Paper

Why are Caesarean Section rates rising?

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Summary

The worldwide increase in Caesarean Section (CS) rates in recent years is causing concern. In the University Obstetric Unit of the Teaching Hospital, Galle (UOU of THG) the CS rate has progressively increased from 13% in 1985 to 22% in 1999.

Repeat CS and fetal distress were the two main indications for CS in 1985 as well as 1999. Preeclampsia became the third leading cause and the proportion of CS carried out for failed induction increased in 1999. Elderly primigravidae, cephalopelvic disproportion (CPD) and breech presentations also became important indications for CS in 1999.

Introduction

During the past two decades Caesarean Section (CS) rates have increased worldwide. In the United States of America (U.S.A) it reached a peak of 25% in 1999. This caused a great deal of concern and prompted the formation of the Task Force on CS rates of the American College of Obstetricians & Gynaecologists, which after studying the problem in detail, recommended a target of reducing the CS rate to 15% in the U.S.A. by the year 2010[1]. In the United Kingdom (U.K.) too the CS rate has increased to 20% in 2000[2]. In Sri Lanka the national CS rate has increased from 9% in 1986 to 14.4% in 1999[3,4]. In one teaching hospital in Sri Lanka the CS rate was 42% in 1999[4].

Various factors have been identified as being responsible for this increase. It has been suggested that the increasing CS rates are not due to any change in the indications but a reduction in the threshold for carrying out CS[5]. Limitation of family size, increased expectations of the couple wanting a healthy child and the Obstetricians' fear of malpractice litigation may be contributory factors. Increased use of CS in nulliparae, previous CS, breech presentation and early intervention in failure to progress in labour, possible cephalo pelvic disproportion and fetal distress are some of the factors which have been found to be responsible for this increasing trend[5,6,7].

In a Teaching Hospital in Glasgow there was an overall increase in the CS rates from 6.8% in 1962 to 18.1% in 1992. The main indications in both years were similar but the largest relative increase was in the malpresentation group (10.8% to 16%) and previous CS group (4.5% to 15.2%)[5]. In New Zealand, the national CS rate which was 9.6% in 1984 increased to 11.6% in 1989 and 15.3% in 1995. Previous CS and dystocia were reported to be the indications for nearly half the CS[7].

In 1988 the CS rate at the Castle Street Hospital for Women (CSHW) was 12.1% and the four main indications for CS were repeat CS (20.9%), fetal distress (20.2%), abnormal labour (20.9%) and breech presentation (12.3%)[3].

In the University Obstetric Unit of the Teaching Hospital Galle (UOU of THG) the CS rate has increased from 13% in 1985[8] to 17.1% in 1995[9] and 22% in 1998[10]. Hence this study was carried out.

Objectives

To analyse the indications for CS in the UOU of THG and to identify strategies which could be adopted to curtail the increasing CS rates.

Design and setting

A cross sectional descriptive study was carried out in the UOU of the THG.

Subjects and method

The hospital records (Bed Head Tickets) of all CS carried out from 1st December 1998 to 28th February 1999 were analyzed. In addition to the basic characteristics of the patients (age, parity and period of gestation), the indication for the CS, the type of CS (elective or emergency) and the duration of stay in the hospital after CS were documented on a prestested data collection form. In the cases where the indication for CS was 'fetal distress', the method of diagnosis of fetal distress was also documented.

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As the CS rate in the unit at that time was known to be approximately 22%[10], the minimum sample needed for the study to tolerate a maximum sampling error of 5% was calculated to be 264[11]. As there were more than 500 deliveries per month in the unit, a three months study period was considered to be adequate to obtain a representative sample for study. During the period of study there were 1580 deliveries of which 349 (22%) were CS. The bed head tickets of all these 349 CS were analysed hence the maximum possible sampling error in the study is 4.3%.

