Research Article

Relation Of Abnormal Fetal Heart Rate & Intra-Operative Findings In An Emergency Cesarean Section

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Abstract

Background: Fetal distress in itself is a non-specific term include indicators such as an abnormal intrapartum fetal heart rate pattern, meconium stained amniotic fluid, low apgar scores or placental abnormality , it's not necessarily that an abnormality in one will reflected as an abnormality in the other or their may be none of these findings.

Aim of study: To describe the relation between intrapartum fetal heart abnormalities and operative findings and neonatal outcomes in an emergency cesarean section .

Patients and methods: A" cross sectional study" performed in Al-Yarmouk Teaching Hospital through the period from the 1st of July 2014 to the 1st of July 2016 on a convenient sample of 638women. Women participated in the study included: women in the labor room who delivered singleton, viable fetus, cephalic presentation, term size pregnancy with gestational age ≥37-40 weeks by emergency caesarian section for abnormal fetal heart rate As a part of the work protocol, the surgeons were instructed to document any findings that may be possible causes for the non-reassuring fetal heart rate as cord abnormality (occult cord prolapse , true knots or entalengement) , placental abruption and rupture uterus , the placentae of those who have no intraoperative findings were send for histopathology.

Results: Mean maternal age was 27.6±8.1 years and mean fetal weight was 3.2±0.6 Kg . 35.2 % of neonates with intra-operative problems needed admission to the neonatal care unit in comparison to 20.3% of those not facing such problems. This difference was significant (p= 0.021)

There is significant association between maternal age and intraoperative abnormalities with P-value of 0.009%. No intraoperative findings were seen in 34% and 65.5% no placental finding were found on histopathology.

Conclusions: Fetal distress may occur for several underlining causes. However, neither of them may reflect fetal asphyxia or acidosis and an abnormal cardiotocography may carries a false diagnosis of fetal distress.

Key words: "Non reassuring fetal heart rate", Intraoperative findings, "Emergency Cesarean section".

INTRODUCTION

Fetal distress is a term used to describe a fetus who does not receive sufficient amounts of oxygen during pregnancy or in labor that may lead to neonatal morbidity & mortality. It may be detected through an abnormal fetal heart rate, while fetal distress is a term commonly used; it is not well defined.[1]

In an unselected population the overall risk of fetal distress was about 3.1% & it exceeded 20% in patients with severe pre-eclampsia, fetal growth-restricted fetuses with abnormal Doppler studies, post-term, severe hypothyroidism and moderate/severe asthma.[2]

The majority of cerebral palsy cases in otherwise normal term infants are not associated with intrapartum hypoxia-ischaemia. [3]

It was found worldwide of 7. 6 million deaths of children under the age of 5 year, about (9.4 %) were as a consequence of intrapartum related complications and about 45 % of stillbirths occurring during labour were usually due to hypoxia.[4,5]

Some evidence showed that maternal age over 35 years is an independent risk factor for fetal distress and uteroplacental insufficiency.[6]

Fetal distress in labour may be due to a variety of pathologies as uterine hyperstimulation, placental insufficiency, , maternal hypotension, placental abruption and cord compression . Recognition and management of reversible pathologies may prevent unnecessary intervention.[7, 8]

True knots, multiple umbilical cord entanglements, and short cords were more common in emergency caeserian section for non-reassurance fetal heart rate & suggest that they play a role in the development of fetal placental vascular lesions and adverse neonatal outcome.[9, 10]

Historically, fetal heart rate monitoring has been the main method for fetal follow up in the labor room, but not give the important information of whether oxygen supply is adequate for fetal tissue metabolism , as inadequate oxygen supply & anaerobic metabolism has commenced, then by definition fetal hypoxia exists and is likely to get worse. There is no direct continuous measurement of fetal tissue pH, and even if there were it would be invasive and likely to be impractical for routine monitoring. When fetal compromise is possible then periodic fetal blood sampling (FBS) can be done. It was found that fetal pulse oximetry which is used as a means of measuring fetal oxygen saturation can be used in combination with fetal heart rate monitoring for further follow up, but usually randomized trials failed to provide convincing evidence that it is helpful.[11]

Fetal well-being is an important reason by which medical intervention may be needed during labour. The decrease in placental blood bow related to uterine contractions may be associated with fetal compromise before labour which eventually leads to fetal hypoxia and finally acidosis. Fetal distress may present as an abnormal cardiotocography or meconium staining of amniotic fluid. However, neither of these causes can confirms fetal acidosis or hypoxia, as the first cause carries a very high false-positive rate for the diagnosis of fetal compromise, while the second cause can be passed for benign reasons, such as fetal maturity.[12]

PATIENTS AND METHODS

A cross sectional study carried out in Obstetric Department of Al-Yarmouk Teaching Hospital through the period from 1st of July, 2014 to 1st of July, 2016. An informed verbal consent was taken from each woman before participating and approval of research was taken from hospital authority, in addition to that participated women were received an appropriate management and delivered by the researcher.

