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Reducing the rate of Primary Caesarean Sections - an Audit

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Abstract

Objective: To evaluate how the implementation of universally acceptable standards affects rates for primary caesarean sections, without compromising maternal or foetal safety.

Methods: A complete audit cycle of all the primary caesarean sections performed in the maternity unit of Aga Khan University was conducted from1st January to 31st March during years 2003 and 2004. New labour management guidelines were implemented after the first audit (appendix). The rates of caesarean section, induction of labour, failed induction, and maternal and foetal outcomes were compared before and after the implementation of the guidelines.

Results: Primary emergency caesarean section rate decreased from 16% to 12%. A reduction in primary caesarean sections was noted in the induced cases. Practice of checking cord blood for foetal pH and maintaining partograms improved markedly. There were no significant adverse maternal and perinatal outcomes.

Conclusion: Implementation of standard labour management strategies can reduce primary caesarean section rate without compromising maternal and foetal safety (JPMA 58:444;2008).

Introduction

Recently there has been a dramatic rise in the caesarean section rate worldwide especially in the developed countries[1]; a low threshold to perform caesarean section is commonly related to the type of maternity set up (public or private), fear of litigation, physician's convenience and difference in clinical practices. Introduction of electric foetal monitoring with a high false positive rate for detection of foetal hypoxia has also contributed to this rise. Many programmes have been developed to reduce the rate of caesarean delivery.[2,3] The course of pregnancy and labour depends on many factors which vary in different regions of the world, therefore, a single rate of caesarean section and induction of labour cannot be recommended universally. All the maternity units should have their own acceptable rates according to the available facilities.

Caesarean section has become much safer over the years, but it cannot replace vaginal delivery in terms of low maternal and neonatal morbidity and less cost[4]; this statement holds true especially for the developing countries where maternal and perinatal mortality rates are unacceptably high.[5]

Approximately one third of caesarean sections are performed electively and two third are performed as emergency procedures. Primary caesarean sections have a major contribution in determining the future obstetric course of a woman.

Among the primary caesarean deliveries the most common indication for an elective procedure is breech presentation and for an emergency procedure includes labour dystocia and non- reassuring foetal heart rate tracings.[6]

In the last five years a significant increase in caesarean sections and induction of labour (> 30%) in our unit raised concerns about the quality of clinical practice. As primary caesarean deliveries contributed most to the overall caesarean section rate (CSR), therefore a retrospective audit of all the primary caesarean sections was conducted. Wide variation in clinical practice among the obstetricians was identified. Main factor for these inconsistencies in clinical practice was attributed to the lack of adherence to standard guidelines and lack of acceptable benchmarks for the rates of caesarean section, induction of labour and failed inductions.[7] Induced cases contributed most to primary caesarean sections. Too many inductions on vague indications and poor bishop scores, assessment and decision making by junior doctors, and missing partograms were observed as a frequent occurrence.

We introduced strategies related to acceptable standards for obstetric practice in and universally defined criteria for principal indications for inductions and caesarean sections in our delivery suite. Re-audit was conducted to determine the effectiveness of these implemented strategies.

Patients and Methods

Women delivering at Aga Khan University Hospital, Karachi between January 1st and March 31st , through 2003 and 2004 were included if they were labeled as "primary caesarean section" on our delivery suite online database software programme. Data was collected on maternal age, parity, booking status, gestational age, onset of labour (spontaneous, induced, no labour), course of labour (partogram, duration of active labour, epidural analgesia in labour), level of urgency (Urgent, Emergency, Semi-elective and Elective), clinical groups, indication for caesarean section, type of anaesthesia (general or regional), need for post operative high dependency unit monitoring, maternal post operative complications (puerperal pyrexia, wound infection, postpartum haemorrhage), perinatal outcome (alive or perinatal death, apgar score < 7 at 5 minutes, cord pH if indicated, presence of meconium, admission to neonatal intensive care unit).

Two cycles of the audit were conducted. The first one from January to March 2003, with existing departmental protocols, to see the baseline rate of primary caesarean sections. The second loop, from January to March 2004, was conducted after implementation of standard protocols after departmental consensus to see the effect on primary caesarean section rates (Appendix).

Additional information was collected in cases of induction of labour, bishop score at induction and at caesarean section and method of induction. The level of urgency was as follows, with emergent implying an immediate threat to maternal and/or foetal life; urgent i.e. foetal and/or maternal compromise which is not immediately life threatening; semi elective i.e. no maternal and/or foetal compromise but needs early delivery; and elective i.e. delivery timed to suit woman or staff.

The indications for induction of labour were grouped into Postdates, Medical indications (preexisting maternal medical conditions such as hypertension and diabetes), Obstetric indications (any maternal or foetal medical conditions arising during ante/post partum period) and Social inductions for convenience of patient or consultant.

