

## Do We Still Need to Examine Patients with Degenerative Cervical Spine Disease?

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### Abstract

**Objective:** To find out the sensitivity of the common points in history and physical examination in cases of degenerative cervical spine disease at King Abdul Aziz University Hospital (KAUH), Jeddah. **Design:** Retrospective study from January 2005 to December 2010. **Results:** A total of 120 cases were reviewed. 63 (52.5%) were females and 57 (47.5%) were males. The mean age was 55.2 +/- 12.8 years. The most common degenerative cervical spine changes were found at C 5-6 levels. The sensitivities for pain radiation was 60%, for history of numbness was 65%, for history of motor weakness was 70%, for finding of motor weakness was 70%, and finding abnormal sensation was 82.5% and for finding abnormal reflexes was 20%. **Conclusion:** The sensitivity of the pointed neurological history and physical examination is variable with no significantly reliable point in the history. Finding out abnormal sensation can be helpful in reaching the diagnosis of degenerative cervical spine disease in presence of neck pain. Further diagnostic test(s) is required to confirm the diagnosis prior to initiating the treatment.

**Keywords:** Cervical; Spine; Sensitivity; Diagnosis; Jeddah.

### Introduction

Cervical spondylosis is a generalized disease process affecting all levels of the cervical spine. Cervical spondylosis encompasses a sequence of degenerative changes in the intervertebral discs, osteophytosis of the vertebral bodies, hypertrophy of the facets and laminal arches, and ligamentous and segmental instability [1]. As the cervical spine ages, degenerative processes occur that involve the intervertebral disk as well as facet joints. Some individuals experience pain as this process evolves [1, 2]. A nerve root impingement within a stenotic neuroforamen is a common sequela of cervical degenerative arthritis and herniated nucleus pulposus [1-3]. Compression of the degenerated structures on the neural elements can result in a variety of conditions such as cervico-cephalic headache, radiculopathy or myelopathy [1, 4-6].

Ten individuals are responsible for the

development of modern physical diagnosis: Hippocrates, Vesalius, Morgagni, Sydenham, Auenbrugger, Corvisart, Laennec, Louis, Mueller, and Osler. Their accomplishments form a "golden thread [that runs] throughout the history of the world, consecutive and continuous, the work of the best men in successive ages" [7]. In patients with neck pain, still the classical way of reaching the diagnosis is taking a detailed history, performing a physical examination then adding radiological investigation when applicable. The MRI of cervical spine is the golden test for diagnosing the degenerative cervical diseases. However, there is a study proved that there are no correlations between manual-medical findings and radiological results related to the subtypes of chronic neck pain [8]. On the other hand, there is not enough studies to show the sensitivity for the common history points and physical examination performed in outpatient or inpatient sittings.

The aim of this study is to find out the sensitivity of the History and physical examination for diagnosing the degenerative cervical spine diseases.

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### Material and Method

This study was done at King Abdulaziz University Hospital in Jeddah, Saudi Arabia. This was a retrospective study. The medical files were reviewed

during January 2005 till December 2010. All patients had a proven degenerative cervical spine disease by MRI study and complaining of neck pain. The medical files of patients visited the neurosurgery service were reviewed for demographic data, medical history (including neck pain, radiation, numbness, weakness) and physical examination (including motor power changes, abnormal sensory examination and abnormal reflexes). The MRI cervical spine was performed with GE1.5T machine; the MRI images were reported by a neuroradiologist at KAUH.

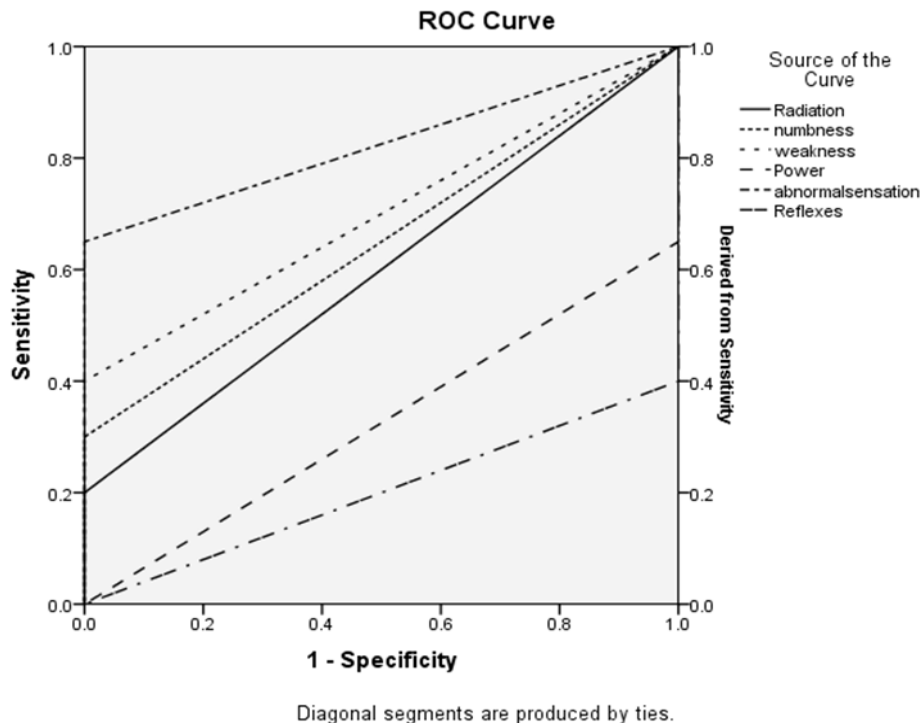
The sensitivity of each point in the history and physical examination was calculated by plotting the *receiver operating characteristic (ROC)* curve (figure 1). The demographic data was presented in form of mean $\pm$  standard deviation for the parametric data