Inclusion criteria included women who delivered singleton, viable fetus, cephalic presentation, term size pregnancy with gestational age ≥37-40 weeks by emergency cesarean section for abnormal fetal heart rate as the only indication As a part of the work protocol, the surgeons were instructed to document any findings that may be possible causes for the non-reassuring fetal heart rate as cord abnormality (cord prolapse , true knots or entalengement) , placental abruption & rupture uterus , the placentas of those who have no intraoperative findings were send for histopathology. Exclusion criteria were chronic medical diseases (Hypertension & Diabetes Mellitus), any indication for emergency cesarean section other than non-reassuring fetal heart rate, initial refusal for cesarean section or any evidence of fetal congenital abnormality

Full history was taken from selected women including: maternal age, gravidity, parity, gestational age and last menstrual period. General and obstetrical examinations for each of those pregnant women were done by the researchers.

All neonates after birth were immediately examined by the pediatrician with confirmation of the sex; weight, Apgar score & any need for neonatal admission were reported. Placentae were taken for those with no obvious possible intraoperative findings & send for histopathology. A convenient sample of 638 cases at term pregnancy fulfilled inclusion and exclusion criteria & agreement to participative from women attending Labour room were included in the study.

The statistical analysis was done by a specialist in Community Medicine. **The results were usually in form of tables and/or graphs.** Kolmogorov Smirnov analysis verified the normality of the data set. **Multiple contingency tables conducted and appropriate statistical tests performed, Chi-square used for categorical variables and Independent Samples t-**

test was used to compare between two means. In all statistical analysis, level of significance (p value) set at ≤ 0.05.

Statistical analysis:

The data entry and management was done via STATA program (ver. 13, 2014).

The categorical data presented as frequency and percentages, while continuous data represent using mean and standard deviation.

Independent t-test was used to compare average of continuous data.

Pearson's chi-square test was used for assessing the association between categorical data.

Binary logistic model used to calculate the real effect of intra-operative problems on neonates condition.

P-value of 0.05 or less considered significant.

RESULTS

The study included 638 women were included in the study and all were taken for emergency CS for non reassuring fetal heart rate.

In relation to the intraoperative finding, no related findings were found in 220 case (34.5%), while in 418 cases (65.5%), intraoperative findings were found in the form of meconium stained liquor in 150 case (23.5%), abruption in 140 case (21.9%), cord around the neck in 100 case (15.7%), occult cord prolapsed in 20 case (3.1%) and rupture uterus in 8 cases (1.3%) as shown in table 1.

Table no.1: Relation between non-reassuring fetal heart rate & intraoperative findings.

Intraoperative finding	Number	%
No gross findings	220	34.5%
Meconium	150	23.5%
Placental Abruption	140	21.9%
Cord around the neck	100	15.7%
Occult Cord prolapsed	20	3.1%
Rupture uterus	8	1.3%
Total	638	100%

For the 220 cases with no intraoperative finding found, placentae were taken and send for histopathological study for microscopical abnormalities in the laboratory deparment of AL-Yarmouk teaching hospital, 144 case (65.5%) no abnormalities were found, while in the remaining 76 case (34.5%) abnormalitiese were found in the form of (48 case (21.8%) inflammatory changes &28 case (12.7%) vascular changes) as shown in table 2.

Table no.2: Placental histopathological results in those women with no intraoperative findings

Placental Histopathology	Number	%
Nothing	144	65.5%
Inflammatory	48	21.8%
Vascular	28	12.7%
Total	220	100%

There was significant association between intraoperative findings and maternal age with P-value of 0.009.

