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EVALUATION OF CERVICAL SPONDYLOSIS BY CONSERVATIVE MANAGEMENT- A PROSPECTIVE CASE CONTROL STUDY

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Conflicts of Interest: Nil

ABSTRACT:

Background: Cervical spondylosis is a generic term for the degenerative cascade that may affect the entire cervical spine that develop either spontaneously with age, or secondarily as the result of trauma or other pathological condition and may be seen radiographically in both symptomatic and asymptomatic individuals.

Objective: The aim of this study was to in the relief of pain, improvement in range of motion and functions in individuals with cervical spondylosis.

Methods: The study included 100 cases of cervical spondylosis that were treated conservatively, between 20-70 years age group over a period of 2 years. Sign and symptoms were evaluated according to age, gender and grading of the severity of the disease.

Results: The scores of Grade l and ll showed excellent results, results were poor in Grade lV scoring patients. The findings of this study suggested that both the interventions are effective in reducing pain, improving ROM and decreasing the level of disability using the level of disability.

Conclusion: In majority of the cases conservative method was significant. Only small percentage that had gross compression or neurological deficit needed surgery. The results were promising in early detected cases and were satisfactory in advanced cases.

Keywords: Endplate Sclerosis, Myelopathy, Osteoarthritis, Spondylosis, Vertebro Basilar Ischaemia.

Introduction

Spondylosis is the degeneration of the spinal column from any cause. In the more narrow sense it refers to spinal osteoarthritis, the age-related wear and tear of the spinal column, which is the most common cause of spondylosis. [1,2] The degenerative process in osteoarthritis chiefly affects the vertebral bodies, the neural foramina and the facet joints (facet syndrome). If severe, it may cause pressure on the spinal cord or nerve roots with subsequent sensory or motor disturbances, such as pain, paresthesia, imbalance, and muscle weakness in the limbs. When the space between two adjacent vertebrae narrows, compression of a nerve root emerging from the spinal cord may result in raticulopathy i. e. sensory and motor disturbances, such as severe pain in the neck, shoulder, arm, back or leg, accompanied by muscle weakness. Less commonly, direct pressure on the spinal cord typically in the cervical spine may result in Myelopathy, characterized by global weakness, gait dysfunction, loss of balance, and loss of bowel or bladder control. The patient may experience shocks (paresthesia) in hands and legs because of nerve compression and lack of blood flow. If vertebrae of the neck are involved it is labeled cervical spondylosis.[1,2,3,8,9] The most common symptoms of the patients in order to frequency were shown in table 1.

When patients are being evaluated for neck pain, plain radiographs are typically obtained prior to three-dimensional imaging. Often the images will reveal cervical spondylosis. Patients frequently

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will question whether the radiographs show significant degenerative changes (as well as if they exclude tumor or infection). When being seen in long-term follow-up of either nonoperative or operative management, they often wish to know whether the underlying cervical spondylosis has progressed or remained stable. It encompasses a sequence of degenerative changes that often begin in the intervertebral disc space and may lead to changes in the surrounding bony anatomy and soft tissues.[6,7] Katz et al[8] proposed that a number of pathological processes cause spondylosis and they lead to vertebral ''endplate sclerosis.''

The disease has a special predilection to the persons engaged in table work. It has a higher incidence in doctors, lecturers, clerks and housewives while lowers in laborers. It was observed to have insidious onset in 97% of the cases only 3% presented with acute onset of pain and neurovascular disturbances. 60% of the patients presented within 6 months of the onset of their illness and the remaining between 6 months to 4 years of onset of their illness.

Causes: Spondylosis is caused from years of constant abnormal pressure, caused by joint subluxation, stress induced by sports, acute and/or repetitive trauma, or poor posture, being placed on the vertebrae and the discs between them. The abnormal stress causes the body to form new bone in order to compensate for the new weight distribution. This abnormal weight bearing from bone displacement will cause spondylosis to occur. Poor postures and loss of the normal spinal curves can lead to spondylosis as well. Spondylosis can affect a person at any age; however, older people are more susceptible.[2]

Complications: A severe but rare complication of this disease is vertebra basilar insufficiency.[1] This is a result of the vertebral artery becoming occluded as it passes up in the transverse foramen. The spinal joints become stiff in cervical spondylosis. Thus the chondrocytes which maintain the disc become deprived of nutrition and die. The weakened disc bulges and grows out as a result of incoming osteophytes.