Collected data was entered in the SPSS statistical package for analysis. Difference in the rates of primary cesarean section, induction of labour and failed inductions during the two audit periods was calculated. Indications and contribution of clinical groups to the caesarean section rate

(CSR) were also compared for two loops of the audit cycle. Maternal and neonatal outcomes were reviewed. Quality of labour monitoring was assessed by rate of compliance of delivery suite staff with the newly introduced criteria, quality of partograms maintained, number of cord blood samples for pH sent with non reassuring foetal heart rate tracings, and involvement of senior personnel in decision making). Caesarean section rates were also calculated for individual consultants, during the audit cycles.

Being a descriptive study no statistical tests were used to compare the audit cycles.

Results

There was 9% increase in the number of total deliveries. Overall caesarean section rate during the two audits was almost similar i.e 32% and 31% respectively. Primary emergency caesarean section rate for our unit decreased from 17% to 12%.Rate of induction of labour also reduced to almost half (28%vs 15%). There was no significant change in the number of failed inductions. Approximately 53.5% (122/228) of women had primary caesarean section which is a significant reduction from 73%.(Table 1).

Non progress of labour and sub optimal cardiotocography (CTG) were the two main indications for emergency caesarean sections whereas breech presentation was the commonest indication for elective caesarean sections. During second part of our audit, partogram justified three quarters of primary caesarean sections performed for non progress of labour. Of the cases with non reassuring foetal heart rate tracing, cord blood for foetal pH was sent in 75% cases (50% in the first audit).

A possible association was observed between primary caesarean section and induction of labour (IOL). Total of 112 inductions were performed during the second audit, out of which 25% (28/112) ended up in caesarean section Although this was similar to the 26% failed induction rate during the first audit, notable difference was that only 53.5% (15/28) of failed inductions had primary caesarean section as compared to 90% (45/50) during the first audit. Interestingly, most common group for failed inductions also changed from post dates (31%) with IOL performed (mean gestation of 40 ± 3 days and mean Bishop score of 2) to uncontrolled medical condition (46%) (Table 2), justifying the need for intervention in terms of maternal and foetal safety.

A review of the practices of individual consultants revealed that primary caesarean saection rate did not differ depending on years of experience and number of deliveries per month for an individual consultant.

The ten group classification was modified in our audit as we did not include women with previous scar. According to the modified group classification, group 2 contributed most to our caesarean section rate i.e Nullipara, single cephalic, =37 weeks, induced or no labor. A 21% decrease was noted in this group.

Assessment of maternal outcome was made on the need for high dependency unit (HDU) monitoring, and number of postoperative complications. Large number of women shifted to HDU for observation due to an underlying

Table 1. Delivery Statistics for Obstetric unit, Aga Khan University.

	2003N (%)	2004N (%)
Total Deliveries	674	735
Caesarean section rate (CSR)	216 (32)	228 (31)
Primary CSR	151 (70)	121 (53)
Repeat CSR	65 (30)	107 (46)
Primary emergency CSR for obstetric unit, AKU	115 (17)	88 (12)
Total Inductions of labour	188 (28)	112 (15.2)
Failed inductions	49 (26)	28 (25)

Table 2. Baseline information of the audit cycle.

Variables	2003 n =151 (%)	2004 n =122 (%)
Maternal Characteristics		
Age (mean) years	28 ± 4.3	29 ± 3.8
Nullipara	96 (63.5)	76 (62.3)
Multipara	55 (36.4)	46 (37.7)
Type of Caesarean Section		
Emergency	121 (80)	107 (88)
Elective	30 (20)	15 (12)
Level of Urgency		
Emergent	33 (22)	46 (38)
Urgent	76 (50)	37 (30)
Semi elective	12 (08)	11 (09)
Elective	30 (20)	28 (23)
Indications for caesarean section		
Non-progress of labour	40 (26)	28 (23)
Sub optimal CTG	42 (28)	35 (29)
Breech	23 (15)	18 (15)
Type of anaesthesia		
General	128 (84.6)	104 (85)
Regional	23 (15)	18 (15)
Indications for induction of labour		
Postdates	47 (31)	11 (09)
Medical	59 (39)	56 (46)
Obstetric	19 (13)	16 (13)
Social	06 (4)	37 (30)
Unclear	20 (13)	02 (1.6)

Table 3. Maternal and foetal outcomes during the audit cycle.

Outcome measures	2003		2004	
	n=151	%	n=122	%
Maternal complications				
HDU admission	08	5.2	15	12.2
Primary postpartum haemorrhage	11	7.2	07	5.7
Puerperal pyrexia	07	4.6	02	1.6
Wound infection	04	2.6	0	0
Perinatal Outcomes				
Alive	151	100	122	100
Perinatal outcome in the suboptimal CTG group	**n=39**	**%**	**n=35**	**%**
Apgar < 7 at 5 minutes	06	15	03	8.5
NICU Admission	07	18	06	17
Meconium aspiration	17	43.6	09	23
Cord ph sent	12	31	25	71.4
Cord ph values				
=7.25	11	91.6	21	84
7.24-7.21	01	8.4	3	12
= 7.20	0		1	4
Perinatal death	0		0	

Appendix. Strategies implemented for obstetric clinical practice after audit 2003

* Acceptable rates for the unit:
  - Induction of labour 20%
  - Failed IOL 15%
  - Caesarean section 25%
* Cut off gestational age for postdates will be 41 completed weeks.
* Bishop score for social inductions should be > 5
* Cord PH should be sent in all cases of caesarean sections performed for suboptimal Cardiotocography.
* Partogram should be maintained for all the cases in active labour.
* Criteria for Non-progress of labour should be fulfilled as follows:
  - Nullipara, six hours of active labour with no cervical change for four hours.
  - Multipara, four hours of active labour with no cervical change for two hours

medical condition, were signed out to the ward within 24-48 hours of the delivery. There was no significant difference in the rate of post operative complications including puerperal pyrexia, wound infection and post partum haemorrhage (Table 3).

