External cardiotocographic monitoring in acute fetal distress

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Abstract

Objective: *To study the relationship between external cardiotocography (CTG) - intrapartum - for acute fetal distress in labor abnormalities and fetal status at birth.* ***Material and method:*** *The study examined a sample of 53 parturient with cesarean for fetal distress from the Department of Obstetrics of SUUB in 2008. There was assessed the relation between the pathological changes of fetal heart rate (FHR) and fetal condition at birth. We included in research all labor anomaly that generated CTG changes.* ***Results:*** *Limited pathogenic significance FHR (tachycardia, early deceleration or limited variability) was associated with good fetal status at birth (Apgar>7) in 66% of cases. Also, in 8 cases (15%) with moderate late deceleration (6 cases) and severe bradycardia (2 cases) the results showed that the Apgar score was favorable, >7. These records were predictive for fetal distress, but inconsistency with the fetal status at birth has resulted in making a large number of unnecessary cesarean.* ***Conclusions:*** *CTG monitoring is a modern and non-invasive method for assessing both antepartum and intrapartum fetal status, having a clear impact on obstetrical care.*
Keywords: *monitoring, CTG, fetal distress.*

The objective of this study was to research the relationship between external intrapartum cardiotocography monitoring in labor anomalies and fetal status at birth.

Nowadays, a series of studies have shown that a misinterpretation of the fetal cardiac rate can lead to a false management of birth. AFD (acute fetal distress) is defined as a homeostatic abnormality determined by different aggressions on fetus, especially the oxygen deprivation; a direct consequence would be the modifications of the external cardiotocographic monitoring, that should lead to an appropriate obstetrical decision.

Material and method

We examined 53 parturient with cesarean for fetal distress, from the Department of Obstetrics of SUUB in 2008.

There was assessed the association between pathological changes of fetal heart rate (FHR) and fetal condition at birth. Labor anomalies that generated alterations of the external cardiotocography monitoring were included in the study.

There were analyzed:

- partograms;
- external cardiotocographic monitoring;
- associated investigations: sound ultrascan;
- fetal condition at birth.

We assessed the relationship between clinical elements suggesting fetal distress: amniotic fluid changes, like the presence of meconium, FHR and paraclinical elements: external cardiotocography monitoring changes.

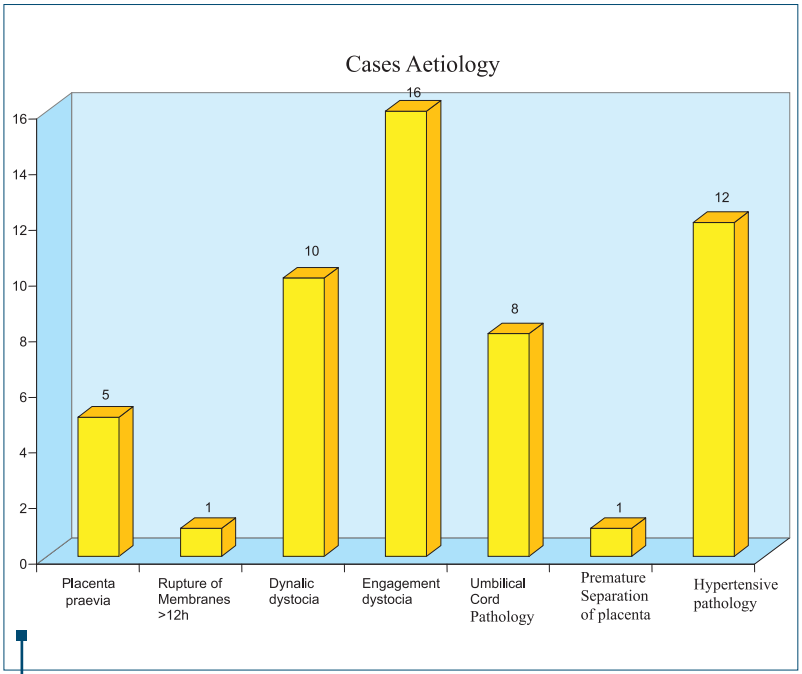
Results

Fetal distress cases had different etiology.

