Assessment of Cervical Spine Mobility in a Subjects with Rheumatoid Arthritis Associated with Neck Pain

Raj Mhatre[1], Poonam Patil[2]

[1]Final Year, Faculty of Physiotherapy, [2]Assistant Professor, Department of Cardiopulmonary, Faculty of Physiotherapy, Krishna Institute of Medical Sciences Deemed To Be University, Karad, Maharashtra, India

Abstract

Background : Rheumatoid arthritis is an immunological mediated ,chronic inflammatory multisystem disease which involves inflammation of peripheral joints along with involvement of haematological , neurological and cardiovascular abnormality. Studies have shown that the involvement of cervical spine is common commonly affecting C1 and C2[1] due absence of intervertebral disc and synovial inflammation resulting in alteration in range of motion. Keeping in mind the inflammation and degeneration causes alteration in mobility . So that present study is conducted with the aim to find out proportion of alteration in mobility at the cervical spine range of motion in subjects with rheumatoid arthritis associated with neck pain.

Methodology: An observational study was conducted in 33 patients at karad with study duration of 6 months .The inclusion criteria was the patient with rheumatoid arthritis any age and gender willing to participate. The outcome measures were goniometer and inch tape method of assessing the range of motion .

Result: The results observational study suggest there is significant decrease in all movement of cervical joint with rotational components were hampered most around 26.36% loss of mobility for left rotation and 26.12 % loss of mobility for right rotation followed by right lateral flexion , flexion, extension , right rotation and left rotation .

Conclusion: the study concluded that rotational movements was more affected in a patients with rheumatoid arthritis associated with neck pain which is attributed to marked involvement of the C1 and C2 vertebrae followed by other movements at the neck.

Key words : *rheumatoid arthritis , cervical spine , range of motion ,goniometer and inch tape .*

Introduction

Rheumatoid arthritis is an immunological mediated ,chronic inflammatory multisystem disease. It involves inflammation of peripheral joints along with involvement of heamatological , neurological and cardiovascular abnormality.

Ra affect about 24.5 million people as of 2015 and the incidence rate is more dominated amongst females. The onset is evident in the age of 3rd and 4th decade of life.

Pathophysiology

It is an autoimmune disease predisposed by some environmental factors like smocking and bacterial

Corresponding Author:
Dr. Poonam Patil ,
Assistant professor , Department of Cardiopulmonary , Faculty of Physiotherapy, Krishna Institute of Medical Sciences Deemed To Be University, Karad,
PIN : 415110 , Maharashtra , India.
Email ID : rajmhatre0914@gmail.com

infections. Genetic factors like present of human leukocyte antigen (HLA) specifically HLA-DRI and HLA –DR4 plays significant role in development of RA. Environmental factors triggers the antigenic activity in immunologically predisposed individuals and modifies our own antibodies like Ig-G , type 2 collagen fibres and vimentin. The process of Citrullation catalyst the autoimmune reaction as the Argenin converts into citrulline presenting type-2 collagen fibres and vimentin. And hence self antigens gets formed. This self antigens triggers the susceptible genes like HLA-DR4 AND HLA-DR1 and hence activation of antigen presenting cells occures which also activates the CD4+ T –cells which produces autoantibodies. The chemical mediators like cytokinesis i.e TNF-α , interferon- Gamma,IL-1 and IL-6 within the joint and leads to inflammatory response and hence activation of B- lymphocytes and macrophages along with endothelial cells. Activation of B-cells release Ig-M antibody against the Ig-G . This leads to proliferation of synovial cells and pannus formation and causes swollen synovial membrane due to granulation and scar tissue. The pannus damages the articular cartilage and erodes bone and damage other soft tissue structures.

Involvement of cervical spine in RA:

In 1952, Kornblum and colleagues3 were the first to recognize the relationship between RA and cervical spine instability[1]. The occiput –C1 and articulation of C1 –C2 are the only joint in the spine without intervertebral disc[1] and this are only consist of synovial joint make them more vulnerable in RA. Axis provide platform for skull to rest on it as it serve the purpose of ring. The transverse ligament of C1 articulates with the posterior aspect of send via synovial joint . This appearance allows the Atlas and axis permit increased motion at cervical joint . Odontoid process of axis articulates with the atlas-transverse ligament . And this allow the 50% of cervical spine rotation. The stability of the Atlanto-axial complex depend primarily on the integrity of transverse ligament . The alar ligament provides secondary stabilization. In RA , the transverse ligament is affected significantly and make it incompetent due to inflammation of the synovial articulation. There could be anterior subluxation of the Atlas if secondary protectors are intact . And if secondary stabilizes are involved then stability gets hampered. Synovial inflammation leads to erosion of the odontoid process . Axial skeleton involvement is a common feature of RA. It has a variable prevalence ranging from 25 to 80% (3), with the cervical spine being almost exclusively affected[2]. There are three types of cervical spine involvement in rheumatoid arthritis(RA). The commonest abnormality was erosions of the odontoid process (47%), followed by atlanto-axial dislocation and apophyseal joint involvement (24%) and only 5% of patients had abnormalities of spinous processes or vertebral bodies. The most common manifestation is AAS (49%), followed by superior migration of the odontoid (SMO, 38%) and subaxialsubluxation (SAS, 10-20%)[2] . The cervical mylopathy is also predominant in some cases[6]. The neck pain was present in 68% in a patiengts with rheumatoid arthritis as per the study conducted[4]. The condition of most patients with C1-C2 alignment abnormalities remained unchanged or became worse with time (i.e., the misalignment became fixed, subluxation increased, or AAI developed)[5].The study was done suggest that the degenerative changes in disc plates and osteophytes formation is also evident in upper cervical region is also prominent in some age group studied[7].