and the frequency with percentage for the nonparametric data. A cutoff point of 50% on the specificity (X) axis was plotted on the ROC curve and the corresponding sensitivity was taken. The results were presented with the *P* value significance and the 95% confidence interval. A *P* value of  $< 0.05$  was considered significant.

All the files included were for patients with cervical spine spondylosis, therefore, the exact specificity and negative predictive values could not be measured.

All the statistical analysis was performed using IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.

The research ethics committee at King Abdulaziz University approved the research project without a need for obtaining a patient consent.



**Fig. 1:** The ROC curve showing the relationship between the sensitivity and specificity

## Results

Total of 120 patients were enrolled. 63 (52.5%) were females and 57 (47.5%) were males.

### Age

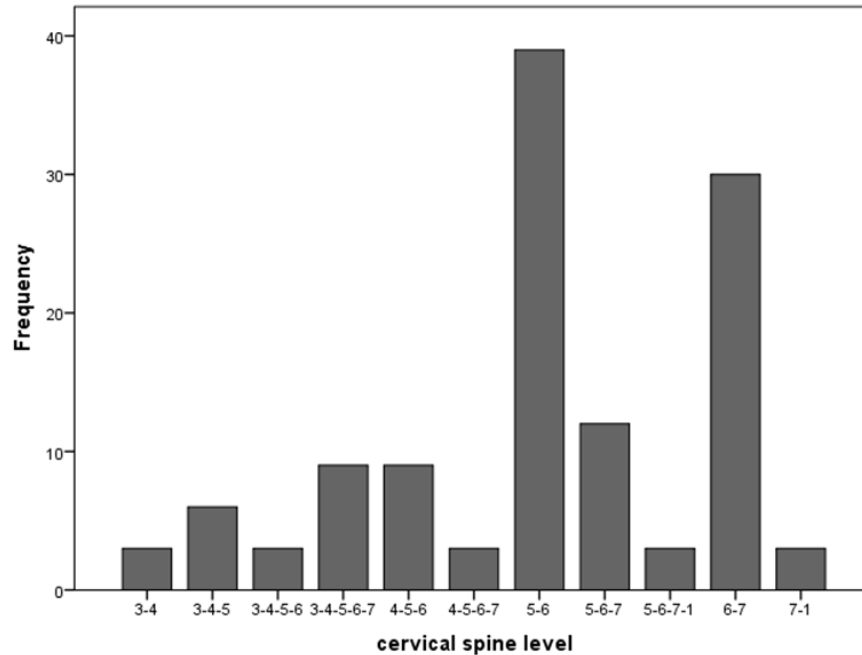
The mean age was 55.2  $\pm$  12.8 years. The minimum age was 29 years and the maximum age was 83 years.

### The Cervical Level Involved

The most common degenerative cervical spine changes were found at C 5-6 levels followed by the C 6-7 level. (figure 2).

### Duration of Symptoms

The mean duration of symptoms prior to the presentation to the medical facility was 41  $\pm$  45.6 months (minimum 5 months and maximum 180 months).



**Fig. 2:** Histogram showing the distribution of the cervical level involved with the degenerative cervical disease.

*The History Points*

**Table 1:** The sensitivity, specificity and likelihood ratio for each point in the study

	Sensitivity %	Specificity	Likelihood ratio	P value	95% CI interval	
					Lower Bound	Upper Bound
Radiation	60	50	1.2	0.56	0.323	0.877
Numbness	65	50	1.3	0.38	0.403	0.897
Weakness	70	50	1.4	0.24	0.483	0.917
Exam power	32.5	50	0.65	0.309	0.093	0.557
Exam sensation	82.5	50	1.65	0.04	0.734	0.966
Exam reflexes	20.0	50	0.4	0.081	0.44	0.356

*Pain Radiation Sensitivity*

There were 84 patient complained of radiation to the upper extremities with neck pain given a false negative rate of 30%. The sensitivity was 60% ( $p = .56$ , 95% CI [0.323, 0.877]) in detecting the degenerative cervical diseases.

the upper extremities with neck pain given a false negative rate of 60% . The sensitivity was 70% ( $p = .24$ , 95% CI [0.483, 0.917]) in detecting the degenerative cervical diseases.

