

Rheumatoid arthritis and dynamic exercises: A case study

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Received - 03 July 2017

Initial Review - 08 August 2017

Published Online - 09 September 2017

ABSTRACT

Rheumatoid arthritis (RA) is a painful and progressive condition. It leads to progressive joint damage which may lead to difficulties in the activity of daily living (ADL) and reduced quality of life (QoL). The aim of this case report, of a 50-year-old RA patient, was to see the improvements in ADLs, pain, aerobic capacity, and QoL. Dynamic exercises in form of resisted and aerobic exercises were given to the patient for 9 months and patient was evaluated at the end of 1, 3, 6, and 9 months. QoL was measured using health assessment questionnaire, pain was measured using visual analog scale and 6-min walk test was used to measure peak VO_2 . Improvement was seen in pain, QoL, and aerobic capacity in all measurements.

Key words: *Aerobic exercises, Physiotherapy, Resistance exercises, Rheumatoid arthritis*

Rheumatoid arthritis (RA) is a chronic and painful clinical condition. The signs and symptoms of RA include joint pain, tenderness, swelling or stiffness for 6 weeks or longer, and stiffness for 30 min or longer. Small joints are affected. RA leads to progressive joint damage, disability, deterioration in the quality of life (QoL), and shortened life expectancy [1]. Medical management approaches to stop the disease process and to control pain and inflammation. Drugs include non-steroidal anti-inflammatory drugs and disease modifying anti-rheumatic drugs [2]. Currently, there is no curative therapy for RA; therefore, patients are subjected to lifelong treatment modalities.

Physiotherapy treatment includes modalities such as hot/cold applications, electrical stimulation, and hydrotherapy [3]. Objectives of physiotherapy and rehabilitation applications in patients with RA are to prevent disability, to increase functional capacity, to provide pain relief, and to provide patient education [1]. Many studies are available in foreign literature regarding the use of physiotherapy in RA patients; however, very few articles have been found in Indian literature. Therefore, we report a case study of an Indian patient with RA who had been taking medications and underwent physiotherapy and showed improvement.

CASE REPORT

A 55-year-old female patient visited Vadilal Sarabhai (VS) hospital with a complaint of right knee pain along with left shoulder pain for a quite long time. She was a known case of RA for the past 30 years and she had been taking disease modifying antirheumatic drugs, analgesics, methylprednisolone, and hydroxychloroquine daily since then. After the delivery of her first child, she began to have small joint pain and swelling. After consulting many doctors, she consulted a rheumatologist and was

diagnosed with RA factor positive. She had persistent small joint pain; especially, in the mornings which became severe after a few years. She had become anxious by the way life was being affected with this progressive disease. Her main complaint was that she was unable to do her daily home chores with the same vigour and agility. She had swelling in the morning which reduced as the day progressed. She had slowly developed swan neck deformity in the index finger of the right hand. Finally, she was referred to physiotherapy department. Written informed consent to write this case report was obtained from the patient.

She was assessed for pain in all the joints using visual analog scale [4]. The range of motion and muscle power using 1 repetition maximum (RM) was taken of large muscles as shown in Table 1. Aerobic capacity was measured using 6-min walk test [5], and the QoL was assessed using health assessment questionnaire [6] - Pune version as shown in Table 1. She was started on a program of combined resistance and aerobic training according to the American College of Sports Medicine (ACSM) guidelines as follows [7]. She was given warm up exercises which consisted of 5 min of self-stretching exercises of the following – bilateral hamstrings, calf, long finger flexors, and active exercises of all joints of upper limb and lower limb in pain-free ranges – 10 rep, set of 2. She started with aerobic exercise in the form of treadmill walking and cycling for 5 min each at RPE (11-13) for 3 days/week. The duration and intensity of aerobic training progressed with time till she reached 20 min each.

Strength training was started with 50% of 1 RM for bilateral quadriceps, hamstrings, biceps, triceps, deltoid, latissimus dorsi, retractors and protractors of the shoulder, 10 rep, set of 2, 3 days/week as tolerated by the patient. Cool down exercises which consisted of 5 min of self-stretching exercises of the following – hamstrings, TA, long finger flexors, and active exercises of the

upper limb and lower limb – 10 rep, set of 2, similar to the warm up. Data were collected at the end of 1, 3, 6, and 9 months which are shown in Table 1.

After completion of 1 month of exercise, she felt better and showed improvement in her strength and activity of daily livings, and she was happy with her results. She insisted on continuing with her exercises so reevaluation was done and intensity and duration of her exercises was increased according to the ACSM criteria. She continued with the treatment for the next 3 months and showed great improvement. Her knee pain was better but improvement in shoulder pain was less. She was then given hot packs [8] to shoulder for 7 days and she showed some improvement. She then continued with a home program and was taught joint protection strategies for the same.

After a month, she fell down and had excessive knee pain and came back to the department. She had swelling in the knee and was given transcutaneous electrical nerve stimulation [9] for 7 days with emphasis on quadriceps exercises. During this time, only cycling was given and not treadmill walking, as walking was painful. Her usual aerobic and strength training exercise was given after her knee pain got better. She was given home advices and again asked to continue exercises at home. The patient was much better and happy with her pain; her QoL had improved along with her aerobic capacity and muscle strength.

