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Ankylosing Spondylitis treated with Physioball Exercises Using Yoga and Gravity – An Innovative Means of physiotherapy

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Abstract
Ankylosing spondylitis is a chronic disease affecting spine, few peripheral joints and diminished chest expansion. It causes considerable pain disability, reduces subject's quality of life and inflicts huge health care burden. This study subject with ankylosing spondylitis was diagnosed in February 2016, but had symptoms, remained undiagnosed and was treated for the musculoskeletal pain since 2012. This presentation aims at to analyze the efficacy of Physioball based exercises using yoga and gravity. The results were encouraging with an improved BASDAI index by 32%. The subjects with AS could be treated with this innovative means of yoga and physical ball exercises for an enhanced quality of life.
Keywords: *AS- Ankylosing Spondylitis, BASDAI – Bath Ankylosing Spondylitis Index, BMD – Bone Mineral Density, VD- Vitamin D, PTH – Para Thyroid Hormone, Physioball – Air Inflated Ball of Varying Sizes from 55 cm to 75 cm.*

Introduction

Ankylosing spondylitis is a common rheumatic disease (Braun etal 1998) and is a chronic disease causes considerable pain and disability (Sjef etal 2009) and markedly reduces the quality of life of patients and it represents a social burden (Ehrenfeld 2012).

There is a strong familial tendency with of the risk of disease determined genetically (Reveille 2006). Ankylosing spondylitis a is a chronic progressive, inflammatory disease primarily affecting the sacroiliac joint, the axial skeleton, entheses and less frequently peripheral joints and extra articular organs such as eye, skin, lung and the cardiovascular system (Govuveia etal 2012). As is more common among men with male: female ratio 3:1. Male predominance were reported in patients with AS as in Albania 8:1 (Koko etal 2014) and 8.1:1 in Korea (Baek etal 2004). Global prevalence of AS was estimated between .1 and 1.4% (AKKOC 2008) and is more common with in Europe with an estimated range from 1.30 to 1.5 million Iraq with .13% (Khudir etal 2014), 1% of Netherland (Magroni etal 2011) and .5 % of Turkey population have AS (Inarir etal 2013) and 4.6 to 5 million in Asia with gender rate of 3.4:1 (Male, Female) (Linadean etal 2013) and the peak age of onset is at 15-35 years (Gran etal 2003). An Albanian study (Koko etal 2014) point's highest frequency between 25-35 years age at the onset of

AS has prognostic significance (Marks etal 1982) and younger age is associated with a poorer prognosis. Prognosis is generally good, 70-90% of patients remain fully independent with minimal long term disability (AS: NICE CKS, 2013)

Cigarette smoking has been associated with long term outcome in patients with AS (Ward 2002) and (chung etal 2012) have shown that smoking was associated with an early beginning of spinal pain and a higher activity of the disease.

New York criteria for diagnosis for AS (Vander Linden etal 1984) used on this subject who has low back pain for more than 3 months and having limitped movements of the lumbar spine and reduced chest expansion. Bath AS disease activity index (BASDAI) was used to assess this subjects disease activity with AS (Nakkou et al 2012).

Management of AS consists of pharmacological means includes NSAIDS, (Dougados et al 2011) disease modifying anti rheumatic drugs (AKKOC etal 2006) corticosteroids, anti TNF agents (Braun 1995 & Spies etal 2009). They often require long term AF therapy, may develop spinal fusion, thoracic kyphosis as being erosive disease involving peripheral joints mainly the hips and shoulders.

