

A RETROSPECTIVE ANALYSIS OVER THE EMERGENCY CESAREAN SECTION PERFORMED DUE TO CARDIOTOCOGRAPHIC MODIFICATIONS

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REZUMAT

Obiective: Studiul de față are ca obiect utilitatea cardiocografiei ca metodă noninvazivă de diagnostic și implicit de prevenție a suferinței fetale. **Material și metode:** Studiu retrospectiv efectuat în cadrul Clinicii Universitare de Obstetrică, Ginecologie și Neonatologie „Bega”, Timișoara în perioada Ianuarie-Iunie 2011 pe un număr de 42 de paciente supuse unei operații cezariene de urgență în urma modificărilor survenite în monitorizarea cardiocografică. **Rezultate:** Corelația dintre modificările cardiocografice și indicii Apgar la un minut a relevat: indici Apgar cuprinși între 8-10 la nou-născuții proveniți prin operație cezariană în urma variabilității bătăilor cardiace fetale bazale (2 cazuri); test nonstres areactiv (4 cazuri); tahicardie (8 cazuri); bradicardie (6 cazuri); decelerații (3 cazuri); indici Apgar de 5-7 pentru nou-născuții proveniți din operații cezariene în urma a testului nonstres areactiv (2 cazuri), bradicardie (6 cazuri) și decelerații (10 cazuri) și un indice Apgar sub 5 pentru nou-născutul provenit din operație cezariană în urma decelerațiilor CTG. **Concluzii:** Monitorizarea cardiocografică poate evidenția orice modificare a ritmului cardiac de bază fetal sub influența contracțiilor uterine fiind un factor preventiv al suferinței fetale în asociere cu alte metode de investigare. **Cuvinte cheie:** cardiocografie, operație cezariană, indice Apgar, suferință fetală

ABSTRACT

Objective: The purpose of this study is to demonstrate the utility of cardiotocography as a noninvasive method of fetal distress diagnosis and prevention. **Material and methods:** Retrospective study conducted in the University Clinic of Obstetrics, Gynecology and Neonatology «Bega», Timisoara during January-June 2011 over a total of 42 patients that underwent emergency cesarean section following changes in cardiotocographic monitoring. **Results:** The correlation between CTG changes and the newborns' 1st minute Apgar score showed: Apgar scores of 8-10 in cesarean section performed for low fetal heart rate baseline variability (2 cases); nonreactive NST (4 cases); tachycardia (8 cases); bradycardia (6 cases); decelerations (3 cases); an Apgar score of 5-7 in cesarean section performed for nonreactive NST (2 cases) and bradycardia (6 cases) and decelerations (10 cases); and an Apgar score under 5 in a cesarean section due to decelerations. **Conclusions:** Cardiotocographic monitoring reveals any changes in the basal fetal heart rate correlated to uterine contractions being used as a preventive factor of fetal distress in correlation with other investigation methods. **Key Words:** cardiotocography, cesarean section, Apgar score, fetal distress

INTRODUCTION

The main purpose of modern obstetrics is to reduce maternal and fetal perinatal risk and to ensure complete integrity of the mother and fetus during labor by increasing security in these respects.

Cardiotocography (CTG) is the most common method of fetal monitoring both during and before labor.^{1,2}

Cardiotocography is a modern noninvasive means of antepartum and intrapartum fetal status monitoring

method that strongly impacts on obstetric practice. The CTG output is influenced by all hypoxic, metabolic or qualitative maternal blood alterations, showing besides bradycardia and tachycardia suggestive hypoxic injury alterations: lack of variability, flat/smooth fetal heart rate (FHR) baseline, accelerations and decelerations.³

CTG monitoring during labor may be continuous or intermittent (at every 15 minutes). Currently there is no data of reduced perinatal mortality and morbidity to support continuous monitoring.

Although most studies show no clear benefits of continuous CTG monitoring for the newborns, it may be a useful evaluation method when assessing the fetus during labor.⁴

A study comparing intermittent auscultation to no fetal monitoring found that auscultation was associated with an increase of the cesarean section index, with no decrease in perinatal mortality. Thus neither continuous electronic fetal monitoring nor auscultation leads to a decrease in fetal mortality or morbidity despite the large clinical trials conducted.⁵

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Therefore, this study aims to determine the impact of CTG monitoring during labor over the decision of pregnancy termination by cesarean section for fetal distress signs and thus over the cesarean section index. But, it also aims to evaluate the effectiveness of CTG in improving outcomes both for patients (mothers) and children during and after birth.