Results

Table 1. The basic characteristics of the study population (n=349)

	Mean	*SD*	*Range*
Age (years)	30.5	4.9	16 - 44
Parity	1.5	1.9	1 - 7
Period of gestation (weeks)	38.9	1.3	35.8 - 42.4

SD = Standard Deviation Mean = Arithmetic mean

Table 2. The distribution of age and parity (n = 349)

Parity / *Age (years)*	*1*	*2*	*3*	*4*	*≥ 5*	*Total*
≥ 20	17	3	0	0	0	20 (5.7 %)
20-29	86	42	20	4	0	152 (43.5%)
30-39	45	61	36	8	8	158 (45.3%)
≥ 40	4	6	6	3	0	19 (5.4%)
Total	152 (43.5%)	112 (32%)	62 (17.7%)	15 (4.3%)	8 (2.2%)	349 (100%)

Of these CS (n=349), 152 (43.5%) were primary CS and 216 (61.9%) were carried out as emergencies (Em-CS).

Table 3. Type of CS (n = 349)

Elective (El)CS	123 (35.3%)
Emergency (Em) CS -in labour	79 (22.4%)
Em-CS- not in labour	67 (19.2%)
* El-CS ⟶ Em-CS	70 (20.7%)
** Non El /non Em-CS	10 (2.8%)
Total	349

* Elective CS ending up as emergency CS due to onset of labour.

** eg. Past section with Past dates and not establishing labour.
Past dates not suitable for induction.

Table 4. Indications for Caesarean Sections (n =349)

Past two sections*	49 (14.7%)
Past section*	40 (11.4%)
Past section* + another complication	21 (6%)
Fetal distress*	42 (12.7%)
Pre eclampsia*	32 (9.2%)
Failed induction	29 (8.3%)
Elderly + Subfertility	22 (6.4%)
Breech presentation	19 (5.3%)
Cephalo pelvic disproportion	18 (5.1%)
Failure to progress in labour	16 (4.3%)
Diabetes mellitus	12 (3.4%)
Antepartum haemorrhage	5 (1.4%)
Other malpresentations	3 (1.4%)
Heart disease	2 (0.6%)
Miscellaneous	38 (10.3%)

*Repeat CS, fetal distress, pre eclampsia and failed induction were the main indications for CS.

Table 5. Method of diagnosis of fetal distress (n=42)

Fetal Heart Sounds (FHS) Abnormality	9 (21.4%)
Meconium stained liquor (Mec)	17 (40.5%)
FHS abnormality. + Mec	6 (13.2%)
Cardiotocograph (CTG) Abnormality	4 (9.6%)
Daily Fetal Movement Chart (DFMC) Abnormality	4 (9.6%)
CTG + DFMC Abnormality	2 (4.7%)

Seven babies were admitted to the Special Care Baby Unit (SCBU) and there was one Neonatal Death giving a perinatal mortality rate (PMR) of 2 per thousand CS. The PMR in the unit during the period of study and for the complete year of 1998 were 22 and 14 per thousand total births respectively[10].

Table 6. Breech presentations

Total no. of breech presentations	*Vaginal deliveries*		*CS*	
	Primip	Multip	Primip	Multip
32	5	8	15	4

Of the 1580 deliveries 32 mothers (2.0%) had breech presentation and 20 of them were primigravidae. Out of these primigravidae 15 (75%) had El- CS. None of the 32 breech babies were admitted to the SCBU.

Of the 1580 deliveries 170 (11%) mothers had induced labour. Of these 170 inductions 29 (17%) ended with an Em- CS for failed induction or failure to progress in labour.

Table 7. Duration of hospitalization after CS

	Mean	SD	Range	p
Em - CS	6.3	1.45	4 - 17	0.05>p>0.02
El - CS	5.4	1.2	3 - 12	

SD = Standard Deviation Mean = Arithmetic mean

Mothers who had Em-CS had a significantly longer mean duration of hospitalization (6.3 days SD. 1.45) compared to those who had on El- CS. (5.4 days SD 1.2, $p<0.05$).

