



An Evaluation of Spinal Deformities and Quality of Life in Male Patients with Ankylosing Spondylitis

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Abstract

Objective: Posture is a combination of the positions which is taken by the joints in every movement of the body. The aim of this study is to determine the spine deformities by posture analysis in patients with ankylosing spondylitis, and, additionally, to evaluate the effects of these deformities on daily life activities and patients' quality of life.

Material and Methods: Thirty patients with ankylosing spondylitis and thirty healthy subjects were included in the study. Posture analysis, through SF-36, and Beck Depression Inventory were applied to all individuals. Shortening of muscles and muscle strength were evaluated.

Results: An increase in thoracic kyphosis, a decrease in lumbar lordosis, deformities of round shoulder, genu valgum and pes planus were significantly prominent in the AS group compared to the healthy group. In both groups, no significant differences were found between means of their body mass index, increased cervical lordosis, low shoulder, and genu varum. There was a decrease of muscle strength and an increase of shortening of muscle in certain muscle groups. It was determined that quality of life in AS patients was negatively affected by posture.

Conclusion: The physiologic and psychological status of patients with ankylosing spondylitis affects their quality of life because of the abnormal posture and weakness of the muscles resulting from the limitation of movement. The patients did not have enough information on their disorders and did not take care of the importance of the disease.

Key Words: Ankylosing Spondylitis; Posture Analysis; Quality of Life.

Ankilozan Spondilit'li Erkek Hastaların Omurga Deformitelerinin ve Günlük Yaşam Kalitesinin Değerlendirilmesi

Özet

Amaç: Postür, vücudun her hareketinde eklemlerin aldığı pozisyonların birleşimidir. Çalışmamızın amacı; Ankilozan Spondilit'li (AS) hastalarda postür analizine bakılarak omurga deformitelerinin belirlenmesi ve bunların AS'li hastaların günlük yaşam aktiviteleri ve kalitesi üzerine nasıl bir etkiye bulunduğu araştırılmasıdır.

Gereç ve Yöntem: Çalışmaya 30 AS'li ve 30 sağlıklı birey alındı. Tüm bireylere postür analizi, SF-36 yaşam kalitesi değerlendirme anketi ve Beck Depresyon ölçeği uygulandı. Kaslarda kısalık ve kas kuvveti değerlendirildi.

Bulgular: Postür analizi değerlendirmesi sonucunda hasta bireylerin torakal kifoz artışı, lumbal lordozda azalma, yuvarlak omuz, genu valgum ve pes planus deformitelerinin anlamlı oranda arttığı gözlemlendi. Vücut kitle indeksi ortalamaları ile postür analizi sonuçlarından servikal lordozda artış, düşük omuz ve genu varum açısından anlamlı bir fark bulunmadı. Belirli kas gruplarında ise kas kuvvetinde azalma ve kas kısalığı tespit edildi. Ankilozan spondilit'li hastalarda yaşam kalitesinin postüre bağlı olarak olumsuz etkilendiği belirlendi.

Sonuç: Ankilozan spondilit'li hastalarda postürün bozulduğu, kaslardaki kısalığın hareketleri sınırlandırdığı ve buna bağlı olarak ortaya çıkan kas zayıflamasından dolayı yaşam kalitesinin düştüğü düşünülmektedir. Ayrıca eğitim seviyesi düşük olan bireylerin, hastalık hakkında yeterli bilgiye sahip olmadığı ve gereken önemi göstermedikleri görülmektedir.

Anahtar Kelimeler: Ankilozan Spondilit; Postür Analizi; Yaşam Kalitesi.