DISCUSSION

RA is a debilitating and progressive disease that affects about 1% of the world population. The prevalence of RA in the US, based on rates of RA from a 1995 Minnesota study and 2005 Census data, is currently estimated at approximately 1.29 million people or 0.6% of the population. RA occurs at twice the rate in women compared with men, with the prevalence of 1.06% in women (as a percentage of the total population) compared with 0.61% in men [10]. Various studies [11-17] have been carried out to study the effects of dynamic exercise program (aerobic training and strength training) in Western population, but the effects of such intervention has not been studied on patients of RA in Indian population. We could not find any Indian study related to physiotherapy management of RA on searching the literature. The relevant review of literature is shown in Table 2.

This patient showed improvement in QoL, strength, and aerobic capacity after 1 month of exercises; which continued, for as long as she continued with the intervention. Improvement was seen in the pain scale though it was less; however, the patient had to rely on analgesics regularly for the pain management which reduced to less than once a day after undergoing physiotherapy treatment. Improvement was also noted in posture, gait, and walking speed as the distance covered in the same time had

Table 1: Outcome measures at various time intervals

Parameters	Pre-intervention data		After 1.5 months		6 months		9 months	
	Left	Right	Left	Right	Left	Right	Left	Right
One RM								
Retractors	1	1	2.5	2.5	2.5	2.5	3	3
Protractors	1	1	2	2	3	3	3	3
Biceps	2.5	3	4.5	4.5	5	5	5	5
Triceps	1	1	2.5	2.5	3	3	3.5	3.5
Elbow flexors	2	2.5	4	4	4.5	4.5	5	5
Hamstrings	3.5	3.5	4.5	4.5	5	5	5.5	5.5
Quadriceps	3	3	4	4	4.5	4.5	5	5
VAS								
Shoulder		5.8		5.3		5.5		5.1
MCP	4.3	5.1	3.8	3.2	3.6	3.2	3.4	3.3
HAQ	31		22		19		19	
6-MWD (m)	190		269		287		310	
Peak VO ₂ (mL/kg/min)	9.318		11.135		11.549		12.078	

RM: Repetition maximum, VAS: Visual analog scale, 6-MWD: 6-min walking distance, MCP: Metacarpophalangeal joints, HAQ: Health assessment questionnaire

Table 2: Review of literature

Author name	Type of study	Title	Result
Van den Ende et al. [16], 1998	Systemic review	Dynamic exercise therapy in RA: A systematic review	Dynamic exercise therapy is effective in increasing aerobic capacity and muscle strength.
Rongen-van Dartel et al. [17], 2015	Meta-analysis	Effect of Aerobic exercise training on Fatigue in RA	An aerobic exercise program is effective in reducing fatigue among patients with RA.
Stavropoulos et al. [18], 2013	RCT	Aerobic training improves cardiorespiratory functioning	Aerobic and resistance exercise intervention can lead to significantly improved CRF, individual CVD risk factors, composite CVD risk, and disease activity and severity in RA patients.

RA: Rheumatoid arthritis, CVD: Cardiovascular disease, CRF: Cardiorespiratory fitness, RCT: Randomized controlled trials

increased. There was no adverse effect of weight bearing activity on pain seen.

A systematic review by Hurkmans et al. suggests that the majority of patients with RA should be encouraged to undertake aerobic and/or strength training exercise. Dynamic exercise helps in improvement of strength and aerobic capacity which improves physical activity [11]. Similar to the findings of the present report, an randomized controlled trials by Häkkinen et al. shows that regular dynamic strength training combined with endurance-type physical activities improves muscle strength and physical function, but not bone mineral density, in patients with early RA, without detrimental effects on disease activity [12]. The RA specific self-management program, delivered by health professionals, was developed by Arthritis Western Australia in 2006. Participants in the program recorded significant improvements in depression and mental health post-intervention, which were maintained to 12-month follow-up [13].

The British Society for Rheumatology and British Health Professionals in Rheumatology guideline for the management of RA proposed a model of care for patients including the use of disease-modifying antirheumatic drugs or biologic agents, on-going education and specialist management, with increasing emphasis on shared care between patients, primary care, and secondary care [14]. The goals of therapy supported by this guidance are to: (i) Control sinusitis; (ii) control symptoms; (iii) promote self-management; (iv) improve physical functioning; (v) improve psychosocial functioning; (vi) monitor for drug toxicity; and (vii) manage and screen for comorbidity. Furthermore, ACSM recommends dynamic exercise as has been used in the above study.

A systemic review was conducted by Hurkmans et al. to assess the quality of guidelines published in peer-reviewed literature concerning the role of physiotherapy in the management of patients with RA. They concluded that six of eight clinical practice guidelines addressing physiotherapy interventions were recommended or strongly recommended according to the Appraisal of Guidelines for Research and Evaluation Instrument. In general, guideline recommendations on physiotherapy intervention, from both the recommended guidelines as well as from the non-recommended guidelines, lacked detail concerning mode of delivery, intensity, frequency, and duration [15].

Limitation of this case report is radiological progression was not assessed and DAS28 was not taken. Furthermore, it cannot be said that the improvement was because of physiotherapy alone from a single case; thus, there is a need of carrying out further research on this in Indian population with RA.

CONCLUSION

Aerobic exercise and resisted exercises reduces pain, improve the QoL of patients by improving their physical activity along with improved mobility. Gait, posture, and strength also improved with dynamic exercises. Physiotherapy and exercise should be advised to patient of RA in Indian population as a routine practice to maintain the physical activity of the patient.

ACKNOWLEDGMENTS

We would like to thank Dr. Sapan Pandya (Rheumatologist Vadilal Sarabhai hospital) for his support and help.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Dinkar D, Sheth M. Rheumatoid arthritis and dynamic exercises: A case study. *Indian J Case Reports.* 2017;3(4):205-207.