Analysis of neonatal outcomes showed no perinatal death. In the primary caesarean sections performed for sub optimal cardiotocographs (CTG) (35/122), cord blood for foetal pH was sent in 75% of cases but none had pH < 7.21, and only 6/35 (17%) babies needed neonatal intensive care admission. All babies were shifted out by second day of birth. Overall perinatal outcome was not compromised with reduction in primary caesarean deliveries. (Table 3).

Quality of obstetric care in the delivery suite improved markedly. There was objective evidence to justify the need for caesarean section including correctly maintained partograms, proper documentation , well selected cases for induction of labor and hundred percent involvement of senior personnel (Consultant level) in decision making,

Discussion

Can caesarean section rate be safely reduced? Our audit was conducted with the objective to answer this question. A single cut off for defining a high or an ideal caesarean section rate (CSR) is very difficult as it may vary in different maternity units according to the clinical practices and set up.[8] In 1985, World Health Organization had suggested that there were no additional health benefits associated with a caesarean section rate above 10-15%. Robson et al reported an overall decrease in the caesarean section rate successfully by applying principles of early diagnosis and treatment of dystocia in nulliparous women in a medical audit of labour management.[9] We shared the results of first loop of our audit with all the consultant obstetricians working in our unit and implemented the acceptable strategies including benchmarks for caesarean section rate, induction of labour and failed induction. Acceptable rates for caesarean sections were determined by departmental consensus, keeping RCOG guidelines in mind. This step proved to be fruitful at the end of the audit cycle and resulted in a marked improvement in the quality of obstetric care, reduction in the number of primary caesarean sections, and more justified indications for induction of labour as evidenced by audit results. Despite a significant reduction in the number of primary caesarean sections and induction of labour, we failed to reach the proposed benchmarks. The lower effect on overall caesarean section rate (CSR) is possibly related to large number of elective caesarean sections performed on patients' informed choice in the cases of one previous caesarean and breech presentations.

Primary caesarean section usually determines the future obstetric course of any woman and therefore should be avoided wherever possible. The 1-2% risk of scar dehiscence associated with trial of vaginal birth after caesarean section (VBAC) can result in serious maternal and perinatal morbidity and mortality in subsequent

pregnancies. Soliman et al[10] have reported labour induction as the most important predictor of primary caesarean section. We had similar results. Most of the primary caesarean sections during the first loop of audit cycle were secondary to failed IOL. The commonest indication for induction in these cases was being post dates (Inductions routinely performed in low risk women at 40 weeks irrespective of the Bishop score). Literature supports routine induction of labour at 41 weeks in uncomplicated pregnancies.[11] After changing our policy for post dates inductions to 41 weeks, there was a significant reduction in the number of induced cases with poor Bishop score. Majority of women presented in spontaneous labour resulting in prevention of unnecessary emergency caesarean sections.

Aim of modifications in obstetric care management should not jeopardize maternal and foetal safety.[12] Lagrew et al report safe lowering of caesarean section rate with no increase in maternal and perinatal morbidity and mortality.[13] In our study there was no adverse effect of the introduced strategies on maternal and perinatal outcomes, and the number of high dependency unit (HDU) admissions post operatively were not related to the procedure itself. Almost all of these women had underlying medical problems and were transferred electively to the HDU for observation and monitoring. Perinatal outcome was also favourable without any perinatal death and fewer NICU admissions.

Our study has certain limitations. Main limitations include shorter duration of the study period and an already high caesarean section rate from the start. Regarding, the obstetricians awareness of audit, they were aware of the first loop of the audit cycle, however the time for the second audit was not disclosed to them. Only the primary investigators were aware of the exact dates. The audit should have been conducted over a longer period of time to identify more avoidable factors related to a high caesarean section rate. Lastly, as we had started this audit with a high caesarean section rate, hence these results may have appeared more dramatic than the actual figures. To check the compliance of all the healthcare workers involved in obstetric care and to stabilize the same level of quality of care, we have planned to conduct monthly critical analysis of primary emergency caesarean sections and failed inductions on regular basis. This will give us a better picture of our delivery suite practices and help in further improvement.

To conclude, safe lowering of the rate of primary caesarean sections is possible without compromising maternal and perinatal outcomes. We strongly recommend the introduction of evidenced based strategies to reduce the number of primary caesarean sections on a national level rather than on an individual basis, as a first step towards safe motherhood.

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