third trimester (week 29-week 40) represents a period of rapid foetal growth. During the early stages of this period, most of the organ systems are becoming fully functional.[2]

Following factors have been included.

PREECLAMSIA: Preeclampsia (PE) is defined as hypertension after 20th week of gestation with high blood pressure of 160/110 mm of Hg, proteinuria above 3 gm per day, possible edema and activation of the coagulation system.[3] It has been demonstrated that maternal demographic characteristics, including medical and obstetric history, are potentially useful in screening PE. In PE, hypertension develops due to vasoconstriction and reduced peripheral vascular compliance. Although hypertension is only a secondary sign of PE, it is an important sign because it is an early indication of the disease.

Management: Magnesium Sulphate is the drug of choice for reducing the rate of eclampsia, but at least 71 women would need to be treated to prevent one case of eclampsia[4].Subsequently, more than 50 trials have been carried out throughout the world and a meta-analysis of these studies detected that the administration of low dose aspirin in high-risk pregnancies is associated with a decrease in the rate of PE by approximately10%.Most studies that evaluated aspirin for the prevention of PE and the onset of treatment was after 16 weeks gestation. However, recent meta-analyses reported that the prevalence of PE can be decreased to 50% by the administration of low-dose aspirin started at 16 weeks or earlier .[5]

PREVIOUS LSCS: In today's obstetric practice we encounter increasing number of post caesarean pregnancies due to rise in primary caesarean due to multi factorial reasons. "Once caesarean section always caesarean section" no longer holds true. Several studies have suggested that in women with prior caesarean section for non-recurrent cause, a trial of

labour is safer than elective repeat caesarean section. This tendency to resist C-section arose from the wish not to compromise a patient's obstetric future, because the dictum "twice a caesarean section always a caesarean section" holds true. Presently, commonest indication for repeat LSCS was previous two LSCS followed by CPD and foetal distress. Repeat LSCS rate is increased due to trend towards less trial of labour and early decision of repeat LSCS.[6]

OLIGOHYDRAMNIOS: Oligohydramnios is defined as amniotic fluid volume that is less than expected for gestational age.[7] Under normal conditions, amniotic fluid volume increases linearly until about 36 weeks of pregnancy, with an average rate of 1000 mL and then its volume decreases to less than 200 mL at 42 weeks. In the past decade a number of ultrasound methods had been used to measure the amount of amniotic fluid. The amniotic fluid index of less than 5 cm is referred as Oligohydramnios. Oligohydramnios involves 3-5% of pregnancies. Generally, Oligohydramnios is less prevalent during early pregnancy and at this time it usually is associated with poor prognosis. In uncomplicated pregnancies at 40.0 to 41.6 weeks, Oligohydramnios is independently associated with an increased risk of low birth weight per centile. Also in several studies Oligohydramnios has been correlated with increased risk of abnormal foetal heart rate, pulmonary hypoplasia, increased risk of caesarean delivery, IUGR, postdate pregnancy, meconium passage, lower Apgar scores, NICU and neonatal death.[8]

Management: APTA is a useful procedure in the management of severe Oligohydramnios; it may be followed by a relatively high rate of rupture of the membranes, particularly during the second trimester. Paradoxically, infusion of higher volume of saline into the amniotic cavity is associated with a significantly lower risk of rupture. APTA is an increasingly accepted treatment option with the aim of a better perinatal outcome, but the risks and benefits of this method are controversial.[9]

LATENT PHASE OF LABOUR: Latent phase of labour is termed as prolonged when it is >20 hours in nulliparous women and >14 hours in multiparous women [10]. The early stage of labor is characterized by irregular, infrequent, and mild contractions and with little or no dilation of thecervix or descent of the foetusduring which the neck of the womb shortens down and softens. This is called effacement. It can also open up to about 3-4cms dilated.[11]

Management: A warm shower can be extremely soothing and relaxing during all stages of labour and can be taken at regular intervals. Transcutaneous Electrical Nerve Stimulator machines are ideal to use during the latent phase of labour and can be left attached right until after the baby is born. Paracetamol tablets are perfectly safe to take during pregnancy and labour, and combined with baths and massage is very useful in reducing the discomfort of the latent phase.[12]

