“Clinical evaluation of effect of Makarasan on structural changes of Greeva Kasheruka in cervical spondylosis”

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Abstract:

Today is the era of modernization and fast life. Everybody is busy and living stressful life. Changing life style of person has created many disharmonies in his biological system. Advancement of busy, professional life and social life, improper sitting posture, continuous work in one posture, jerking movements during travelling and sports, all these factors create undue pressure and stress injury to spine and play an important role in producing disease like cervical spondylosis. In this study total 70 patients of Cervical Spondylosis having signs and symptoms of same, selected from OPD of our hospital. Patients were divided into two groups, 35 patients in control group and 35 patients in trial group. Patients in trial group were advised to Practice Makarasan as per yoga module adapted during study and Patients in control group were advised to do Neck Exercise as per neck exercise module adapted during study for 90 days daily. Assessment was done on the basis of pain, tenderness, stiffness and x-ray report of cervical spine before and after study. Makarasan is significantly effective in reduction of signs and symptoms of cervical spondylosis but there were no changes seen in anatomical structures in patients of cervical spondylosis after intervention of Makarasan.

Key words: Cervical Spondylosis, Makarasan, Neck Exercise.

INTRODUCTION:

In God's creation, the evolution of man is considered supreme. According to Indian tradition, the highest purpose of human life is the fourfold realization of Dharma, Artha, Kama and Moksha. For the accomplishment of these purposes, health of a person must be maintained. Since birth, decay and death are always co-existed with life, the study of abnormal health status and their management has also been studied with the dawn of the human intellect.
Faulty dietetic habits and irregular life style are responsible for early degenerative changes in bodily tissue and play a vital role in the manifestation of such degenerative disorder. In this way, this disease is now becoming a significant threat to the working population.

60-70% women and 85 % of men may show changes related with cervical spondylosis by the age 45, radiologically. 20% patients presenting with non-traumatic myelopathic symptoms have cervical spondylosis. This is the cause for non-traumatic spastic paresis and quadriplegia. The prevalence of cervical spondylotic myelopathy ranges between 96-100% by the age seventy years in females and males. Radiographic changes are additional severe in male then in female.

Cervical spondylosis is a degenerative condition of cervical spine. The main pathology is found in the cervical spine; primarily in the intervertebral discs and vertebral bodies. It results in pain and stiffness in neck, radiating pain into arm, headache, vertigo, giddiness, paraesthesia, numbness etc. It disturbs the daily routine and overall life of the patient. Though it is not fatal instantly but it causes more severe complications in later stage. It cripples the patient, makes him burden to others. Such person can't perform the day to day activities properly due to severity of pain and this way it does not cut the years from life but life from the years. Modern medical science provides various types of medical and surgical therapy but none of the therapy is satisfactory in cervical spondylosis. All the treatments are just for symptomatic relief. Due to more untoward effect of pain-relieving drugs e.g. Nonsteroidal anti-inflammatory drugs, Steroids and surgical procedure, alternative medical systems like Ayurveda and Yoga are now coming into focus to find out better remedy for this condition.

Yoga is a group of physical, mental and spiritual practices which are performed from ancient India. Asanas are performed as a physical exercise; Asanas promote good health as well as treat clinical signs and symptoms. Makarasana is described in Gheranda Samhita and Yogdipika. Makarasana increases the Jatharagni and maintains the Tridosha in our body. The effect of Makarasana is mainly on the musculoskeletal system. In Makarasana the cervical spine undergoes backward bend. Normally in the upright posture the weight of the body is transmitted through spinal column, producing a compressing effect especially on the discs. The backward bend offers more space to the intervertebral discs releasing the compression besides weight is a function of gravity and in lying down position as in Makarasana the pull of gravity is transmitted from the abdomen and thighs to the ground. It is therefore very useful posture in cervical spondylosis.

Hence it is the need of society to apply the knowledge of yoga in the current era of altered life style. By knowing the functional anatomy of asanas, it will
surely be beneficial in curing many diseases without interference of medication. Cervical spondylosis is one such disease where the effect of asanas can be observed. Therefore, this study is an attempt to observe the changes in cervical vertebrae in cervical spondylosis after intervention of Makarasan.

