

OXYTOCIN INDUCED NEONATAL HYPERBILIRUBINEMIA

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ABSTRACT: INTRODUCTION: Hyperbilirubinemia is one of the most common causes of health problems, observed in 60% of term and 80% of preterm infants in the first week of life. Hyperbilirubinemia leads to neurotoxicity in severe condition. Some studies suggests that liberal use of oxytocin for inducing labour is one of the factor which lead to neonatal hyperbilirubinemia. **OBJECTIVE:** To compare the effect of oxytocin and neonatal bilirubin levels with spontaneous vaginal delivery. **MATERIALS AND METHODS:** 100 full term parturients were selected for this study. The subjects were divided into two groups. 50 healthy babies of women who had oxytocin induced labour and 50 healthy babies of women with normal vaginal delivery following spontaneous onset of labour formed the control group. Neonatal serum bilirubin was measured on day 1, 3 and 5 after delivery. Bilirubin was measured by spectrophotometry. Data was analysed in ms excel sheet using spss 19.0v. Statistical analysis was done by using unpaired't' test. **RESULTS:** There was significant increase in bilirubin level in oxytocin induced group compared to control group on day 1 and 3. There was insignificant increase in bilirubin level in oxytocin induced group on day 5. However the level of serum bilirubin is within normal limits as bilirubin level normally rises on till 4th day and decreases thereafter. **CONCLUSION:** Neonatal hyperbilirubinemia may be due to oxytocin administration by continues IV infusion which results in erythrocyte swell and rupture. Increase in bilirubin level in oxytocin induced group is within physiological limits.

KEYWORDS: Hyperbilirubinemia, Oxytocin.

INTRODUCTION: Hyperbilirubinemia is one of the most common causes of health problems observed in 60% of term and 80% of preterm infants in the first week of life.¹ Serum bilirubin levels at birth - normally 1.8-2.8mg/dl. Between the 3rd and 4th day the bilirubin levels in mature infants increases to 5-10mg/dl.² It is manifested with bilirubin level of more than 5 mg/dl and is harmless in some cases but may lead to neurotoxicity in severe condition therefore early detection and treatment of neonatal hyperbilirubinemia is crucial in the prevention of bilirubin induced encephalopathy.^{3,4} The neonatal hyperbilirubinemia practice guidelines published in 2004 by the American Academy of Paediatrics (AAP) expresses the paediatric community's concern regarding bilirubin-induced neurological pathology.⁵ There are many factors which can lead to development of Hyperbilirubinemia in a neonate like blood group incompatibility, gestational age, preeclampsia, certain drugs used by mother, abnormal deliveries, sex of the baby and oxytocin administration.^{6,7,8,9} Some studies suggests that extensive use of oxytocin for inducing labour is one of the factor which lead to neonatal hyperbilirubinemia.¹⁰ Although oxytocin is widely accepted as a safe & effective initiator of uterine contractions, some authors have found an association with hyperbilirubinemia while others have not.^{7,11} So the present study was done with an aim to determine the ability to predict severe hyperbilirubinemia in term healthy newborns delivered through oxytocin induced labour.

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AIM & OBJECTIVE: To compare the effect of oxytocin and neonatal bilirubin levels with spontaneous vaginal delivery.

MATERIALS AND METHODS: The present study was carried out at Navodaya Medical College and Research centre, Raichur. 100 full term parturients were selected. The subjects were divided into two groups. The first group consisted of 50 healthy babies of women who had oxytocin induced labour and second group consisting of 50 healthy babies of women with normal vaginal delivery following spontaneous onset of labour formed the control group. All the gestation were of 38 weeks duration or more, all were on no medications except for iron preparation and had uncomplicated pregnancies. None of the newborn infants had any signs of respiratory distress syndrome. Newborn infant who were growth retarded or newborn infant born with APGAR score of less than 6 were excluded from the study. The study and its conduct were cleared by the human ethical clearance committee & all the participants gave written informed consent. Bilirubin was measured on day 1, 3 and 5 after delivery. About 10ml of blood samples were collected from umbilical cord from the placental site of the umbilical cord for day 1 measurement. Later on neonatal capillary blood was obtained by heel prick on day 3 and 5 under strict aseptic precautions. Bilirubin was measured by spectrophotometry.

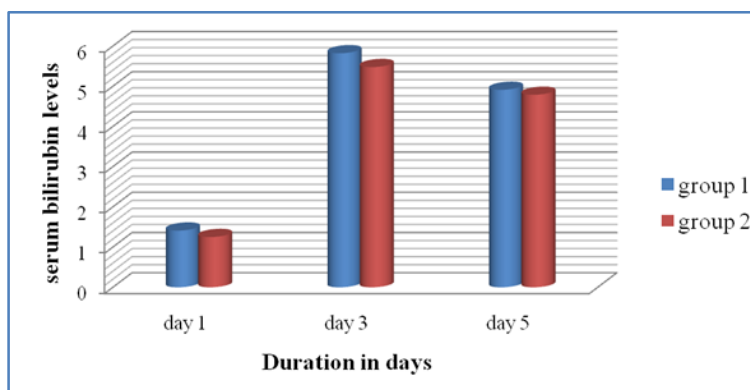
Statistical Analysis: All data are expressed as mean±standard deviation (S.D). Data was analyzed in MS excel sheet using SPSS 19.0v. Statistical test applied was unpaired 't' test for comparison between dose of oxytocin used for induction of labour and the serum bilirubin levels obtained on the three days. A p value of <0.05 considered as statistically significant.

