Original Article

Pregnancy Outcome in Preeclampsia with Impaired Liver Functions

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Abstract

Background:
Preeclampsia is a multi-system disorder that can affect 5-8% of all pregnancies and is a major contributor to maternal and perinatal morbidity and mortality. There is no single liver function test to fulfill all the criteria for a good predictor of preeclampsia.

Objective:
To determine the outcome of pregnancy in preeclampsia with impaired liver functions.

Methods:
This analytic observational study was carried out in the Department of Obstetrics and Gynaecology in Rangpur Medical College Hospital, Rangpur, from January 2018 to December 2018. 20 preeclamptic patients with impaired liver function were comprised as group A and 80 preeclamptic patients with normal liver function were comprise as group B. AST, ALT, Alkaline phosphatase, PT serum bilirubin, serum creatinine, and urine for albumin were tested and compared.

Results:
Out of these 100 study subjects serum bilirubin, Alkaline phosphatase, AST, ALT, Prothrombin time were more deranged in patients with impaired liver function (group A) than group B. Maternal and perinatal complications were higher among group A than group B.

Conclusion:
Impaired liver functions in preeclampsia adversely affect pregnancy outcome(in the form of pulmonary oedema, HELLP syndrome, DIC, PPH, Renal dysfunction, Abruptio placentae, Maternal mortality, LBW baby, Fetal asphyxia, IUFD, IUGR, NICU admission, Perinatal death. Therefore prior information of liver function tests in such patients may help to reduce perinatal & maternal morbidity & mortality.

Keywords: Preeclampsia, Liver functions

Introduction:

Preeclampsia is the most challenging clinical entity affecting both mother and fetus. It is a predisposing factor for maternal as well as perinatal morbidity and mortality. The incidence of preeclampsia in developing nations has been reported to be around 4-18%.[1] Preeclampsia is defined as pregnancy-specific syndrome observed usually after 20 weeks of gestation with systolic blood pressure ≥140mmHg and diastolic blood pressure ≥ 90 mmHg accompanied by significant proteinuria with or without edema. Severe preeclampsia is associated with elevated blood pressure ≥160/110 mmHg, on two occasions at least 6 hrs apart, on bed rest; with proteinuria ≥ 5gm in 24 hrs urine sample; along with other symptoms such as headache, visual disturbances, hyperreflexia, epigastric or right upper quadrant pain, vomiting, oliguria, impaired liver function and thrombocytopenia (HELLP Syndrome).[2] In most of the cases, about 75% of preeclampsia appear to be mild and 25% are severe.[3] In normal pregnancy, the LFT is either normal or slightly increase or decrease but within the normal range. Thus an increase in serum alanine aminotransferase (ALT), serum aspartate aminotransferase (AST), serum bilirubin & total bile acid concentration during pregnancy may be pathologic and should have further evaluation.[4] Serum albumin level, bilirubin concentrations are significantly low during the whole pregnancy, due to hemodilution and serum alkaline phosphatase (ALP) concentrations are considerably higher. The prothrombin time (PT) remains unchanged during pregnancy & serum fibrinogen increase in late pregnancy.[5] Abnormal LFT occurs in 3% of pregnancies and

preeclampsia is the most frequent cause. Prevalence of abnormal liver function test in pregnancy complicated by preeclampsia & eclampsia varies from 20-30%.[6] There is a marked increase in ALT, AST, and LDH. Hemolysis, elevated liver enzymes & low platelet count (HELLP Syndrome) have been well described which complicate up to 10% of cases of severe PE.[7] Women with preeclampsia associated with abnormal liver function have a greater chance of maternal and fetal complications than those with normal liver function. This study was conducted to evaluate pregnancy outcomes in preeclampsia with impaired liver functions. So, proper antenatal care, timely intervention by taking a prompt decision after diagnosis of the disease, and referral to a higher center and by giving appropriate treatment at that center may reduce maternal and perinatal morbidity and mortality.

