IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 8 Ver. VIII (Aug. 2015), PP 01-05
www.iosrjournals.org

Caesarean Section Rates in a Teaching Hospital: A Ten Year Review

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Abstract: *Caesarean Section (CS) is one of the most commonly performed surgical procedure worldwide. Globally there is an alarming increase in the cesarean section rate. The increase in CS rate is of concern not only because of the associated higher morbidity and mortality compared to vaginal route, but also for the effects on subsequent pregnancies and deliveries. The present study was undertaken to study CS rates and some of their determinants over a ten year period from 2002 to 2012 at Government Maternity Hospital, Tirupati, attached to Sri Venkateswara Medical College, Tirupati, Chittoor (D.t), A.P., India. This hospital caters to predominantly rural population. The caesarean section rate was 166/1000 live births in 2002 and it is 225/1000 live births in the year 2012. There is a steady increase in CS rate over the 10 year period. The raise in primary caesarean rate is 11.87% (2002) to 12.75% in 2012. Repeat caesarean section rate has increased considerably from 47.29% in 2002 to 96.9% in 2012. Repeat caesarean section contributed mainly to the increase seen in CS rate in our institution. Reducing primary caesarean rate is an important intervention in reducing caesarean section rate. Vaginal birth after caesarean section should be increased to lower CS rate.*

Keywords: *Cesarean Section (CS), India, Indications.*

I. Introduction

Caesarean Section is one of the commonest surgery performed worldwide. Globally there is an alarming increase in the CS rate. The procedure is not benign and needs to be performed only when circumstances distinctly require it. The consensus recommendation for optimal CS rate of 10-15% was made by WHO in 1985[1]. Since then, caesarean sections have become increasingly common. When medically justified, a caesarean section can effectively prevent maternal and perinatal mortality and morbidity. However, there is no evidence showing the benefits of caesarean section for women or infants who do not require the procedure.

As with any surgery, caesarean sections are associated with short and long term risks which can extend many years beyond the current delivery and affect the health of the woman, her child, and future pregnancies. These risks are higher in women with limited access to comprehensive obstetric care. CS is associated with increased risk of blood transfusion, hysterectomy and death as compared to vaginal delivery [2]and a uterine scar can increase the risk of uterine rupture, placenta accreta and placenta previa in subsequent pregnancies[3,4]. A fourfold increase in maternal mortality rate associated with CS was observed even after controlling for medical and obstetric complications, maternal age, and preterm delivery[5]. Even elective CS had a 2.84 fold greater chance of maternal death as compared to vaginal birth. In UK, a two fold increase in mortality with CS was detected[6]. Babies are also vulnerable to unnecessary risks from rising CS rates, like accidental injuries due to surgeon's knife(6% in non-vertex presentation)[7], respiratory distress syndrome[8], iatrogenic prematurity etc. Even with repeated ultrasound scans, there may be errors in judging when to do an elective CS. As CS rates rise, so do premature births. Since CS entails higher costs than vaginal delivery[9], CSs done routinely without medical indication could represent a drain on resources and have negative implications for health equity[10].

In developed countries the CS rate went from about 2.5% to 6% in the 1970s to about 12% to 22% in the late 1990s[11]. In 2004, the rate in the United States reached 29.1%[12] which is far higher than the WHO recommended CS rate. Data in developing countries are not easily available. The escalating Caesarean section rates has been attributed to the fear of litigation, more liberal use of CS for breech presentation, the detection of fetal distress by continuous electronic fetal monitoring, abdominal delivery of growth retarded infant, and improved safety of caesarean section in developed countries. The reasons are less clear in developing countries[13,14]. This increasing trend must be stopped and even reversed without detriment to a continuing improvement in maternal and fetal health[14]. It is proposed that careful probing of the trend and indications for the use of caesarean section may identify pathway to lower the caesarean section rate[15] which was done in this study.

