Original Research Paper

Volume-10 | Issue-2 | February - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Gynaecology

CORD SERUM ALBUMIN IS COMPARED WITH CORD SERUM BILIRUBIN AS A RISK INDICATOR IN CASE OF NEONATAL HYPERBILIRUBINAEMIA AFTER INDUCTION-AUGMENTATION OF LABOUR WITH OXYTOCIN

Dr Jhantu Kumar Saha	Associate Professor, Dept. Of Obs & Gynae, Medical College, Kolkata, West Bengal
Dr Pallab Kumar Mistri*	Associate Professor, Dept. Of Obs & Gynae, Medical College, Kolkata, West Bengal *Corresponding Author
Dr Arjun Das	Junior Resident, Dept. Of Obs & Gynae, Medical College, Kolkata, West Bengal

ABSTRACT **Introduction:** The association between oxytocin-induced labour and neonatal hyperbilirubinemia is well documented**. The** objectives of our study are to compare cord serum albumin level with cord serum bilirubin in predicting neonatal hyperbilirubinaemia(NH) and to know the effect of labour induction with oxytocin in neonatal hyperbilirubinaemia.

Materials and methods: 100 women were given oxytocin for augmentation of labour (group T), and 100 women were not given oxytocin for control (group C). Details of the current pregnancy in the form of period of gestation(POG), gravida,parity, use of oxytocin in augmentation of labour or not, mode of delivery, neonatal outcomes, length of hospital stay etc. were noted.

Results: In With Oxytocin group, 68(68.0%) patients had Jaundice and in Without Oxytocin group, 38(38.0%) patients had Jaundice. The mean cord albumin of Group T patients was 3.1310 ± .7058 and in Group C patients was 2.9100 ± .6667. The mean cord bilirubin of Group T patients was 1.9820 ± .4740 and in Group C patients was 1.9860 ±.7002.

Discussion: Distribution of mean cord albumin with both groups was statistically significant (p=0.0239) while mean cord bilirubin with both groups was not statistically significant (p=0.9623). Mean NICU Stay with both groups was not statistically significant (p=0.532).

KEYWORDS : Neonatal hyperbilirubinaemia, Oxytocin, Cord Albumin, Cord bilirubin

INTRODUCTION:

Neonatal Hyperbilirubinemia (NH) is the most common cause for readmission during the early neonatal period (6.5%)[1,2]. Early prediction will help in early discharge and prevent hospitalization of babies and mothers. Albumin is synthesized by liver and it helps in transport of unconjugated bilirubin with the help of Uridine-diphospho-glucuronyltransferase (UDPGT) liver enzyme. Free bilirubin is anticipated when the bilirubin- to- albumin (B: A) ratio is > 0.8.[4] There are studies to predict NH by measuring cord albumin and cord bilirubin individually. The association between oxytocin-induced labour and neonatal hyperbilirubinemia is well documented with suggested causes including hepatic glucuronyltransferase immaturity, anoxic liver damage, enhanced placenta fetal transfusion, increased erythrocyte fragility, and mechanical trauma to erythrocytes .During the neonatal period, metabolism of bilirubin is in transition from the fetal stage to the adult stage [2,4]. By predicting the neonates at risk for significant NH early at birth, we can design and implement the follow-up programme in these risk groups, costeffectively. Our objectives are to compare cord serum albumin level with cord serum bilirubin in predicting neonatal hyperbilirubinaemia(NH) and to know the effect of labour induction with oxytocin in neonatal hyperbilirubinaemia [3].

MATERIALS AND METHODS:

The hospital-based case controlled study was carried out in the Dept. of Gynae and Obs, Medical College, Kolkata from the January 2018 to January, 2019 in total 200 parturient mothers, selected by purposive sampling technique. Of those, 100 women were given oxytocin for augmentation of labour (group T), and 100 women were not given oxytocin for control (group C). Antenatal mothers with term gestation in labour requiring or not requiring augmentation with oxytocin and sequentially born term babies with gestational age ≥ 37 weeks from any mode of delivery (normal and C-section), Birth weight ≥2.5kg, and APGAR score of more than 7 at first and fifth minutes of life were included in our study.

The following parameters to be evaluated for each case selected. Details of the current pregnancy in the form of period of gestation(POG), gravida,parity, use of oxytocin in augmentation of labour or not, mode of delivery, neonatal outcomes, length of hospital stay etc. were noted. Pre designed pre tested proforma was created for each mother for data collection, followed up and hospital records including OT records, labour room records, SNCU record were checked [1,2].

