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Pathology

Coagulation profile in newborns born to mothers with pregnancy induced hypertension

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ABSTRACT

Background :
Pregnancy induces complex changes concerned with hemostasis .Severe hypertension in pregnant women before 36 weeks of gestation is a multisystem disease & is a threat to the wellbeing of mother as well as her child. Alteration in coagulation profile is the most common cause of haemorrhagic diathesis in newborn born to mothers with pregnancy induced hypertension. So the objective of the study was to study coagulation parameters in newborns born to mothers with PIH in different subgroups.

Methods:
The effects of pregnancy induced maternal hypertension on the coagulation profile of newborn were studied in 80 cases comparing the values with that of infants born to normotensive mothers.

Results:
All the neonates born to mothers with severe pre-eclampsia & eclampsia were preterm neonates. The values of Prothrombin Time, Partial Thromboplastin Time with Kaolin, Thrombin Time, Fibrinogen Degradation Products were significantly raised and Fibrinogen and Platelet count were reduced significantly in both term and preterm test groups as compared to controls.

Conclusion:
Both term & preterm neonates of PIH mothers are at increased risk of developing thrombocytopenia & coagulation defects. Neonates of pre eclamptic and eclamptic mothers had thrombocytopenia & coagulation defects. Thrombocytopenia might be the earliest manifestation of neonatal disease. The derangement in coagulation parameters was more marked with increasing severity of PIH.

KEYWORDS : Pregnancy induced hypertension; Coagulation profile; Newborn

INTRODUCTION:

One of the most catastrophic event in neonatal practice is haemorrhagic diathesis. The neonatologist is exposed to a number of conditions where the complications like disseminated intravascular coagulation, sepsis, intracranial haemorrhage arise. Most of the perinatal haemorrhages now observed in neonates born to high risk mothers i.e. mothers with pre-eclampsia, abruptio placenta, or due to intravascular coagulopathies. [1,2]

Perinatal haemorrhagic disorder was termed 'secondary haemorrhagic disease of newborn' by Aballi & De Lamerens in 1962 [3], since it was not related to Vitamin K deficiency. Most of the haemorrhagic diseases of newborn are usually observed on 2nd & 3rd day of life & are associated with no underlying disorder except Vit. K deficiency. [4] Coagulation disorders occur from intrauterine life to 7th day after birth. Perinatal death is commonly due to placental infarcts, abruptio placente, intrauterine asphyxia & prematurity [5,6] So the objective of the study was to study coagulation parameters in newborns born to mothers with PIH in different subgroups.

MATERIAL AND METHODS:

A total number of 160 cases admitted in wards & NICU in Shri. Chhatrapati Shivaji Maharaj General Hospital, Solapur were studied over a period of 10 months . The selection of cases was done with the help of paediatrician, after taking detailed history & doing through clinical examiniation of newborns. The cases comprised of two groups of newborns . Group I included 80 cases as control. All were newborns of normotensive mothers within 7 days after birth. Coagulation tests were done in all these neonates. Group II included 80 newborns born to hypertensive mother. This group is further divided as. Both groups of mother and infants were free from major illness Newborns born to mothers with gestational hypertensive

Bledding Time was done using Ivy's Method. [7] Whole blood clotting time was done using Lee & White method . Prothrombin time, Partial thromboplastic time with kaolin Thrombin Time, Fibrinogen Determination in semiautomated coagulation analyser Hemostar XF 2.0 . Platelet Count was done by (By Sysmex Kx 21 Cell Counter). FDP :- Semiquantative latex agglutination test by TULIP

Results:

Total 160 cases were studied out of which 80 cases were of control group i.e. neonates born to normotensive mothers & 80 cases were neonates born to hypertensive mothers. In this study group of 80 cases of PIH, 30 cases were of preterm neonates of PIH mothers (37.5%) & remaining 50 (62.5%) were of term neonates of PIH mothers.

Table No. 1
Distribution of term & preterm neonates in subgroups

Group	No. of Term cases	Number of preterm cases	Total	Percentage
Gestation hypertensive	18	--	18	22.5%
Mild PET	32	--	32	40.0%
Severe PET	--	24	24	30.0%
Eclampsia	--	06	06	7.5%
Total	50	30	80	100%

The test group was further subdivided as neonates born to mothers with gestational hypertensive comprising 18 cases (22.5%), with pre-eclampsia (mild+severe: 32+24) 56 cases (70.0%) & with eclampsia 6 cases (7.5%)

Table No. 2
Comparison of mean value of coagulation parameters of term neonates born to PIH mothers with term control.