N.B. Boehm FH has shown the real difficulty in in-

Table 1 Etiology of fetal distress cases

Etiological diagnosis	Number of cases	%
Placenta praevia	5	10
Membrane rupture for more than 12 hours	1	2
Dynamic disorder	10	18
Engagement Dystocia	16	30
Umbilical cord prolepses	8	15
Premature separation of normally inserted placenta	1	3
Hypertensive pathology	12	22
Total	**53**	**100**



Graphic 1. Etiology

Table 2 The relationship between the FHR and Apgar score

FHR alterations	Number of cases	Apgar score >7	Apgar score <7
Tachycardia	10	7	3
Moderate bradycardia	2	2	
Severe bradycardia	5	2	3
Early decelerations	9	9	
Moderate late decelerations	6	6	
Severe late decelerations	12		12
Simple variability	9	9	
Total	**53**	**35**	**18**

terpretation the FHR variations. Some of these variations are more likely to be the result of an adaptation reaction to „stress" than a real fetal distress like the intrauterine asphyxia.

In all parturient had been performed external cardiotocography monitoring using the The Cadence II - Fetal Monitor for minimum 20 minutes, except for 5 cases who were admitted to the hospital for emergency and had cesarean in less than 45 minutes.

For the monitorized cases the necessity for cesarean was determined by the FHR changes in principal, but also by the persistent request of the parturient with emotional lability to have a cesarean, the important labor discomfort, the amniotic fluid aspect, etc. In all cases the CTG monitor was modified.

We present a few external cardiotocography monitoring changes.

There were negative results in two of the cases, which lead to the death of the fetus.

The time between the FHR changes and the decision of emergency extraction of the fetus had varied from 30 to 60 minutes. In 35 cases (66.1%) the Apgar score was >7 and in 17 cases was <7; we have to highlight 8 cases (15%) from the group with Apgar score over 7, 2 with severe bradycardia and 6 with moderate late deceleratios.

In the group with Apgar score less than 7, 3 presented tahycardia and had an Apgar score at 5 minutes more than 7, 15 had severe bradycardia and severe late decelerations and also presented a positive evolution.

There is a strong association (66% in our study) between the fetal status at birth and a limited pathogenic CTG monitoring (tachycardia, simple variable decelerations). In the mean time, in 8 cases positive for fetal distress 2 had severe bradycardia and 6 moderate late decelerations and the Apgar score was more than 7. These results show a negative association between the CTG monitoring and fetal status at birth.

Other authors[6], as well, have shown the association between external cardiotocographic monitoring (interpreted as negative for fetal distress) and a good fetal condition at birth in 97% cases. In only 28% of cases the CTG monitor positive for fetal distress was associated with a low fetal status at birth.

We have to mention that in all cases, the acute fetal distress was installed during labor. There was no chronic hypoxia acutisation (placental insufficiency) at the beginning of labour.

Taking in consideration the facts presented, the conclusion is that a normal aspect of the external cardiotocography monitoring is associated with a good fetal status at birth, but a CTG monitor considered predictive for a fetal distress (15% in our studies) is not always associated with the fetal condition. For this reason, in some cases, the cesarean is performed for fetal distress indicated by the monitor and it's unnecessary.

