

Correlation of admission cardiotocography and amniotic fluid index in improving the perinatal outcome in uncomplicated pregnancies.

Dr Manasa Yarlagadda , Consultant OBGY, Chennai, Dr Shreyaa Sriram, Consultant OBGY, Chennai.

Abstract:

Introduction: The main aim of monitoring antenatal mothers during the peripartum period is to identify fetuses at risk, intervene timely and give a good perinatal outcome. There are many modalities used in monitoring the fetal well being of which CTG and AFI are the simple, economical, easy to use and give better perinatal outcomes.

Aim: To detect the reliability of admission CTG with AFI in detecting fetuses at risk in uncomplicated pregnancies.

Methods and methodology: This is a prospective study conducted during the period of 1 year from May 2020 to May 2021 in a private setup. The study included 100 low risk women admitted for safe confinement to the labour room. All the patients were subjected to 20 minutes of CTG and screening AFI and these were correlated with the presence of meconium, mode of delivery, APGAR score at 1 and 5 minutes and need for NICU admission.

Result:

When both CTG and AFI are taken into consideration for meconium staining, in the pathological CTG group, with normal liquor 2(50%) had meconium whereas with oligohydramnios, 2(100%) had meconium stained liquor. In respect to the mode of delivery when both AFI and CTG were considered, with suspicious CTG, with oligohydramnios, 3(37.5%) and 5(62.5%) delivered by vaginal route and LSCS respectively and with normal AFI 22(57.9%) and 16(42.1%) delivered by vaginal route and LSCS respectively. In the pathological group all patients were delivered by LSCS irrespective of the AFI. When both CTG and AFI are taken into consideration in observing APGAR score, in patients with pathological CTG who had normal liquor, 3(75%) had poor APGAR at 1" out of whom 1(33.3%) had poor APGAR at 5". Pathological CTG with oligohydramnios both(100%) the neonates had poor APGAR at 1" and 5". With both CTG and AFI together for the need for NICU admission, in the pathological group, with normal liquor the NICU admission was 1(25%) and with oligohydramnios the NICU admission was 2(100%).

Conclusion: Hence admission CTG with AFI together can detect fetuses at risk in uncomplicated at the time of admission and thus prevent adverse perinatal outcomes.

Keywords: cardiotocograph, amniotic fluid index, perinatal outcomes, meconium, APGAR score, NICU admission

Date of Submission: 02-07-2021

Date of Acceptance: 16-07-2021

I. Introduction

Delivering a healthy baby to a healthy mother is important in the scope of obstetrics. According to the WHO, it is estimated that perinatal asphyxia due to fetal hypoxia occurs in about 2-10 per every 1000 neonates born at term. WHO Newborn Health Unit, also estimates that 900,000 deaths occur yearly due to birth asphyxia.

Fetal wellbeing is assessed by monitoring the fetal heart rate using cardiotocography (acute). Amniotic fluid index (chronic). A quantitative measure of the amniotic fluid, along with the CTG can be used to assess the perinatal outcomes. AFI is obtained by measuring the pockets of four quadrants of the pregnant uterus. The main objective of using these techniques is to identify the fetal wellbeing and fetal asphyxia, timely intervention and prevention of neonatal morbidity and mortality.

The aim of this study is to assess the role of admission CTG and AFI in identifying fetal hypoxia on admission and correlating it with the results of perinatal outcome.

II. Methods And Methodology

This is a prospective study conducted in the labour room of a private nursing home during a period of 1 year from May 2020 to May 2021. 100 antenatal patients with uncomplicated pregnancies were admitted to the labour room for safe confinement either for induction of labour or in early labour. These patients were subjected to admission CTG and AFI and the labour progress was monitored and the obstetrical interventions and perinatal outcomes were documented.

Inclusion criteria:

Conditions that were included in the study are patients at term (between 37-40 weeks), singleton pregnancies, cephalic presentation, Intact membranes, Primi and multigravidas, previous NVD, non anomalous fetus

Exclusion criteria:

The conditions that were excluded from this study are preterm and postdated pregnancies, multiple pregnancies, BOH, PROM, fetal anomalies, maternal comorbidities, abnormal lie and presentation, previous LSCS, precious pregnancies

Procedure:

After the initial assessment of the patient, she is subjected to an admission CTG. CTG is done for 20minutes with the uterine contraction monitoring. CTG is assessed using FIGO classification 2015 by taking into consideration the four parameters of the CTG, which are the baseline heart rate, beat to beat variability, accelerations and decelerations, which are correlated with the uterine contractions if present. CTG is divided into normal, suspicious and pathological. AFI is measured with an ultrasound machine using the four quadrant technique. AFI <5cm is considered oligohydramnios and normal if it falls between 6-25cms. Patients with normal AFI and CTG are induced or allowed to progress into active labour and monitored. When the CTG is pathological, then irrespective of the AFI, the patient is taken up for LSCS. When the AFI is <5cms, CTG is monitored and the mode of delivery depends according to the CTG findings. The perinatal outcomes were assessed with the variables obtained.

