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ORIGINAL ARTICLE

ELEVATION OF SERUM ALKALINE PHOSPHATASE LEVEL IN POSTPARTUM PATIENTS

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ABSTRACT

Background: Liver is a vital organ which undergoes several functional changes during pregnancy and revert to the pre pregnant state during puerperium. Incidence of intrahepatic cholestasis is high in South Asia and is more common in women with multiparity and advanced maternal age. Serum Alkaline Phosphatase (ALP) can be from liver biliary system, placenta and bone. Elevated levels of Alkaline phoshatase (ALP) may indicate liver disease or certain bone diseases. So the measurement of ALP in pregnancy and puerperium is important. **Materials and Methods:** Ninety (90) antenatal women with gestational age between 37 & 40 weeks who delivered without any antenatal complication were selected in this prospective study. Information was collected after detailed history taking and complete physical examination. All subjects selected for this study underwent caesarean section. Blood samples were collected for liver function tests just before delivery, 48 hours after delivery (day 2), day 5 and on day 10. Statistical analysis was done using ANOVA test. **Results:** There was 14% increase in serum ALP levels after delivery on day 2 and 16% on day 5 in comparison to antenatal period and on 10th day there was only 10% drop from day 5 and did not reach the pre-delivery levels. There was 10% increase in serum AST levels after delivery on Day 2 and another 9% on Day 5 in comparison to antenatal period and it dropped back to pre-delivery levels on day 10. There was 9% increase in serum ALT level after delivery on Day 2 and 11% on Day 5 in comparison to antenatal period and on 10th day it dropped back to pre-delivery levels. Other parameters like total protein, serum albumin and globulin, total bilirubin and direct bilirubin were unaffected. **Conclusion:** Alkaline phosphatase levels and the transaminase levels (AST and ALT) were significantly higher after delivery on day 2, 5 and declined to pre-delivery levels by post-operative day 10 except alkaline phosphatase. These findings should be kept in mind while interpreting the liver function test results in the immediate post-partum period and if the enzyme levels remain raised even after 10 days into post-partum period, it may be a warning sign of underlying liver dysfunction.

Keywords: Alkaline Phosphatase (ALP), LSCS - Lower Segment Caesarean Section, Post partum, Puerperium.

1.INTRODUCTION

Intrahepatic cholestasis has prevalence of about 1/1000 to 1/10,000 and are more common in South Asia .It is more common in women with multiparity, advanced maternal age and women using oral contraceptives(Lata,2013). Alkaline Phosphatase (ALP) is an enzyme in the liver biliary system, placenta and bone. Higher-than-normal levels of ALP may indicate liver damage or certain bone diseases(Simko,1991). Sometimes physiological adaptations occurring during normal pregnancy and puerperium can be misinterpreted as pathological but these adaptations can also unmask or worsen preexisting disease[8]. So, here arises the need for regular LFT check-ups during pregnancy and puerperium. Our objective here was to demonstrate the serum ALP changes in the Post partum period.

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2.METHODOLOGY:

Ninety (90) antenatal women with gestational age between 37 & 40 weeks, who was admitted in the Department of Obstetrics and Gynaecology, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram were

selected for this Hospital based prospective observational study approved by Institutional Human ethics committee (M18/RMMC/2015).

INCLUSION CRITERIA**:**

Antenatal mothers with gestational age between 37 & 40 weeks without any antenatal complications and delivered in the hospital were selected for the study. All these study subjects were incidentally delivered by lower segment caesarian section (LSCS).Cases were selected irrespective of age, parity and socio-economic status.

EXCLUSION CRITERIA:

Women with pregnancy associated complications like diabetes mellitus, heart disease**,** fetal anomalies, liver disease and on medications which can alter liver function**.** Blood samples were collected from ante cubital vein by venepuncture from women in early labour or at the onset of labour pains or on the day of elective lower segment caesarian section after fasting of about 6 hours. Postpartum samples were taken from each women on 48 hours after delivery (day 2), post-operative day 5 and on post-operative day 10. All assays were performed with an automated multi-channel analyzer using standard methods for estimation. Statistical analysis was done using SPSS version 20.0. ANOVA test was used. For all the statistical tests of significance, p value of <0.05 was considered significant.

3.RESULTS:

About 64% of the study subjects were in the age group of 21 to 25 years. About 44.5% of the study subjects were primigravida and 55% of the study subjects were multigravida. Among multigravida, 70% had delivered previously through LSCS while the remaining 30% had previous normal vaginal delivery. About 69% of the study subjects delivered during 37- 40 weeks and 31% of the study subjects delivered at 40 weeks. The mean serum ALP levels raised steadily after delivery on day 2 and day 5 in comparison to antenatal period and though it declined by tenth day, it did not reach down to pre-delivery levels (p value<0.05). This rise in mean serum ALP levels after delivery on day 2 and day 5 in comparison to antenatal period and the drop in ALP levels from day 5 to day 10 was statistically significant. The mean serum AST and ALT levels also raised steadily after delivery on day 2 and day 5 in comparison to antenatal period and then it dropped back to pre-delivery levels on postnatal Day 10(p value<0.05). This rise in mean serum AST & ALT levels after delivery on day 2 and day 5 in comparison to antenatal period and the drop in AST and ALT levels from day 5 to day 10 was statistically significant. The changes in mean levels of other biochemical parameters like total bilirubin, direct bilirubin, total protein, serum albumin and serum globulin after delivery was not statistically significant.