This study was conducted on 100 cases of cervical spondylosis and managed conservatively in the outpatient department. Post treatment patient were followed for a period of about 3 years (wherever possible). The results were promising in early detected cases and were satisfactory in advanced cases.

MATERIAL AND METHODS

This prospective observational study was carried out in the Department of Orthopedics, Sri Shankaracharya Institute of Medical Sciences, Bhilai, Chhattisgarh, over a period of 2 years from December 2016 to December 2018. An ethical clearance was obtained from the institutional committee prior the study. The study included 100 cases of cervical spondylosis that were treated for cervical spondylosis conservatively, between 20-70 years age group.

These patients were examined clinically, radiologically and systematically to exclude other causes of the symptoms and physical sign present in the patients. The patients were divided into four grade son the basis of the score secured by them depending upon their clinical symptoms, physical signs and radiological appearance of their cervical spine. They were managed conservatively depending upon their clinical grades and results were evaluated subjectively and clinically.

RESULTS

It is primarily the disease of degenerative age group; peak incidence of the disease is in between 41-50 years of age amounting about 36%. The incidence shows a rising pattern after the age of 20 years upto a fall after that upto 70 years. It is rare before 20 and after 70 years. It is a male predominance of 76% while 24% of patients were female.

On clinical examination patients have stiffness in the neck with restricted neck movements while few had muscular wasting, 2 patients presented with quadriparesis with autonomic disturbances in the form of bladder and bowel disturbances.

The radiological appearance of their cervical spine on anteroposterior, lateral and oblique views (right and left) shows in Table 2.

It was interesting to note that there was no clinical correlation with x-ray finding in a good number of cases. After Clinico radiological

confirmation of diagnosis, patients were divided into four grades to plan out their management.
Clinical grades on the basis of scoring shown in table 1 and 2 and number of patients in various grades is evident from the chart shown in Table 3.
The patients of various grades were managed as follows
Grade l:
-Physiotherapy consisting of forward backward and lateral bending of neck.
-Shoulder exercises 5-10 m/day for 3 weeks. The routinely or SOS in subsequent period as required.
Grade ll:
-Analgesics and anti-inflammatory drug.
-Hot fermentation with warm saline 5min twice daily for 1 week.
-Physiotherapy as mentioned above.
Grade lll:
-Rest at home for 2 weeks.
-Cervical traction in head halter with a fixed pulley weight ranging from 4-10 lbs. 7-10 min/day for 10 days.
-Short wave diathermy after traction for 5 min.
-Physiotherapy for 10 min daily.
-Orthotics off and on in the form of cervical collar.
Grade IV:
-Hospitalization of the patient.
-Continuous cervical traction with head halter with elevated head end with 4-10 lbs weight.
-Nursing care of bladder, bowel and back.
-Analgesics and anti-inflammatory.
- POP immobilization in the form of Minerva jacket for 6 weeks after recovery from acute phase followed by orthotics in the form of cervical collar for constant use at least for 6 months then off and on as per need.
The results were evaluated subjectively and clinically as-

- Excellent- No sign and symptoms postoperatively at least for 5 years
- Good- Subsidence of symptoms but persistence of little restrictions of neck movements.
- Fair- Restriction of neck movements but to a lesser extent and occurrence of symptoms after extraction.
- Poor- Persistence of symptoms to a lesser extent which aggravates on exertion and persistence of physical signs.

The distribution of results in various grades was shown in table 4. The scores of Grade l and ll showed excellent results, results were poor in Grade lV scoring patients.

Tables 1: Clinical symptoms in patients.