Discussion

Audit and feed back has an impact on clinical practice and has been found to influence CS rates too[12]. The CS rate in the unit and its comparison with the CS rates of other centres[2,3,7,13-17] is shown in Table 8.

Table 8. Caesarean section rates

Country/Center	*Year*	*Rate (%)*
Galle (present study)	1999	22
Galle[9]	1995	17.1
Galle[8]	1985	13
Castle Street Hospital for Women, Colombo[3]	1992	11.8
De Soysa Maternity Hospital, Colombo[14]	1999	21
Teaching Hospital, Peradeniya[17]	1999	26
Madras[15]	1983	16.2
Singapore[15]	1990	12.8
Jordan[13]	1998	8.4
United States of America[15,16]	1985	23
New Zealand[7]	1998	15.3
United Kingdom[2]	2000	20

CS is in general considered a safe option for the fetus. However the relative risks of maternal mortality and morbidity, expenditure and mean duration of hospitalization are more compared to a vaginal delivery. An increasing CS rate per-se does not improve the perinatal out come18. This is because an improved socio-economic status of the population together with advances in neonatal care facilities will contribute a great deal in improving the perinatal outcome. In the U.K. estimates of the additional cost of a CS varies from Sterling Pounds 24 in a primigravida to 780 in a multigravida[19,20]. Effective measures are needed to reduce the maternal mortality and morbidity, expenditure and prolonged hospitalization associated with CS without compromising the perinatal outcome.

The four main indications for CS in this unit during the periods 1985 and 1999 are shown in Table 9. In addition to severe pre eclampsia and failed induction becoming important indications for CS in 1999, 6.5% of CS were for 'elderly primigravidae', 5% were for breech presentations and another 5% were for an antenatal diagnosis of CPD.

Table 9. Indications for CS in the UOU of THG

1985[8]		*1999*	
Repeat Section	(30%)	Repeat Section	(32%)
Fetal Distress	(21%)	Fetal Distress	(13%)
Failure to Progress	(5%)	Severe Pre eclampsia	(9%)
Failed Induction	(5%)	Failed Induction	(8%)

Of the 1580 total number of mothers delivered 61(3.9%) had one previous CS. Of these 61 mothers only 17(27%) were given a trial of scar and 13(76%) of these mothers had successful vaginal deliveries. Hence the repeat CS rate in those who had one previous CS was 78.7%.

Repeat CS constitutes the commonest indication for CS in most countries. It varies from 8% - 35% in different countries. In this study the proportion of repeat section (32%) was higher than in other South Asian centres (Table 10).

Table 10. Proportion of Repeat Caesarean Sections in total CS

Country/Centre	*Year*	*Rate (%)*
USA[15,16]	1987	35
Norway[15,16]	1987	23
Hungary[15,21]	1997	8
Madras[15]	1986	26.2
Bombay[15]	1987	24.2
Galle[8]	1988	30
Galle (present study)	1999	32

The incidence of vaginal delivery after one previous CS was low (24.9 %) in the present study. The chances of such a delivery are greater if the previous indication was a non recurrent one or prior to the CS the patient had had a vaginal delivery. Vaginal delivery rates of up to 64% 21 have been reported from other centers (Table 11).

Table 11. Proportion of vaginal delivery after one previous CS

Country/Centre	*Year*	*Rate (%)*
Galle (present study)	1999	24.9
Norway[15,21]	1987	41.1
Hungary[15,21]	1987	32
London[22]	1988	44.4
Sydney[23]	1992	64

In the absence of any contraindication for vaginal delivery (eg: CPD), a mother can be a given a chance to deliver vaginally in an institution where labour can be monitored carefully and the operation theatre made available at short notice. This may help to bring down a high repeat CS rate to a reasonable level. Vaginal birth after CS has a small risk of scar rupture with a resultant threat to mother and infant. After a classical CS the incidence of scar rupture is about 6-9% compared with 0.2-1.0% following the lower segment operations[24,25].

