DISCUSSION
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The liver is an active site of protein synthesis under normal conditions. The liver is responsible for the synthesis of the serum proteins, excepting the immunoglobulins (Gordon & Humphrey, 1960; Martin & Nouburger, 1957 and Miller et al., 1954). In chronic inflammatory diseases of the liver, serum gamma globulins rise two or more times to normal. This increase is not due to a greater synthesis by liver cells but the littoral cells responding to the injury. The concurrent decrease of serum albumin is a measure of liver damage and reflects diminished synthesis (Osborn and Takatsuki, 1953). The clinical application of electrophoretic fractionations of serum proteins in hepatic disorders was first established by Gray & Barron, 1943. Subsequently extensive studies were done on serum proteins by this technique (Brauto, C., 1951; Demoulenacar, 1961 and Martin, 1946). These workers recognised the characteristic patterns of serum proteins in hepatic disorders. Similarly the circumstances, primarily responsible for accumulation of ascites, remain speculative, despite the recognition of several
potentially relevant disorders of hydrostatic or osmotic equilibrium in hepatic diseases. Keeping this view in picture, electrophoresis of ascitic fluid was carried out to see any correlation of ascitic fluid protein changes with that of serum proteins alterations in hepatic disorders.

I. ELECTROPHORETIC PATTERN OF SERUM PROTEIN IN CIRRHOSIS LIVER.

In cirrhosis, significant diminution of the mean concentration of total serum proteins, serum albumin and alpha globulins and a rise of beta and gamma globulins are well known changes. These findings were reported for the first time by Gray & Barron (1943). Subsequently other workers also reported similar findings (Martin et al., 1941; Post & Patek, 1942; Wuhrmann & Underly, 1960; Cohen & Gordan, 1962 and Anderson, 1964). In the present study the total serum proteins were low in comparison with control group and diminution was significant ($P \leq 0.001$). Similarly significant decrease in the level of serum albumin ($P \leq 0.001$) was noted. The raised levels of alpha globulins were noted but the difference was insignificant
statistically ($P \geq 0.05$). The beta globulin was not raised instead showed tendency to decline, although insignificant statistically ($P \geq 0.05$). The gamma globulin level was above normal and the difference was significant ($P \leq 0.01$). The decrease, though insignificant statistically in beta globulin, might be due to poor separation between beta and gamma globulins. The beta-gamma bridging i.e. lack of demarcation between beta and gamma globulins peaks described as a characteristic feature of the electrophoretic pattern in hepatic cirrhosis (Berg et al., 1961; Gaschka et al., 1958; Wahrman et al., 1960 and Zimmerman et al., 1957). Seroussi and Vaucamps, 1961 and Tomasi et al., 1965 explained these findings on the basis of four fold increase in the concentration of immunoglobulin IgA as compared to only two fold increase in the concentration of immunoglobulin IgG.

II. IMMUNOGLOBULIN IN CIRRHOSIS LIVER

The hypergammaglobulinemia as noted above in cirrhosis liver is likely to be a part of immunological response (Cohen, 1963). The antibodies against the cell nuclei (Doniach, Roitt Walker and Sherlock, 1969) Mitochondria (Walker & Sherlock, 1965) Smooth muscle (Johnson Holbrook, 1965) are only few antibodies produced
in chronic liver disease. The raised levels of IgG and IgA were reported in cirrhosis liver by various workers (Maclachlan et al., 1965; Feizi, 1965 and Deicher et al., 1949). The very high level of IgA was reported in alcoholic cirrhosis by Nckelvey & Fahey, 1965 and Lee, 1965. In the present work the high levels of immunoglobulins IgG (\( P \leq 0.05 \)) and IgA (\( P \leq 0.001 \)) were noted. The immunoglobulin IgM level was decreased in comparison with control group. The difference in IgM level was not significant statistically (\( P > 0.1 \)). These findings were similar as reported by other workers (Fahey & Sherlock, 1968).

III. ELECTROPHORETIC AND IMMUNOLOGICAL CHANGES IN ASCITIC FLUID.

The immunoelectrophoretic studies confirmed the presence of nearly all the plasma proteins in ascitic fluid, due to cirrhosis liver (Szabo et al., 1963; Schultz and Heremans, 1966). They also reported slightly increased concentration of albumin and alpha globulins fractions in ascitic fluid as compared to plasma. The beta and gamma globulins were also present but in lower concentration as compared to plasma. In the present study the albumin level was almost identical in serum and ascitic fluid i.e. 29.6% and 30.5% respectively. The beta and gamma globulins were in the
concentration of 14.5% and 28.8% in ascitic fluid as compared to 13.1% and 34.5% in serum respectively. This amply support the view that ascitic fluid contains all the fractions of plasma proteins in same proportions in dilute form.