Symptoms	Score	No	%
Pain in neck	1	58	58
Tingling and numbness in hands and fingers	1	38	38
Pain in shoulder arm and interscapular region	1	35	35
Heaviness in head	1	17	17
Severe headache	1	4	4
Weakness of upper limb	1	2	2

Table 2: Radiological findings in the patients.

Radiological findings	Score	No	%
Obliteration or diminution of cervical lordosis	1	100	100
Marginal osteophytes	1	Anterior 92	92
	1	Posterior 76	76
Marginal sclerosis of vertebral bodies	1	65	65
Intervertebral foraminal narrowing	1	60	60
Osteoarthritis of apophyseal joints	1	24	24
Subluxation or dislocation of vertebral body	2	8	8
Vertebral collapse	2	0	0

Table 3: Clinical grades on the basis of scoring.

Score	Grade	No
1-6	I	18
7-10	Il	27
11-15	Ill	51
16<	lV	4

Table 4: The distribution of results in various grades.

Result	Grade I	Grade Il	Grade Ill	Grade lV
Excellent	100%	69%	24%	0%
Good	0%	28%	49%	0%
Fair	0%	3%	20%	25%
Poor	0%	0%	7%	50%

DISCUSSION

Cervical spondylosis is a degenerative disease process evident from its acceptable correlation with lateral humeral epicondylitis, Carpel Tunner syndrome and diminished diameter of cervical canals.[9,10] Cervical spondylosis is a general term that refers to the degenerative changes. The symptoms of cervical spondylosis include pain which might be radiating or localized in the neck, limitation of neck movements, postural abnormalities. Though the prevalence of degeneration in various parts of body but it dominates in the neck, back and knees making an individual to pay the penalty for upholding his neck and maintain an upright posture.[11,12]

Degeneration of the spine is a very common phenomenon. The morphological changes occurring during degeneration have often been described macroscopically, histological and using many different imaging techniques such as plain radiography, discography, computed tomography or magnetic resonance imaging.[13,14]

Recent researches have moved away from the study of 'normal structural degeneration' to a critical analysis of the significance of ischemia both of nerve roots and of the cervical cord as a penultimate lesions in cervical spinal and root diseases.[4,5]

The associated radiological changes in terms of structural changes which produce them vary from obliteration of cervical lordosis, intervertebral space diminution, marginal osteophytosis with sclerosis, and osteoarthoses of apophyseal joints to the subluxation and dislocation of the vertebral body. These changes can be seen on standard and x-ray film in anteroposterior lateral and right or left oblique views of the cervical spine. These appearances are those of the bony cervical spine changes in soft tissue structure as intervertebral discs articular cartilage. Nerve root, meninges, blood vessels must also be considered. As it may be the reason for the lack of correlation between clinical symptoms and radiological appearance of the cervical spine of the individual.

Brain and Wilkinson[1] grouped their patients according to their symptoms into acute radiculopathy, disc radiculopathy, cervical Myelopathy, patients with headache as symptom, patient with pain in neck as symptom and Vertebro basilar ischemia on physical examination. They have varying degree of limitation of neck movement with weakness of hands arm and shoulder muscle with sensory and autonomic deficit in few and varying degree of structural degeneration of cervical spine on radiological examination. Considering all these as a whole we divided our patients into 4 grades on the score which they secured depending upon clinical symptoms physical signs and radiological examination of their cervical spine.[31,35]

Management of the condition must be assessed against this natural history. It is directed toward relief of pain, muscle spasm and natural restoration of the neck movements. It's treatment

on a flexed neck, local application of heat and analgesia depending on grading or severity of condition. As the severe pain and acute phase off, comfort can be obtained from a soft collar. Though the collars are mechanical inefficient, in that they do not immobilize the neck in the real sense absolutely and for this reason they are not harmful.[4] While driving a car or walking because of inadequate immobilization it does not block, mechanoreceptor impulses from joints and ligaments of the neck.[35,36]