PROM (Premature Rupture of Membrane): PROM refers to rupture of the fetal membranes prior to the onset of labor irrespective of gestational age.[13] For this reason, it is also termed as Prelabour ROM. PROM can occur either at term or preterm (37 weeks). Prolonged PROM refers to PROM greater than 24 hours, and is interconnected with an increased risk of ascending infection.[14] PPROM occurs in 3% of pregnancies and causes around 25-30% of all preterm deliveries. Most common complications involved in PPROM patients include intrauterine infection, which can lead to Chorioamnionitis, Metritis after delivery and perinatal outcome such as neonatal sepsis. Other complications are cord compression leading to fetal distress, cord prolapse during rupture of membranes and placental abruption.[15]

Management: Conventional management for women with PPROM before 34 weeks gestation, is associated with antibiotic and corticosteroid administration.[15]

ANEMIA: Anemia is defined as a qualitative or quantitative deficiency of hemoglobin or red blood cells in circulation, resulting in a decrease in oxygen carrying capacity of blood to organs and tissues. According to WHO, Hb level of 11 g% is considered anemic during pregnancy. Classification: Mild: 10-10.9 g/dl Moderate: 7-9.9 g/dl Severe: <7 g/dl [16]. Serum Ferritin of 15 micro gm/L is associated with iron deficiency anemia.WHO estimation indicates a 65-75% prevalence of anemia in pregnant women in India.

Management: Iron supplementation to the mother during pregnancy enhances perinatal outcome.Government of India, Ministry of Health recommends 100 mg of elemental iron with 0.5 mg folic acid for prophylaxis and, for treatment more than 180 mg of elemental iron per day is required.[17]

BREECH PRESENTATION: Breech presentation is defined as a foetus lying in the longitudinal position with the feet closest to the cervix. Modern obstetric practice eases the

trend of increase in the elective caesarean section rate for breech presentation. Standard recommendation for vaginal breech delivery are proper labour selection criteria like assessment of the type of breech presentation, foetal growth, estimated foetal weight and attitude of the foetal head. The current concept of safe delivery is by caesarean section so there is increase rate of elective caesarean section especially in Primi gravid women with breech presentation.[18]

FETAL DISTRESS: The terms fetal distress and fetal asphyxia are often used interchangeably. Asphyxia is defined as acidosis resulting from progressive hypoxia in uterus. FHR monitoring can detect hypoxic episodes well before the development of asphyxia. Initiation of hypoxemia results in the elevation of fetal blood pressure due to constriction of fetal peripheral vessels and further results in slowing of fetal heart rate and respiratory compromise. Intermittent Auscultation in Labour, Electronic fetal monitoring, Digital Fetal Scalp Stimulation, Fetal Scalp Blood Sampling, Umbilical Cord Blood Gases, etc can be used for assessing intrapartum fetus distress.[19]

Management: It includes changing of maternal position; Hydration; Oxygen transfer at the placental interphase is more dependent upon the perfusion rather than on the lack of oxygen in most of the cases. Amnioinfusion.[20]

SHORT PRIMI: There is no universal definition of short stature in pregnant women has been well accepted. This is due to the fact that maternal height distribution is varied among different geographic or ethnic groups of study [21]. Witter et al. showed that a maternal height less than 157 cm was significantly associated with an increased risk of C- section delivery. The main causes for emergency Caesarean section in short women are Cephalo-Pelvic Disproportion (CPD) and labor arrest.[22] Steiner et al. described short women, with a stature below 155 cm as high risk patients for Caesarean section even after controlling for labor dystocia [23]. Maternal height reflects maternal pelvic size, which is related to dystocia, has been shown to be predictive for obstructed labor. Therefore, short maternal stature seems to be an important risk factor for emergency Caesarean section. Inverse relationship between maternal height and the cesarean rate has been consistently demonstrated but the application of height to predict risk of obstructed labor or cesarean section remains again a controversial.