Variables:

The variables considered in this study are the results of CTG, amount of liquor, colour of liquor at spontaneous/artificial rupture of membranes, mode of delivery, APGAR score at 1 and 5 mins and NICU admission.

TABLE 1. CTG and AFI correlated with colour of liquor.

CTG	AFI	COLOUR OF LIQUOR	
		CLEAR	MECONIUM
NORMAL	<5	7 (7%)	0 (0%)
	>5	36 (36%)	5 (5%)
SUSPICIOUS	<5	6 (6%)	2 (2%)
	>5	30 (30%)	8 (8%)
PATHOLOGICAL	<5	1 (1%)	1 (1%)
	>5	2 (2%)	2 (2%)

TABLE 2. CTG and AFI correlated with mode of delivery.

CTG	AFI	MODE OF DELIVERY	
		Vaginal Delivery (normal and assisted)	LSCS
NORMAL	<5	4 (4%)	3 (3%)
	>5	39 (39%)	2 (2%)
SUSPICIOUS	<5	3 (3%)	5 (5%)
	>5	22 (22%)	16 (16%)
PATHOLOGICAL	<5	0 (0%)	2 (2%)
	>5	0 (0%)	4 (4%)

TABLE 3. CTG and AFI correlated with APGAR score measured at 1 and 5 minutes of birth.

CTG	AFI	APGAR (<6)	
		1 MINUTE	5 MINUTES
NORMAL	<5	0 (0%)	0 (0%)
	>5	0 (0%)	0 (0%)
SUSPICIOUS	<5	0 (0%)	0 (0%)
	>5	4 (4%)	1 (1%)
PATHOLOGICAL	<5	2 (2%)	
	>5	3 (3%)	1 (1%)

TABLE 4. CTG and AFI correlated with NICU admission.

CTG	AFI	NICU ADMISSION
NORMAL	<5	0 (0%)
	>5	0 (0%)
SUSPICIOUS	<5	0 (0%)
	>5	2 (2%)
PATHOLOGICAL	<5	2 (2%)
	>5	1 (1%)

III. Results

Table 1

Out of the 100 patients delivered, 19 (19%) patients had meconium stained liquor. When both CTG and AFI are taken into consideration, in the pathological CTG group, with normal liquor 2(50%) had meconium whereas with oligohydramnios, 2(100%) had meconium stained liquor.

Table 2

Out of the 100 patients studied, 48 (48%) had normal CTG's, 46 (46%) had suspicious CTG's and 6 (6%) had pathological CTG's.

83 (83%) had AFI more than 5cm and 17 (17%) had AFI less than 5cm.

Out of the 48 patients with normal CTG at admission, after monitoring, 43(89.6%) delivered vaginally and 5 (10.4%) were taken up for emergency LSCS. Out of the 46 patients with suspicious CTG at admission, 25(54.3%) delivered vaginally and 21 (45.7%) underwent LSCS. Out of the 6 patients with pathological CTG at admission, all 6 (100%) were taken up for LSCS.

When AFI was less than 5cms, 7(41.2%) had vaginal delivery and 10 (58.8%) underwent LSCS. when the AFI was more than 5 cms, 61(73.5%) delivered vaginally and 22 (26.5%) had LSCS.

When both AFI and CTG were taken together, most patients with normal CTG delivered vaginally. With suspicious CTG, with oligohydramnios, 3(37.5%) and 5(62.5%) delivered by vaginal route and LSCS respectively and 22(57.9%) and 16(42.1%) delivered by vaginal route and LSCS respectively. In the pathological group all patients were delivered by LSCS irrespective of the AFI.

Table 3

The APGAR score was lower in the pathological group as compared to the normal and suspicious group. When both CTG and AFI was taken into consideration, patients with pathological CTG who had normal liquor, 3(75%) had poor APGAR at 1" out of whom 1(33.3%) had poor APGAR at 5". Pathological CTG with oligohydramnios both(100%) the neonates had poor APGAR at 1" and 5".

Table 4

A total of 5 neonates required admission. The neonates with normal CTG did not require any NICU admission. In the suspicious group, irrespective of AFI, totally 2 neonates needed NICU admission. In the pathological group, with normal liquor the NICU admission was 1(25%) and with oligohydramnios the NICU admission was 2(100%).

IV. Discussion

In this study, the need for both admission CTG and AFI in identifying high risk fetuses and the improving perinatal outcomes was observed.