II. Materials & Methods

The present study is a retrospective study conducted at Government Maternity Hospital, Tirupati, Chittoor (D.t), Andhra Pradesh, India. This is one of the teaching hospital attached to S.V.Medical College ,Tirupati. This is a tertiary care hospital catering to the population of Chittoor, Kadapa, Nellore & Ananthapur.

Cesarean Sections over 10 years from 2002 to 2012, and no. of all live births during the same period were collected from hospital records. Indications for caesarean sections were collected and analyzed. The Primary and repeat caesaren section rates were calculated for the years 2002 and 2012. The cesarean rate was calculated as the number of cesarean births divided by total live births. The rate for each indication was calculated as the number of cesarean births performed for each indication per 1,000 live births. The categories of indications for cesarean section included fetal distress, multiple gestation, malpresentation, failed induction, failed progression [arrest of dilatation or arrest of descent] (including failed forceps or vacuum extraction), cephalopelvic disproportion, maternal indications, and fetal indications. In our study, the category of fetal distress includes fetal distress during labor, and abnormal umbilical artery doppler study. Maternal indications are the maternal conditions predating the pregnancy that could complicate delivery like vesicovaginal fistula repair, post myomectomy, complete perineal tear, and medical causes. Obstetric indications are the conditions brought about by the current pregnancy like placenta previa, abruptio placentae, placenta accreta, and cord prolapse. Fetal indications included intrauterine growth restriction, prematurity, and congenital malformations in which vaginal delivery was not possible. For repeat sections, cesarean was performed without trial for vaginal delivery with cephalopelvic disproportion and for those who presented with scar tenderness and cases where previous section was done in the periphery with doubtful scar strength. Also, patients with previous cesarean section were counseled about vaginal birth after cesarean delivery. Cesarean section was electively performed for those who did not opt for vaginal birth.

III. Observations and Results

A total of 6512, 11075, and 13,612 live births occurred in the hospital in 2001, 2007, and 2012 respectively. The overall caesarean section rate and the trends in cesarean section were examined in relation to the total number of live births during the study period.

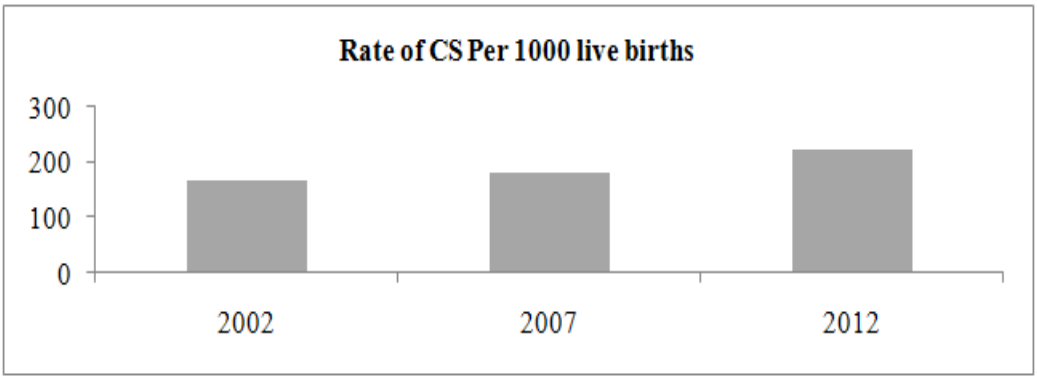

Fig-1: Rate of CS Per1000 live births in 2002, 2007&2012

The overall caesarean section rate increased from 2002 to 2007 to 2012. The average annual rate increased from 166 per 1000 live births (16.6%) in 2002 to 182 per 1000 live births (18.2%) in 2007 to 224.5 (22.4%) per 1000 live births in 2012 as shown in Fig.1.

