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COMPARATIVE ANALYSIS OF NEONATAL HAEMATOLOGICAL FACTORS IN NORMAL, INDUCED AND CAESAREAN SECTION

Physiology

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ABSTRACT

Aim: To compare the neonatal haematological parameters among full term neonates born by normal vaginal delivery induced delivery and Caesarean section births.

Materials and methods: This study was carried upon 90 full term neonates divided who were in 3 equal groups. The comparison of the neonatal haematological factors is observed in 30 neonates delivered by normal, induced & caesarean deliveries. Haematological samples to measure haemoglobin and Total RBC Count were collected on day1, day 3 and day 5 of birth.

Result: Among 90 subjects, neonates delivered by induced delivery, level of neonatal haematological factors is statistically significant higher compared to other groups on 1st, 3rd and 5th day of birth.

Conclusion: Awareness of neonatal haematological factors is higher among induced delivery than caesarean deliveries.

KEYWORDS:

Neonate, Oxytocin induced, haemoglobin, RBC

INTRODUCTION

Perinatal mortality is a problem of serious dimensions in all countries. It now account for about 90% of all foetal and infant mortality in the developed countries. Approximately 63% of infant death occurs between birth 27 days of life and remainder between 28 days and one year. Main causes of death are intrauterine and birth asphyxia, low birth weight birth trauma and intrauterine or neonatal infection. Prolonged effort time and obstetrics complication also play major role. It can be minimized by timely induction and acceleration of labour by oxytocic drugs or by caesarean section.The most widely used drug that can be used for induction of labour is oxytocin. In 1954 the American biochemist Vincent du vigeneaud first narrated an octapeptide amide with the hormonal activity of oxytocin12. Even after the discovery of prostaglandin, oxytocin is widely used in most of the hospitals for induction of labour in suitable cases. The aim of present study was to measure neonatal total RBC count and haemoglobin delivered by normal, Induced and caesarean methods. Further to know about the level of hypoxia and pharmacological effects of oxytocin and bupivacaine on subsequent neonate.

MATERIAL & METHODS

After obtaining permission from institutional ethical committee, the study was carried out among 90 subjects, divided in 3 group like spontaneous vaginal delivery (group 1), oxytocin induced delivery (group 2) and elective caesarean section (group 3) who were selected from Gynaecology & obstetrics department of our institution. Haemolytic disease (Rhesus and ABO incompatibility, preterm neonates were excluded from the study. Neonates born to mothers with past or coexisting illness like maternal anemia (Hb<10 gm%), multiple gestation, pregnancy induced hypertension, diabetes, mothers on anticoagulants, were too excluded. New born were observed during their stay in the hospital and also up to the age of five days even they were discharged. Hematologic equipment's like Haemocytometer kit, microscope for measuring RBC's count and Sahli's Haemoglob inometer kit was used to measure the haemoglobin level, RBC counts. Hb levels and Total RBC counts was determined on 1st day, 3rd day & 5th day in neonates. On the 1st day, cord blood was collected by inserting a needle into the umbilical vein while the placenta still in utero. On the 3rd and 5th day capillary blood was collected by heel prick after cleaning the skin using alcohol swab. Heel prick was done with a lancet to a depth of about 2mm, and it should be rotated before being pulled out. In this study total RBC was estimated by modified Jendrassik & grof method.

RESULTS

In the present study, 90 neonates were under study. According to mode of delivery neonates were grouped into three groups like spontaneous vaginal delivery (group 1), oxytocin induced delivery (group 2) and elective caesarean section (group 3) subjects. It was compared on these subjects if any haematological changes or variations existed between these various groups. Total of 30 subjects were chosen for study in each group. On 1st, 3rd & 5th days of birth, haematological parameters were calculated and compared accordingly among them. It is significant to note that the RBC's level had a rising tendency up to the 3rd day and had a falling tendency afterwards but the none reached to the previous normal level on the 5th day. (Table – 1)

Table – 1: Comparative values of RBC count in million/mm^3 between 3 groups.

Day	Groups	RBC count in million/mm3		Standard deviation	't' test	P value	Significance
		Range	Mean				
At birth (or)1st DAY	Gp – 1(n=30)	5.4 – 6.5	5.927	0.378	3.0098	0.0039	Very statistically significant.
	Gp – 2(n=30)	5.5 – 6.6	6.203	0.331			
	Gp – 1(n=30)	5.4 – 6.5	5.927	0.378	4.5312	< 0.0001	Extremely statistically significant.
	Gp – 3(n=30)	4.5 – 6.1	5.417	0.487			
	Gp – 2(n=30)	5.5 – 6.6	6.203	0.331	5.1978	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	4.5 – 6.1	5.413	0.487			
3rd DAY	Gp – 1(n=30)	5.3 – 6.5	5.914	0.383	2.0465	< 0.0452	Statistically significant
	Gp – 2(n=30)	5.4 – 6.4	6.100	0.318			
	Gp – 1(n=30)	5.3 – 6.5	5.914	0.383	5.6374	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	4.5 – 6.1	5.353	0.473			
	Gp – 2(n=30)	5.4 – 6.4	6.100	0.318	7.1786	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	4.5 – 6.1	5.353	0.473			
5th DAY	Gp – 1(n=30)	5.3 – 6.4	5.847	0.382	2.9033	0.0052	Very statistically significant
	Gp – 2(n=30)	5.7 – 6.4	6.082	0.225			
	Gp – 1(n=30)	5.3 – 6.4	5.847	0.382	5.1097	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	4.2 – 6.0	5.26	0.500			
	Gp – 2(n=30)	5.7 – 6.4	6.082	0.225	8.2115	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	4.2 – 6.0	5.26	0.500			

It is significant to note that RBC'slevel on the 3rd day has gone up about 3 times from the value at birth and declined on 5th day but still remained high than that of the birth value. (Table – 1).