All the three major immunoglobulins (IgG, IgM and IgA) were found in ascitic fluid. Chodirker and Tomasi (1963) reported that IgA and IgG ratio was always less than one in internal secretions such as pleural fluid ascitic fluid, amniotic fluid and synovial fluid. The IgA here is not of secretory type and the IgG and IgA ratio is similar to plasma that is approximately 5 : 1. In the present study all the three immunoglobulins were found in ascitic fluid. The IgG and IgA ratio was 1.4 : 1 in ascitic fluid as compared to 3.3 : 1 in plasma respectively. Thus slightly higher ratio of IgA was noted in ascitic fluid.

CHRONIC PERSISTENT HEPATITIS AND ELECTROPHORETIC FRACTIONS OF SERUM PROTEINS

In patients of chronic persistent hepatitis, the low concentration of total serum proteins and that of serum albumin were reported by Willeox and Bacher (1961) and Celzayd & Kirsner (1967). The alpha proteins levels were not altered much, the beta and gamma
globulins levels were raised above normal in consistent with other chronic inflammatory disorders of liver, as reported by Martin (1946), Cutman (1948) and Ricketts (1949) & Sunderman (1963) also reported diminution of serum albumin, slightly raised level of beta globulin and raised level of gamma globulin. In the present work, the total serum proteins and serum albumin were significantly low (p < 0.01) and (p < 0.001) respectively. The alpha globulin concentration was slightly higher as compared to control subjects, but the difference was insignificant (p > 0.5). The beta globulin level was low but difference was insignificant (p > 0.1). The gamma globulin level was found to be raised. The difference, however, was insignificant (p > 0.5).

SERUM IMMUNOGLOBULINS IN CHRONIC PERSISTENT HEPATITIS

The serum immunoglobulins profile was altered in chronic persistent hepatitis. The raised IgG level was reported by Nienson et al. (1950). Fakuda et al (1979) reported that IgG and IgA levels were raised, while IgM level was within normal limits. The increase in all three class of immunoglobulins were reported by Lee (1965) and Reizl (1968). In present study the raised levels of IgG and IgA were noted but the difference
was statistically significant only in IgA class (p < 0.05). The immunoglobulin IgM level was almost identical with control group and the difference was insignificant (p > 0.5).

CIRRHOSIS, ACTIVE HEPATITIS AND ELECTROPHORETIC
FRACtIONATION OF SERUM PROTEINS

The hypergamma-globulinaemia is the characteristic feature of this syndrome. Zimmerman and associates, who first described this syndrome in (1957), suggested that marked hypergamma-globulinaemia indicating increased production of anti-liver proteins and hypothesized that the syndrome represented a auto-destructive process. Born (1950) and Kunkel et al (1957) reported 26 instances of this syndrome with hypergamma-globulinaemia. The gamma globulin peak characteristically was a broad band which was attributed due to increase in all the immunoglobulins (Zimmerman et al., 1957). In the present work the total serum proteins and serum albumin were significantly low (p values < 0.001 and < 0.01 respectively. The alpha globulins were low but the difference was insignificant. The beta globulin was also low but difference was not significant (p > 0.1). The gamma globulin level was raised but difference was not significant (p > 0.5). In this study the population of this
group was small, so nothing can be commented about the statistically insignificant rise of gamma globulin.

**SERUM IMMUNOGLOBULINS IN CHRONIC ACTIVE HEPATITIS**

Lee (1968), Miescher (1966) and Deicher et al (1969) reported high levels of IgG and less striking increase in IgM and IgA levels in serum. While other workers like Machlachlan et al (1965) and Peiiz (1969) reported no increase in the level of IgA while IgG and IgM were raised. An increase of IgM particularly after steroid therapy was reported by Wellheim (1957). An increased number of immunoglobulin producing cells were found in the presence of piecemeal necrosis and lymphoid infiltrates (Nadziyannis et al., 1969).

In the present study all the immunoglobulins (IgG, IgM and IgA) were found to be raised, but IgG level was significantly higher ($P \leq 0.01$). The difference in IgM and IgA level was insignificant ($P > 0.5$ and $70.1$ respectively).