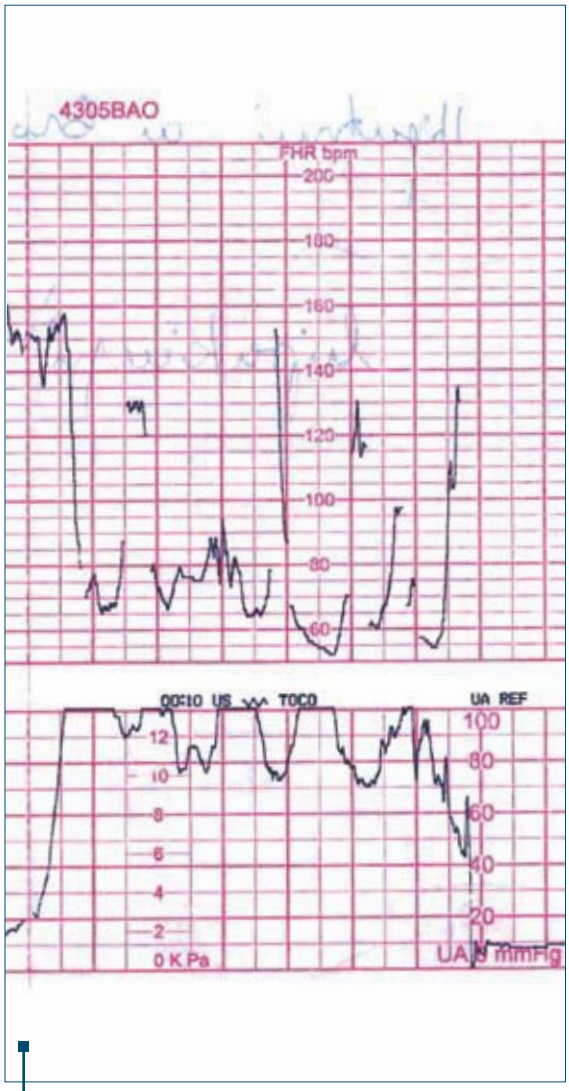


Figure 1. ST Case. Hypercontractility and hypertony with fetal bradycardia

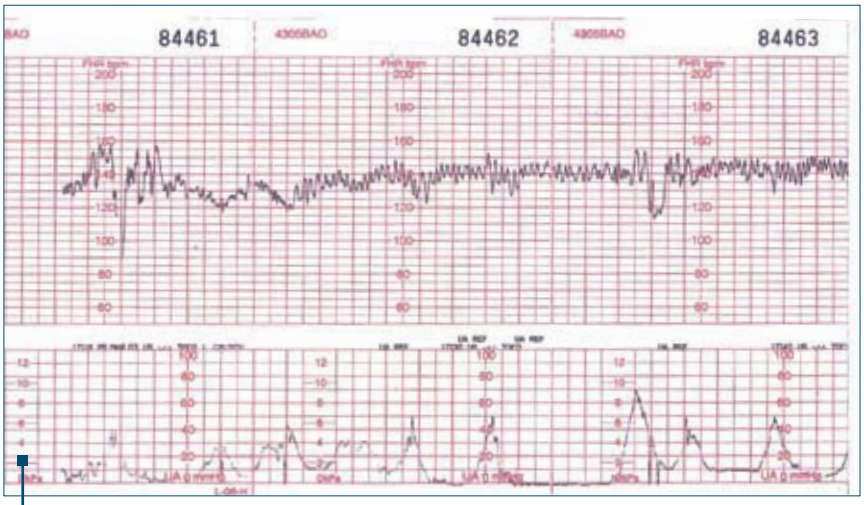


Figure 2. VU Case. Simple variable decelerations

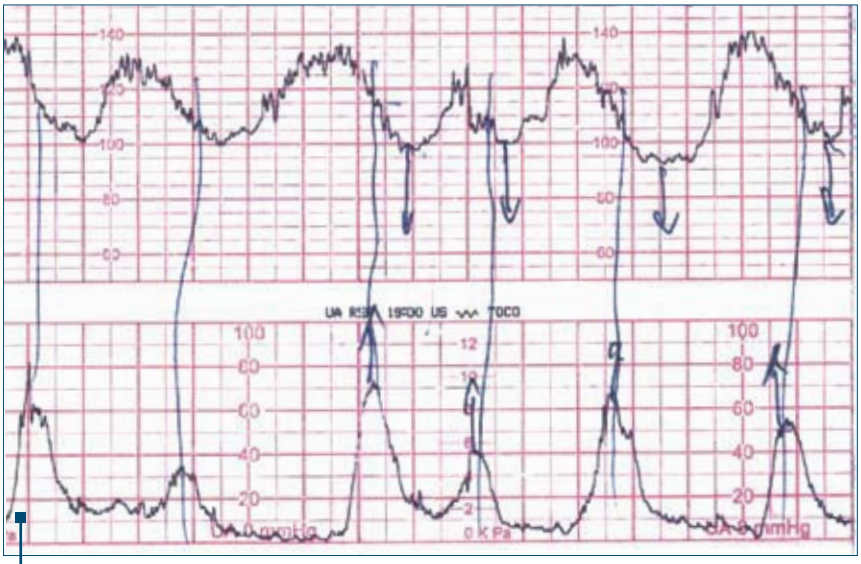


Figure 3. BO Case. Late decelerations

Because of these inaccuracies, Murphy et all[7] have established a tolerable maximum time table for different types of FHR anomalies (which can be applied in maternities which only have the cardiotocograph for monitorizing the labor). In the table below we can see the time needed for the metabolic acidosis to install from the beginning of the pathological FHR.