OBESITY: Body mass index more than that of 30kg/$m^2$is defined as Obesity .[24] It is an epidemic not only in developed countries but also in the developing world and becoming an

increasingly common problem, both in general population and in women of the reproductive age. Increase in BMI suggesting that pregnant women are at greater risk of a number of maternal and foetal complications of pregnancy, including pre-eclampsia, caesarean section intrauterine death, induction of labour and anesthetic complications. When compared with women with a normal BMI, obese mothers have a greater risk of medical diseases during pregnancy. The risk of mothers entering pregnancy with type 2 diabetes mellitus increases linearly with increasing BMI. Raised pre-pregnancy BMI also produces an additional threefold risk of developing GDM. Mechanical complications associated with pregnancy such as pelvic pain and lower back pain are noticed more frequently in overweight and obese women during their pregnancy. The combination of these factors contributes to reduced mobility in the overweight and obese cohort during pregnancy and consequently leads to the risk of developing venous thromboembolism (VTE). The mechanisms underlying the adverse pregnancy outcomes in obesity, while poorly understood, probably initiated by abnormal adipose tissue distribution secondary to excessive weight gain in women who are already obese prior to conception. This in turn, contributes to metabolic and immunologic dysfunction at a time of natural physiological aberrancy.[25]

ADVANCED MATERNAL AGE: Pregnancy in woman of age more than 35years [26].As maternal age increases, fertility decreases and the rate of spontaneous abortion increases. Main outcome measures include, Severe maternal adverse outcomes, including maternal near miss (MNM), maternal death (MD), and severe maternal outcome (SMO), and perinatal outcomes, including preterm birth (<37 weeks of gestation), stillbirths, early neonatal mortality, perinatal mortality, low birth weight (<2500 g), and neonatal intensive care unit (NICU) admission.[27]

METHODOLOGY

The Study site was In-patient department of Obstetrics and Gynaecology, Gandhi hospital, Secunderabad.

Study design includes prospective observational study for the duration of 6months (August 2015 to January 2016). We included Pregnant women of all age groups, both Primi gravida Multi gravida and also pregnant women with co-morbid disease conditions of In-patient department in Obstetrics. We excluded pregnant women with normal delivery. The study protocol was submitted to Institutional Ethical Committee, CMR College of Pharmacy, Hyderabad for approval and it was approved. Study procedure of protocol (factors associated

with rate of cesarean section in a tertiary care hospital) includes Ward round participation in Postnatal and post-operative unit for the identification of all pregnancy cases according to inclusion and exclusion criteria and collected the data in structured documentation form. Collected cases were analysed to check the different factors causing C-section and data was interpreted. Interpreted data was statistically analyzed by using Windostat 9.2 version. ANOVA was performed to analyze various parameters to obtain statistical significance for each parameter to obtain final result and report was prepared. P values for statistical significance are- <0.01, <0.05, <0.001, <0.0001.

RESULTS AND DISCUSSION

Total no. of cases were 120, and were analyzed for the following results:

TABLE – 1: - AGE WISE DISTRIBUTION OF CESAREAN DELIVERIES. (n =120)

S.NO	AGE GROUPS (YEARS)	TOTAL NO OF CESAREAN DELIVERIES	PERCENTAGE (%)
1	<20	08	07%
2	20-25	89	74%
3	26-30	21	17%
4	>30	02	02%
	F ratio	Between samples	0.418
		Within samples	0.000
	P value	Between samples	0.740
		Within samples	<0.0001

Among 120 cases 74% C-sections were observed between age group 20-25 years with significant difference of P value 0.0001 which is similar to the study conducted by Bhat S et al., 2015.

TABLE – 2: - AREA WISE DISTRIBUTION OF CESAREAN DELIVERIES (n=120)

S.NO	AREA	NUMBER	PERCENTAGE (%)
1.	Urban	74	62%
2.	Rural	46	38%
	F ratio	Between samples	0.277
		Within samples	0.000
	P value	Between samples	0.599
		Within samples	1.000

Sancheta G et al., 2010 showed that there was no significant difference observed between urban area compare to rural area similarly in present study P value was observe to be 0.5.

TABLE – 3: - FACTOR WISE DISTRIBUTION OF CESAREAN FACTORS (n=160)

S.NO	FACTORS	NO OF CESAREAN FACTORS	PERCENTAGE (%)
1.	Pre eclampsia	33	28%
2.	Oligohydramnios	31	26%
3.	Prolonged latent phase of labour	27	23%
4.	Previous LSCS	26	22%
5.	Pre mature Rupture Of Membrane (PROM)	20	17%
6.	Fetal distress	08	07%
7.	Breech presentation	07	06%
8.	Anemia	06	05%
9.	Short primi	02	02%
10.	Obesity	00	00%
11.	Advanced Maternal age	00	00%

TABLE – 4:-PROBABILITY VALUE AND F RATIO OF EACH FACTOR.