Table 1: Baseline Characteristics of the Study Subjects

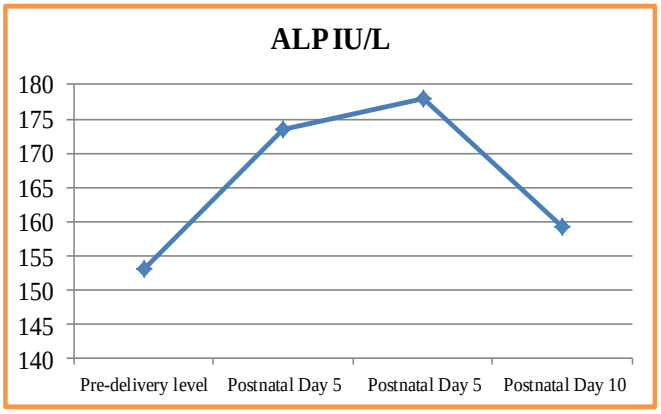
Parameter	n=90; Mean±SD
Maternal age (Years)	24.78±2.43
Gestational age (weeks)	38.7±1.1
Hb (g/dl)	10.21±0.71
RBS (mg/dl)	100.10±12.31
Wt of the mother (Kg)	61.31±7.41
Birth wt of the Baby (gms)	2906±311

Table 2: ALP (IU/L**) Levels at various time Intervals in the study population as per Obstetric History (n=90)**

Obstetric History	N	**Serum ALP (**IU/L **) Levels (Mean ± Std. Deviation)**				**p value**
		Pre-delivery Level	**Postnatal Day 2**	**Postnatal Day 5**	**Postnatal Day 10**	
Primi-gravida	40	156 ± 32	172 ± 28	177 ± 26	160 ± 30	**0.004**
Previous LSCS	35	154 ±30	177 ± 38	179 ± 33	160 ± 27	**0.002**
Previous Normal delivery	15	144 ± 30	171 ± 33	178 ± 37	157 ± 38	**0.050**
p value		0.468	0.753	0.931	0.966	

Table 3 Liver Function Tests at Various Time Intervals in the study population (Pre-Delivery, Post Partum Day 2, 5, and 10) (N=90)

Liver function test	Mean levels ± Std. Deviation				p value
	Pre-delivery level	Postnatal Day 2	Postnatal Day 5	Postnatal Day 10	
Total bilirubin (mg/dl)	0.76 ± 0.07	0.76 ±0.08	0.78 ±0.12	0.75 ±0.11	0.151
Direct bilirubin (mg/dl)	0.15 ±0.05	0.16 ±0.12	0.17 ±0.14	0.16 ±0.10	0.787
AST (IU/L)	30.66 ±6.64	33.31 ±6.36	35.04 ±6.09	31.18 ±6.37	**<0.001**
ALT (IU/L)	33.07 ±7.41	35.70 ±6.9	37.66 ±7.03	34.06 ±7.12	**<0.001**
ALP (IU/L)	153.02 ±30.9	173.59 ±33.0	177.92 ±30.45	159.34 ±30.02	**<0.001**
Total Protein (g/dl)	5.98 ±0.67	5.96 ±0.62	5.94 ±0.62	5.84 ±0.65	0.481
Serum albumin (g/dl)	3.21 ±0.29	3.20 ±0.23	3.24 ±0.29	3.13 ±0.28	0.059
Serum globulin (g/dl)	3.00 ±0.48	3.02 ±0.47	3.03 ±0.44	2.96 ±0.42	0.729



4.DISCUSSION:

