COMPARISON OF LIVER FUNCTION TESTS OF NORMAL AND PRE-ECLAMPTIC PREGNANT FEMALES: A HOSPITAL BASED STUDY

Obstetrics & Gynaecology

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ABSTRACT

Background: Pre-eclampsia is a multi-system disorder of unknown etiology involving almost every organ of body including kidney, liver, brain, heart, stomach and adrenals. In liver periportal hemorrhagic necrosis, ischemic lesions and fibrin deposition occurs due to thrombosis of arterioles.

Objective: To compare the liver function tests in normal pregnancy and preeclampsia

Methodology: This study was conducted in the Department of Obstetrics and Gynaecology, SKIMS, Soura, Kashmir for 18 months. Participants were divided into two groups:

Cases: Comprised of 200 patients with toxemia of pregnancy,

Controls: comprised of 500 normal, healthy normotensive pregnant women. This group was studied to get the normal values of liver enzymes and served as controls. A complete blood count, microscopic examination of urine, liver function test, kidney function test, 24 hour urinary protein estimation was done on all participants.

Results: Among the cases, 49(24.5%) patients while 76 (15.2%) controls had deranged serum bilirubin. Ninety-nine(49.5%) cases had deranged ALT while 16(3.2%) controls had so. Among the cases, 103(51.5%) had deranged AST level while it was deranged in 64(12.8%) controls. ALP and serum total protein followed similar pattern (more deranged in cases than controls).

Conclusion: Liver function test impairment occurs in preeclampsia which is characterized by rise in mean level of serum transaminase levels and serum bilirubin level and fall in serum total protein and albumin level.

KEYWORDS

Serum Bilirubin, Liver function, Pre-eclampsia, Albumin

INTRODUCTION

Preeclampsia is a pregnancy specific syndrome observed usually after 20th week of gestation with systolic blood pressure ≥ 140 mmHg and diastolic blood pressure ≥ 90 mmHg, on two occasions at least 6 hours apart, accompanied by significant proteinuria with or without edema, in a previously normotensive and non proteinuric women or it may be defined as rise in systolic blood pressure more than 30 mmHg and rise in diastolic blood pressure more than 15 mmHg over previously known blood pressure and it resolves within 12 weeks postpartum.¹ Pre-eclampsia is a multiple system disorder of unknown etiology involving almost every organ of body including kidney, liver, brain, heart, stomach and adrenals.²

In liver peri-portal hemorrhagic necrosis, ischemic lesions and fibrin deposition occurs due to thrombosis of arterioles. There may be subcapsular haemorrhage which may rupture causing sudden hypotension and haemoperitoneum. HELLP syndrome may develop.³ The hypertensive disorders are responsible for approximately 15% of maternal mortality. Approximately 30% are due to chronic hypertension and 70% are due to gestational hypertension.⁴ The incidence of pregnancy induced hypertension appears to range from 5-9 % for gestational hypertension and from 5-7% for preeclampsia among nulliparous women without chronic hypertensive disease or diabetes mellitus. The incidence of PIH in nulliparous women is 4-5 times higher than in multipara.

Objective: To compare the liver function tests in normal pregnancy and preeclampsia

METHODS

After obtaining the ethical clearance from institutional ethical committee, this study was conducted in the Department of Obstetrics and Gynaecology, SKIMS, Soura, Kashmir for 18 months. In this study, the patients were divided into two groups:

GROUP A (CASES):- This group comprised of 200 patients with toxemia of pregnancy. All pregnant women irrespective of parity, chronological age with Blood pressure $\geq 140/90$ mmHg and proteinuria ≥ 300 mg in 24 hours urine sample were included in cases. Pregnant women with multiple pregnancy, gestational diabetes renal disease, liver disease, cardiac disease, history of drug intake that affects the liver function, past history of hypertension, unwilling to take part in the study were excluded.

GROUP B (CONTROLS):- This group comprised of 500 normal, healthy normotensive pregnant patients irrespective of parity and

chronological age visiting the antenatal clinic. These patients had no antenatal complication during the present pregnancy and had normal obstetric history in past. This group was studied to get the normal values of liver enzymes and served as controls.

All participants had a detailed general and systemic examination followed by per abdominal and per vaginal examination. Demographic characteristics and relevant family history and past history were recorded. Any prior treatment received or need of hospitalization was recorded. A complete blood count, microscopic examination of urine, liver function test, kidney function test, 24 hour urinary protein estimation was done.

RESULTS

A total of 700 pregnant females participated in the study; 200 cases and 500 controls. The age and parity of the participants is given in table 1.

Table 1: Age and parity of cases and controls

Age (years)	Cases		Controls		Percentage
	Number	Percentage	Number	P-value	
20-24	14	7	48	9.6	0.908
25-29	81	40.5	224	44.8	
30-34	84	42	168	33.6	
≥ 35	21	10.5	60	12.0	
Parity					
0	96	48	256	51.2	0.156
1	65	32.5	168	33.6	
2	34	17	72	14.4	
3	05	2.5	4	0.8	
Total	200	100	500	100	

Cases had a mean age of 29.45 ± 3.67 years. Patients with age ≥ 30 years comprised about 52.5% of cases among cases. Controls had a mean age of 28.8 ± 3.71 years. Maximum controls were in age group of 25-34 years comprising about 78.4% of controls.

Among the cases, 96 (48%) were nulliparous while in controls, 256 (51.2%) were nulliparous.

Table 2 gives the liver function tests of the study participants.