MATERIAL AND METHODS

This is a retrospective study conducted over a period of six months (January-June 2011) in the University Clinic of Obstetrics and Gynecology Bega Timisoara. During this period the population of pregnant women undergoing cesarean section consists of 514 patients. Of these, a total of 42 were selected for inclusion in this study. The inclusion criteria consisted of the decision to end pregnancy by emergency cesarean section due to CTG signs of fetal distress.

For each subject CTG monitoring was performed continuously during labor by using a Philips Avalon FM30 CTG and the signs of fetal distress were: late decelerations, bradycardia and severe tachycardia.

The database is built in an MS Excel file and contained data about: mother (age, area of origin, marital status, educational level), pregnancy (gestational age) and the clinical status of the newborn immediately after birth (APGAR score).

RESULTS

The age of patients in the study group varies between 17 and 42 years, 43% being from rural areas and 57% from urban areas. Of the total, 18% were college graduates, 63% had secondary education and 19% had primary education.

In the study group, comprising 42 patients, the cesarean section indication was done based on the CTG changes alone. The gestational age (GA) of the resulting newborns was of: 38-42 weeks (full term pregnancies) for 76% of patients; below 38 weeks (preterm births) for 21% of the patients and a patient (3%) with GA over 42 weeks (postmature pregnancy). (Table 1)

Table 1. Gestational age.

GA	N	Percentage
< 38 weeks	9	21%
38-42 weeks	32	76%
>42 weeks	1	3%

Assessment of neonatal well-being was performed using the Apgar score as it represents a simple, repeatable and rapid assessment method of the newborn immediately after birth. In this respect 55% had an Apgar score varying between 8 and 10 (well adapted newborns), 43% a score between 5 and 7 (risk of fetal clinical depression), and one case (2%) had an Apgar score under 5 points (Apgar score = 1). (Table 2, Fig. 1) Most cases had an Apgar score of 9 points (17 cases).

Table 2. Apgar Score.

Apgar score	No. of newborns	Percentage
8-10	23	55%
5-7	18	43%
< 5	1	2%

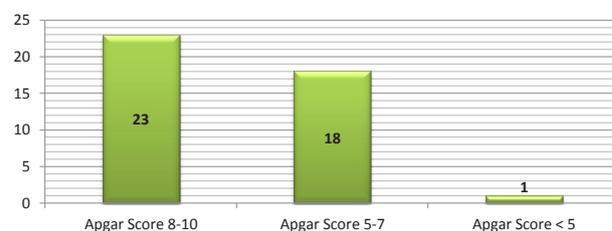


Figure 1. Apgar score variations.

Regarding the cardiotocographic changes that led to the decision to terminate the pregnancy by cesarean section, there was no variability in 2 cases (5%), in 6 cases (14%) the non-stress test (NST) was nonreactive, in 19% of the patients (8 cases) there was persistent tachycardia with FHR values of 180-200 bpm; in 29% of the patients (12 cases) there were found severe bradycardia with FHRs between 80-100 bpm, in 33% of the cesarean section the indication was of CTG decelerations reaching values of up to 60 bpm. (Fig. 2) Most were variable followed by early decelerations.

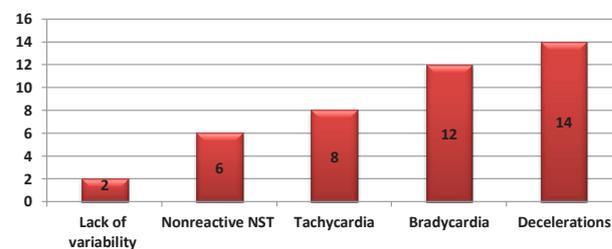


Figure 2. CTG modifications and cesarean section.