INTRODUCTION

Primarily involving the spine, ankylosing spondylitis (AS) is a disability-causing inflammatory rheumatic disease with pain, disfigurement, and activity limitation. In the early period, it basically effects the sacroiliac joints causing possible peripheral joint involvement in the subsequent periods. AS may be accompanied by extra-skeletal complications such as acute anterior uveitis, aortic insufficiency, cardiac conduction defects, pulmonary fibrosis in the upper lobes, neurological

involvement, and secondary renal amyloidosis (1-3). Spinal posture changes often start in early stages and in time they become easier to identify. Finally, the patient can only stand in a forward leaning position and cannot stare horizontally. Once there is a decrease in lumbar lordosis with increased thoracic kyphosis and anterior tendency of the head, activities of daily living such as communicating, driving, going out, and maintaining personal hygiene are restricted (4-6).

Posture is the combination of body positions taken in every movement of the joints. In other words, it is the

optimal positioning of every part of the body in accordance with the adjacent segments and the rest of the body. With the help of the analyses made by using the pendulum method, we can evaluate the effects of AS disease on people (7-9).

In this study, we aim to determine the differences between AS patients and healthy control group patients in terms of spinal deformity, the effect of spinal deformity on the quality of life, and, following the posture analysis we conducted, shortening of the muscles and muscle strength.

MATERIAL AND METHODS

This study was carried out with 30 patients who were diagnosed with AS and 30 healthy volunteers. The study commenced after we acquired the approval of Inonu University Human Ethics Committee (2010/36). For this purpose, we selected our patients from among male AS patients between 20 and 45 years of age who applied to Inonu University Turgut Ozal Medical Center Physical Therapy and Rehabilitation outpatient clinic for follow-ups. Our patients had no cognitive or mental problems, surgical history or any other neurological deficits. Primarily an observational analytical study, our research was conducted March 2010 through September 2011. All our patients were informed about the study in advance and we collected consent forms from each of them. Patients went through posture analyses through pendulum method. The pendulum rope used in this method is expected to pass on from specific points in an upstanding person who does not have any problems. The deviation on these points indicates posture disorders (7). In addition, we also applied muscle strength and muscle shortness evaluation tests. To measure the muscle strength test, we made use of Dr Robert W. Lovett's manual muscle test due to the fact that it is widely used and clinically validated (7). Muscle length was determined according to the anthropomorphic criteria (10). Moreover, all individuals took a questionnaire to collect information regarding their socio-demographic background.

We applied Short Form-36 (SF-36) scale in order to assess the quality of life of individuals enrolled in the study. SF-36, made up of 36 questions, allows us to evaluate patient's physical function, social function, physical role limitations, emotional role limitations, mental health, energy, and the eight dimensions of pain and general health perception. Subscales assess the

health between 0 and 100, 0 indicating poor health status, and 100 indicating the best health status (11,12). In addition to that, we asked our patients to take Beck Depression Inventory, a self-rated scale which was developed by Beck et al. to assess somatic, emotional, and cognitive symptoms of depression through 21 symptom categories (13).

For the eligibility of quantitative variables for a normal distribution, we performed Kolmogorov-Smirnov test. To compare the qualitative variables in AS groups and control groups, we made use of the Yates's-corrected chi-square test and Fisher's exact chi-square test; as for the quantitative variables we conducted the Mann-Whitney U-test; and finally, we applied the t-test for independent cases. Quantitative variables are expressed as mean \pm standard deviation ($\bar{x} \pm SD$) while qualitative variables are given in percentages (%). In all tests, the statistical significance level was considered to be $p < 0.05$.

RESULTS

50% of the AS patients in the study were between the ages of 20-35, while the remaining 50% were between the ages of 36-45. In the healthy control group, 60% were between 0-35, and the 40% were between 36-45. In the AS group, 3.3% were illiterate, 10% were primary school graduates, 23.1% were secondary school graduates, 26.3% were high school graduates, and 36.3% had university degrees. In the control group, 3.3% were primary school graduates, 16.6% were secondary school graduates, 23.1% finished high school, and 56.1% were university graduates. 10% of our AS patients are unemployed, 50% worked at state institutions, 33.3% were self-employed, and 6.7% were students. Among the healthy individuals, 3.3% were unemployed, 66% worked at state institutions, 26.4% were self-employed, and 3.3% were students.