RESULTS: The data of 50 neonates in group 1 who were born via vaginal route after labour induction with oxytocin and 50 neonates in group 2 who had normal spontaneous delivery without oxytocin infusion were analysed. Mean gestational ages of the groups were similar. There was significant increase in bilirubin level in oxytocin induced group compared to control group on day 1 and day 3. There was insignificant increase in bilirubin level in oxytocin induced group on day 5. However the level of serum bilirubin is within normal limits as bilirubin level normally rises on till 4th day and decreases thereafter.

Day	Group I	Group II	Mean difference	95% of difference	t- value p value	P-value
Day 1	1.411±0.241	1.251±0.291	0.16	0.05 - 0.27	2.99	0.003
Day 3	5.822±0.717	5.478±0.851	0.34	0.03 - 0.66	2.17 0.03	0.03
Day 5	4.912±0.623	4.789±0.711	0.12	-0.38 -0.14	0.92 0.36	0.36

Table 1: Showing levels of bilirubin in two groups

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Graph 1: Showing levels of bilirubin in two groups

DISCUSSION: Neonatal hyperbilirubinemia is the result of increased formation and /or impaired conjugation. Many factors have been studied to demonstrate their influence on bilirubin levels, but there is still a great deal of controversy regarding their role. One of these factors is oxytocin. Various studies on neonatal bilirubin levels and the use of oxytocin for the management of labour have produced conflicting results but it has been widely accepted that oxytocin infusion during labour increased the risk of neonatal hyperbilirubinaemia.^{12,13,14,15,16,17} Our findings on day 1 and day 3 are consistent with these studies. However some other recent studies have not shown any association between oxytocin administered to the mother during labour and serum bilirubin levels in infants.^{11,18,19} In our present study the level of serum bilirubin levels in group 1 were significantly higher than those in group 2 on day 1 & day 3 ($p=0.003$, $p=0.03$) respectively while the levels were higher but not significantly so on day 5 ($p=0.36$). However the levels of serum bilirubin of the present study is within the physiological limits as bilirubin levels normally rises to 5-10mg/dl by the 3rd to 4th days of neonatal life and decreases thereafter.² The elevated bilirubin levels were only of biochemical and not of clinical concern and none of babies during this period received any phototherapy or any other medical treatment or both. Several theories have been reported to explain the higher bilirubin level after induction with oxytocin. There is increased hemolysis associated with significantly decreased erythrocyte deformability.²⁰ Other mechanism are trauma to the fetal erythrocyte as a result of uterine activation, vasoconstrictive effects of oxytocin on uterine blood vessel and hyponatraemia caused by the administration of large quantities of electrolyte free diluents for oxytocin infusion.^{7,11,18} Neonatal hyperbilirubinemia may be due to oxytocin administered by continuous IV infusion, results in expansion of maternal ECF with dilutional hyponatremia and hypo-osmolality by virtue of its antidiuretic effect. Since maternal and fetal body fluids are in constant transplacental equilibrium, an expansion of fetal ECF occurs as a result erythrocytes swell and become osmotically more fragile. These swollen and hyperfragile erythrocytes are easily trapped by the spleen, resulting in higher bilirubin.⁶ A relatively immature glucuronyl transferase system due to absence of the hormonal upsurge of normal labour and an enhanced placenta -fetal transfusion due to oxytocin -induced uterine contractions, with resultant increase in red cell mass in neonates, have also been suggested.^{15,21}

Maissel et al reported that breast feeding and the percentage of weight loss after birth were major determinants for the neonatal jaundice rather than oxytocin infusion in the healthy

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newborns.²² Omigbodun et al, have compared 0.9% saline and 5% glucose solution as a vehicle for oxytocin infusion in labour and have reported that isotonic saline rather than 5% glucose solution appeared to be associated with low neonatal bilirubin levels. 5% dextrose used as diluents for oxytocin increase the risk of transplacental hyponatraemia due to infusion of large volumes of salt free fluid into the mother and neonatal hypoglycemia and neonatal hyperbilirubinemia as a consequence.²³ So the increase in serum bilirubin levels on day 1 and day 3 in our present study could be due to use of 5% dextrose as a diluents for oxytocin rather than oxytocin itself.

CONCLUSION: Neonatal hyperbilirubinemia may be due to oxytocin administration by continuous IV infusion which results in erythrocyte swell and rupture. Increase in bilirubin level in oxytocin induced group is within physiological limits. Higher level of bilirubin on day 1& 3 of neonatal period with only of biochemical and no clinical concern with oxytocin. For better clarity, further clinical randomized trials with large number of cases with control group are required to establish the interaction between these parameters.

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