Table – 2:- Comparative values of Haemoglobin between 3 groups of deliveries.

Day	Groups	Haemoglobin in gm/100 ml		Standard deviation	't' test	P value	Significance
		Range	Mean				
At Birth (or) 1ST DAY	Gp – 1(n=30)	15.7 – 17.5	16.690	0.721	3.5687	0.0007	Extremely statistically significant
	Gp – 2(n=30)	16.1 – 18.2	17.310	0.621			
	Gp – 1(n=30)	15.6 – 17.9	16.690	0.721	2.9457	0.046	Very statistically significant
	Gp – 3(n=30)	15.1 – 17.3	16.200	0.557			
	Gp – 2(n=30)	16.1 – 18.2	17.310	0.621	7.2881	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	15.1 – 17.3	16.200	0.557			
3rd DAY	Gp – 1(n=30)	14.9 – 17.8	16.490	0.8126	2.4598	0.0169	Statistically significant
	Gp – 2(n=30)	15.8 – 17.7	16.935	0.567			
	Gp – 1(n=30)	14.9 – 17.8	16.490	0.8126	2.8126	0.0067	Very statistically significant
	Gp – 3(n=30)	14.9 – 17.2	15.98	0.571			
	Gp – 2(n=30)	15.8 – 17.7	16.935	0.567	6.5003	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	14.9 – 17.2	15.98	0.571			
5th DAY	Gp – 1(n=30)	14.7 – 17.4	16.290	0.859	2.6700	0.0098	Very statistically significant
	Gp – 2(n=30)	16.1 – 17.6	16.780	0.522			
	Gp – 1(n=30)	14.7 – 17.4	16.290	0.859	2.5950	0.0120	Statistically significant
	Gp – 3(n=30)	14.5 – 16.9	15.800	0.576			
	Gp – 2(n=30)	16.1 – 17.6	16.780	0.522	6.9052	< 0.0001	Extremely statistically significant
	Gp – 3(n=30)	14.5 – 16.9	15.800	0.576			

On comparison of the mean RBC's level of the 3rd day, the mean value of caesarean delivery group is slightly higher (4.148) than that of the normal delivery group (3.806). The difference between the mean of two groups is statistically significant with a 't' value of 2.90 and 'p' value of 0.05.

In normal delivery, it is significant to note that the RBC's level had a rising tendency up to the 3rd day and had a falling tendency afterwards but none reached to the previous normal level on the 5th day (Table – 1). At birth, the RBC's of different authors in between 0.74 and 2.507mg/100ml. in other hand of induced delivery also showed as significant (Table – 2). And finally, in caesarean delivery value slightly increased

DISCUSSION

Neonatal jaundice is the commonest abnormal physiological finding during first week of life. Increase in the incidence of jaundice might be due to an increase in the use of oxytocic drugs in the management of labour Ghosh and Hudson, 1972(6). Infants born following spinal block with bupivacaine have also increase risk of jaundice.

On the 5th day, the RBC's level of different author ranged between 4.3 and 6.3 mg/100ml. the RBC level on the 5th day of the study is 3.632mg.100ml. Nelson (1998) and Gupta (1977) also stated that the RBC'slevel in full term infants settle down by the end of the first week(7).

In most of the cases in this institution, feeding is started within six hours and this may be one of the factors which results in lowering the RBC's level.

The mean RBC's level in induced group at birth as reported by different workers (e.g. Davies et al, 1973; Davidson, 1973; Gray & Mitchell, 1974; Bearley & Alderman, 1975; Thiery et al, 1975; Chew and Swann, 1977; Sivasuriya et al, 1978), lies between 0.51 to2.71mg/100ml. The mean RBC's level of the present work is within the range of reports of different workers. The mean RBC's level on the 3rd day of present work ranged between 4.829mg /100ml whereas reports of different workers of the 3rd day lie between 6.17 – 8.73mg/100ml. This shows slight decreased value of the present work with that of the other lie between 3.45 – 7.0mg/100ml, whereas the mean level of the 5th day of the present work is 4.275mg/100ml which is slightly lower in comparison to otherworkers. (8,10,11,3,13)

CONCLUSIONS

In total 90 neonates were investigated for RBC's, total RBC count and haemoglobin concentration. Out of these 30 cases were of normal delivery group, 30 cases of induced delivery group 30 cases of caesarean delivery group. In each case RBC's, total RBC count and haemoglobin concentration was estimated at birth, on 3rd day and on 5th day. In this study only a significant rise in values of Total RBC count and haemoglobin concentration levels were noticed in induced delivery group in comparison to other groups. It can be concluded that there is no danger of hyperbilirubinemia in neonates born by oxytocin induced delivery as well as infants born following spinal block with Bupivacaine (heavy).

Conflict of interest: - Nil

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