After the posture analysis conducted through pendulum method, we observed the following in our patients: increased thoracic kyphosis, decrease in lumbar lordosis, rounded shoulders, and notable increase in genu valgum and pes planus deformities (Table 1).

However, posture analysis did not provide us with significant difference between the groups in terms of cervical lordosis increase, low shoulders, and genu varum ($p > 0.05$).

Table 1. Postural analysis results of patient and control groups

Variables	Patient Group n(%)	Control Group n(%)	p
Increase in thoracic kyphosis	30 (100,0)	17 (56,6)	<0,05
Decrease in lumbar lordosis	22 (73,3)	0 (0)	<0,05
Rounded shoulders	29 (96,6)	15 (50,0)	<0,05
Genu valgum	18 (60,0)	5 (16,6)	<0,05
Pes planus	17 (56,6)	5 (16,6)	<0,05

A significant decrease was detected ($p < 0.05$) in AS patients concerning back extensors, anterior trunk

flexors, right and left lateral trunk flexors, neck extensors, right and left scapula abductors, and right

scapula elevator muscle strength. However, there were no significant differences ($p > 0.05$) between the groups with regards to scapula adductor muscles on either side

and the left side scapula elevator muscle strength. The muscle strength test results of both groups are provided in Table 2.

Table 2. A comparative evaluation of the muscle strength test. (Patient and control groups $n=30$)

Parameters	Mean Value Patient/ Control	p
Back extensor strength	1,20/1,90	<0,001
Anterior trunk flexors strength	1,50/1,96	<0,001
Right lateral trunk flexion strength	1,23/1,90	<0,001
Left lateral trunk flexion strength	1,23/1,90	<0,001
Neck extensor strength	1,80/2,00	0,009
Left scapula abductor strength	1,86/2,00	0,039
Right scapula abductor strength	1,83/2,00	0,019
Right scapula elevation strength	1,86/2,00	0,039
Left scapula elevation strength	1,93/2,00	0,155
Right scapula adduction strength	1,90/2,00	0,078
Left scapula adduction strength	1,90/2,00	0,078

Comparing the two groups, we have noticed significant difference with regards to muscle shortness in pectoral region, hip flexors, and lumbar extensors while we did

not notice any difference in muscle shortness as far as hamstrings and gastrocnemius muscles ($p > 0,05$) (Table 3).

Table 3. A comparative evaluation of the groups in terms of muscle shortness

Parameters	Patient Group n(%)	Control Group n(%)	p
Right pectoral muscle shortness	22 (73,3)	15 (50)	<0,05
Left pectoral muscle shortness	22 (73,3)	15 (50)	<0,05
Right hip flexor muscle shortness	26 (86,6)	10 (33,3)	<0,05
Left hip flexor muscle shortness	26 (86,6)	10 (33,3)	<0,05
Lumbar ekstensor muscle shortness	23 (76,6)	10 (33,3)	<0,05
Right hamstring muscle shortness	26 (86,6)	27 (90,0)	>0,05
Left hamstring muscle shortness	25 (83,3)	27 (90,0)	>0,05
Right gastrocnemius muscle shortness	9 (30,0)	6 (20,0)	>0,05
Left gastrocnemius muscle shortness	9 (30,0)	6 (20,0)	>0,05

The results of SF-36 sub-function test about general health and pain relief, physical function, emotional role strength, and the relationship between social functioning and mental health are given in Table 4. Comparing the two groups, we have found out that the most effected sub-function in AS group was unhappiness and fatigue, along with difficulties in walking long distances as far as physical function is concerned. General health and pain, on the other hand, were less effected. In all measures concerning quality of life, we have observed significant differences ($p < 0.05$).