AIMS AND OBJECTIVES:
To study the effect of Makarasan on structural changes of Greeva Kasheruka in cervical spondylosis.

MATERIALS AND METHODS:
In the present study, the diagnosed patients of cervical spondylosis were selected.

Type of Study: Clinical Study.

Sample Size: 70

Location of Study: Ayurved hospital and other hospitals OPD/IPD.

Duration of Study: This study was conducted over 3 months.

Method of Study: Total 70 patients were taken and they were divided into two groups, 35 patients in control group and 35 patients in trial group.

1. Trial Group: Patients in this group were advised to Practice MAKARASAN as per yoga module adapted during study.

Yoga module adapted in the Study
Asana: Makarasan was advised

Time: 15 mins per Session, Morning: In between 6-7 AM

Standard Operational Procedure (SOP): (Light on Yoga by B.K.S Iyengar)

Pre procedure: Omkara chanting for 2 mins.

Main procedure:
1. Lie flat on the belly with forehead resting on floor, legs straight and feet together.
2. On an exhale, lift your head, chest, legs and arms away from the floor.
3. Slowly rise your arms and bring it behind your head.
4. Engage your glutes and lift your legs higher, stretching your thighs. Contract your quadriceps and keep your legs completely straight. Touch your inner thighs, knees, and ankles together.
5. Remain in this position for as long as possible with normal breathing. Slowly return to the starting position while exhaling.

Post procedure: Relaxation – 2 mins

Time Duration of Makarasan
It is suggested that one should retain this posture for the time duration on inhaling or if one chooses to breathe while retaining Makarasan Posture then one should retain it for 30 to 120 seconds.

Total time for Asana procedure is 15 mins.

2. Control Group: Patients in this group were advised to do Neck Exercise as per neck exercise module adapted during study.

Neck Exercise Module Adapted During Study (Harrisons Manual of Médecins)
**Time:** 15 mins per Session, Morning: In between 6-7 AM

**A. Neck Flexion and Extension**

Stand straight or sit on the chair, slowly bring the head down till the chin touches the chest. Hold on for 10 seconds, and then return to the same position. Now lean the head backward and hold in position for 10 seconds before coming back to the normal posture.

Repeat this exercise at least 5 times in each direction.

**B. Neck Rotation**

Stand straight or sit on the chair, slowly turn the head towards the right keeping the chin straight. Stay in the position for 10 seconds and return to the center. Now turn the head to the left similarly and hold for 10 seconds.

Repeat this exercise at least 5 times in each side

**C. Neck Lateral Flexion**

Hold up the neck in a sitting or standing position, slowly tilt the head towards the right side keeping the right shoulder down. Hold for 10 seconds and bring the head back to normal position. Repeat the same by switching the side. Repeat it 5 times each.

**Method of selection of study subject:**

A) **Inclusion criteria:**
1. Clinically diagnosed patients of cervical spondylosis.
2. Patient presenting with sign and symptoms of cervical spondylosis.
3. Patient of both genders.
4. Age group 30-60 years.

B) **Exclusion criteria:**
1. Trauma to cervical spine.
2. Individuals having chronic diseases.
3. Congenital Anomalies.

**Study Design**

1. Diagnosed cervical Spondylosis patients with written informed consent were selected.
2. Cervical region of Diagnosed patients was examined by case record form and x-ray report.
3. Total 70 patients were divided into two groups i.e. 35 patients in Trial group and 35 in the control group.
4. Step by step procedure of makarasan was explained to patients in trial group up to proper asana done by them under guidance of yoga expert.
   The patients in trial group were advised to perform makarasan every morning as per yoga module up to 3 months.
5. Patients in control group were advised to do neck exercise as per neck exercise module every morning up to 3 months.
6. The follow up was taken every 30 days up to completion of 3 months.
7. After completion of 3 months, cervical region was examined by case record form and x-ray report.

