Neonatal Outcome in Caesarean Births for Unexplained Fetal Distress

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Abstract: *Background:* Appropriateness of caesarean section (CS) for foetal distress (FD) is proved by neonatal status at birth. Validity is known after intervention has been done, whether justified CS or not. It provides information about delays also.

Objectives: Objectives were to know burden of CS for FD in women with no apparent risk factors, factors detected during CS, accuracy of diagnosis, whether really FD or false alarm.

Material Methods: Five years records of births were analysed for knowing about CS for FD in women with no obvious risk factors, neither in history, nor clinical examination or day to day investigations which could have lead to diagnosis of FD. Approval of institute's ethics committee was taken. Analysis of records of women who had CS (2121) performed for FD as primary indication, revealed that 38.15%, (809 of 2121 CS for FD), were study subjects, no risk factor.

Clinical diagnosis of unexplained FD contributed to 10.6% of CS, 15.2% of emergency CS, 3.7% of births during study period. Details of CS, intra-operative findings, status of liquor amnii, placenta, umbilical cord vessels, status of baby at birth beyond were recorded.

Results: Of 809 cases, 6 (0.8%) were teenagers, 569 (70.33%) of 20-24 yrs, 705 (87.14%) were primigravida, actually 95.67% were nullipara, highly significantly (P<0.01) more primigravida than over all 45% primigravida. 11.99%, (97 of 809) CS were performed at less than 34 weeks gestation. FD was diagnosed by any one or two or all three, nonstress test, moderate or thick meconium in liquor or persisting foetal tachycardia or bradycardia. NST recorded category – III (non reassuring foetal heart) in 395 (48.83%) women, in others 48.83% (395 of 809) it was moderate or thick meconium in liquor amnii, persistent foetal bradycardia, moderate (<100 bpm) or severe (<80 bpm) in 2.6%, (21 of 809), persisting foetal tachycardia (>180 bpm) in 6.18% (50 of 809). Baby was vigorous at birth in 353 (43.63%), 427 (52.78%) required NICU admission. Of them, 241 (56.44%) improved, survived, but 186 (43.56%) died, 29 (3.58%) were still born. Overall loss of 26.5% in CBs for FD is, a matter of concern.

Conclusion: Many CS were performed in women without risk factors with diagnosis of FD. In quite a few it was proved that intervention was needed and also in some delayed too, but in some it seemed to be unwanted intervention. Studies are needed to search for non-conventional or unknown risk factors for FD, also for authentic modes of knowing non-reassuring foetal status. Once diagnosed it is essential to have best outcome by quick right, interventions.

Keywords: Caesarean section, Unexplained foetal distress, Neonatal status, Perinatal asphyxia, Perinatal death.

INTRODUCTION

The appropriateness of caesarean section (CS) for foetal distress (FD) is evident only after seeing the neonatal status at birth. American College of Obstetricians and Gynaecologists (ACOG) [1] in its guidelines described that the term FD was imprecise and nonspecific because of its low positive predictive value even in high-risk populations and many a times was associated with an infant who was in good condition at birth. But equally true is the fact that baby may be limp, sometimes still born after CS for FD, obviously indicating perinatal asphyxia, either delay in decision making or in taking out the baby once decision has been made.

FD, term used by many obstetricians is deemed inappropriate by many, since it means clinician's interpretation of foetal condition, but does not provide information of status of baby, severity of problem, the cause or implications of the outcome. Validity of intervention is known only after the intervention done. While CS is common and diagnosis of foetal distress is common there are not many studies on the subject from regions with low resources. So it was decided to look into cases who had CS for FD in women with no disorder which could have affected the baby, with a prospective study in mind.

OBJECTIVES

To know the burden of diagnosis of intrapartum FD in women with no apparent risk factors, to know appropriateness of diagnosis, possible factors responsible for intrapartum FD not visible at diagnosis and neonatal outcome with a prospective study in mind.

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MATERIAL METHODS

Five years records of births were analysed for knowing about CS and their indications, mainly CS for FD in women with no obvious risk factors which could cause FD. Approval of the institute's ethics committee was taken. Consent from the patients without identification of individual case was taken in all the cases as a policy. Analytical study was done with a prospective study in mind. The details of CS, including intra-operative findings, state of baby at birth and beyond, state of liquor amnii, placenta & umbilical cord vessels and any other abnormalities were recorded. Neonatal outcome, stillborn or birth asphyxia, neonatal intensive care (NICU) management and neonatal death with cause were recorded and analysed. Since study used case records retrospectively, short comings are limitations but strength too, as it tells what happens in every day practice.

Total births during the period of analysis were 21,517, of which, 13,871 (64.46%) were vaginal and 7,646 (35.54%) by CS. Of the 7646 CB, 2343 (30.64%) were elective CS & 5303 (69.36%) emergency CS, 4585 (59.96%) mainly for the mother and 3061 (40.04%) for foetal indications, however some had materno-foetal indications. Of 5303 emergency CS, 3182 (60.00%) were performed for various indications and 2121 (40.00% of 5303 emergency CS, 27.74% of 7646 CS and 9.85% of all births) were performed for FD.

