Insulin-like growth factor-I in rheumatoid arthritis: Associations with physical activity levels and disease activity

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Presented by

Hanan Mohamed Mohamed Fathi
M.B. ; B.Ch. , M.Sc.

Supervised by

Prof. Dr. Nabila Abdel-Hamid Gohar
Professor of Rheumatology and Rehabilitation
Faculty of Medicine, Cairo University

Prof. Dr. Fawzi Ahmed Halawa
Professor of Medical Biochemistry
Faculty of Medicine, Cairo University

Dr. Sahar Fakhreldin Mohamed
Assistant Professor of Rheumatology and Rehabilitation
Faculty of Medicine, Cairo University

Faculty of Medicine
Cairo University
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Abstract

Purpose: To evaluate the Insulin-like growth factor-I status of patients with rheumatoid arthritis and to assess the relative importance of factors such as age, sex, occupation, habitual physical activity. Also to determine if altered Insulin-like growth factor-I (IGF-I) in RA is due to inflammation, altered body composition, or lack of exercise.

Methods: This study comprised sixty- nine patients. They were divided into 2 groups; group I : thirty adult patients suffering from rheumatoid arthritis (twenty-two female patients and eight male patients) diagnosed according to the proposed 1987 criteria revised American Rheumatism Association criteria for RA(Arnnett et al., 1988). Group II: thirty-nine patients with non-inflammatory disorders(twenty four patients having knee osteoarthritis; nineteen female patients and five male patients according to the criteria of (Altman et al., 1986),and fifteen female patients having fibromyalgia according to ACR criteria,1990 (Wolfe et al., 1990). Patients were matched with twenty age and sex healthy controls (Group III). They were all subjected to:

- Full history taking with special emphasis on information about habitual level of physical activity using Physical activity scale score (Jackson and Ross,1992) and Food frequency questionnaire (Narins, 1992).
- Full clinical, general and musculo-skeletal examination to determine any organ involvement, functional status and disease activity.
- Body fat composition: measuring the skin fold thickness, percentage body fat in addition to different body measurements.
- Routine laboratory investigations to assess any disease activity, and laboratory detection of Insulin-like growth factor-I (IGF-I) in serum using radioimmunoassay (RIA).

Results: Thirty adult patients suffering from rheumatoid arthritis (RA) were included in this study.Their ages ranged between 27 and 63 years old with a mean of 44.7±10.2 years. They were twenty-two female patients with age ranged between 27 and 63 years old with a mean of 41.7±9.8 years. and eight male patients with age ranged between 28 and 62 years old with a mean of 56.6±4.2 years.

Modified HAQ was ranged between zero and 2.5 with a mean of 0.8±0.549. Disease activity of RA patients was examined according to both Mallya and Mace index (Mallya and Mace, 1981) and also Simplified Disease Activity Index (SDAI) (Smolen et al., 2003) and were found to have mostly from mild to moderate disease activity. Physical activity score was ranged from 0 with a maximum of 2.Triceps skin fold thickness (TSF) ranged between 8mm and 39mm with a mean of 21.7 ±8.3. Body mass index (BMI) ranged between 20.3 and 43.2 with a mean of 27.97 ±5.4. Regarding to their percentage of body fat , it ranged between 17% and 48% with a mean of 31.66 ±7.2. IGF-1 was ranged between 60 and 376 ng/ml with a mean of 165 ±84.5 ng/ml. All the patients and healthy controls were matched according to their sex and age. Patients showed a low level physical activity and exercise with ($p < 0.001$), a high % body fat ($p = 0.009$) and lower levels of IGF-1 with ($p=0.04$) in both patient's groups when compared to the control group . % of body fat was highest in non –RA group with a mean of 37.2±8.1%, followed by the control group with a mean of 32.28±6.7% and was lowest in RA group with a mean of 31.6±7.2%. Also, IGF-I was highest in control group with a mean of 213±53 ng/ml, followed by the non –RA group with a mean of 201±75 ng/ml and was lowest in RA group with a mean of 165±84 ng/ml. The lowest physical activity score was in non –RA group , then the RA group and higher scores in the control group. In comparisons done between one group versus each of the two groups; When The RA group was compared to both the non RA group and the control group in relation to IGF-1 it showed a significant values with ($P=0.04$) and ($P=0.03$) respectively. Physical activity score was of significant value in between all groups with ($P< 0.01$) . Percentage of body fat was of significant value ($P=0.004$) between the RA group and Non RA group but no significant values were detected between the RA group and the control group ($P= 0. 8$). Also no significant relations were detected when assessing disease activity in rheumatoid arthritis using multivariate Mallya and Mace disease activity index or Simplified disease activity index (SDAI) in relation to IGF-I.When correlation was done between detailed physical activity score as being assessed by Physical activity scale score (Jackson and Ross,1992), a significant positive value was detected with IGFI ($P= 0.04$) in our RA patients.

Conclusion: Low levels of Insulin-like growth factor-I (IGF-I) in RA is most probably due to lack of programmed recreation exercise or regular heavy physical exercise.

Keywords: Body cell mass; percentage body fat; RA, IGF-I; C reactive protein.