**Follow up:** Follow up was done periodically for 90 days

1. **1 st follow up**  - on 30 th day
2. **2 nd follow up**  - on 60 th day
3. **3 rd follow up**  - on 90 th day

**ASSESSMENT CRITERIA**

A. **Subjective Criteria:** Ruka, Pidanasahatvam, Graha
**Ruka (Pain Level) VAS**
- Grade – 0 No Pain 0-1
- Grade – 1 Mild Pain 2-4
- Grade – 2 Moderate Pain 5-7
- Grade – 3 Severe Pain 8-10

**Pidanasahatvam (Tenderness)**
- Grade – 0 No tenderness
- Grade – 1 Subjective experience of tenderness

**Graha (Stiffness)**
- Grade – 0 No stiffness
- Grade – 1 Stiffness for less than 5 to 10 minutes
- Grade – 2 Stiffness for 20 to 30 minutes
- Grade – 3 Stiffness for more than 1 hour

**B. Objective Criteria:** Radiological investigation i.e. X-Ray of Cervical Spine.

**OBSERVATIONS AND RESULTS**

|                     | Mann-Whitney U | Wilcoxon W | Z      | P value (2-tailed) |
|---------------------|----------------|------------|--------|-------------------|
| Ruka                | 325.000        | 955.000    | -3.934 | .000              |
| Pidanashatvam       | 263.000        | 893.000    | -4.398 | .000              |
| Graha               | 324.500        | 954.500    | -3.665 | .000              |
| Normal              | 490.000        | 1120.000   | -2.024 | .043              |
| Loss of lordosis    | 490.000        | 1120.000   | -2.024 | .043              |
| Hyper lordosis      | 612.500        | 1242.500   | 0.000  | 1.000             |
| Narrowing disc space| 332.500        | 962.500    | -3.837 | .000              |
| Flattening of vertebral body | 612.500 | 1242.500   | 0.000  | 1.000             |
| Posterior vertebral lipping | 560.000 | 1190.000   | -1.758 | .079              |
| Anterior osteophytes| 612.500        | 1242.500   | 0.000  | 1.000             |
| Posterior Osteophytes| 612.500 | 1242.500   | 0.000  | 1.000             |

Since p value < 0.05, the level of significance; Ruka, Pidanashatvam, Graha, Normal, Loss of lordosis, narrowing disc space; there is strong evidence to reject the null hypothesis. There is no significant difference in structural changes of Greeva Kasheruka i.e. Hyper lordosis, Flattening of vertebral body, Posterior vertebral lipping, Anterior osteophytes, Posterior Osteophytes in Group A & Group B.
There is significant difference in effects on factors Ruka, Pidanasahatvam, Graha, Normal curvature, Loss of lordosis, Narrowing of disc space in Group A & Group B.

The mean rank values suggest that the effect is more in Group A than that in Group B for factors Ruka, Pidanasahatvam, Graha, Normal & the effect is more in Group B than that in Group A for factors Loss of lordosis, Narrowing disc space.

DISCUSSION:

Discussion on effect of the treatment

1. Effect on Ruka

In trial group the effect on Ruka over 35 patients suffering from cervical spondylosis showed the mean score of 3.93 before the treatment was reduced to 1.47 after the treatment. The mean rank values suggest that the grades are reducing significantly as the days of treatment increasing for Ruka. (P=<0.05).

In control group the effect on Ruka over 35 patients suffering from cervical spondylosis showed the mean score of 3.80 before the treatment was reduced to 1.37 after the treatment. The mean rank values suggest that the grades are reducing significantly as the days of treatment increasing for Ruka. (P=<0.05). There is significant difference in grades of Ruka in both trial group and control group but according to statistical analysis the mean rank values suggest that the effect is more in trial group than that in control group. Suggesting that Makarasan is strongly capable for reducing Pidanasahatvam (tenderness) significantly in cervical spondylosis than that of control group.

2. Effect on Pidanasahatvam

In trial group the effect on Pidanasahatvam over 35 patients suffering from cervical spondylosis showed the mean score of 3.76 before the treatment was reduced to 1.26 after the treatment. The mean rank values suggest that the grades are reducing significantly as the days of treatment increasing for Pidanasahatvam. (P=<0.05). In control group the effect on Pidanasahatvam over 35 patients suffering from cervical spondylosis showed the mean score of 3.51 before the treatment was reduced to 1.44 after the treatment. The mean rank values suggest that the grades are reducing significantly as the days of treatment increasing for Pidanasahatvam. (P=<0.05)

There is significant difference in grades of Pidanasahatvam in both trial group and control group but according to statistical analysis the mean rank values suggest that the effect is more in trial group than that in control group. Suggesting that Makarasan is strongly capable for reducing Pidanasahatvam (tenderness) significantly in cervical spondylosis than that of control group.