Analysis of case records of the 2121 CS performed for FD, as the primary indication, revealed that in 61.85% (1312 of 2121) cases, there was some or other maternal or foetal factor, which could have caused FD (analysed separately) but in 38.15% cases (809 of 2121 CS performed for FD) no risk factors were recorded, neither in the history, nor physical, obstetrical examination and nor in day to day investigations like blood groupings and Rh typing, blood counts (haemoglobin, white blood cell count, platelet counts), sickling, VDRL, Diabetes screening, HIV, HBsAg, ultrasonography prior to labour or at the time of admission to labour ward. These cases with clinical diagnosis of unexplained FD were the study subjects. They contributed to 10.6% of all CS, 15.2% of emergency CS and 3.7% of all births during the study period.

RESULTS

Six (0.8%) of 809 women were teenagers, 569 (70.33%) were of 20-24 yrs, mean age was 23.2 ± 1.14 years. Overall 705 (87.14%) were primigravida, actually 95.67% (774 of 809) were nullipara. 11.99%, (97 of 809) CSs were performed at gestation of less than 34 weeks. The analysis of the mode of diagnosis of FD for decision to do CS, revealed that in 395 (48.83%) cases it was because of category-III (non reassuring NST), in 48.83% (395 of 809) because of presence of moderate or thick meconium in liquor amnii, moderate bradycardia (<100 bpm) or severe bradycardia (<80 bpm), 2.6% (21 of 809), and persisting moderate foetal tachycardia (>180 bpm) in 6.18%, (50 of 809). Overall intraoperative findings revealed, presence of cord around the neck in 27 (10.71%), 3 cases (11.11% of 27) had two or more tight loops of cord around the neck, not diagnosed during ultrasonography and may be this occurred after sonography. Placental abruption with retro-placental clots was found in 2 (0.79%) & in one more case liquor amni was blood stained (0.39%). Of the 809 CB, babies were vigorous at birth in 353 (43.63%), 427 (52.78%) required NICU care, 241 (56.44%) of all the babies admitted to NICU improved but 186 (43.56%) died and 29 (3.58%) babies were still born.

Of the 53 (21.03%) cases where there was intraoperative thick meconium, intermittent auscultation had revealed tachycardia in 6 (11.3%), bradycardia in 5 (9.4%), but FHR was normal in 42 (79.3%) cases. NST was category – III (Non-reassuring) in 41 (77.35%) cases, 2 (3.77%) category – II (Indeterminate) & 10 (18.86%) category – I (reassuring). In case with blood stained liquor with abruption(1.2%), intermittent auscultation of foetal heart & NST were normal. Of the 2 (2.4%) cases in which concealed placental abruption was detected during CS, one had tachycardia (1.2%) and other had normal heart rate on intermittent auscultation but NST was category – III (Non-reassuring), in other case, it was category – I (normal). In 27 cases with cord around the neck the intermittent auscultation, was normal in 21 (77.8%) cases, 2 (7.4%) had bradychardia, 4 (14.8%) had tachycardia. NST was category – III (Non-reassuring) in 21 (77.77%), in 4 (14.81%) category – II (indeterminate) & 2 (7.40%) had category – I.

Of 809 cases 29 (3.58%) babies were stillborn, 353 (43.63%) babies were vigorous at birth, 427 (52.78%) needed NICU admission. Of those admitted to NICU. 186 (43.55%) died, a big perinatal loss after CB for FD. 22.99% of all CS for FD without risk factor, a matter of real concern. But, in 43.63% cases it was false alarm too (Table **1**).

Table 1: Demography of Cases with Caesarean Sections for Foetal Distress

Case Character	Number	%
AGE		
<20	6	0.8
20 - 24	569	70.33
25 – 29	163	20.15
30 – 34	49	6.06
>35	13	1.6
TOTAL	800	98.94
GRAVIDA		
Primigravida	705	87.14
Second or Third	91	11.25
Multigravida	13	1.61
TOTAL	809	100
PARITY		
Nullipara	774	95.67
Primipara	32	3.96
>2	3	0.37
TOTAL	809	100
PERIOD OF GESTATION		
<34	97	11.99
≥34-<37	81	10.01
≥37-40	560	69.22
>40	71	8.78
TOTAL	809	100
DIAGNOSTIS OF FOETAL DISTRESS		
Non Reassuring NST	343	42.4
Meconium	395	48.83
Foetal Bradycardia	21	2.6
Foetal Tachycardia	50	6.18
TOTAL	809	100
NEONATAL OUTCOME		
Healthy	353	43.63
NICU	427	52.78
Improved	241	56.44
Deaths	186	43.56
Still Births	29	3.58
TOTAL	809	100