Methods:

This is an analytic observational study which was conducted on dept of Obst & Gynaecology in Rangpur Medical College Hospital, Rangpur, from January 2018 to December 2018. The study population was all the admitted patients after 28 weeks of gestation diagnosed as preeclampsia by history, thorough clinical examination, and relevant inves tigations. Patients with preexisting hepatic dysfunction, chronic kidney disease, and systemic disease were excluded. Investigations were carried out in this study include CBC, serum urea, prothrombin time, serum Bilirubin, alkaline phosphates (ALP), aspartate aminotransferase(AST), alanine aminotransferase (ALT), Prothrombine time (PT). Then the study population was divided into two groups. Group A consists of 20 patients with preeclampsia having impaired liver functions and Group B consists of 80 patients with preeclampsia having normal liver functions. Pregnancy outcomes were compared between these two groups. All the information was collected in a predesigned interview schedule. Data were analyzed using SPSS software version 23. A Chi-square test was done to see the significance of difference and p-value $p<0.05$ was taken as significant.

Results:

Consecutive 20 Preeclamptic patients with impaired liver functions were taken as group A and 80 preeclamptic patients with normal liver function were taken as group B. Age of the patient varied from 20-30 years (mean 25.65±4.75). The majority were from low socioeconomic status and primarily educated (Table-I).

All of them had a pregnancy of either the 2nd or 3rd trimester with a mean duration of gestational age 35.00±2 in group B and 31.44±2.4 in group A. Majority of the patient were not taking ANC (Table-II).

Table-I: Demographic profile of study subject (n=100)

Parameter	Preeclamptic mothers		X^2-value	p-value
	Group-A Impaired Liver Function (n=20)	Group-B Normal Liver Function (n=80)		
Age group (Years)				
<20	02(10%)	07(8.75%)		
20-30	15(75%)	48(68%)		
>30	03(15%)	25(31.25%)		
Mean ± SD	25.65±4.757	25.65±4.757	2.108	0.349 (NS)
Socioeconomic status				
Low	18(90%)	66(82.5%)		
Middle	02(10%)	11(13.75%)	1.030	0.597 (NS)
Upper	00(00)	03(3.75%)		
Level of education				
Illiterate	08(40%)	06(7.5%)		
Primary	09(45%)	51(63.75%)	14.196	0.003 (S)
SSC	02(10%)	14(17.5%)		
HSC	01(5%)	09(11.25%)		

Table-II: Patient profile of study subject (n=100)

Parameter	Preeclamptic mothers		X^2-value	p-value
	Group-A Impaired Liver Function (n=20)	Group-B Normal Liver Function (n=80)		
Gravida				
Primi	15 (75%)	59 (73.75%)	0.909	0.013 (NS)
Multi	05 (25%)	21 (26.25%)		
ANC				
Yes	03 (15%)	29 (36.25%)	3.320	0.068 (NS)
No	17 (75%)	51 (63.75%)		
Gestational age				
<34 weeks	07 (35%)	17 (21.25%)		
>34 weeks	13 (65%)	63 (78.75%)	1.658	0.198 (NS)
Mean±SD	31.44±2.439	35.00±2.645		

ALT level was normal in most of the group B patients according to normal range, while it was raised in100%of group A patients and it was significant (p<0.001). AST level was elevated among 70% of group A but none in group B. Serum bilirubin, Alkaline phosphatase, and Prothrombin time all are elevated in Group A rather than group B which was statistically significant (Table-Ill).

Table-III: Biochemical profile of study subject (n=100)

Parameter	Preeclamptic mothers		X^2-value	p-value
	Group-A Impaired Liver Function (n=20)	Group-B Normal Liver Function (n=80)		
Routine investigations				
Hb% (gm%)				
>10gm% <10gm%	00 (00) 20 (100%)	07 (8.75%) 73 (91.25%)	1.882	0.170 (NS)
Platelet count				
1.5-4.0 lack/µL <1.5 lack/µL	04 (25%) 16 (75%)	80 (100%) 00 (00)	76.190	<0.001 (S)
Proteinurea				
Trace + ++ +++	00 (00) 00 (00) 02 (10%) 18 (90%)	25 (31.25%) 00 (00) 09 (11.25%) 46 (57.5%)	8.913	0.012 (NS)
Liver Function Test				
Serum bilirubin				
0.1-1.2mg/dl >2mg/dl	02 10%) 18 90%)	80 (100%) 00 (00)	87.805	<0.001
Alkaline Phosphatase				
Normal (45-115µ/L) Raised (>115µ/L)	00 (00) 20 (100%)	56 (70%) 24 (30%)	31.818	<0.001 (S)
Alanine amino Transferase				
Normal (7-55µ/L) Raised (>55µ/L)	00 (00) 20 (100%)	56 (70%) 24 (30%)	76.190	<0.001 (S)
Aspartate amino Transferase				
Normal (8-48µ/L) Raised (>48µ/L)	06 (30%) 14 (70%)	80 (100) 00 (00)	65.116	<0.001 (S)
Prothrombin time				
Normal (12-14sec) Raised (>14sec)	13 (65%) 07 (35%)	80 (100%) 00 (00)	30.108	<0.001 (S)