Physiotherapy and improving mobility of the spine, maintaining and improving mobility of the spine and peripheral joints, strengthening the muscles of the trunk, the legs, the back and the abdomen by exercises (Vitanen etal 1998) The role of physiotherapy and exercises for the treatment of AS are cost effective (Elyan and Khan 2006) significant spinal posture and improved physical functions improvement (Dagfinrud etal 2008)

Role of surgery in AS where a large proportion of patients with AS develop hip arthritis. Hip replacement should be considered in patients with pain and disability and with radiological evidence of value for a variety of reasons in AS, including fusion procedures for segment instability and wedge lumbar osteotomy for fixed kyphotic deformity (Zoching etal 2006)

Aims & Objectives of this original case study on a subject with AS was to a) Analyse the efficacy of exercises using Physioball b) To evaluate using BASDAI the impact of physical exercises. With specific yoga and gravity aided postures.

Past Medical History

This study subject was 41 years aged male, endomorph, occasional alcoholic and a widower. His nature of life style was sedentary. Known type II diabetic with hba_1c at 6.5%, had vitamin D deficiency at 9ng/ml, an increased PTH, a decreased BMD of both neck of femur and CT scan revealed bilateral sacroiliitis.

Anthropometric Findings

BMI: 44 kg / m^2

Waist Circumference: 105 cm

C/O

Since 4 years was complaining of neck pain and stiffness, was treated elsewhere with NASID, electrotherapy pain reduction modalities on and off, by February 2016 year he developed low back pain, early morning stiffness, both groin pain and right shoulder pain.

Present Medical Condition:

O/b

- Ambulant unaided
- Mobile upper thoracic kyphosis

Posture

- Rounded shoulder, anteverted scapulae
- Increased bilateral genu valgum

O/E

- Diffuse pain in the posterior cervical and scapular region, restricted end range of cervical and shoulder movements
- Tender bilateral upper part of groin
- Diffuse pain in lumbar sacral junction and right sacroiliac region
- Exaggerated lumbar lordosis with mild atrophy of para spinal muscles

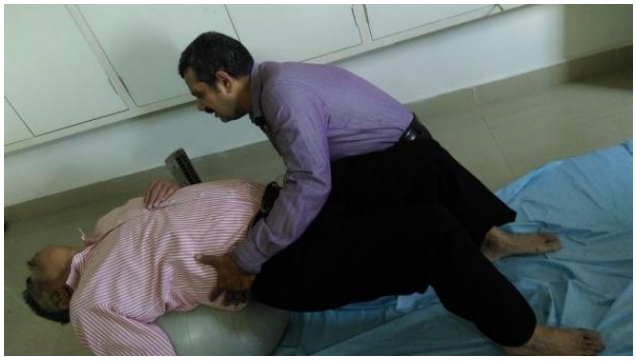
- Forward flexion (Shobers test) of the spine full, also side flexion and extension full and pain free
- Bilateral hip extension, adduction and lateral rotation painful and restricted after slight active/ passive excursion
- Bilateral knee joints range of motion full but Vastus Medialis lag was positive
- Other peripheral joints NAD except right shoulder with restricted abduction and lateral rotation in end ranges.
- Bilateral hand grip → Good
- Incentive spirometer → 1,300 cc (Vital Capacity)
- Moderate exercise tolerance with exert-ional fatigue and mild dysponea recorded.

Provisional Diagnosis:

Ankylosing spondylitis

RX Given

- A part from a set of active exercises, regular walking, incentive spirometer, sunlight exposure, pranayama the subject was taught a set of home programme
- The Physioball was used to mobilize and strengthen the spine which was safe, effective and unique being used among ankylosing spondylitis patients
- Duration each session lasting for 20-25 minutes
- Frequency of weekly twice
- Period of follow up, from February 2016 till 16.03.2017



I Subject in supine lying on Physioball with assistance, gravity aids for extension of neck movements and pelvic bridging

II Swan posture in prone position helps for spine flexion and gravity helps movement, Physioball as supportive medium also spinal extension exercises done