There were no significant relation regarding fetal weight or parity & neonatal admission were needed in 32% of cases as shown in table no.3

Table no.3 Maternal, fetal & neonatal relations with intraoperative abnormalities

Parameters	Intra-operative abnormalities Mean ± Standard deviation		p-value
	Yes	No	
Parity	1.6±1.5	1.4±1	0.275
Maternal age (years)	28.2±8.4	25.4±6.8	**0.009***
Fetal weight (Kg)	3.2±0.6 Range (2-5)	3.3±0.5	0.463
Need neonatal admission	No (204)	32%	

		Intra-operative abnormalities		Total
		Yes	No	
Need admission to NICU	**Yes**	174 (35.2%)	30 (20.8%)	**204 (32%)**
	No	320 (64.8%)	114 (79.2%)	**434 (68%)**
Total		**494 (100%)**	**144 (100%)**	**638 (100%)**

*** Significant at 0.05 level by Independent t-test**

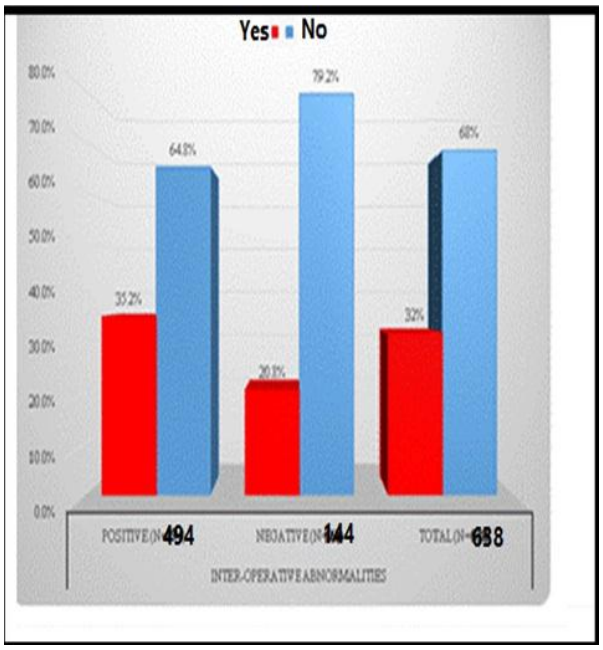

Figure 1 Percentage of neonatal admission according to intraoperative findings (p= 0.021 Sig.). Odds Ratio (95%CI) = 2.21 (1.17-4.17)

A 174/548 (35.2 %) of neonates with intra-operative problems needed admission to neonatal care unite in comparison to 30/144 (20.3%) of neonate did not face such a problem. This difference was significant (p= 0.021).

On the other hand the logistic analysis showed that intra-operative problems urged neonates to be admitted to NICU two times more common than those without any problems [Odds Ratio (95%CI) = 2.21 (1.17-4.17)].As shown in the figure no.1 & table 3.

DISCUSSION

Fetal distress is an emergency condition involve abnormal fetal heart monitoring that occurs when their is fetal asphyxia. It is usually detected through abnormal fetal heart rate, amniotic fluid abnormality and decreased fetal movement. Because of this, medical professionals must have an immediate intervention to avoid perinatal morbidity and mortality.

During labor, oxygen transport to the fetus may be altered by different mechanisms which lead to hypoxic changes and acidosis, as abnormal perfusion within the utero-placental vasculature, spiral arteries and compression of umbilical cord during contractions which result in umbilical cord blood flow cessation [(13).] or placental function may be sufficient for fetal growth, but may be inadequate for extra demands needed during labor process , which eventually lead to fetal intrapartum hypoxia or in severe cases, these babies can suffer hypoxic ischaemic encephalopathy. [(14,15)]

The current study showed no significant association between fetal weight & fetal distress while a study made by Ananth and Vintzileos in 2006 , found that preterm births in mothers with fetal distress due to medical conditions ,the cause were due to ischemic placental condition, while regarding neonatal weight, the higher incidence of Low birth weight neonates (<2.5 kg) was noticed among mothers with Fetal Distress (52.78%),[(16)] the same was found in a study made in 2011 by Coutinho et al. reported a relation between Low birth weight and abnormal fetal heart rate,[(17)] this variation in the results may be due to exclusion of medical diseases in the current study.

Regarding the relationship between maternal age & the incidence of intraoperative complications, in our study extremities of maternal age has been shown to have a significant association. These findings were similar to two studies , the first in 2007 made by Bergholt et al. & the second in 2010 made by Zwart et al., both showed that nulliparity had been shown to be associated with higher incidence of intraoperative complications in our series & significant effect of high BMI on the incidence of intraoperative complications.[18,19]

Regarding placental histopathological changes in no intraoperative findings , about 34% related to vascular & inflammatory changes , while in2013 group study made by Gheorman V, Gheorman L ,et al .found that about half of the cases , placental lesions were suggestive of fetal distress as a diverse etiology of placental vascular changes and the placenta of pregnant women with associated diabetes as immaturity , vascular edema glycogen stores and fibrinoid changes.[20]

Conclusion:

Emergency cesarean section for non reassuring fetal heart rate with no operative findings may be due to placental causes which can be proved by histopathology.

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