3. Effect on Graha

In trial group the effect on Graha over 35 patients suffering from cervical spondylosis showed the mean score of 3.77 before the treatment was reduced to 1.21 after the treatment. The mean rank values suggest that the grades are reducing significantly as the days of treatment increasing for Graha. (P=<0.05). In control group the effect on Graha over 35 patients suffering from cervical spondylosis showed the mean
score of 3.61 before the treatment was reduced to 1.44 after the treatment. The mean rank values suggest that the grades are reducing significantly as the days of treatment increasing for all Graha. (P=<0.05)

There is significant difference in grades of Graha (stiffness) in both trial group and control group but according to statistical analysis the mean rank values suggest that the effect is more in trial group than that in control group. Suggesting that Makarasan is strongly capable for reducing Graha(stiffness) significantly in cervical spondylosis than that of control group.

**Effect of Treatment on Structural Changes in Greeva Kasheruka**

1. **Effect on Cervical Curvature**

In trial group 68.6% patients reported as normal curvature and 31.4% patients reported as abnormal curvature before starting treatment (0\textsuperscript{th} day), 80.0% patients reported as normal curvature and 20.0% patients reported as abnormal curvature after treatment (90\textsuperscript{th} day). In control group 65.7% patients reported as normal curvature and 34.3% patients reported as abnormal curvature before starting treatment (0\textsuperscript{th} day), 97.1% patients reported as normal curvature and 2.9% patients reported as abnormal curvature after treatment (90\textsuperscript{th} day). There is significant difference in effect on narrowing of intervertebral disc space in both trial group and control group but according to statistical analysis the mean rank values suggest that the effect is more in control group than that in trial group. Suggesting that Makarasan is not capable for reversing narrowing of intervertebral disc space to normal intervertebral disc space in cervical spondylosis than that of control group.

2. **Effect on Intervertebral Disc Space**

In trial group 94.3% patients reported as narrowing of intervertebral disc space and 5.7% patients reported as normal intervertebral disc space before starting treatment (0\textsuperscript{th} day), 60.0% patients reported as narrowing of intervertebral disc space and 40.0% patients reported as normal intervertebral disc space after treatment (90\textsuperscript{th} day). In control group 91.4% patients reported as narrowing of intervertebral disc space and 8.6% patients reported as normal intervertebral disc space before starting treatment (0\textsuperscript{th} day), 11.4% patients reported as narrowing of intervertebral disc space and 88.6% patients reported as normal intervertebral disc space after treatment (90\textsuperscript{th} day). There is significant difference in effect on narrowing of intervertebral disc space in both trial group and control group but according to statistical analysis the mean rank values suggest that the effect is more in control group than that in trial group. Suggesting that Makarasan is not capable for reversing narrowing of intervertebral disc space to normal intervertebral disc space in cervical spondylosis than that of control group.

3. **Effect on Vertebral Bodies**

There is no significant difference in grades of Flattening of vertebral body, Posterior vertebral lipping, Anterior osteophytes, Posterior Osteophytes before treatment and after treatment, according to observational data and statistical
There is no significant difference in effects on Flattening of vertebral body, Posterior vertebral lipping, Anterior osteophytes, Posterior Osteophytes in trial group and control group. Suggesting that Makarasan is not capable for reversing structural changes in vertebral body to normal structure of vertebral body in cervical spondylosis.

CONCLUSION:

- Makarasan stretches the anterior vertebral muscles, joints of vertebral column and also contracts the posterior neck muscles. It promotes the flexibility of vertebral column and relieves the nerve compression.
- X-ray of cervical spine shows that the improvement was seen in abnormal curvature but there were no changes seen in anatomical structures in patients of cervical spondylosis after intervention of Makarasan.
- In the present study, Makarasan is significantly effective in reduction of signs and symptoms of cervical spondylosis.

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