Table: 1 Results of pre and post BASDAI of this study subject

	BASDAI Index %	Improved by
Pre	62 %	32%
Post	42 %	

Discussion

This study subject was treated with specific yoga postures with the support of Physioball such as swan posture and cat and camel posture (Swan) where gravity helps in mobilizing the spine and with the support of the ball strengthening of spine and neck abdominal muscles with more muscle work are unique as inferred from photos shown above:

a) Cochrane review have pointed that supervised group physiotherapy is better than home exercises (Dagfinrud etal 2008)
b) A RCT among AS with exercises have recorded that supervised individualized physical therapy given on a regular basis will be more effective (Krag etal 1994)
c) Unsupervised home exercises including set of regular exercises including recreational activities which should forms part of daily routine of patients life (Hidding etal 1993)

Ankylosing spondylitis is a complex potentially debilitating disease that is insidious in onset with loss of productivity, owing to work disability, unemployment, health care cost and reduced quality of life (Sieper etal 2002). 5% of patients presenting with early morning stiffness with

chronic inflammatory back pain have AS (Underwood 1995). Arthritis of shoulders and hips occurs in early cause of the disease neck pain and stiffness is characteristic of advanced disease (Muac etal 1988). Neck pain and stiffness were the initial complaints of this study subject two years back which was treated with NSAID and electrical modalities as and then required.

Sacroiliitis is the earliest recognized manifestation of AS, but peripheral joints and extra articular structures may also be affected (Braun etal 1998). This study subject was found to have bilateral sacroiliitis as evidenced with CT scan of spine taken in June 2016, confirms radiological diagnosis (Stafford etal 2002). With restricted chest wall motion, decreased vital capacity (Sieper etal 2016) patients excursion using incentive spirometry for calculation of vital capacity was 1,300 cc and evidenced with low exercise tolerance with tachypnea and fatigue as recorded with 20 minutes of physical exercises.

Amor etal 1994 have identified hip involvement, regard less the age at onset was a risk factor for radiographic spinal progression (Chou 2001) in the first two years of the disease was predictive of poor outcome of AS (Mari etal 2000). This study subject with pain and grade 2 tenderness of bilateral adductor tubercle with restricted hip abduction and decreased BMD of both hip neck of femur, suggestive of poor prognosis of this subject.

Employment rates of AS subject from 18 studies have ranged from 55% to 89% (Boonen etal 2002) annual sick leave with a paid job in 5 studies varied from six to forty six days. While work disability ranged from 3% to 41% (Boonen etal 2001) with productivity costs in US at $4945 per patient annually in Netherland, France and Belgium at 3188 – 8862 euros (Ward 2002). Quality of life gets significantly lowered with mobility, house work, self care tasks, copying with illness, anxiety, payment for treatment, relationships with spouses, family, friends, side effect of drugs, appearance, future outcome, stiffness, pain, fatigue, sleep problems as reflected in a longitudinal cross sectional surgery of 175 patients with AS (Ward 1999). As shown in the table where this innovative means of using yoga postures with Physioball the subjects BASDAI has improved by 32% in an year of therapy

Uniqueness and Implications of this study

I. This case study was unique that basic concept of biomechanics such as proprio-ception, cocontraction, closed kinematic exercises were applied on this subject with AS
II. Using gravity mobilizing and strength-hening of the spine with Physioball offering a supportive medium.
III. Few of the yoga postures such as swan, pawanmuktasan and Bhujangasana could well be practiced and tolerated by this subject to further facilitate functional outcome from this study subject
IV. The outcome of functional betterment could be extended on an larger sample size and with other tools of measurement.

Critical Appraisal

This original innovative study were the subject was treated with few yoga postures using Physioball was the first of its research study, hence lacks evidence.

Using proprioception and closed kinematic exercises among AS subjects was an innovative means where balance could improve also influencing on peripheral joints also requires specific evidence from previous researches.

Conclusion

Physical exercises including isometric, active movements, hydrotherapy, hot pac application were recorded earlier but this study evaluates specific impact of Physioball in improving joint mobility promote motor power and better posture. Larger sample size with larger duration studies, comparison with other physical therapy modality among AS are highly recommended.

Limitations of this study being one year follow up, with long term follow up and more measurable means can be validictive of this study.

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