Coagulation Parameters	Control n=50	S.D	Term neonates of PIH mothers n=50	S.D	t	p
PT in sec.	16.12	± 1.15	18.38	± 2.54	5.94	≤ 0.01
PTTK in sec.	45.18	± 1.61	60.58	± 11.54	9.39	≤ 0.01
TT in sec.	11.0	± 0.69	13.62	± 5.08	3.61	≤ 0.01
Platelet count in Lakh/cmm	2.2	± 0.13	1.4	± 0.23	2.7	≤ 0.05

Table shows PT, PTTK & TT are slightly raised & platelet count is significantly reduced in study group. P value ≤ 0.05 is significant.

Table No. 3
Comparison of mean value of coagulation parameters of preterm neonates born to PIH mothers with preterm control.

Coagulation Parameters	Control n=30	S.D.	Preterm neonates of PIH mothers n=30	S.D.	t	P
PT in sec.	17.56	± 0.49	24.63	± 2.21	4.17	≤ 0.01
PTTK in sec.	52.03	± 3.69	89.23	± 16.0	4.14	≤ 0.01
TT in sec.	11.10	± 0.49	26.0	± 4.43	4.84	≤ 0.01
Platelet count in Lakh/cmm	2.2	± 0.09	1.22	± 0.28	18.49	≤ 0.01

It is evident that PT, PTTK & TT are significantly raised & platelet count reduced significantly as compared to control group.
P value ≤ 0.01 is significant.

Study showed reduction in platelet count is the only abnormality observed in neonates born to mothers with gestational hypertension . Significant reduction in platelet count & raised PT, PTTK & TT in subgroup of mild pre-eclampsia was found . It is evident that PT, PTTK, TT are significantly prolonged as well as platelet count is significantly reduced in subgroup of severe pre-eclampsia. There was a marked prolongation of PT, PTTK, TT & marked reduction in platelet count in eclampsia as compared to other subgroups. Study showed 37% preterm neonates born to PIH mothers were having hypofibrinogenemia with values less than 100 mg% . Only one infant born to eclamsia mother shows FDP test positive.

DISCUSSION:

Many workers have tried to stress the importance of various coagulation tests in relation with normal neonates & neonates of toxemic mothers. Also they have tried to co-relate coagulation defects with possible etiopathogenesis. The data seems to provide evidence that neonates of eclampsia are associated with DIC, where as evidence for a co-relation between coagulation abnormalities in newborns of preeclampsia & DIC is scanty. Some investigators considered that not only DIC in neonates is characteristic of changes of toxemia of pregnancy but it also plays major role in pathogenesis of coagulation abnormalities in neonates. [8]

Various workers have studied fibrinolytic system in neonates of hypertensive mothers. Most of the workers studied fibrin degradation products & fibrinogen levels in neonates born to preeclamptic & eclamptic mothers. S. Narayan et al[2] observed 60% neonates having increased FDP value in 6 out of 10 cases. Agarwal et al [9] observed raised FDP in 26.6% cases & hypofibrinogenemia in 36.6% cases. In present study hypofibrinogenemia was seen in 3 premature neonates (3.75%) & FDP test was positive in one premature neonate. There appears to be a discrepancy between present study & previous series FDP test result which could be due to the fact that in other series FDP & fibrinogen estimation were done with sensitive kit methods. Semiquantitative analysis methods used in present study which are slightly crude methods.

Different workers have reported variable findings regarding the defect in different plasma coagulation parameters. S Narayan et al [10] observed significant prolongation of PT, PTTK, TT in 30% cases. Agarwal et al [9] observed prolongation of PT, PTTK, TT in 26% cases which suggests DIC.In present study we observed prolongation of PT, PTTK, TT in 25% cases i.e. in 20 neonates. Out of which in 15% cases there was low fibrinogen content. Prolonged PT, PTTK, TT and low platelet count suggest DIC and low fibrinogen confirms DIC. Our study co-relates with Agarwal et al and Narayan et al with 26% and 30% cases respectively.

Present study conclude that there is no significant change was observed in BT, CT as compared to control group. Platelet count was significantly reduced in neonates born to PIH mothers as compared to control group. Prothrombin time, partial thrombomplastin time with kaolin and thrombin time were significantly prolonged in neonates born to severe pre-eclamptic and eclamptic mothers and in pre-term neonates. PTTK prolonged in term as well as pre-term neonates born to pre-eclamptic mothers. Fibrinogen concentration was reduced in preterm neonates born to severe pre-eclamptic & eclamptic mothers. Fibrin degradation product was present in preterm neonate born to eclamptic mother. Platelet count, PT, PTTK, TT were found to be most useful tests in assessing the hemostatic abnormalities in neonates born to hypertensive mothers.

As time advances the routine screening tests, supplemented by various sophisticated investigations like factor assays, will be more accessible. These sophisticated investigations will help to quantitate even smallest defects in hemostatic mechanism. With these routine screening tests coagulation disorder in neonates born to hypertensive mothers can be detected. This detection of coagulation disorder will be helpful to neonatologists in treating DIC & serious haemorrhages.

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