Original Article

NEONATAL OUTCOMES IN TERM PREGNANCIES IN NORMAL VS ABNORMAL TERM PREGNANCIES IN NORMAL VS ABNORMAL CARDIOTOCOGRAPHY- AN EXPERIENCE AT A TERTIARY CARE HOSPITAL

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ABSTRACT

OBJECTIVE: To compare the neonatal outcomes in normal vs abnormal cardiotocograhy in term pregnancy.

MATERIALS AND METHODS: This was a prospective analytical study carried out in A unit of obstetrics and Gynaecology department of Shaheed Mohtarma Benazir Bhutto Medical University Larkana from 15th April 2022 to 15th October 2022. A total 224 patients meeting inclusion criteria were included in study. In Group A (normal CTG) there were 111 patients and 113 were in Group B (ab-normal CTG). Patients with known fetal congenital abnormalities, intrauterine growth restriction, and fetal mal presentations were excluded from the study

RESULTS: The mean age of sample population was 26.02+4.497. Multigravidae were more than primigravidae in both groups (86.4% vs 13.6% in Group A and 72.5% vs 27.5% in Group B). In Group B, caesarean section rate was higher (82.3%) than Group A (9%). From Group B, 26 (23%) newborns went to NICU for admission, whereas only 8 (7.2%) newborns from Group A needed NICU admission. Hypoxic ischemic encephalopathy was also observed more in newborns in Group B compared to Group A (10 vs 1). In Group A 12 babies had APGAR score <7 at 1 minute while in Group B 18 babies had APGAR score < 7 at 1 minute. In Group A 2 babies had APGAR score <7 at 5 minutes whereas in Group B 7 babies had APGAR score < 7.

CONCLUSION: The caesarean section rate, NICU admission and hypoxic ischemic encephalopathy were more in Group B than in Group A and this difference was statistically significant (p-value 0.000, 0.000 and 0.006 respectively). Whereas there was no statistically significant difference in APGAR Score at 1 and 5 minutes in both groups (p-value 0.26 and 0.094 respectively)

KEYWORDS: Cardiotocography, APGAR score, Caesarean section, hypoxic ischemic encephalopathy.

How to cite this

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INTRODUCTION

Labour is not only painful for mother, it puts significant stress on the fetus as well. Nutrients and oxygen supply to the fetus are reduced due to reduced uterine perfusion during uterine contraction. This stress is further added if there is pre labour uterine insufficiency in pregnancies complicated by medical disorders. Fetal distress during labour, if not diagnosed and treated promptly may lead to increased neonatal morbidity including birth as-phyxia, low APGAR score, operative delivery, NICU admission and even death in severe cases. This emphasizes the need for fetal monitoring during labour.

There are various methods for fetal assessment during labour. It includes structured intermittent auscul-tation, cardiotocography, assessment of amount and co-lour of liquor and fetal scalp blood sampling. 3 According to RCOG guidelines fetal heart rate should be monitored after every 15 minutes in the active phase of first stage of labour and every 5 minutes in second stage of labour preferably after a uterine contraction. Cardiotocography (CTG) is a simple, non-invasive tool for assessing fetal status during labour. 5 There are 4 basic components of CTG i.e baseline heart rate, variabil-ity, presence of acceleration and absence of deceleration. Normal baseline fetal heart rate is 110-160 beats per min-ute. Normal baseline variability is 5-25 beats per minute. Accelerations is increase in the base line fetal heart rate of 15 beats per minute lasting for 15 seconds. Decelerations is decrease in the base line of fetal heart rate of 15 beats per minute lasting for more than 15 seconds. Patient histo-ry, medical condition and stage of labour should be taken into account while interpreting CTG. 6 A single abnormal parameter of the CTG should not be interpreted in isola-tion. In our unit, we follow the three tier system of interpre-tation of the CTG recommended by RCOG and ACOG. In this system CTG is classified as Normal (all features are reassuring) suspicious (only 1 feature non-reassuring) and abnormal