A study conducted by C.M. Shilpa Shekar et al[42] reported the use of low level LASER therapy, TENS and physiotherapy on cervical spondylosis pain. When the condition has settled, regular exercises, attention to posture, height of pillow and working position must be instructed to prevent worsening of the clinical picture. Since operative treatment does not treat the organic pathology so it does not alter the prognosis, but markedly reduces the clinical picture. Some time it may affect the prognosis adversely specially when manipulation and are carried out. The effectiveness of LLLT and TENS with neural mobilization along with exercises was assessed by assessing the effectiveness of pain reduction using VAS scale, the effectiveness of neck ROM using UG, the effectiveness of neck disability using NDI. Therefore the study concluded that the Cold laser therapy (LLLT) with neural mobilization along with Exercises is more effective in reducing Pain, in increasing cervical spine Range of motion and in improving activities of daily living.

Ljubica M. et al[43] conducted a study on Sixty subjects who have received a course of 15 treatments over 3 weeks with an active laser(LLLT)which was applied to the skin projection at the anatomical site of the spinal segment involved with the following parameters: wavelength 905 nm, frequency 5,000 Hz, power density of 12 mW/cm2, and dose of 2 J/cm2, treatment time 120 seconds at each points, at whole doses 12 J/cm2 and they concluded that the Statistically significant differences of pain, in relief of arm pain and increased range of neck extension in patients with acute neck pain with radiculopathy.[43]

A study was done to examine the effect of cervical spine with ultrasound therapy and exercise to manage cervical spondylosis. The subjects were under a structured 6 weeks exercise programme, cervical spondylosis and ultrasound therapy for each day for 6 - days a week. There is statistically significant reduction in cervical spine functional score index measures and improvement in range of motion of cervical spine with p value less than 0.05 after 6 weeks of supervised exercise program, ultrasound therapy and isometric neck strengthening exercise. The result of the present study suggest that ultrasound therapy and exercise are effective for cervical spondylosis.[42,43]

Various physiotherapy treatment protocols have been advocated in the past such as Rest, Taping, Orthosis, Butterfly pillow, cervical collar, Stretching and Myofascial release. Electrotherapy modalities in the form of ultrasound, phonophoresis, iontophoresis, laser, Microwave diathermy, Cryotherapy, Moist Heat have been given in the past Myofascial release is a soft tissue mobilization technique. If the condition is treated in acute stage, then symptoms will be aggravated. If treated in the chronic stage, the symptoms will be alleviated. By Myofascial release there is change in the viscosity of the ground substance to a more fluid state which elements the fascia's excessive pressure on the pain sensitive structure and restore proper alignment. Hence this technique is proposed to act as a catalyst in the resolution of cervical spondylosis[40] Mobilization and strengthening programs are valuable because they can help correct functional risk factor, such as tightness of the sternocleido scalene muscle and weakness of neck muscles. Ultrasound is one of the most commonly used treatment modality in management of soft tissue lesions. Ultrasound consist of inaudible high– frequency mechanical vibrations created when a generator produces electrical energy that is converted to acoustic energy through mechanical deformation of a piezoelectric crystal located within the transducer, waves produced are transmitted by propagation through molecular collision and vibration, with a progressive loss of the intensity of the energy during passage through tissue

(attenuation) due to absorption dispersion or scattering of wave. Although many laboratory–based research studies demonstrated a number of physiological effects of ultrasound upon living tissue, there is remarkably little evidence for benefit in treatment of soft tissue injuries.[40,41]
The purpose of this study is to reducing pain and improving function. There are many individual studies which have been done to check the effectiveness of ultrasound therapy and cervical mobilization techniques and isometric neck strengthening exercise to relieve the pain and improve the function in the patient with cervical spondylosis.

Post management period and subsequent follow up in our cases lead us to conclude that early detected cases of cervical spondylosis in less severe form of their clinical presentation respond well to the conservative or non operative treatment.

CONCLUSION

One hundred cases of cervical spondylosis treated by conservative management where surgery has not been indicated. It is observed that in majority of the cases conservative method succeeded. Only small percentage that had gross compression or neurological deficit needed surgery.
Limitation of the present study was small sample size, relatively short term intervention. The present study has focused on patients with cervical spondylosis so the findings are applicable to patients within this category only.

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