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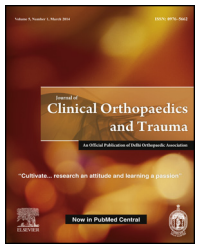

Original Article

Risk factors in cervical spondylosis

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ABSTRACT

Background: Cervical spondylosis is essentially a degenerative disorder common after fourth decade. It has been seen that radiological evidence of cervical spondylosis do not necessarily co-relate with clinical findings. This discrepancy has been attributed to the morphometric dimensions of the vertebrae, age, sex, race, occupation, weight and height of the patients.

Objective: The objective of this study is to co-relate the variables like age, sex, race, occupation, vertebral body diameter, canal diameter, canal body ratio of cervical spine vertebrae with cervical spondylosis cases with normal population.

Methods: In this hospital based, case control, consent based, cross-sectional, clinico-radiological study 200 individuals (controls-100, cases-100) who were subjected to lateral projection radiographs of cervical spine. Their age, sex, race, occupation, height, weight and mid-sagittal canal diameter (CD), sagittal vertebral body diameter (VBD) and the canal-body ratio (CBR) of the cervical vertebrae was recorded and analyzed statistically.

Results: There was no relation between vertebral dimensions and clinical groups. In radiculopathy group, age and height showed significance on univariate analysis. While only age remained significant on multivariate analysis. In neck pain group age, sex, and height showed significance on univariate analysis while in multivariate analysis age, sex and occupation were significant risk factors.

1. Introduction

Cervical spondylosis is essentially a degenerative disorder starting in the intervertebral disc and progressing with advancement in age to involve more than one disc.[1] The term covers the pathology in the spine and the neurological syndrome associated with it.[1] Nearly 50% of people over the age of 50 and 75% of those over the age of 65 have typical radiographic changes of cervical spondylosis.[2] It is important to realize that radiological changes with age only represent structural changes in the vertebrae but such changes do not necessarily cause symptoms.[3]

It is believed that this mismatch between radiographic appearance and clinical symptoms have is not only because of

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age[4–6] but also because of gender,[5,7,8] race,[8,9] ethnic group,[10] height[7] and occupation.[1,11–13] It has also been attributed to various morphological dimensions of the vertebrae like antero-posterior vertebral body diameter (VBD), mid-sagittal vertebral canal diameter (CD) and canal-body ratio (CBR). Morphological dimensions of vertebrae (VBD, CD, CBR) and patient characteristics (age, sex, height, occupation) in adult population in normal healthy persons as controls and in cases of cervical spondylosis were studied. The findings were statistically analyzed and results reported.

2. Aims & objectives

The objective of this study is to co-relate clinically and statistically the variables like age, sex, race, height, weight, occupation, vertebral body diameter, canal diameter, canal body ratio of cervical spine vertebrae and to find which the above variables either singly or as a group are the risk factors in causing cervical spondylosis.

3. Materials and methods

This hospital based, cross-sectional, clinico-radiological study done in department of orthopedics included 200 subjects (males 100 & females 100). The study was done after prior approval from ethical committee of the Institute. All those willing to participate after informed and written consent were included in the study. Individuals aged 20 years or above with complaints of neck pain, stiffness in neck, brachial neuralgia, symptoms of cervical radiculopathy or myelopathy were included. Individuals less than 20 years of age, with history of cervical spine injury, surgically intervened cervical spine or spinal cord, infective pathology of cervical spine, tumors and congenital/developmental cervical anomalies were excluded.

Detailed history, clinical examination for assessing cervical spine dysfunction was performed. The subjects, on the basis of their signs and symptoms, were categorized into symptomatic and asymptomatic group. Symptomatic group was again subdivided into two groups – Group I: patients with Cervical Spondylotic Radiculopathy (CSR)/Cervical Spondylotic Myelopathy (CSM), Group II: Patients with complaints of neck pain, not improved by treatment for other causes of neck pain over 2 weeks period of observation. Group III was the control group comprising of all those who reported to our outpatient department with complaints unrelated with cervical spondylosis and found to be having no signs and symptoms of cervical Spondylosis. Group I and Group II had 50 patients and Group III included 100 individuals.

Race, age, sex, height, weight and occupation of the subjects were noted. The subjects were divided into Mongoloid (0) and non-mongoloid race (1). The occupation was divided as 1) house hold workers (0), 2) Outdoor workers (1), 3) Manual laborers (2) and, 4) Head load carriers (3).

All were subjected to a lateral projection radiograph of cervical spine. Each subject sat erect with his opposite shoulder touching the cassette film holder and his head held in a neutral position with 3 kg sandbags in each hand. The x-ray focus to film distance was kept at a constant distance of 183 cm with central rays focusing over the fourth cervical vertebra 2.5 cm behind the mastoid process.[12] The mid-sagittal canal diameter (MSD), sagittal vertebral body diameter (VBD) and the canal-body ratio (CBR) were recorded. The sagittal diameter of the cervical spinal canal in each subject was measured between two fixed bony landmarks. The anterior point being the middle of the posterior surface of the vertebral body height from C2–C6 and the posterior point being the anterior-most point on the spino-laminar line. Likewise, the sagittal diameter of the vertebral body of the corresponding vertebra was measured from the middle of the anterior surface of the vertebral body height to the middle of the posterior surface of the vertebral body height. The canal–body ratio (Torg–Pavlov ratio) at each vertebral level was calculated by dividing the sagittal diameter of the cervical spinal canal by the sagittal diameter of the vertebral body.[13,14] Measurements were made directly on the radiograph after marking points or lines with a graphite film marker, which provided a very small well-defined point or line necessary for accurate measurement.[15] Measurements were made with a standard metallic ruler (precision ±0.5 mm). Same ruler was used throughout the study. Each measurement of distance was rounded off to the nearest millimeter. All measurements were made independently twice by two observers without reference to prior measurements and the average distance measured was rounded off to the nearest 0.5 mm. Various dimensions thus determined were recorded in a standard proforma. Height, weight, race, age, sex and occupation were also noted. The data was recorded and entered in a Microsoft excel file. The statistical analysis was done in Epi-info 2000 program.

4. Observations & results

This study included 200 individuals (males – 100, females – 100) who attended out-patients clinic of Orthopedics department during the study period. Various vertebral dimensions of cervical vertebrae were measured from lateral projection radiographs of cervical spine as described in methodology. The vertebral dimensions of the three groups are shown in Table 1. K–W test was applied for vertebral body diameter, canal diameter and canal body ratio between all three clinical groups and it was found that the difference was not significant ($p > 0.05$). The mean age, height and weight of the individuals included in the Group I [$n = 50$ (25%)] were 49.76 ± 11.30 years, 156.58 ± 8.84 cm and 55.32 ± 11.04 kg respectively. The mean age, height and weight of the individuals from clinical group II [$n = 50$ (25%)] were 45.82 ± 11.35 years, 156.14 ± 9.22 cm and 55.86 ± 10.78 kg respectively. Similarly, the individuals of clinical group III [$n = 100$ (50%)] had their mean age, height and weight 39.38 ± 14.35 years, 159.54 ± 8.17 cm and 55.60 ± 9.06 kg respectively (Table 2).

5. Univariate analysis

The comparison of clinical group I (radiculopathy) with the control group (clinical group III) for differences in age, height, weight, sex, race and occupation was done and it was found