(2 or more features non reassuring or 1 or more abnormal). With all benefits of being non-invasive, readily available with pretty good sensitivity, it is only a screening test and secondary diagnostic tests are needed to avoid unnecessary obstetric intervention. Fetal blood sampling is needed to confirm acid based status of the fetus. 8 It is invasive and may not be available everywhere especially in resource limited areas. Rational of our study is to compare neonatal outcome in terms of APGAR score at 1 and 5 minutes, mode of delivery, NICU admission and hypoxic ischemic encephalopathy in normal vs abnormal cardiotocography

MATERIALS AND METHODS

This prospective analytical study was carried out in the Department of Obstetrics and Gynaecology Unit "A" of MTI Shaheed Mohtarma Benazir Bhutto Medical University Larkanafrom 15th April 2022 to 15th October 2022. Before starting the study, the ethical committee approved the proposal for the study. WHO sample size calculator was used to calculate the sample size. Relating to the correspondence prevalence of the disease of 18%, confidence interval of 95% and mar-gin of error of 5%, sample size came to be 224. Labour-ing women of age between 20-55 years, having period of Gestation 37-42 weeks admitted to labour room were included in the study while patients with known fetal con-genital abnormalities, intra uterine growth restriction and fetal mal-presentations were excluded.

Data collection procedure: Patients fulfilling inclu-sion criteria were enrolled in study. Informed consent was taken from all patients included in study. The fetal status was assessed by intra partum cardiotocography. Two groups were formed on the basis of cardiotocography findings. Group-A with normal cardiotocography findings and Group-B with abnormal cardiotocography findings. The results of cardiotocography were interpreted accord-ing to RCOG guidelines. All Patients were thoroughly as-sessed throughout their labour and mode of delivery was decided according to maternal and fetal status. The AP-GAR score was calculated for newborn babies at 1 and 5 minutes. The number of babies sent to NICU were thor-oughly assessed by pediatricians for signs and symptoms of hypoxic ischemic encephalopathy. All data was collected using a preformed proforma. The results of the study were analyzed using SPSS v.25. Descriptive statistics of percentages and frequencies were used for analysis of basic variables. Chi-square test was used to detemine the differences between neonatal outcomes and cardiotocography findings in both groups. In addition, Pearson correlation test was used to check the relationship between neonatal outcomes and abnormal cardiotocography. The results of all the test of significance will be considered significant at $p < 0.05$ level.

RESULTS

Total number of patients was 224. Group A consists of 111 cases with normal CTG and Group B consists of 113 cases with abnormal CTG. Mean age of population was 26.0214+497 with the age range of 17 to 38 years. In both groups, multigravidae were more than primigravi-dae. Group A had 96 (86.4%) multigravida and 15(13.6%) primigravidae. In Group B, multigravidae were 82 (72.5%) and primigravidae were 31 (27.5%). In Group A, 12 babies had APGAR score of <7 at 1 minute while in Group B, 18 babies had APGAR score of <7 at 1 minute. Two ba-bies had an APGAR score of <7 at 5 minutes in Group A while, 7 babies had an APGAR score of <7 at 5 minutes in Group B. There was no statistically significant difference in APGAR score of newborns at 1 minute (P = 0.261) and 5 minutes (P=0.094). Caesarean section was performed in 10 patients in Group A compared to 93 in Group B. Result is statistically significant (P< 0.001). In group A, 8 babies were sent to NICU whereas 26 babies in Group B were referred to NICU. This finding was statistically significant P<0.001). Difference between 2 groups in terms of Hy-poxic ischemic encephalopathy was also statistically sig-nificant (P = 0.006).

DISCUSSION

Results of our study showed that abnormal CTG is associated with an increased rate of cesarean section, NICU admission and hypoxic ischemic encephalopathy of the newborns, however it is not associated with low AP-GAR Scores. The mean age of the population in our study was 26.02+4.497, with age range of 17 to 38 years. The study conducted by Amena et al. showed the similar re-sult (26.7 + 4.9). 9 L. Ali found the mean age of his study population to be 30.51 + 6.11 years. 10 We have 13.5% primigravidae and 86.5% multigravidae in Group A and 27.4% primigravidae and 72.6% multigravidae in Group B. It is comparable to the incidence reported by Bhartiya et al. 11 More than 90% of patients with normal CTG deliv-ered normally whereas only 17.6% patients with abnormal CTG delivered normally and 82.4% had cesarean section. This difference is statistically significant (P.value 0.000). Salahuddin N et al. showed similar results where 76.7% of patients with abnormal CTG had undergone cesarean section. 12Gordane et al. reported the cesarean section rate of 64%. 13 Whereas, a study done by Oladrain et al. and Istran et al. showed cesarean section rate of 72% and 66.7%, respectively. 14, 15 The increase in cesarean section rate is due to the need of intervention to expedite the de-livery of the distressed fetus.