DISCUSSION

High numbers of CS performed for FD are contributing substantially to increasing CS rates worldwide. Some such CS are performed because of fear of litigations associated with poor outcome, other might be with genuine reason. The diagnosis of FD is directly proportional to the intensity of intrapartum monitoring. Martin *et al*. [2] reported that by 1975, just over 20% of labours were monitored with electronic foetal monitoring (EFM), a number that went well over 80%. It has been reported that EFM was used in 45% of all labours in 1980; 62% in 1988; 74% in 1992; and 85% in 2002. An important aspect to be remembered is the high false positive rate for FD associated with most intrapartum foetal monitoring methods, coupled with the poor ability to interpret results, both may contribute to unnecessary interventions [1,3]. The situation in resource limit countries is different, as EMF is not done in all the cases. FD is usually diagnosed with intermittent foetal heart auscultation and / or meconium in liquor also but action is aggressive intervention, mostly CS which could cause morbidity / even mortality or future sequlae for mother and the baby too. Further it is essential that critical analysis is done after CS, specially when CS is performed for the baby, whether baby was still born or neonatal death, whether it was false alarm. Costs physical, emotional and financial are too high**.**

Nelson *et al*. [4] reported that despite the rise in CS rate to excess of 25%, neither the rate of CP nor that of any other childhood neurologic problems has changed in the slightest, weighing against the inappropriate & alarming rise in CS rate. Unfortunately, precise information about the frequency of false-positive results is lacking, and this lack is due in large part to the absence of accepted definition of FD. Intermittent auscultation criticized with advent of EFM has been relooked and has also been advised as standard of care by joint committee of American Association of Paediatricians (AAP) and ACOG [5] in all low risk cases. The suggested duration & frequency of intermittent auscultation is minimum of 60 seconds at least every 30 minutes after a contraction in the active first stage and every 5 minutes in the second stage of labour [6]. In the presence of increased risk of perinatal death, cerebral palsy or neonatal encephalopathy and with oxytocin use for induction or augmentation, continuous EFM has been suggested [7]. However this also is not solving the problems.

In some women with no disorder in the mother even at the onset of labour, interventions are done for FD. What has been suggested is that the brainstem responds with sympathetic stimulation to increase catecholamine levels, which first increase heart rate

and variability and then, if hypoxemia persists or worsens, constrict peripheral arterial beds, which result in systemic hypertension [8]. However a compromised baby of the mother with risk factors responds in a different way to acute problems than that of the mother with no risk.

A study of term pregnancies with diagnosis of foetal asphyxia had revealed that in 63% cases there was no known risk factor for foetal asphyxia [9]. Any mother, even if screened and found to be with no risk factor can develop FD due to intrapartum decreased oxygenation of foetus because of suboptimal uterine perfusion, placental dysfunction, and intrapartum events not known earlier [6]. Sometimes there is true distress, sometimes there is false alarm. It is essential to conduct studies regarding the causes of foetal asphyxia in women without obvious maternal / foetal disorder and also authenticity of diagnosis of FD. Women with disorders which predispose to perinatal asphyxia should be managed appropriately and timely and those without such disorders should be managed in such a way that unnecessary interventions are avoided and research must continue. Unnecessary interventions lead to high CS. This also changes woman's future fertility. In the present study most were primigravida, changing their fertility. Similarly if intervention is essential, it needs to be timely. Otherwise it becomes fruitless CS. Operative delivery with its problems, with no take home baby is a matter of concern as happened in the present study, 27% mothers who had CB for FD in women with no risk had no take home baby.

Since it was a retrospective study, it was not possible to know which factors were responsible, whether it was delay in diagnosis or delay in taking out the baby or any other factor, limitation of the study. Surgeon's skills in taking out the baby quickly / safely also affects the outcome in such cases.

Cochrane review by Neilson [10] provided some modest support for the use of foetal ST waveform analysis while deciding to undertake continuous electronic foetal heart rate monitoring during labour. The unnecessary CS can be avoided and also quite a lot of babies saved by timely CS. If the assessment methods are better, to pick really distressed baby early CS will not be fruitless. Simple assessment techniques need to be widely available for diagnosis of non reassuring foetal status or true FD. The clinician should reconsider the diagnosis made by FHR changes alone *i.e*. intermittent auscultation & electronic foetal heart monitoring. These methods should be interpreted with some reservations due to limited accuracy in diagnosing foetal hypoxia, asphyxia and subsequent neonatal outcome. The etiology has been analyzed, and more than half of the cases remain unexplained by any obvious cause [11, 12].

Further studies are needed to search for non-conventional or unknown risk factors, which might be involved in FD, also for establishing the authenticity of the diagnosis of non-reassuring foetal status, as well as appropriateness of the timely interventions done for the same. Research needs to continue.

CONCLUSIONS

Foetal distress is a common indication of CS. In quite a few cases FD is diagnosed in women without any risk factors. Many a times baby is vigorous after CS performed for FD but equally true is, still births and neonatal deaths after CB, with clinical exclusive diagnosis of FD. Research must continue in all aspects, risk factors, prevention, timely diagnosis and research for factors leading to FD in cases of no obvious risk and methods of diagnosis of foetal distress.

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