S.NO	FACTORS	F ratio		P value	
		B/w	With in	B/w	With in
1.	Pre eclampsia	0.966	0.000	0.411	<0.0001
2.	Oligohydramnios	4.450	0.000	0.005*	<0.0001
3.	Prolonged latent phase of labour	0.468	0.000	0.705	<0.0001
4.	Previous LSCS	1.553	0.000	0.205	<0.0001
5.	Pre mature Rupture Of Membrane (PROM)	0.850	0.000	0.469	<0.0001
6.	Fetal distress	0.751	0.000	0.524	<0.0001
7.	Breech presentation	0.724	0.000	0.540	<0.0001
8.	Anemia	0.722	0.000	0.541	<0.0001
9.	Short primi	0.230	0.000	0.876	<0.0001

Table-5:- AGE WISE DISTRIBUTION OF EACH FACTOR: (n=120)

S.NO	FACTORS	AGE WISE DISTRIBUTION	NO OF CESAREAN	PERCENTAGE (%)
1.	Preeclampsia	<20	04	12%
		20-25	23	70%
		26-30	06	18%
		>30	00	0%
2.	Oligohydramnios	<20	00	0%
		20-25	27	87%
		26-30	02	6.5%
		>30	02	6.5%
3.	Prolonged latent phase of labour	<20	01	4%
		20-25	22	81%
		26-30	04	15%
		>30	00	0%
4.	Previous LSCS	<20	01	3.84%
		20-25	17	65.38%
		26-30	08	30.76%

		>30	00	0%
5.	PROM	<20	01	05%
		20-25	16	80%
		26-30	02	10%
		>30	01	05%
6.	Fetal distress	<20	01	12.5%
		20-25	07	87.5%
		26-30	00	0%
		>30	00	0%
7.	Breech presentation	<20	01	14.3%
		20-25	06	85.7%
		26-30	00	0%
		>30	00	0%
8.	Anemia	<20	00	0%
		20-25	06	100%
		26-30	00	0%
		>30	00	0%
9.	Short primi	<20	00	0%
		20-25	02	100%
		26-30	00	0%
		>30	00	0%

There was a high significant difference of <0.0001 for preeclampsia which is similar to the study conducted by Cho JG et al., 2013. Second major indication was oligohydramnios with significant difference of 0.005 which is in parallel to the study conducted by Sangeetha K et al., 2015.

Latent phase of labour is the major indication for C-section with P value of 0.0001 which is comparable to the study conducted by Shamshad 2008.

Previous LSCS was 4th factor significance of 0.0001. In comparison to the study conducted by Rajitha S et al., 2013.

Fatimah T et al., 2010 showed that PROM is also one of the risk factor for C-section similarly in this study P value was observed to be 0.009 indicating same.

Out of 120 caesarean cases breech and foetal distress showed a significant difference of P value 0.001 and <0.001 which was found to be similar to the study conducted by shamshad 2008.

Anaemia and Short Primi secure the least percentage respectively out of 120 caesarean deliveries. P value for Anaemia is 0.001 and for Short is 0.001.

TABLE NO- 6:- RATE OF CESAREAN SECTION

S NO	YEAR (AUG- JAN)	TOTAL NUMBER OF DELIVERIES	TOTAL NUMBER OF C-SECTIONS	PERCENTAGE (%)
1.	2013-14	4788	1906	39.8%
2.	2014-15	4627	1928	41.66%
3.	2015-16	4738	1831	38.64%

Compared to present study there was increased rate of C-section to 40% during 2014 august – 2015 january but it was decreased to 38.6% in 2015 august – 2016 January was found to be similar to the study conducted by Gjonej et al., 2015.

CONCLUSION

The most important factors that have contributed to the caesarean births are Preeclampsia, Oligohydramnios, prolonged latent phase of labour, Previous LSCS, PROM, Foetal distress, Breech presentation. Less influential in our study appears Anaemia, Short Primi. So we recommend

1. Better prenatal and perinatal care.
2. Selection of the women who have had previous C-section and careful management of their future pregnancies.
3. Promote vaginal birth to the women with previous C-section if she fulfils the criteria for vaginal delivery.

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