Liver disease can cause significant morbidity and mortality in both pregnant women and their infants and many obstetric conditions also can affect the liver function and result in several complications(Corton et al., 2014). Fatty liver of pregnancy, obstetric intrahepatic cholestasis and other liver diseases need monitoring by doing LFTs for preventing complications(David et al., 2000). In liver, alkaline phosphatase is found histochemically in the microvilli of bile canaliculi and on the sinusoidal surface of hepatocytes(Lata,2013; Valenzuel et al., 1987). Alkaline phosphatase from the liver, bone and kidney are thought to be from the same gene but that from intestine and placenta are derived from different genes.[12] Highest levels of alkaline phosphatase occur in cholestatic disorders(Friedman and Maddrey,1987). Elevations occur as a result of both intrahepatic and extrahepatic obstruction to bile flow and the degree of elevation does not help to distinguish between the two(Ropponen et al., 2006; Adeniyi and Olatunbosun,1984). In acute viral hepatitis, alkaline phosphatase is usually either normal or moderately increased. Hepatitis A may present a cholestatic picture with marked and prolonged itching and elevation of alkaline phosphatase(Warnes et al., 1977; Simko,1991). Other diseases like infiltrative liver diseases, abscesses, granulomatous liver disease and amyloidosis may also cause a rise in alkaline phosphatase[12]. Mildly elevated levels of alkaline phosphatase may be seen in cirrhosis and hepatitis of congestive cardiac failure(Strunin,1992; Valenzuela et al., 1987). Drugs such as cimetidine, frusemide, phenobarbitone and phenytoin which can cause increase in levels of alkaline phosphtase were not used in our study. In our study, there was mild elevation of alkaline phosphatase on 2nd and 5thday of postpartum period and declined on tenth day. Bilirubin was not significantly elevated. There was only mild elevation of serum AST and ALT levels. Serum albumin level was not significantly altered indicating that synthetic function of liver is not affected. Serum AST and ALT levels also declined to antenatal levels on 10th day. Based on the observations, cholestasis and hepatitis can be ruled out[3,15]. Since the cause for elevation serum ALP could not be due to liver disorder, it could be of placental origin[15]. Furthermore, anaesthesia and caesarean section surgery itself can have an impact on the LFT(Strunin,1992; Cowa et al., 1991; Batchelder and Cooperman,1975). Anaesthesia causes a moderate reduction in hepatic arterial blood flow and hepatic oxygen uptake and either the initial hypo-perfusion during anaesthesia or reperfusion injury, or both, may contribute to postoperative liver dysfunction(Cowa et al., 1991; Batchelder and Cooperman,1975; Ngai,1980). Lower segment caesarean section itself leads to a reduction in hepatic arterial blood flow in part because of the traction on the abdominal viscera which may cause reflex systemic hypotension as a result of dilatation of capacitance vessels(Batchelder and Cooperman,1975). Hemodilution before delivery and hemoconcentration after delivery might influence serum liver enzyme levels(Lata,2013) Hence the rise of serum ALP could not be pathological as demonstrated by the findings of our study.

5.CONCLUSION:

Based on the study findings it can be concluded that the alkaline phosphatase levels rise significantly immediately after delivery and this rise is short-lived as it slowly returns back to pre-delivery levels after tenth post-operative day. This rise could be due to either placental factors or hemodynamic factors or both. Hence it should be interpreted with caution as this may be a warning sign of underlying liver dysfunction. Further research is needed to explain the basis of such changes in pregnancy and postpartum period.

6.REFERENCES:

Adeniyi, FA and Olatunbosun, DA. 1984.Origins and significance of the increased plasma alkaline phophatase during normal pregnancy and preeclampsia. Br J Obstet Gynaecol,91(9):857–862

Batchelder, BM, Cooperman LH. 1975.Effects of anesthetics on splanchnic circulation and metabolism. Surg Clin North Am 1975;55:787-794.

Ch'ng CL, Morgan M, Hainsworth I, Kingham JG. Prospective study of liver dysfunction in pregnancy in Southwest Wales. Gut. 2002; 51:876–80.

Corton, MM, Leveno, K, Bloom, S, Hoffman, B. 2014.Williams Obstetrics 24/E (EBOOK). McGraw Hill Professional.

Cowan, RE, Jackson, BT, Grainger, SL and Thompson, RPH. 1991.Effects of anesthetic agents and abdominal surgery on liver blood flow. Hepatology 14:1161-1166.

David, A. L., Kotecha, M. and Girling, J. C. (2000), Factors influencing postnatal liver function tests. BJOG: An International Journal of Obstetrics & Gynaecology, 107: 1421–1426.

Friedman, LS and Maddrey, WC.1987. Surgery in the patient with liver disease. Med Clin North Am.71(3):453.

Gordon T. Factors associated with serum alkaline phosphatase level. Arch Pathol Lab Med 1993; 117: 187-193.

Lata, I. 2013.Hepatobiliary diseases during pregnancy and their management: An update. International journal of critical illness and injury science. Jul;3(3):175.

Ngai, SH.1980. Effects of anesthetics on various organs. N Engl J Med 1980;302:564-566

Ropponen, A, Sund, R, Riikonen, S, Ylikorkala, O and Aittomäki, K. 2006.Intrahepatic cholestasis of pregnancy as an indicator of liver and biliary diease: A population-based study. Hepatology.43:723–8.

Simko, V. 1991.Alkaline phosphatases in biology and medicine. Dig Dis, 9 : 189-193.

Strunin, L. 1992.Anesthetic management of patients with liver disease. In: Millward-Sadler GH, Wright R, Arthur MJP, eds. Wright's Liver and Biliary Disease. London: Saunders,1381-1393.

Valenzuela, GJ, Munson, LA, Tarbaux, NM. 1987.Time-dépendent changes in bone, placental, intestinal, and hepatic alkaline phosphatase activities in serum during human pregnancy. Clin Chem. 33(10):1801–1806.

Warnes, TW, Hine, P and Kay, G. 1977.Intestinal alkaline phosphatase in the diagnosis of liver disease. Gut,18: 274-279.

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