Patients with a previous CS have a wide variation in the repeat CS rate. While some obstetricians still believe in the dictum "Once a CS always a CS" others have shown that a trial of scar is safe even in the presence of two previous scars, in carefully selected patients[26-28]. However the successful vaginal delivery rate has been shown to decrease from 83% to 75.3% and the risk of scar rupture increase from 0.6% to 1.7% after one CS and after two or more CS respectively[26].

In a prospective observational study carried out in Riyadh, Saudi Arabia to determine the outcome of trail of labour after two CS, it was shown that out of 115 selected mothers who had two previous CS 103 (89%) delivered vaginally. There was not even a single scar dehiscence among the mother delivered vaginally. There was one scar dehiscence that required hysterectomy after a failed trail of labour. Hence they suggested that a trail of labour in selected patent with even two previous CS is a reasonable option[27]. Other studies carried out in the USA[26] and Pakistan[28] too have had similar results. Although most women and their obstetricians would not be comfortable in adopting such a policy this should be an encouragement to at least increase the proportion of mothers who are allowed a trial after only one previous CS. The women should be properly selected and be well informed of the advantages and disadvantages of a trial of scar.

Is there an ideal CS rate? [29,30]. In 1985 the W.H.O. recommended an optimal CS rate of 10 -15%[31] (10% for the general population and 15% for a high risk population). The topic discussed at length in a South Asian Regional Conference held in Colombo recently was "Should the CS rates be reduced and if so how?"[32]

It has been found that the highest variation in CS rates occurs among women in their first pregnancy having term singleton fetuses in the vertex presentation and no complications. Furthermore CS in these low risk women have not resulted in improved outcomes. High risk patients have a much lower variation in CS rates[1]. Hence the initial decision to carry out a primary CS on a nulliparous woman should be taken with great care. In the present study there were 44% primary CS. Approximately one third of these were El CS in 'elderly subfertile' primigravidae. A diagnosis of "Dystocia" is a common indication for a primary CS in a primigravida and should be made with caution[13]. A successful vaginal delivery may become possible with the judicious use of oxytocin.

A patient's right to demand an elective CS has also become an issue in certain countries[33,34]. Although some mothers even in Sri Lanka request El CS because they are scared to undergo a painful labour, it has not become a major issue as yet. Concerns about the risk of urethral and rectal sphincter damage and also future genital prolapse after vaginal delivery may also contribute to an increase in CS rates[35].

Fetal distress (12.7%) was one of the main indication for CS in the present study. This is comparable with the 13.7% reported from Bombay[15] but much lower than the 38.6% and 30% reported from Nigeria[15]

and USA[15,16] respectively. Electronic fetal monitoring with its associated high false positive rates of fetal distress diagnosis was considered to be responsible for this high CS rate in the latter centres. Randomized control trials of electronic fetal heart rate monitoring during labour compared with intermittent auscultation have shown a doubling of CS for fetal distress when fetal heart rate monitoring was complemented with selective fetal blood sampling, and a four fold increase when it was not[36]. There is also little or no evidence that the large increase in CS for suspected fetal distress in recent years has had any effect on reducing the incidence of cerebral palsy[37]. CS for suspected fetal distress may be significantly reduced by fetal scalp blood pH measurements and fetal E.C.G wave form analysis to confirm the diagnosis. Intrauterine resuscitation such as placing the mother in the left lateral position, oxygen administration by face mask, inhibition of excessive uterine contractions by omitting oxytocin infusion and saline amnio infusion may also help[38]. Meconium staining of the amniotic fluid is some times associated with fetal distress but per-se its association with fetal distress is too weak to justify CS[39]. In the present study meconium stained liquor was the only criterion used for the diagnosis in 41% of CS carried out for fetal distress.

