

Original article :

Study of serum total bilirubin & LDH levels in HIV positive patients

Dr. Ranjit Patil¹, Dr. Prathamesh H Kamble²

¹Professor, Department of Biochemistry, Dr. UlhasPatil Medical College, Jalgaon, Maharashtra, India

² Assistant Professor, Department of Physiology, B J Government Medical College, Pune-1.

Corresponding author: Dr. Prathamesh H Kamble

Abstract:

Abnormal liver biochemistries are a frequent feature of HIV disease hence we carried out this study to assess the significance of biochemical parameters in HIV positive patients. Analysis of liver-associated enzymes may also help focus the diagnostic workup. The present study attempts to assess the following in HIV positive patients –

1. To study whether the liver functions are deranged in HIV positive patients by estimating the serum total bilirubin & LDH levels.
2. Whether or not it can be used as a diagnostic & prognostic tool.

The mean \pm SD serum total bilirubin & LDH in control group was demonstrated to be 0.64 ± 0.09 mg % & 196.6 ± 11.62 IU/L which was found to be increased to 1.17 ± 0.87 mg % ($p < 0.05$) & 275.67 ± 79.3 IU/L ($p < 0.01$) in HIV positive patients. The increase was found to be statistically significant for total bilirubin & LDH. It could be concluded that the liver function tests are deranged in HIV positive patients as compared to control. The deranged serum total bilirubin & LDH levels may identify patients requiring further investigations, thus can be used as a diagnostic & prognostic tool.

Keywords: Total bilirubin; Lactate dehydrogenase; HIV/AIDS.

Introduction

The results of LFTs though rarely diagnostic, may identify patients requiring further investigations. An elevated LD level, combined with abnormal levels of other lab tests, is still valuable in diagnosing liver disorders & many other problems. Impaired biliary excretion may manifest as an elevation of bilirubin, may help as a diagnostic indicator in HIV positive patients. Thus serum bilirubin levels may help in management of patients infected with HIV. Liver biopsy reveals a specific diagnosis in 30% to 80% of patients with AIDS & finding of opportunistic infection or neoplasms in liver biopsy may yield important prognostic information. Serum LDH is no substitute for appropriate microbiological studies. However with further evaluation it may prove to be a

useful test in guiding clinical management of dyspneic patients in whom sputum or bronchial examinations are negative or not immediately available.⁴ Greater levels of this enzyme is little specific, but have a high sensitivity in case of TB & pneumocystosis.⁸

Aims & Objectives: 1. To study whether the liver functions are deranged in HIV positive patients by estimating the serum total bilirubin & LDH levels. 2. Whether or not it can be used as a diagnostic & prognostic tool.

Materials & Methods

The present study on, “Serum Total Bilirubin & Lactate Dehydrogenase Levels in HIV Positive Patients”, was carried out in Department of Medical Biochemistry, Government Medical College,

Aurangabad, Maharashtra, India. Forty HIV positive and 40 healthy & HIV negative control cases were included in the study with mean age [morbid (27 males & 13 females) & control cases (28 males and 12 females)] approximately 35 years.

Inclusion Criteria – HIV positive patients were included.

Exclusion Criteria– Congestive heart failure, jaundice, & hepatomegaly cases were excluded.

The serum samples were collected from the Department of Microbiology after they were confirmed to be HIV positive by the ELISA Recombigen Test & Rapid Capillus Latex Agglutination Test. Blood samples from healthy individuals were collected in the OPD, processed for HIV testing & after confirming HIV negativity the samples were analyzed biochemically. The biochemical investigations were performed on the fully automated analyzer – ErbaSuperstat 919. End Point [Walter &Gerarde] method for total bilirubin &Enzymatic method [Henry et al] for serum LDH estimation were applied.

Total Bilirubin: Bilirubin reacts with diazotized sulphanilic acid to form a colored azo-bilirubin in

strongly acidic solution. Dimethyl sulfoxide (DMSO) is used as accelerator. Conjugated and solubilized unconjugated bilirubin reacts with diazotized sulphanilic acid to produce an acid azobilirubin (absorbance noted at 542 nms).

Total Bilirubin = A(T)/ A(S) * Conc of std (mg %)
[Normal Value = 0.1 – 1.2 mg %].

LDH: Decrease in absorbance due to oxidation of NADH is monitored at 340 nms& is directly proportional to LDH activity.

LDH = Absorbance / min* Factor (8199) [Normal Value = 140 – 300 IU/L].

Statistical analysis used: Statistical analysis was done by applying paired “t” test. Results were presented as mean ± standard deviation (SD).

Results

The mean age of control group including morbid group was calculated to be 35.17 years (22 to 53 years) & 34.65 years (22 to 55 years) [table 1]. The mean ± SD serum total bilirubin (p < 0.05) & LDH (p < 0.01) was found to be increased in HIV positive patients.