APGAR score < 7 at 1 minute was seen in 10.8% of babies in Group A and 16% of babies in Group B. An APGAR score more than 7 at 1 minute was seen in 89% of babies in Group A and 84% babies in Group B. where-as APGAR Score more than 7 at 1 minute was seen in 89.2% of babies in Group A and 84% babies in Group B. It remained less than 7 at 5 minutes in 1.8% of newborn in Group A and 6.2% newborns in Group B. It was more than 7 at 5 minutes in 98.2% and 93.8% in Group A and Group B respectively. It showed no statistically significant difference in APGAR Score at 1 and 5 minutes. A local study conducted by Sheikh et al reported no association between abnormal CTG and APGAR Scores at 1 and 5 minutes. 16 A study conducted by Mahjabeen N in Dhaka Showed

statistically significant difference in APGAR Scores in both groups. 17In Group A 7.2% of newborn babies needed NICU admission in comparison to 23% of the newborn babies in Group A. It was statistically significant difference (P. val-ue 0.000). It compares favorably with other studies done previously. 18, 19 Timely detection of fetal distress with use of CTG results in increase in the NICU admission but de-crease in the neonatal death. These babies needed only oxygen by bag and mask for a very short duration and none of them needed advanced resuscitation.Our study showed statistically significant differ-ence in hypoxic ischemic encephalopathy in both groups (1% versus 10%). Similar results are reported by Dilip Kumar Bhagwair. 20 All babies had mild hypoxic ischemic encephalopathy. They were kept under observation for 48 hours and then were discharged. No neonatal deaths were recorded in both groups in our study. Study done by Singh SK showed neonatal death rate of 0.6% (3 of 500). 21 Reduced morbidity and mortality are due to early detection of fetal compromise and timely intervention to expedite delivery process.

CONCLUSION

The caesarean section rate, NICU admission and hypoxic ischemic encephalopathy was more in Group B as compared to Group A and these differences were sta-tistically significant. There was no statistically significant difference in APGAR scores in both group. CTG is a useful, noninvasive tool to detect fetal distress. But at the same time, it results in increased cesarean section. Fetal blood sampling should be done to confirm fetal acidosis before performing cesarean section. In this way, fetal distress will be diagnosed without increased cesarean section rate.

