Comparative investigations on vitamin A level of plasma in some rheumatic diseases

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SUMMARY The vitamin A levels in the plasma of patients suffering from rheumatoid arthritis, ankylosing spondylitis, spondylosis, ankylosing hyperostosis (whether or not connected with diabetes) were investigated. Somatically healthy neurotic patients and patients suffering from diabetes without rheumatological problems served as controls. It was found that the retinol level of plasma decreased in patients of both sexes suffering from rheumatoid arthritis and clinically active ankylosing spondylitis, but increased in female patients suffering from ankylosing hyperostosis connected with diabetes, and also in the diabetes group. The retinyl-esters content of plasma decreased in the rheumatoid arthritis group and increased in female patients suffering from spondylosis and in the clinically inactive ankylosing spondylitis group. The total vitamin A content changed only in the rheumatoid arthritis group where a lower level was found compared to a somatically healthy control group.

Key words: Rheumatoid Arthritis, Spondylosis, Ankylosing Spondylitis, Ankylosing Hyperostosis, Vitamin A.

INTRODUCTION Numerous factors affect the vitamin A level in the plasma. Of these factors the immune and/or endocrine system are of importance. Dietary vitamin A and its provitamins (carotenoids) are absorbed through the intestinal tract and via lymph chilomicros and/or portal vessels transported to the liver mainly in the form of retinyl-esters. The biologically active form of vitamin A present in many tissues is retinol (6). Many of the rheumatic diseases are accompanied by inflammation which affects the immune system (13). The activation of the immune system also had an effect on the transport of vitamin A (5) as well as on the conversion of retinyl esters to retinol (17). Some earlier investigations have shown that rheumatoid arthritis (3,5,7,10,11), osteoarthritis (3,10,11), ankylosing spondylitis (11,14) and ankylosing hyperostosis (1,11,16) have an effect on the vitamin A level of plasma.

The aim of this study was to collect data on changes in vitamin A metabolism and transport in rheumatic diseases as well as to investigate the effect of inflammation on this process.
MATERIALS AND METHODS

Patients

Group I. Patients suffering from rheumatoid arthritis (25F/25M). Their functional status according to Steinbrocker’s grade was in the 2nd to 3rd class and met the ARA criteria. Latex and Waaler-Rose tests were positive. The RF titres were higher than 10U/ml.

Group II. Male patients (n=25) suffering from clinically active ankylosing spondylitis (ESR values higher than 35 mm/h).

Group III. Male patients (n=20) suffering from clinically inactive ankylosing spondylitis (with ESR values lower than 20 mm/h). Patients in Group II and III were diagnosed in accordance with the New York Criteria for ankylosing spondylitis (8).

Group IV. Patients suffering from spondylosis (20F/20M). Latex fixation tests were negative in this group.

Group V. Patients suffering from ankylosing hyperostosis and diabetes mellitus (10F/10M). Ankylosing hyperostosis was diagnosed by a two-direction X-ray of the vertebral column and also according to clinical symptoms (rigid vertebral mobility). Diabetes mellitus was diagnosed using the glucose tolerance test.

Group VI. Patients suffering from ankylosing hyperostosis (15F/15M) but in whom diabetes was not diagnosed.

Group VII. Somatically healthy subjects (15F/15M) hospitalised for neurotic problems.

Group VIII. Patients suffering from diabetes mellitus (20F/20M) but without clinical symptoms of rheumatological problems and negative X-rays of vertebral column.

Immunological and Chemical Methods

Latex fixation tests were carried out using the Gamma Latex Reagent Kit (Human Institute for Serobacteriological Products and Research, Budapest). The Waaler-Rose test was made using the Cellognost-RF Reagent Kit (Behringwerke, Marburg). For the chemical determinations, blood was taken from the antecubital vein by venipuncture after 12 hours of fasting. The plasma was separated from the cells within 4 hours after blood taking. Until this point of time the serum vitamin A derivatives did not change as has been reported earlier (9). Separation of vitamin A derivatives (retinol, retinyl-esters) was made according to Vahlquist (18) and their quantity was measured with trichloroacetic acid colour reagent (2). The retinyl-esters were standardised in form of retinylacetate. Significance values were calculated with the Student "t" test.

RESULTS

It was found that age did not differ significantly in all the patient groups as compared to the control group.

The retinol content of serum was significantly lower in the RA group (I) as compared to the control group (VII). Similar changes were found in patients suffering from clinically active ankylosing spondylitis (II). The retinol content of the plasma was significantly higher in female patients suffering from ankylosing hyperostosis and diabetes (V) and also in the female patient group suffering from diabetes (VIII) compared to the controls (VII). Among other groups the differences were not significant. It must also be noted that the control (normal) value of retinol in plasma of female patients was lower than in the male patients.

The retinyl-esters content of the plasma was significantly higher in female patients suffering from ankylosing hyperostosis and diabetes (V) and also in the female patient group suffering from diabetes (VIII) compared to the controls (VII). Among other groups the differences were not significant. It must also be noted that the control (normal) value of retinyl-esters content of plasma was significantly lower in patients of both sexes suffering from RA (I) as compared to the controls (VII).

The total vitamin A content of plasma