When the presence of meconium stained liquor was observed, in patients with normal CTG, the group with normal AFI had 5(13.9%) had meconium but none in the oligohydramnios group had meconium. In those with suspicious CTG, in patients with normal liquor, 8(26.6%) had meconium whereas 2(33.3%) with oligohydramnios who had meconium staining. In those with pathological CTG, with normal liquor 2(50%) had meconium whereas with oligohydramnios, 2(100%) had meconium stained liquor.

In assessing the mode of delivery, in patients with normal CTG, most patients delivered vaginally. In the suspicious group,5(62.5%) patients with oligohydramnios delivered by LSCS as compared with 16(42.1%) in those with normal liquor. In the group with pathological CTG, irrespective of AFI all patients delivered by LSCS ,6(100%).

During observation of APGAR scores, in the group with pathological CTG with normal liquor, 3(75%) had poor APGAR at 1" out of whom 1(33.3%) had poor APGAR at 5", but in those with pathological CTG and oligohydramnios both - 2(100%) the neonates had poor APGAR at 1" and 5". In patients with suspicious CTG, 4(10.5%) had poor APGAR at 1", of whom 1(25%) had poor score at 5". In the normal CTG patients, none had poor score.

With regards to NICU admission, in the suspicious group, irrespective of AFI, totally 2 neonates needed NICU admission. In the pathological group, with normal liquor the NICU admission was 1(25%) and with oligohydramnios the NICU admission was 2(100%). None of the neonates with normal CTG required NICU admission.

In a similar note, Borade JS et al. in 2018, states that the need for LSCS, intrapartum fetal distress, meconium stained liquor, APGAR score, need for neonatal resuscitation and perinatal morbidity were definitely higher in cases with abnormal MBPP. Similarly S Jha et al. in Nepal in 2020, stated that the rate of cesarean section increased when there was abnormal modified biophysical profile. Neonatal resuscitation and admission was increased in abnormal modified biophysical profile. S Rathod et al in this study, MBPP has been used as a primary antepartum fetal surveillance method for high risk pregnancies and an improved prenatal outcome has been achieved in this study.

V. Conclusion

Normal CTG with normal AFI category had better perinatal outcomes and more number of vaginal deliveries. Suspicious CTG with normal liquor had only a slightly more number of normal deliveries. But it had significantly less cases of meconium and better perinatal outcomes. With oligohydramnios, the rate of cesareans were a little higher in number. Pathological CTG was associated with cesarean section and poor perinatal irrespective of the AFI. Hence this study concludes that subjecting the patient to CTG and AFI at the time of admission helps in identifying the fetuses at high risk and helps intervene timely and prevent adverse neonatal outcomes. These simple and cost effective methods can be used to monitor patients perinatally to give better perinatal outcomes in uncomplicated pregnancies.

References

- [1]. Savita Rathod, Vanitha LV. Clinical study of modified biophysical profile (MBPP) as an antepartum surveillance test in high risk pregnancies. *SAS J. Surg.*, Volume-1; Issue-2 (Jul-Aug, 2015); p-36-39
- [2]. Santosh Jha, Ganesh Dungal. Role of Modified Biophysical Profile in High Risk Pregnancy in Predicting Fetal Outcome. *J Nepal Health Res Counc* 2020 Jul-Sep;18(48): 401-5
- [3]. Jankidevi S. Borade, Sushma P. Sharma. The role of modified biophysical profile in predicting perinatal outcome in high risk pregnancies. Borade JS et al. *Int J Reprod Contracept Obstet Gynecol.* 2018 Jun;7(6):2287-2294
- [4]. GD Maiti, Sapna Jaggi. Clinical efficacy and reliability of amniotic fluid index (AFI) as labour admission test in correlation to perinatal outcome. *International Journal of Clinical Obstetrics and Gynaecology* 2018; 2(2): 89-93
- [5]. J A J N Jayasinghea, W Gunawardana, R C Fernandupullec. Borderline amniotic fluid index as a predictor of adverse perinatal outcomes. *Sri Lanka Journal of Obstetrics and Gynaecology* 2019; 41: 59-65.
- [6]. Nirav R Patel, Gunvant K. Kadikar, Bhumika G. Kalathiya, Priti Bajaj. A prospective study of admission test during labour and foeto-maternal outcome. *Int J Res Med.* 2015; 5(3); 40-43.
- [7]. Shruti Prabha, Kumudini Jha. Role of Admission Cardiotocography in Predicting Perinatal Outcome in Low Risk Obstetric Population. *Int J Med Res Prof.* 2017; 3(2); 369-72.
- [8]. Dr. Iram Aslam, Dr. Nazia Mussarat, Dr. Sadia Bano. Perinatal outcome in low amniotic fluid index. *Professional Med J* 2015;22(1): 137-142

XXXXX. "Correlation of admission cardiotocography and amniotic fluid index in improving the perinatal outcome in uncomplicated pregnancies." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(07), 2021, pp. 40-43.