Aim

To study the alteration in mobility at the cervical spine in a patients with rheumatoid arthritis associated with neck pain**.**

Objectives

1.To find the alteration in mobility at the cervical spine in a patients with rheumatoid arthritis associated with neck pain with the help of goniometry.

2.To create awareness about the alteration in a mobility of cervical spine in a subjects .

3.To aware them about the future complications of

altered ROM and its effect on body

Materials :

1)data collection sheet

2) Consent form

Methodology

Type of study = observational

Study design = cross sectional

Place of study= karad, Maharashtra.

Sample size = 33

Sampling technique = convenient

Study duration = 6 months

INCLUSION CRITERIA : The individuals of Krishna institute of medical sciences , deemed to be university , Karad , Males / females suffering from rheumatoid arthritis, Patient with neck pain associated with neck pain with no specific age group criteria.

EXCLUSION CRITERIA : Individuals not willing to participate and individuals with symptoms other than rheumatoid arthritis.

DATA COLLECTION PROCEDURE : 33 subjects both male and female were selected for the study . Individuals were not willing to participate and individuals with symptoms other than rheumatoid arthritis were excluded. The written consent was taken from subjects those willingly to participate . Institutional ethical committee approve was obtained prior to beginning of the study. The conclusion was done based on goniometry and inch tape method of assessing the range of motion .

STATASTICAL ANALYSIS : Descriptive statastics such as mean , standard deviation and percentage was used to present the data . Association of altered mobility at cervical spine area was assessed by ENOVA P test . "P" value less than 0.030 were considered as significant . Data analysis was performed by using Microsoft excel and SPSS v16.0 .

Tables 1: By goniometer (in degrees)

movement	*avarage*	*normal - avarage*	*% of avarage*	*100 - %*
flexion	68.75	16.25	80.88%	19.12
extension	65.15	14.85	81.43%	18.43
left rotation	66.37	23.63	73.74%	26.26
right rotation	66.5	23.5	73.88%	26.12
L. lateral flexion	40.31	9.69	80.62%	19.38
R. lateral flexion	40.06	9.94	80.12%	19.88

Table 2: By Inch tape method : in centimeters

movement	*avarage*	*normal -avarage*	*% of avarage*	*100-%*
flexion	11.13	2.87	79.56	20.44
extension	6.43	1.6	80.39	19.61
left rotation	8.89	3.11	74.12	25.88%
right rotation	9.01	2.99	75.08	24.92%
L. lateral flexion	8.13	1.87	81.3	18.70%
R. lateral flexion	8.09	1.81	80.9	19.10%

Discussion

Cervical spine involvement in rheumatoid arthritis has been common feature of the disease. Due to long time standing of RA leads to cervical spine involvement. C1 and C2 joint is more commonly involved and there are previous studies that suggest atlantoaxial involvement of the cervical spine in RA is not so uncommon. Apart from atlanto-axial joint involvement , subaxial subluxation and other causes like cervical myelopathy are much common ultimately lead to joint erosion , altered mobility at the cervical joint . Loss of physiological lordosis , painful and limited AROM and passive cervical movements are prominent.

In this study , we've made an attempt to calculate and evaluate the cervical spine altered mobility by the means of goniometer and inch tape method.

Each and every movement at the cervical spine has been tracked out by both means of measurement methods . Values got recorded without any gender discrimination and majority of the patient were females as RA is a female dominant disease.

Age was ranging from 41 to 70 years as the rheumatoid arthritis with neck pain is prominent in this age only i.e the later half of life. There was no such criteria for gender and age but majority of the patient were female and above 40 years.

After comparing the data values with age wise distribution with particular movement were done i.e flexion movement was considered with age wise categorization. The age group strategy was straight forward as they belonged to 41-50 ,51-60 , 61-70. The mean and SD value was recorded then P value and F value were found out to find out age wise significance of RA and reduced ROM at the cervical joint. There was no as such relation between the increasing age leads to more hypomotility except for the rotational movement which had significant P value when measuring via inch tape method for both right rotation and left rotation p value showed significance with increasing age.

The observational study suggest there is significance decrease in all movement of cervical joint with rotational components were hampered most around 26.36% loss of mobility for left rotation and 26.12 % loss of mobility for right rotation by goniometric method due to more

involvement of C1 and C2 vertebrae in RA followed by right lateral flexion , flexion, extension , right rotation and left rotation.

Other movement were also affected ranging from 18 – 20 % .

Both method showed similar result in terms of percentile loss of ROM and there was minute difference in them suggest both method have similar effect while measuring the ROM with minimal difference and hence both method can be accepted to find out the percentage of loss of ROM.

So at the end of the discussion , we can suggest that rotational component get hampered in terms of ROM when cervical spine hypomobility than the other movements. Other movements also had significant loss but in lesser extent than the rotation. There is no significant relation between the age and reduced mobility except for rotational component. It could be because of severity of the RA differs patient to patient.

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Conflict of Interest : The authors declared that there are no conflicts of interest concerning the content of the present study.

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