The study group comprised 200 healthy newborn infants with birth weights of 2000-4500 g (mean 3250 g) andApgar scores exceeding 7 at one minute. With use of a wide-bore needle and gentle suction to avoid haemolysis 20 ml venous cord blood was collected as soon as the cord had been clamped and divided and before placental separation. Of the 200 infants, 100 had been delivered after spontaneous labour and 100 after induction of labour by amniotomy and intravenous oxytocin (Syntocinon). The average dose of oxytocin used was 1500 mU (range 1000-2000 mU). In the cases selected for study the prolongation of labour was beyond 18 hours and analgesia was achieved with intramuscular pethidine. No patient was given epidural analgesia. In none of the cases was there clinical or cardiotocographic evidence of fetal distress, and all mothers had spontaneous vertex deliveries. The remaining infants were delivered by elective caesarean section. Within two hours after delivery the following procedures were carried out on the cord blood: packed cell volume was measured with a Hawksleymicrohaematocrit; Plasma aliquots were stored at -20 C until all samples were collected and then estimated in a batch for bilirubin concentration by a standard autoanalytical method, for haptoglobin concentration with M-partigenhaptoglobin plates (Behrislg Diagnostics), and for lactate dehydrogenase activity (normal range in our laboratory 70-240 IU 1) bv the method of Wroblewski and La Due."In-vitro studies were made on fetal cord blood. In the first experiment 3000 'U oxytocin wasadded to 20 1(0-ml aliquots of erythrocyte suspension, and 500 :ul isotonic saline was added to a duplicate 20 10-ml aliquots prepared from the same cordblood. The samples were incubated at 37 C and the EDI of the two sets measured intervals. In the second experiment 50 5-ml aliquots of erythrocyte suspension were prepared and 500 :l isotonic saline and 500 sU, 1500 uU, 2500 !)U, and 4000: sU oxytocin respectively added to groups of 10, which were then incubated for four hours and the EDI of each sample measured.

RESULTS AND ANALYSIS:

Data collected for two groups (Group T- with oxytocin, Group C- without oxytocin) were analyzed by statistical software to get the result. P-Value<0.05 was considered significant.

Table 1:

Parameters	Group T (n=100)	Group C (n=100)	P-Value
Age in years±SD	31.55±6.67	31.98±5.95	0.6315(NS)
Gestational age in weeks±SD	38.55±1.35	38.5±1.37	0.808(NS)

Mean Baby birthweight in Gram±SD	2684.48±429.27	2602.17±417.63	0.1709(NS)
Apgar score in 1 min. ±SD	7.87±0.76	7.87±0.74	1.00(NS)
Apgar score in 5 min. ±SD	8.07±0.77	8.01±0.77	0.92(NS)

The mean age (in years) of with Group T patients was 31.5500 ± 6.6793 years and Group C patients were 31.9800 ± 5.9594 years. Distribution of mean age (in years) with both groups were not statistically significant (p=0.6315). Distribution of mean gestational age in weeks with both groups was also not statistically significant (p=0.8082). The mean gestational age of Group T patients was 38.5540 ± 1.3560 and Group C patients was 38.5070 ± 1.3785.The mean birth weight of Group T patients was 2684.4800 ± 429.2735 and Group C patients was 2602.1700 ± 417.6382. Difference of mean birth weight with both groups was not statistically significant (p=0.1709). In Group T, 36(36.0%) patients had Apgar at 1 min 7, 41(41.0%) patients had Apgar score at 1 min 8 and 23(23.0%) patients had Apgar at 1 min 9. In Group C, 35(35.0%) patients had Apgar at 1 min 7, 43(43.0%) patients had Apgar at 1 min 8 and 22(22.0%) patients had Apgar at 1 min 9. Association of Apgar at 1 min vs groups was not statistically significant (p=0.9589). In Group T, 29(29.0%) patients had Apgar at 5 min 7, 40(40.0%) patients had Apgar at 5 min 8 and 31(31.0%) patients had Apgar at 5 min 9. In Group C, 29(29.3%) patients had Apgar at 5 min 7, 40(40.4%) patients had Apgar at 5 min 8 and 30(30.3%) patients had Apgar at 5 min 9.Association of Apgar at 5 min vs groups was not statistically significant (p=0.9943).

TABLE 2:

Parameters	Group T (n=100)	Group C (n=100)	P-Value
Cord albumin (mg/dl)±SD	3.13±0.70	2.91±0.66	0.023(S)
Cord bilirubin (mg/dl)±SD	1.982±0.47	1.986±0.70	0.962(NS)
NICU Stay in days±SD	6.62±1.99	6.24±2.07	0.532(NS)

The mean cord albumin of Group T patients was 3.1310 ± .7058 and in Group C patients was 2.9100 ± .6667. Distribution of mean cord albumin with both groups was statistically significant (p=0.0239). The mean cord bilirubin of Group T patients was 1.9820 ± .4740 and in Group C patients was 1.9860 ±.7002. Distribution of mean cord bilirubin with both groups was not statistically significant (p=0.9623).

In study group T, 68% babies developed jaundice and in control group C, 38% babies developed jaundice within seven days of birth. It was statistically significant (Chi-Square value: 18.06, p-value<0.0001. The mean NICU Stay of Group T patients was 6.62 ± 1.99 and Group C patients was 6.44 ± 2.071.Distribution of mean NICU Stay with both groups was not statistically significant (p=0.532).