Table 1: Mean Age & Sex differentiation in Control & Morbid Group

Group	Mean Age (Years)	No: of Males	No: of Females
Control	35.17	28	12
HIV Positive Cases	34.65	27	13

Table 2: Mean ± SD in Control & Morbid Group

Biochemical Parameter	Max-Min Range [Control]	Max-Min Range [Morbid]	Mean ± SD	
			Control Group	Morbid Group
Total Bilirubin [mg%]	0.8-0.5	0.5-5.5	0.64 ± 0.09	1.17 ± 0.87**
LDH [IU/L]	220-169	622-210	196.6 ± 11.62	275.67 ± 79.3*

* p < 0.01 [Significant] & ** p < 0.05 [Significant] when compared with controls.

Discussion

The mean ± SD serum total bilirubin & LDH in control group was found to be 0.64 ± 0.09 mg % & 196.6 ± 11.62 IU/L which was found to be increased to 1.17 ± 0.87 mg % & 275.67 ± 79.3 IU/L in HIV positive patients. The increase was found to be statistically significant for both total bilirubin (p < 0.05) & LDH (p < 0.01). 32.5 % of HIV positive patients had serum bilirubin level above the upper limit of normal whereas 12.5% of patients had serum LDH levels above the upper limit of normal.

The elevation of serum bilirubin levels in HIV positive patients may have been due to abnormalities of biliary tract including intra and extra hepatic sclerosing cholangitis, papillary stenosis, & acalculous cholecystitis. The infecting organisms are usually Cryptosporidia, Cytomegalovirus, or Microsporidia. The infective agent probably involves vascular endothelium, causing ischemic vasculitis and bile duct damage. Impaired biliary excretion may manifest as an elevation of bilirubin and along with serum LDH may help as a diagnostic indicator in HIV positive patients. Thus serum bilirubin levels may help in the management of patients infected with HIV.

Glasgow B. et al (1985) found normal serum bilirubin in AIDS patients infected with

Mycobacterium aviumintercellulare, Cytomegalovirus, & Kaposi’s sarcoma.³Dworkin B., et al (1987) stated that, during the course of AIDS, only 13% of patients had total serum bilirubin level of greater than 3 mg % [initial results = Total Bilirubin = 0.7 mg/dL & LDH = 445 IU/L].²Most of the studies included AIDS patients with *Pneumocystis carinii* infection, which is a common occurrence in patients with AIDS, like studies by Valencia ME et al (1994) [LDH = 460 IU/L], Tanaka A et al (1993), & Grover SA et al (1992) which stated that serum LDH increase may be caused by *Pneumocystis carinii* infection. The serum LDH levels were found to be elevated in all these studies. 63% of patients with *Pneumocystis carinii* infection, which is a common occurrence in AIDS patients, had elevated LDH levels (Opravil M et al 1994).⁵ Serum LDH was significantly higher among *Pneumocystis carinii* pneumonia patients than in patients without PCP (mean 423 IU/L versus 234 IU/L) (Grover SA et al (1992)). They concluded that serum LDH is strongly associated with the presence of PCP among AIDS patients.⁴

Vaccher E et al (1996) stated that serum LDH level was an independent predictor of shortened survival.⁷ Wilcox C. M. et al (1996) stated that magnitude & pattern of liver test abnormalities in

those with HIV infection can help distinguish cholestatic from hepatocellular lesions but taken alone do not indicate a specific diagnosis. The majority of these patients had no identifiable biliary or hepatocellular disease. Serum bilirubin levels are usually normal so that jaundice from cholangiography alone is extremely unusual.⁹ Amrapurkar DN, Rathi PM et al (1997) found serum bilirubin levels to be elevated in 13 % of HIV positive patients.¹In HIV positive patients serum LDH levels may be a marker of hepatic infection. The estimation of LDH may prove to be a useful test in guiding the clinical management of HIV infected patients with *P carinii* pneumonia.

Conclusion

Both serum total bilirubin & LDH levels were found to be deranged, i.e. predominantly elevated, in HIV

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positive patients. Both of these may serve as a prognostic indicator, since HIV positive patients with highly elevated levels of these parameters had a poor prognosis. The presence of a marked elevation of serum total bilirubin & LDH helps to identify patients requiring further investigations such as USG, liver biopsy, & ERCP. Thus HIV positive patients with predominantly elevated serum total bilirubin & LDH levels should undergo further investigations, thereby leading to a diagnosis of particular infecting organism. Therefore it could be concluded that serum bilirubin & LDH levels may help in management of patients infected with HIV & may be a useful parameter in diagnostic workup in HIV positive patients.