There are cardiotocografic scores (Krebs, FIGO) which include all the FHR parameters in order to diminish the false positive CTG for fetal distress.

A fundamental point of view was raised by G. Boog who analyzed the neonatal prognosis. Apgar score 1 has a low prognostic interest and it is used for neonatal reanimation, and Apgar 5 witness extrauterine adaptation.

If the Apgar score between 0 and 3 is maintained for more than 20 minutes, the cerebral motor damage is high (Westgate -7).

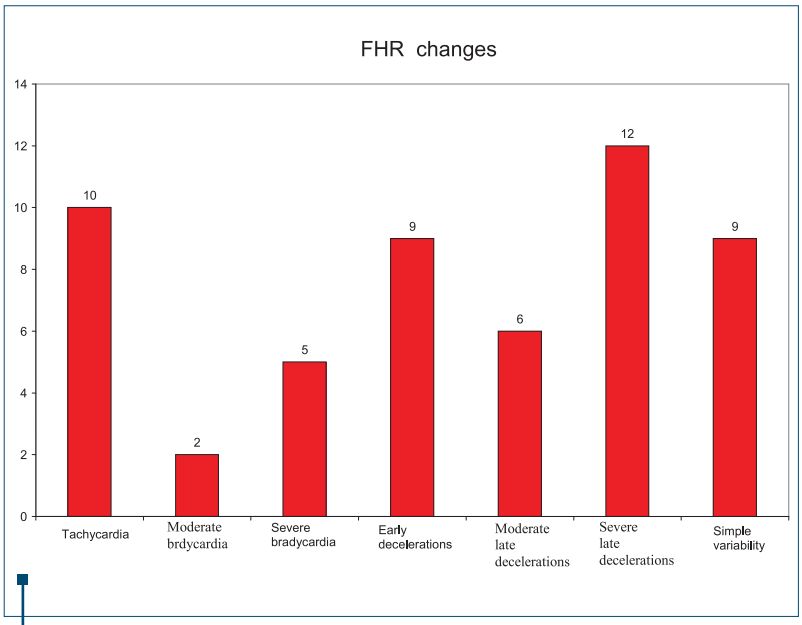
The purpose of external intrapartum CTG monitoring consisted in identification of fetuses presenting variable levels of hypoxia, based on the FHR changes. FHR changes can be generated by other factors as well: the 4 behavior states (calm or agitated sleep, calm or agitated vigilance status), changes in placental blood flow, the increase of temperature, drugs etc. As result, misinterpretation of pathological CTG could lead to delays of the decision for surgical intervention, and severe asphyxia of the fetus.

Conclusions

Labour anomalies as hypertony or hypecontractility have a negative impact on the fetus affecting the materno-fetal exchanges, the result being installation of fetal hypoxia and acidosis. In this case, CTG monitoring anomalies lead to the correction of the dynamic anomalies or to fetal extraction in time.

Table 3 FHR anomalies lenght and the necessity for an active management (scalp pH or fetal extraction) (Murphy and all.)[7]

FHR anomalies	Tolerable maximum time
Isolated tachycardia(160-180bpm)	120 minutes
Tachycardia >180bpm	60 minutes
Bradicardia <100bpm	20 minutes
Moderate variable decelerations <50bpm, time >30" şi <60"	120 minutes
Severe variable decelerations (>50bpm, time >60")	40 minutes
Late decelerations (delay>20")	40 minutes
Flat line (<5bpm)	60 minutes
Tachycardia >160bpm + late decelerations or severe variables+	40 minutes



Graphic 2. FHR alterations

In our study, in the cases of tachycardia, early decelerations or simple variables, the correlation with a good fetal status at birth was 66%. In 8 cases (15%) with moderate late deceleratios or severe bradicardia, the Apgar score was more than 7.

These were predictive records for fetal distress, but inconsistency with the fetal status at birth - which is good - has resulted in making a large number of unnecessary cesareans.

CTG monitoring is a modern and non-invasive method for assesing both antepartum and intrapartum fetal status, this method having a clear impact on obstetrical care. The information correlated with clinical and paraclinical elements lead to a decrease in perinatal morbidity and mortality.

There are additional methods for the fetal monitoring which help reducing the unnecessary cesareans by correct appreciation of the intrapartum fetal status: internal CTG (invasive method), fetal pulsoxymetry, fetal EKG, pH determinations from the fetal scalp. ■

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