Among them pulmonary edema is highest. Maternal mortality was 45% in group A and 3.75% in group B which was statistically significant, the majority of the cause of death were DIC & Pulmonary edema (p<0.001).(Table-lV)

Table-lV: Distribution of maternal outcome of the study subject (n=100)

Parameter	Preeclamptic mothers		X^2-value	p-value
	Group-A Impaired Liver Function (n=20)	Group-B Normal Liver Function (n=80)		
Mood of delivery				
VD	09 (45%)	55 (68.75%)	3.917	0.048 (S)
LSCS	11 (55%)	25 (31.25%)		
Maternal morbidity	20 (100%)	12 (15%)	53.125	<0.001 (S)
Pulmonary oedema	07 (35%)	06 (7.5%)	10.698	0.001 (S)
HELLP syndrome	05 (25%)	00 (00)	21.053	<0.001 (S)
DIC	04 (20%)	00 (00)	16.667	<0.001 (S)
PPH	04 (20%)	04 (5%)	4.891	0.027 (S)
Renal disfunction	02 (10%)	00 (00)	8.163	0.004 (S)
Abruppio placentae	00 (00)	02 (2.5%)	.510	0.475 (NS)
Maternal mortality	09 (45%)	03 (3.75%)	25.781	<0.001 (S)

No significant difference in birth weight of babies between group A and group B. 1 minute and 5 minutes APGAR scores were better in group B. Neonatal complications were more in group A compared to group B and it was statistically significant. Perinatal death was high in group A (25%) than in group B (5.0%) which was statically not significant (p>0.01) (Table-V).

Table-V: Distribution of fetal and perinatal outcome of the study subject (n=100)

Neonatal Issues	Preeclamptic mothers		X^2-value	p-value
	Group-A Impaired Liver Function (n=20)	Group-B Normal Liver Function (n=80)		
Live birth	15 (75%)	66 (82.5%)	.199	0.656 (NS)
VD	09 (45%)	55 (68.75%)	3.917	0.048 (S)
APGAR score (1 minute)	5.06±3.104 09 (45%)	7.76±1.216 54 (68%)	3.475	0.062 (NS)
APGAR score (5 minutes)	5.82±3.555 12 (60%)	8.73±1.387 66 (83%)	4.720	0.030 (S)
Low birth weight <2.5Kg	08 (40%)	25 (31.25%)	0.554	0.457 (NS)
Asphyxia	06 (30)	08 (10%)	5.316	0.021 (S)
IUD	07 (35%)	05 (6.25%)	12.524	<0.001 (S)
IUGR	08 (40%)	09 (11.25%)	9.373	0.002 (S)
NICU Adimission	10 (50%)	28 (35%)	1.528	0.216 (NS)
Death within 7 days	05 (25%)	09 (11.25%)	2.512	0.113 (NS)

Discussion:

