EVALUATION OF ACUTE PHASE REACTANTS AS INDICATORS OF ACTIVITY IN LEPROSY

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Acute phase reactants i.e. ESR, C-reactive proteins, alpha-1 antitrypsin, complement (C3), and circulating immune complexes were evaluated in relation with the activity of the disease in leprosy. Levels of all the acute phase reactants were significantly raised during the active phase (LL and ENL), while these were normal during the arrested phase of the disease. Appearance of circulating immune complexes also followed the same pattern. It is concluded that raised levels of ESR, C-reactive proteins, alpha-1 antitrypsin, complement (C3) and circulating immune complexes suggest active phase (LL, ENL) of the disease in leprosy.

Key words : Leprosy, Activity, Acute phase reactants.

Differentiation between active and arrested (fully treated) disease is of paramount importance, especially when it is leprosy. Various methods/criteria, besides the specific histopathological (skin scrapings for AFB or skin biopsy), non-specific immunological i.e. acute phase reactants are being evaluated for indicating the disease activity. With better understanding of the immuno-regulatory mechanisms in the recent past, the acute phase reactants need a second look for their utility. The present work has been done to study as to how far the acute phase reactants are helpful in ascertaining the activity of the disease process.

Materials and Methods

Clinical material comprised of 20 patients having active lepromatous leprosy (LL), 20 patients having ENL, and 10 burnt out or fully treated lepromatous leprosy patients.

The results were compared with 50 healthy, sex, age and socio-economic status matched individuals. All disorders affecting temporary or permanant changes in the immunological parameters were excluded by necessary clinical and biochemical investigations.

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All these cases underwent the following investigations : Fasting ESR by Westergren's tube method,[1] C-reactive proteins,[2] Alpha-1 antitrypsin,[2] Complement C2, C3, C4,[2] and for circulating immune complexes (cryoprecipitate[3] and PEG technique[4]).

Results

Fasting ESR was raised in LL (60 mm) and ENL (70 mm) and normal (18 mm) in the arrested group. There was no statistically significant difference between LL and ENL. C-reactive protein (CRP) was positive in 60% of LL and ENL cases and negative in the arrested group. Alpha-1 antitrypsin levels were significantly raised in LL (400 mg%) and ENL (410 mg%), and normal in the arrested group (200 mg). Serum complement levels of C2 and C4 were normal in all the groups, but levels of C3 were significantly raised in LL (375 mg%) and ENL (291 mg%), and normal in the arrested group (70 mg%). Circulating immune complexes (CIC) were detected in 60% of LL patients, 90% of ENL and 10% of the arrested LL patients.

Comments

Present day knowledge of the immuno-regulatory mechanisms in leprosy has far reaching implications in its diagnosis and management. Assessment of on-going inflammation in terms of its activity or control is now possible with

the help of simple investigations based on this knowledge. Presence of acute phase reactants in serum, though non-specific, is an indicator of active inflammation, the levels declining or normalising with subsidance of activity. Fasting ESR, if considered in isolation, is a highly non-specific test. When considered along with other acute phase reactants however, raised levels accompanied active disease and near normal levels, arrested disease. C-reactive proteins, the appearance of which denotes acute inflammation with macrophage activation were present in active disease only, an experience also shared by others.[5,6] Levels of alpha-1 antitrypsin, the protease inhibitor which is released during the active phase of an illness to counteract various exogenous as well as endogenous proteases, were higher during active disease and normal in the arrested state, as also reported by others.[7,8] Normal levels of C2 and C4, with raised C3, indicate alternate pathway of complement activation, though Seitz et al[9] reported classical pathway activation in ENL which has later been disputed. Malaviya et al[5] reported normal C3 levels in LL and Bhushan Kumar[10] decreased levels in BL, implying that complement is consumed during inflammation in leprosy. However, no case of active disease with complement deficiency was observed by us. The levels of C3 were normal in arrested cases, as others[11] have also reported decreasing levels of C3 during recovering reactions. The rise in C3 occurs as a part of acute phase reactants and returns to normal with cessation of activity. Thus ESR, CRP, A-1AT and C3 levels are significantly elevated in active stage of the disease and normalise in the arrested stage (Table 1). Circulating immune complexes were significantly more frequently demonstrable in the active phase and absent in the arrested phase, as also has been reported by others.[12]

Table I. Disease activity and acute phase reactants.

Group	Number of cases	ESR (mm)	CRP (%+)	A-1 AT (mg%)	C3 (mg/100ml)	CIC (%+)
Control	50	20±10	0	200±80	95±25	0
LL	20	60±10	60	400±100	375±175	60
ENL	20	70±10	60	410±90	291±103	90
Arrested	10	18±15	0	200±70	70±40	10
Control Vs. Arrested		N.S.	N.S.	N.S.	N.S.	N.S.
Control Vs. LL		<0.05	<0.001	<0.001	<0.001	<0.001
Control Vs. ENL		<0.05	<0.001	<0.001	<0.001	<0.001

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