The method of delivery for a persistent breech presentation remains controversial. A large number of obstetricians prefer to carrying out an elective CS for breech presentations by considering neonatal outcome. This is based on the argument that a cephalic presentation will have a better overall perinatal outcome after a vaginal delivery compared to a breech presentation irrespective of the experience of the person conducting the delivery. In breech presentations CS rates as high as 92.8% and 82.3% have been reported from Sweden and U.S.A. respectively[39] compared to the 75% in the present study. The worse neonatal outcome after vaginal delivery of a breech presentation compared to a cephalic presentation may be due to pre-existing fetal problems, which result in a breech presentation rather than harm during vaginal breech delivery[40]. A randomized control trial conducted in 1980 compared vaginal delivery versus CS delivery for breech presentation and failed to show any difference in perinatal outcome[41]. However subsequent larger studies including the 'Term Breech Trial' have suggested a poor perinatal outcome following vaginal rather than abdominal breech delivery[42,43]. It is possible that the poor outcome seen in the latter studies is due to a decline in the skills of those conducting an assisted breech delivery (ABD).

The skills and experience of the person conducting an ABD will influence the perinatal outcome of the baby. Hence unless a universal decision is taken to deliver all breech presentation by CS, it is necessary that junior obstetricians are trained to carry out ABD. Otherwise the future generation of obstetricians will not have the skills nor the experience in conducting ABD and this will necessitate CS for all breech presentations in the future. To allow a vaginal delivery for breech presentation there should be no feto-pelvic disproportion, extended neck, cord complications or prematurity[15]. A policy of an external cephalic version at term in breech presentation can reduce its incidence[44,45].

In the present study 18 mothers (5.1%) had a CS because of CPD. In a majority of these CPD was suspected clinically before the onset of labour. Even x-ray pelvimetry has been shown to be unsatisfactory for the prediction of CPD[39]. A diagnosis of a CPD should be avoided in the absence of adequate uterine contractions and a trial of labour. A non engaged head in a woman with a previous CS per se should not be considered an indication for elective CS unless the diagnosis is obvious, except in special circumstances where there are other high risk factors.

Eclampsia and pre-eclampsia contributed to 9.2% of the total CS in the present study. It was comparable with the 8% in Madras but much higher than the 2.1% in Bombay[15]. With good prenatal care, risk screening, use of parental antihypertensives and newer anticonvulsants the maternal prognosis has improved without increasing the CS rates[46]. Hence CS may not be needed unless emergency delivery is indicated. In certain situations where urgent (not emergent) delivery is required vaginal delivery may be feasible.

In the present study failed induction was seen to be a significant problem which is contributing to the increasing CS rate. Although Prostaglandin (PG) are not available in the government hospitals in Sri Lanka, other methods such as the insertion of a Foley's catheter can be used to ripen the cevix when it is unfavourable[47]. The Ministry of Health should consider providing vaginal PG pessaries to government hospitals as it is available in the private sector now and is not very expensive. In any case the decision to induce labour should be taken with great care.

The level of experience of the junior obstetricians managing the labour ward, who has often only telephone contact with a senior obstetrician, will influence CS rates[30]. A study from a teaching hospital in Sri Lanka showed that a consultant was involved in the decision to perform CS only in 37.5% of cases and a definite indication for the procedure was lacking in many instances[48].

Although this issue was not addressed in this study, increased involvement of a senior, experienced obstetrician will no doubt optimise the use of CS.

Conclusion

The CS rate is high in this unit compared with other centres and it is showing an increasing trend over the last 15 years. Repeat CS, fetal distress, pre-eclampsia and failed induction were the main indications for CS, while 'subfertile elderly primigravidae', CPD and breech presentation too made a significant contribution.

Repeat CS, breech presentation, failed induction and suspected CPD are situations where it should be possible to increase the vaginal delivery rate and reduce the CS rate without compromising perinatal outcome. This would lead to a reduction of morbidity (and mortality), expenditure and prolonged hospitalisation associated with C.S.

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