Regarding the correlation between CTG changes and the newborns' 1st minute Apgar index, there were two cases with Apgar scores between 8-10, in which the cesarian section was performed for low FHR

baseline variability. Of the 6 cases with nonreactive NST, 4 Apgar scores were between 8-10 points and 2 scores were between 5-7. In all cases of CTG persistent tachycardias in which was performed an emergency cesarean section, the neonates were granted an Apgar score ≥ 8 . Half of the infants who were born by caesarean section due to CTG severe bradycardia had an Apgar score of 8-10 points, the other half having with Apgar scores between 5-7 points.

Cesarian section in early and variable decelerations lead to:

- 3 newborns with an Apgar Score of 8-10;
- 10 newborns with an Apgar Score of 5-7;
- 1 newborn with an Apgar Score of 1.

In Table 3 and Figure 3 are presented the correlations between CTG changes and the Apgar score.

Table 3. The correlation between CTG changes and the 1st minute Apgar Score

CTG changes	Apgar Score		
	8-10	5-7	< 5
Lack of variability	2	-	-
Nonreactive NST	4	2	-
Tachycardia	8	-	-
Bradycardia	6	6	-
Decelerations	3	10	1

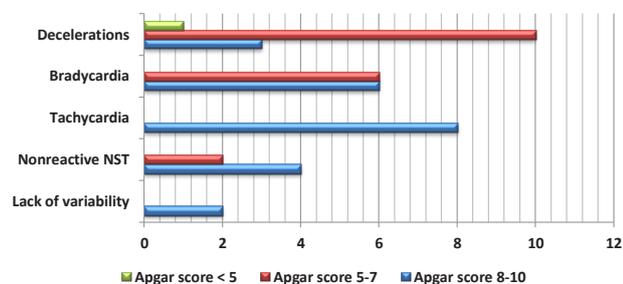


Figure 3. The correlation between CTG changes and the 1st minute Apgar Score.

DISCUSSIONS

Although CTG emerged as a modern and noninvasive method of fetal monitoring being widely used worldwide, it alone, is not a reliable method for assessing the appropriateness of pregnancy termination by caesarean section.⁶ However, CTG monitoring, alone, increases significantly the birth rate through cesarean section, but the association of other fetal distress detection methods can mitigate this trend.⁷

On CTG accuracy in detecting acute fetal distress, a study in the Faculty of Medicine in Brno shows that

the group of cases in which, following significant CTG changes leading to fetal distress, the pregnancy termination through cesarean section was decided in only 36.19% of the CTGs' modifications interpreted as changes caused by acute fetal distress were real (the newborns presented clinical depression after birth). The remaining 63.18% newborns, although presented signs hypoxia on CTG and cesarean section was decided, were born healthy and probably not requiring completion of delivery by cesarean section.⁸

In the study group formed of 42 patients in which were detected CTG changes and cesarean section was decided, only 19 presented Apgar scores less than 7, thus showing that there was real fetal distress (45.2%). These data are consistent with data found in the literature (36.19% - Czech study), proving once again that CTG monitoring alone cannot provide reliable data for decision making in termination by cesarean delivery, requiring additional tests that appreciate the existence of a real fetal distress in labor.

Other studies such as the study of Antenatal cardiotocography for fetal assessment and Study of the importance of CTG monitoring for the diagnosis of acute fetal distress performed in the Clinic of Obstetrics and Gynecology Polizu in 2007, argue that there are several false-positive results in which CTG indicates fetal distress and the newborns were given an Apgar score of 8 to 10 points, resulting in an unnecessary cesarean section.^{9,10} Our results are consistent with these studies, given that we found a high rate of cases in which CTG alterations suggested fetal distress, but the neonatal Apgar index was between 8 and 10 (55%). This proves once again that the decision of cesarean section based solely on CTG changes (suggestive of fetal distress) is a decision that leads to an increased cesarean section index without significant improvement of patient and newborn outcomes.

Limitations of the study lie from the fact that it was a retrospective study over a relatively short period of time, thus preventing from complete statistical processing.

CONCLUSIONS

Antepartum and peripartum fetal distress is a real issue that cannot be neglected and that if not identified on time leads to an increase in neonatal morbidity and mortality. CTG monitoring is an easy, non-invasive, cheap and at hand method that reveals any alterations in the FHR baseline, but the data obtained through this study show that cesarean section performed solely on data obtained through CTG monitoring does not

bring major benefits for fetal well-being, most times being a false-positive, and that unnecessarily increases the cesarean section index without benefits for mother and fetus.

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