REFERENCES

1. Jenny B, Myles T. Fetal compromise in the first stage of labour. In: Obstetrics & Gynaecology: An evidence-based text for the MRCOG. 3rd Edition. CRC Press; Page 395.
2. MacLennan A. A template for defining a causal relation between acute intrapartum events and cerebral palsy: international consensus statement. BMJ. 1999 Oct 16;319(7216):1054-9. doi: 10.1136/bmj.319.7216.1054. PMID: 10521205; PMCID: PMC111684.
3. Smith GC. Life-table analysis of the risk of perinatal death at term and post term in singleton pregnancies. Am J Obstet Gynecol. 2001 Feb;184(3):489-96. doi: 10.1067/mob.2001.109735. PMID: 1122850.
4. Low JA, Pickersgill H, Killen H, Derrick EJ. The prediction and prevention of intrapartum fetal asphyxia in term pregnancies. Am J Obstet Gynecol. 2001 Mar;184(4):724-30. doi: 10.1067/mob.2001.111720. PMID: 11262479.
5. Stout MJ, Cahill AG. Electronic fetal monitoring: past, present, and future. Clin Perinatol. 2011 Mar;38(1):127-42, vii. doi: 10.1016/j.clp.2010.12.002. PMID: 21353094.
6. Garabedian C, De Jonckheere J, Butruille L, Deruelle P, Storme L, Houfflin-Debarge V. Understanding fetal physiology and second line monitoring during labor. J Gynecol Obstet Hum Reprod. 2017 Feb;46(2):113-117. doi: 10.1016/j.jogoh.2016.11.005. Epub 2017 Jan 30. PMID: 28403965.
7. Chen HY, Chauhan SP, Ananth CV, Vintzileos AM, Abu-hamad AZ. Electronic fetal heart rate monitoring and its relationship to neonatal and infant mortality in the United States. Am J Obstet Gynecol. 2011 Jun;204(6):491.e1-10. doi: 10.1016/j.ajog.2011.04.024. Epub 2011 Apr 20. PMID: 21752753.
8. Wiberg-Itzel E, Lipponer C, Norman M, Herbst A, Prebensen D, Hansson A, Bryngelsson AL, Christoffersson M, Sennström M, Wennerholm UB, Nordström L. Determination of pH or lactate in fetal scalp blood in management of intrapartum fetal distress: randomised controlled multicentre trial. BMJ. 2008 Jun 7;336(7656):1284-7. doi: 10.1136/bmj.39553.406991.25. Epub 2008 May 25. PMID: 18503103; PMCID: PMC2413392.
9. Amena K, Nurun NK, Fahmida N. Role of elaborate Cardiotocography in pregnancy management. BSMMUJ. 2009;2:18-24.
10. Ali L, Mushtaq R, Ahmed N. Frequency of pathological CTG in low risk women and its outcome. Pak J Surg. 2014;30(4):309-313.
11. Bhartiya V, Sharma R, Kumar A, Srivastava H. Admission Cardiotocography: A Predictor of Neonatal Outcome. J Obstet Gynaecol India. 2016 Oct;66(Suppl 1):321-9. doi: 10.1007/s13224-016-0912-0. Epub 2016 Jun 14. PMID: 27651624; PMCID: PMC5016479.
12. Salahuddin N, et al. Obstetrical and fetal outcome in patients with abnormal Cardiotocography. Biomedical. 2017 Oct-Dec;33(4):309-313.
13. Bogdanovic G, Babovic A, Rizvanovic M, Ljuca D, Grgic G, Djuranovic-Milicic J. Cardiotocography in the prognosis of perinatal outcome. Med Arch. 2014;68(2):102-5. doi: 10.5455/medarh.2014.68.102-105. PMID: 24937932; PMCID: PMC4272492.
14. Ayodeji OF, Kuhn RJ. Abnormal antepartum cardiotocography and major fetal abnormalities. Aust N Z J Obstet Gynaecol. 1986 May;26(2):120-3. doi: 10.1111/j.1479-828x.1986.tb01546.x. PMID: 3464250.
15. Ikram M, Javed A, Mukhtar S. Cardiotocography: Role of intrapartum cardiotocography in evaluating fetomaternal outcome. Professional Med J. 2018;25(10):1537-1545.
16. Shekh SM, Kamruddin A, Selna F, Riaz T. Role of pathological Cardiotocography in evaluating fetal well-being. J Core Physicians Surg Pak. 2006;16:404-407.
17. Mahjabeen N, Nasreen SZA. Analysis of normal and abnormal admission Cardiotocography (CTG) and its association with perinatal outcomes. Sch Int J Obstet Gynae. Feb. 2022;2:32-36.
18. Dhakare TJ, Patole KP. A study of Cardiotocography during active labour to assess the perinatal outcome in high-risk pregnancy. MVP Journal of Medical Sciences. 2016;3(2):92
19. Sunitha C, Rao PS, Prajwal S, Kumar Bhat R. Correlation of intrapartum electronic fetal monitoring with neonatal outcome. Int J Reprod Contracept Obstet Gynecol. 2017 Jun;6(6):217
20. Bhagwani DK, Sharma M, Dolkar S, Kotha Pall S. To study the correlation of Thompson scoring in predicting early neonatal outcome in post-asphyxiated term neonates. J Clin Diagn Res. 2016;10:SCI16-19.
21. Singh SK, Kumar R, Agarwal A, Tyagi A, Bisht SS. Intrapartum cardiotocographic monitoring and its correlation with neonatal outcome. J Family Med Prim Care. 2022 Nov;11(11):7398-7405.

Authors Contribution	
Ahmed Ali	Conception of study design, acquisition, analysis, and interpretation of data.
Abdul Ghafoor	Drafting and methodology, data interpretation
Zaheer Ahmed	Analysis and interpretation of data for work & Data Collection

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