This study was conducted in Obstetrics & Gynecology dept in Rangpur Medical College and Hospital, Rangpur is an important referral hospital of North Zone in Bangladesh. In the present study, the study population were 100 having preeclampsia, had been divided into two groups. Impaired liver functions 20 were in group A (case) and normal liver functions 80 were in group B(control). The younger age group is an important risk factor. Though it was a disease of the adolescent group in the present study, the mean age was 25.65±4.757 years in both groups are matched. The majority of the population was 20-30 years. These ages are more vulnerable due to early marriage and pregnancy in our country as compared to western countries. This age difference was not statistically significant (p>0.34). It is consistent with the study of Amit G et al. where the mean age was 25.12 ± 3.65 years. Maximum 82.82% of patients were between 20-29 years of age.[8] Also consistent with S Kishwaraet al in Bangladesh Medical Journal (2011).[9] In the present study, the majority came from low socioeconomic status which was statistically not significant (p<0.597). It correlates with the study of Savita Rani et al where 84% belong to low socioeconomic status.[10] Regarding educational background majority of the patient were primarily educated and very few were illiterate in both groups which were statistically significant (p<0.05). It is due to primary education being free in our country so, the majority of the people were primarily educated. This study was matched with the study of Cicih O, Lelly A. They showed that lowered educated women had the highest risk of preeclampsia compared to high education.[11] It was also consistent with Koido Pet al.[12] In this study, most of the population came from rural areas.Rural people are more vulnerable to developed preeclampsia because in a rural area there is a lack of ANC facilities, women are less empowered due to a lack of education and self-awareness. The study was conducted in Rangpur Medical College Hospital which is a public hospital where the maximum cases came from low affluent societies and referred from the different rural zone. It correlates with the study of Savita Rani Singhal et al where 84% had a rural background.[10] The incidence of preeclampsia was more in primigravid. This is comparable to Mac Gillivray which shows that primigravida has 15 times greater risk compared to multigravida[13] also correlates with Savita Rani Singhal et al where primigravida was 70%.[10] In the present study, 75% of group A and 63.75% of group B took irregular and no antenatal care at all. Group B comparatively took more ANC but it was not significant (p>0.068). According to Majhi et al 82.3% of patients did not have a regular antenatal check-up.[14] This indicates that low socioeconomic status, lack of education poverty, and inadequate antenatal check-up has a close relationship with preeclampsia and impaired liver function. The present study show mean gestational age of the mother was 31.44±439 and 35.00±2.645 weeks in group A and B respectively, which is statistically insignificant (p>0.0198). Amit G et al also observed similar findings with that of the present study, their study was also statistically not significant.[8] Barua found mean gestational age was 37.55 weeks.[15] This study indicates more the gestational age less the maternal and perinatal complications. Regarding the liver function test all the values are deranged in group A compared to group B which were statistically significant (p<0.001) which was consistent with Dilip KB al where ALT, AST, ALP & bilirubin were elevated respectively these are statistically significant (p<0.001).[16] This indicates preeclampsia is a pregnancy-related complication with a mortality rate of less than 1% when it is associated with impaired liver function maternal and perinatal outcomes are found poor. Regarding maternal outcome out of 20 patients in group A, 25% developed HELLP, 20% PPH, 10% renal dysfunction, 35% pulmonary edema, 20% DIC, and maternal mortality was 45% all were statistically significant (p<0.001). Abruption placenta was 2.5% in group B population which was statistically not significant (p>0.0475). As per Loi K et al[17] HELLP 6%, pulmonary edema 5%, ARF 14%, Abruption 2% were noted in preeclamptic patients with deranged liver function. As per Punneta M et al[18] support, these results were statistically significant (p <0.001).In the present study, 75% of group A and 82.5% of group B were live birth which was statistically not significant. In this study fetal complication is more in group A population compared to group B. Out of 20 patients in group A 30% developed fetal asphyxia, 40% IUGR, 25% IUD, and 25% perinatal death occur within 7days which was statistically significant. 40% were LBW and 50% of them need NICU admission which was not statistically

significant. Apgar score in both one minute and five minutes was deranged in group A. Apgar score in one minute was nonsignificant (p>0.062) and Apgar score in five minutes was statistically significant (p<0.05). This study was consistent with Savita Rani Singha et al.[10] So, from this study, it was found that nulliparous, primarily educated women with low socioeconomic status and lower gestational age group those who were not in antenatal care more prone to develop the impaired liver function. People with impaired liver functions showed adverse pregnancy outcomes.

Conclusion:

Though preeclampsia is not a totally preventable disease the devastating effect from its consequences can be prevented by regular antenatal care, proper screening of high-risk cases for prediction of risk factors, and taking appropriate management strategies. Creation of awareness by health education through much media, social motivation regarding female child education, nutrition, empowerment & employment. Early detection of high-risk individuals by well-trained medical personnel and timely referral to tertiary care centers will lead to improved perinatal and maternal outcomes.

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