Table-1: Caesarean Section rates from 2002 to 2012

Year	Total No. of Deliveries	No. of Caesarean Sections	Rate per 1000 live births	Percentage
2002	6512	1081	166.00	16.6
2003	7311	1457	199.2	19.9
2004	7851	1725	219.7	21.9
2005	8917	1684	188.8	18.8
2006	9588	1636	170.6	17.6
2007	11075	2016	182.0	18.2
2008	10989	2210	201.1	20.1
2009	10878	2270	208.6	20.8
2010	11839	2633	222.4	22.2
2011	12658	2954	233.3	23.3
2012	13612	3056	224.5	22.4

There is gradual increase in caesarean section rate from 166 per 1000 live births in 2002 to 224.5 per 1000 live births in 2012.

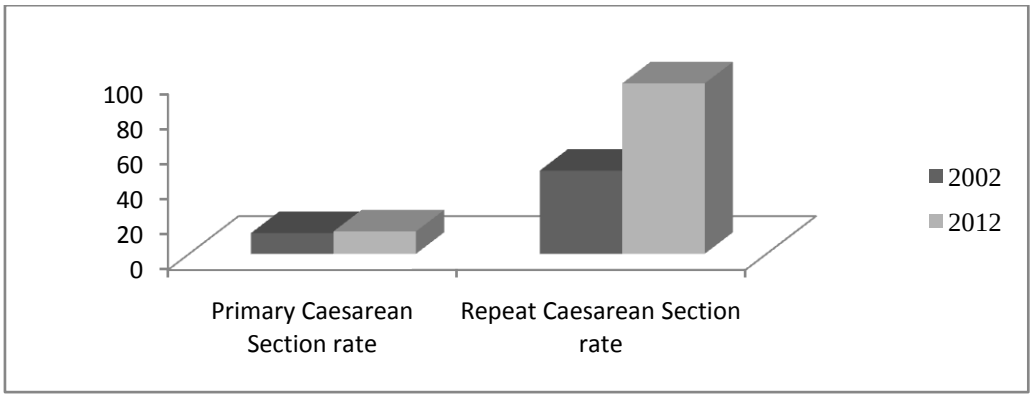

Fig-2: Caesarean Section rate per 1000 live births

Both the primary and repeat caesarean section rates increased during this period as shown in Fig-2. The primary caesarean section rate increased from 118.7 per 1000 live births (11.8%) in 2002 to 127.5 per 1000 live births (12.75%) in 2012. Whereas the repeat caesarean section rate increased from 472.9 per 1000 live births (47.29%) in 2002 to 969 per 1000 live births (96.9%) contributing to the major part of increase in CS rates.

Table-2: Indications for caesarean sections in 2002 &2012 shown as rate per 1,000 live births

	2002	**2012**
Post caesarean pregnancy	47.29	96.9
Obstetric Indications	14.89	26.15
Failed Progression	13.05	15.50
Maternal Indications	9.2	11.38
Multiple gestation	2.3	3.23
Fetal Indications	0.15	0.73
Failed Induction	3.37	4.04
Malpresentation	20.88	19.83
Cephalo Pelvic Disproportion	28.90	26.6
Fetal Distress	26.41	19.9

The majority of increase is attributable to repeat caesarean sections followed by obstetric indications, failed progression, maternal indications, multiple gestation, fetal indications .