Table 2: Liver function tests (LFT) of normal and pre-eclamptic pregnant women

LFT Parameters	Cases		Controls		P value
	Number	Percentage	Number	Percentage	

Serum Bilirubin					
Normal	151	75.5	424	84.8	0.004
Deranged	49	24.5	76	15.2	
Mean±SD	0.78±0.39		0.69±0.35		
ALT					
Normal	101	50.5	484	96.8	<0.001
Deranged	99	49.5	16	3.2	
Mean±SD	42.6±34.35		15.5±9.24		
AST					
Normal	97	48.5	436	87.2	<0.001
Deranged	103	51.5	64	12.8	
Mean±SD	31.9±97.76		13.4±4.32		
ALP					
Normal	19	9.5	132	26.4	<0.001
Deranged	181	90.5	368	73.6	
Mean±SD	273.1±181.4		176.5±55.14		
Total Protein					
Normal	192	96	496	99.2	<0.001
Deranged	8	4	4	0.8	
Mean±SD	6.73±1.63		6.98±1.45		
Serum Albumin					
Normal	87	43.5	234	46.8	0.429
Deranged	113	56.5	266	53.2	
Mean±SD	3.41±1.46		3.55±0.61		
Total	200	100	500	100	

Mean serum bilirubin level among the cases was 0.78 ± 0.39 mg/dl and in controls, it was 0.69 ± 0.35 mg/dl. Among the cases, 49 (24.5%) had deranged serum bilirubin level while 76 (15.2%) controls had so.

Among the cases, 99(49.5%) patients had deranged ALT compared to 16(3.2%) controls who had deranged ALT. Fifty-one percent had deranged AST level among the cases and 64(12.8%) controls had it deranged. Among the cases, 181(90.5%) patients had deranged ALP level while 368(73.6%) controls had deranged ALP.

In the cases, 8(4%) had deranged serum total protein level while as 4(0.8%) controls had deranged serum total protein level. Eighty-seven (43.5%) cases had normal serum albumin level and 113(56.5%) had it deranged while as 266(53.2%) controls had deranged serum albumin level.

DISCUSSION

The present study was conducted to evaluate liver function test in normal and pregnancy induced hypertension. The results of our study were analysed and compared with published literature.

In our study, cases had a mean age of 29.45 ± 3.67 years. Patients in age group of ≥ 30 years comprised about 52.5% of cases. A study was conducted by **Neha Kumari et al** to find out the age group prone to develop preeclampsia.³ In this study, they concluded that women > 30 years of age are prone for development of preeclampsia. **Duckitt et al** reported that increased incidence of preeclampsia in women with age greater than 30 years.⁶ Our results were consistent with these studies.

In our study, 96(48%) cases were nulliparous followed by primiparous (32.5%). Our results were consistent with **Sonia Hernandez-Diaz et al** who found that risk of development of preeclampsia (4.1%) is more in first pregnancy as compared to subsequent pregnancies (1.7%) and **Cichi Opatasari et al** who found that nulliparous women have 78% risk of developing preeclampsia as compared to primipara.^{7,8}

Mean serum bilirubin level in our study was higher in cases as compared to controls. In cases, mean serum bilirubin was 0.78 ± 0.39 mg/dl and in controls, it was 0.69 ± 0.35 mg/dl. Our results are consistent with **Dilip Kumar et al** who found the mean serum bilirubin in cases was 0.86 mg/dl compared to controls having a mean serum bilirubin level of 0.65 mg/dl.⁹ **N R Hazari et al** also found the mean serum bilirubin in cases was 0.82 ± 0.24 mg/dl as compared to controls in whom it was 0.79 ± 0.17 mg/dl.¹⁰

In our study, 99(49.5%) cases had deranged ALT while 16(3.2%) controls had so. Our results are consistent with **Dilip kumar et al** who found the mean serum ALT raised in 48.93% of cases compared to controls where it was raised only in 1.5% of patients.⁹ Our results were also consistent with **N R Hazari et al** who found the mean serum ALT level in cases was raised in 45% of patients.¹⁰

In our study mean serum AST in cases was 31.9 ± 97.76 U/L and in controls, it was 13.4 ± 4.32 U/L. Our results were consistent with **Dr swapan Das et al** who found the mean level of serum AST in cases was 40.58 ± 10.75 U/L compared to 8.21 ± 2.60 U/L in controls.¹¹ Our results were also consistent with **Bibi Munaza et al** who found the mean serum AST in cases was 41.34 ± 10.70 U/L as compared to 8.24 ± 2.54 U/L in controls.¹²

Mean serum ALP among cases in our study was 273.1 ± 181.4 U/L and in controls mean serum ALP was 176.5 ± 55.14 U/L. Among cases, 181(90.5%) had deranged ALP level compared to 368(73.6%) controls who had deranged ALP. Our results were consistent with **Dr Swapan Das et al** and **N R Hazari et al** found the mean value of serum ALP to be higher in cases as compared to controls.^{10,11} However, higher value of ALP in cases(90.5%) as well as in controls(73.6%) may be due to placental origin and bone origin of alkaline phosphatase.

Mean serum total protein level was 6.73 ± 1.63 g/dl and in controls, mean serum total protein level was 6.98 ± 1.45 g/dl. Among cases, mean serum albumin level was 3.41 ± 1.46 g/dl while controls, it was 3.55 ± 0.61 g/dl. Our results were consistent with **N R Hazari et al** who found the total protein and serum albumin level in cases was lower than that in controls and was found to be 5.6 ± 0.71 gm/dl and 3.40 ± 1.2 gm/dl respectively in cases as compared to 5.91 ± 0.30 gm/dl and 3.67 ± 0.82 gm/dl in controls.¹⁰ However, low level of serum albumin was found in both cases and controls (56.5% vs 53.2% patients) in our study which may be due to normal physiological hemodilution of pregnancy.

CONCLUSION

Liver function test impairment occurs in preeclampsia which is characterized by rise in mean level of serum transaminase levels and serum bilirubin level and fall in serum total protein and albumin level.

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