Table 4. A comparative evaluation of SF-36 test and Beck Depression Inventory (For each of the patient and control groups, $n=30$)

	Mean Value Patient/Control	p
SF general	12,50/15,36	<0,05
SF physical	20,03/27,36	<0,05
SF role	9,00/12,23	<0,05
SF social	39,96/31,06	<0,05
SF mental	9,23/15,36	<0,05
Beck Depression Inventory	18,7/5,52	<0,05

The Beck Depression Inventory score results of AS patients and healthy control group are given in Table 4. According to these data, it is possible to state that there is a significant difference between the patients who have been diagnosed with AS and the control group ($p < 0.05$).

DISCUSSION

Our study shows that AS disease causes joint destruction, deformity, muscle shortening, pain, and decrease in muscle strength, all of which in turn decrease success in daily living activities for the patients and bring about psychological problems. The individuals who enrolled in the study, usually due to long-term pain avoidance, have constraints in motion, and thus, various daily living activities. The patient histories tell us that the reason behind hospital admissions is pain, rather than limitation of motion. Most patients were not even aware of the existing limitation of motion. Ozgul et al.'s study shows that there is a statistically significant relationship between the educational status of patients with AS and the course of the disease along with the ways to fight the disease (3). Similarly, another study conducted

expresses that pain and limitation of movement adversely effect quality of life (14). In our study, the history of the patients show that AS patients with low educational status have little information about the disease. Examining the sociodemographic findings, we found out that 10% of our AS patients were unemployed. These patients lost their jobs after the development of the disease. Accordingly, they have been psychologically influenced after losing their jobs in a negative way.

In other studies conducted, it has been observed that patients with AS have increased thoracic kyphosis and cervical lordosis, and decreased levels of lumbar lordosis (15,16). In our study, we used the pendulum method for postural analysis. We did not find any significant difference between the patient and control groups in terms of cervical lordosis increase. In addition to this, within the scope of posture analysis, our findings were in line with the literature concerning the presence of increased thoracic kyphosis (5,6). This increase in thoracic kyphosis was seen in all patient groups. In our evaluation of lumbar lordosis, again in accordance with the data in literature, there was a significant decrease (5,6). The mechanical disruption of the lumbar spine, the flattening of the lumbar spine, may be one of the causes of back pain in patients. Moreover, increased thoracic kyphosis is a finding that shows the progress of the disease.

Cooper et al. have applied biopsy to lumbar paraspinal extensor muscles in AS patients and identified atrophy due to the restriction in motion (17). In our study, too, following the assessment of muscle strengths, we have determined loss of strength especially in the extension and flexion muscles. At this point, it should also be mentioned that muscle shortenings may predispose postural changes.

In the evaluation of psychological state of individuals and state of daily life activities, we used the SF-36 quality of life test and the Beck Depression Inventory. We have decided to use these tests because they give a total score, are easy to apply, clear, and reliable (11). In their study, Tubergen et al. has used the SF-36 in patients with ankylosing spondylitis before and after the therapy. They have found that there was a meaningful rise in quality of life after the treatment (18). Again, in Tubergen et al.'s study, there was success in physical function though there was no change in pain status or overall health. In our study, there were significant differences with regards to pain and general health status, physical function, emotional role strength, social functioning and mental health between the two groups. In the patient group, the most affected sub-functions have been those about the social and physical functions. General health and pain were less affected.

As far as the results of the Beck Depression Inventory assessment in our study, it was concluded that AS patients were more depressed than the control group. No matter how the two groups in our study matched in terms of quantity and age, we can state that the

difficulty of reaching adequate number of patients with certain specifications and the short period of time during which we had to conduct the study were among the limitations of this study.

We have observed that shortness in muscles in patients with AS restricts movement and that, particularly due to muscle wasting, this results in deterioration in posture and decrease in quality of life. In addition, another observation we have made was the fact that patients were psychologically influenced and their daily lives were affected by the disease. Besides, patients from lesser educational backgrounds did not have enough knowledge about the disease and, more importantly, did not show the necessary importance. In this context, AS patients should be educated about the disease and provided with protective physical therapy modalities. Also, those who are psychologically influenced by their condition should be treated with supportive treatment.

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