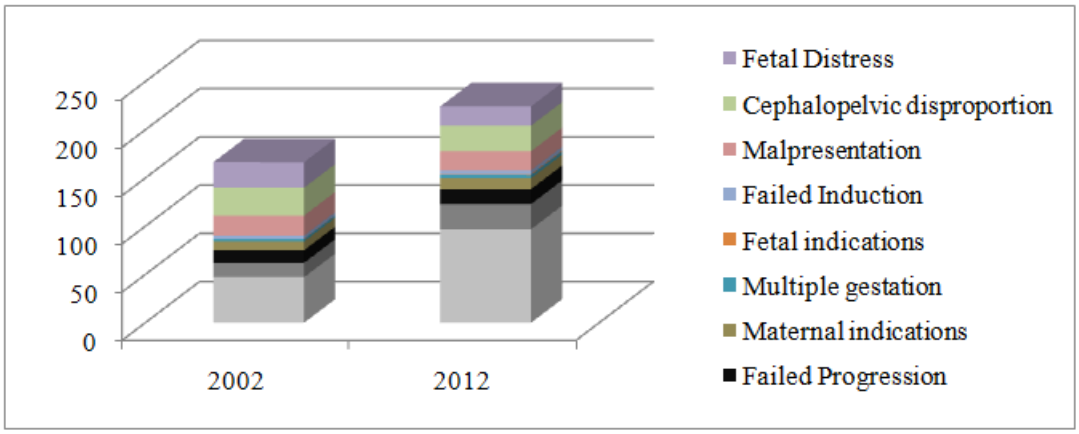

Fig-3: Relative contribution of indications to caesarean section (Per 1,000 live births)

The majority of increase is attributable to repeat caesarean sections

IV. Discussion

Today there is concern over the rising caesarean section rates, in both developed and developing countries across the world[13,16]. The rates of both primary and repeat caesarean section have been on the rise[17]. There is a steady increase in CS rate over the 10 year period. A rise of 5.8% caesarean Section was observed in the present study i.e from 16.6% in 2002 to 22.4% in 2012. Average annual caesarean section rate in the present study can be compared with the following studies.

Present Study	2002-16.6%	2007-18.2%	2012-22.4%
Mittal Shiba et al Study[18]	2001-17.15%	2006-23.47%	2011-28.93%
Barber et al.[17]	2003-26%	2009-36.5%	
Ba'aqeel[19]	1997-10.6%	2006-19.1%	
Stavrou et al.[20]	1998-19.1%	2008-29.5%	
Chong et al.[21]	2001-19.9%	2010-29.6%	
Litorp et al.[22]	2000-19%	2011-49%	
Mehta A et al.[23]	1987-9%	1997-16%	
Saha et al[24]	2007-29%		

In our study, both the primary and repeat caesarean section rates increased as in that of the Mittal Shiba et al Study[18], Barber et al.[17] Study. Repeat caesarean section accounted for the most of the increase in the present study where as primary caesarean section contributed to major part of increase in the above studies. The largest contributor to the rise in Caesarean Section rate is previous caesarean section in the present study which is consistent with the findings of a study in the Welsh population conducted by Choudhary et al.[25] , Stavrou et al.[20] , Helen Litorp et al[26] studies. This rate, combined with the fact that the increase over time was predominantly due to CS prior to onset of labour, may indicate that vaginal birth after CS is not being considered by obstetricians and/or women. Practice of Trial of Labour After Caesarean Section (TOLAC) is less in our hospital due to doubtful scar strength, details regarding previous CS being not available, less trained personnel for monitoring, more no. of deliveries being conducted in the institution and more no. of referrals. Next major contributor to the rise in Caesarean Section in primary caesarean section is Obstetric indications, as this hospital is a tertiary care hospital, and major referral centre catering to 4 districts and also referrals in late stages of labor.

The present study also shows an increase in labor arrest disorders, due to an increase in arrest of dilatation[17,23] as well as descent[23,27]. This increase in arrest of descent is possibly because of a decrease in difficult instrumental delivery over a period of time.

Multiple gestation, and fetal indications were also slightly increased may be because of increasing infertility, use of ovulation induction drugs & advanced investigative procedures used in detection of fetal abnormalities.

V. Conclusion

The rate of caesarean section has increased from 2002 to 2012. Significant increase is seen in repeat caesarean section rate in the present study. Increasing trial of scar in women with previous caesarean section is an important intervention in reducing caesarean section rate. Future efforts to reduce the overall caesarean section rate should be focused on reducing the primary caesarean section rate.

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