In previous studies, laser nephelometry was found to be a sensitive and well reproducible method to quantitatively determine various serum proteins in plasma as well as in other body fluids. The principle of this method is the reaction of monospecific antisera against immunoglobulins and other serum proteins with the corresponding antigens. Under appropriate conditions, immune complexes are formed in vitro. These cause light scattering of a helium neon laser-beam which can be measured with a sensitive photometric system.

Recently, a new method has been developed to determine anti-gammaglobulin factors in the serum. This is a modification of the original test principle. The concentration of anti-gammaglobulin factors in the serum is determined using defined antigens of human serum. The test system offers purified heat-aggregated human IgG. This test system has been characterized by Schmolke et al. as well as Husmann et al. as a reliable and well reproducible method to determine anti-gammaglobulin factors. Interestingly, the results obtained indicated a higher sensitivity of this test as compared to all other conventional methods.

Schedel et al. have described that sera from patients with multiple myeloma contain anti-gammaglobulin factors. In order to find out whether these are identical with the anti-gammaglobulin factors found in rheumatic diseases, we applied this laser nephelometric method to study sera from patients with monoclonal gammopathies. In addition, we attempted to characterize these rheumatoid factors immunologically.

MATERIALS AND METHODS

All experiments were performed using the laser-nephelometer PDQ. The helium-neon laser-beam has a wavelength of 632.8 nm. The angle of 31.8° used in

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Key-words: Laser nephelometry; Paraproteinemias; Plasma proteins; Rheumatoid factors.

RHEUMATOID FACTORS IN PARAPROTEINEMIAS

Fig. 1: Technical principles of the laser-nephelometer PDQ used in these studies.

this test has been found to be most sensitive for measuring light scattering by immune complexes (fig. 1). The results obtained can directly be read from the digital indicator system of the laser-nephelometer. Monospecific antisera, buffer solutions, reagents and the necessary glass cuvettes as well as normal standards were commercially supplied.

Sera from 175 patients with the immunochemically secured diagnosis of a monoclonal gammapathy were tested. The clinical diagnosis was multiple myeloma or Waldenström’s disease. The reactions of sera from patients with IgG, IgM, IgA and IgD paraproteinemias were compared with those of 20 normal control sera as well as 20 sera from patients with rheumatoid arthritis. After heat inactivation sera were diluted using filtered 0.15 mol NaCl-solution; 0.1 ml of rheumatoid factor containing patients’ sera were diluted with 1.0 ml of normal saline. After adding 0.2 ml of antigen, the solution was incubated for 20 min at room temperature. Thereafter the light scattering was measured using the laser-nephelometer PDQ. For comparison, all sera were tested for anti-gammaglobulin factors using the latex agglutination test (Behring Institut) and the Waaler-Rose test.

RESULTS

Studies on 175 sera from patients with various paraproteinemias using 2 different agglutination tests as well as laser nephelometry (laser RA-test) for anti-gammaglobulin factors gave in 60 cases positive results (34%). As demonstrated in tab. 1, in most instances laser RA-test positive reactions were accompanied by