DISCUSSION:

Oxytocin is an important therapeutic agent in obstetrics and probably its effect on erythrocytes cannot be prevented other than by keeping the total dose used to a minimum. Arora BM et al [5] (2019) found that the incidence of significant hyperbilirubinemia in their study was 14%. Among jaundiced newborns, mean cord bilirubin levels in babies who subsequently developed hyperbilirubinemia was 2.798±0.5559 mg/dl and in others were 1.511±0.3260 mg/dl and the difference was statistically significant. There was a statistically significant correlation between cord neonatal jaundice. Our study showed that the mean cord bilirubin (mean± SD) of babies with Oxytocin group was 1.9820 ± .4740 and without Oxytocin group babies was 1.9860 ±.7002 with the distribution of mean cord bilirubin with both groups was not statistically significant (p=0.9623). Abbas SS et al [6] (2015) found that incidence of neonatal jaundice in Group A was 52% and in Group B was 12% with relative risk 4.3 (95% confidence interval: 2.69-6.73). Their study shows that maternal oxytocin used for induction of labor increase the incidence of neonatal jaundice, and it is logical to prevent hyperbilirubinemia by reducing the dose of oxytocin. Oral E et al [7] (2003) found that the difference between study and control groups regarding the rate of hyponatremia, neonatal hyperbilirubinemia and neonatal jaundice was not statistically significant. In our study, 68% and 38% babies developed jaundice in test and control group respectively after birth. It was statistically significant (Chi-Square value: 18.06, p-value<0.0001). Akhavan S et al [8] (2017) found that there was no significant association statistically between neonatal hyperbilirubinemia and using oxytocin for induction oflabor(p=0.44). Brits Het al [9] (2018) found that the prevalence of neonatal jaundice was 55.2%; however, only 10% of black babies who were diagnosed with jaundice appeared clinically jaundiced. More than half (55.2%) of healthy term neonates developed neonatal jaundice. Taksande A et al [10](2005) found that these neonates were divided into 3 groups, Group A (cord serum albumin levels < 2.8 gm/dl), Group B (cord serum albumin levels between 2.8 to 3.4 gm/dl) and Group C (cord serum albumin levels 3.4 gm/dl). In our study, we had found that the mean cord albumin (mean± s.d.) of with Oxytocin patients was 3.1310 ±0.7058 and without Oxytocin patients was 2.9100 ± .6667. Distribution of mean cord albumin with both groups was statistically significant (p=0.0239).We found that the distribution of mean NICU Stay with both groups was not statistically significant (p=0.5320).

CONCLUSION:

Oxytocin should be used with caution in view of its ability to develop neonatal hyperbilirubinemia by inducing haemolysis. Cord serum bilirubin level ≤ 2mg/dl are considered safe while ≥2.1mg/dl are highly suggestive of babies who will develop neonatal hyperbilirubinemia. Cord blood albumin levels ≥3.4 gm/dl is probably safe for early discharge of baby. The study variables, cord serum albumin and cord serum bilirubin can be used as screening test for neonatal hyperbilirubinemia for term neonates and is cost effective individualizing the follow-up and are planning for early discharge.

REFERENCES:

1) Singh S, Singh M. Oxytocin induction and neonatalhyperbilirubinaemia. Br Med J. 1977; 2(6093): 1028– 1028.
2) Suchanda S et al. Cord blood albumin as a predictor of neonatal jaundice. International J. Biological and Medical Research 2011; 2(1):436-438.
3) Rudy Satrya, Sjarif Hidayat Effendi, Dida AkhmadGurnida. Correlation between cord blood bilirubin level and incidence of hyperbilirubinemia in term newborns. Paediatrica Indonesiana 2009; 49(6): 349- 354.
4) Fujiwara R, Maruo Y, Chen S, Tukey RH. Role of extrahepatic UDP-glucuronosyltransferase 1A1: Advances in understanding breast milk-induced neonatal hyperbilirubinemia. Toxicol Appl Pharmacol. 2015 Nov 15. 289(1):124-32.
5) Arora BM, Nair SK, Bhattacharjee J, Ganesan TS, Venkatesh T. KEY NOTE ADDRESSES
6) Abbas SS, James J, Sreedevi N. Oxytocin and neonatal hyperbilirubinemia: A prospective cohort study. Indian J Child Health.2015;2(3):129-30.
7) Oral E, Gezer A, Çagdas A, Pakkal N. Oxytocin infusion in labor: the effect different indications and the use of different diluents on neonatal bilirubin levels. Archives of gynecology and obstetrics. 2003 Jan 1;267(3):117-20.
8) Akhavan S, Alibakhshi A, Shirazi M, Mohammadi SR, Tarafdari A. Oxytocin and Neonatal Hyperbilirubinemia: A Cohort Study. Research Journal Of Pharmaceutical Biological And Chemical Sciences. 2016 Jul1;7(4):2098-101.
9) Brits H, Adendorff J, Huisamen D, Beukes D, Botha K, Herbst H, Joubert G. The prevalence of neonatal jaundice and risk factors in healthy term neonates at National District Hospital in Bloemfontein. African journal of primary health care & family medicine.2018;10(1):1-6.
10) Taksande A, Vilhekar K, Jain M, Zade P, Atkari S, Verkey S. Prediction of the development of neonatal hyperbilirubinemia by increased umbilical cord blood bilirubin. Ind Medica.2005;9(1):5-9.