*History of Numbness Sensitivity*

There were 57 patients complained of numbness in the upper extremities with neck pain given a false negative rate of 52.5% . The sensitivity was 65% ( $p = .384$ , 95% CI [0.403, 0.897]) in detecting the degenerative cervical diseases .

*Physical Examination of Abnormal Motor Power Sensitivity*

There were 36 patient found to have of weakness in the upper extremities given a false negative rate of 70%. The sensitivity was 70% ( $p = .309$ , 95% CI [0.093, 0.557]) in detecting the degenerative cervical diseases.

*History of Weakness Sensitivity*

There were 48 patient complained of weakness in

*Physical Examination of Abnormal Sensation Sensitivity*

There were 30 patient found to have of abnormal sensation in the upper extremities given a false negative rate of 75% . The sensitivity was 82.5%

( $p = .04$ , 95% CI [0.734, 0.966]) in detecting the degenerative cervical diseases.

#### *Physical Examination of Abnormal Reflexes Sensitivity*

There were 57 patient found to have of abnormal reflexes in the upper extremities given a false negative rate of 52.5%. The sensitivity was 20% ( $p = .081$ , 95% CI [0.44, 0.356]) in detecting the degenerative cervical diseases.

### **Discussion**

Degenerative cervical spine disease is not uncommon problem among adult population. It is estimated that cervical stenosis was present in 4.9% of the adult population [9]. Usually the patients present with neck pain that radiates to the upper extremities (radiculopathy) or with unsteady gait with possible bowel and/or bladder control abnormality (myelopathy) that can be associated with numbness and weakness of the limb(s). The most important need for performing the physical examination after localizing the lesion, is to decide whether the patient needs surgery or conservative treatment [10]. The gold standard image for diagnosing degenerative cervical spine diseases is the MRI [11].

In this article it is shown that there are no sensitive points in the history of neck pain including the enquiry about pain radiation, enquiry about numbness and a complaint of muscle(s) weakness. Due to lack of literature for any similar study, a comparison is made with similar finding in different parts of the body. In the abdominal pain, for instance, history taking is significant in reaching the diagnosis [12]. In contrast, history taking is not significant in reaching the diagnosis in children with musculoskeletal abnormal joints (13). would this variation be due to the age or the organ? this need to be examined more.

The sensitive point in the examination is finding abnormal sensation. again a similar finding is not available in the current literature, some studies found the physical examination in the musculokeletal system are helpful [14] and another one found it insufficient to reach the diagnosis [15].

On the other hand, the low sensitive points in the physical examination are the abnormal motor exam and the abnormal reflexes. this finding is in line with a study correlating patient with radiculopathy neurological examination with the electrophysiological study [16]. And in urinary tract infection as well where the recommendation not to

rely on the physical examination solely [17].

So, the history taking and pointed physical examination can be useful as a screening tool with keeping all other differential diagnoses in mind. Another situation where the pointed history and physical examination can be used with caution are in busy outpatient sittings and as filtering tool for MRI ordering to avoid increasing the waiting time and the cost [18] for the needed patients. Nowadays with MRI self referral to the specialists offices, this pointed history and physical can be used to correlate the images abnormality with the patient clinical findings [19].

This paper focused more on the sensitivity due to the nature of the patients included, that they are positive for the degenerative cervical spine disease, however, by taking a specificity of 50% the chances of making a misleading assumption is minimized and the recommendations are unbiased, another study with mixed positive and negative MRI for cervical degenerative diseases is needed to find out the exact specificity as well.

The art of history taking and performing a through physical examination are very important specially in the initial assessment of the patient [20, 21]. Once there is any doubt about the final diagnosis, a cervical spine MRI has to be obtained [22, 23].

The limitations of this study are the small number of patients, the inclusion of only the diseased patients with inability to measure the exact specificity and the negative predictive value and the retrospective design of the study.

It is recommended to do another prospective study with a larger group of patients and inclusion of negative MRI finding as well.

### **Conclusion**

The sensitivity of the pointed neurological history and physical examination is variable with no single reliable point in the history such as pain radiation, numbness and weakness. The only reliable point in the physical examination is finding out abnormal sensation. Further diagnostic test(s) is required to confirm the diagnosis prior to initiating the treatment.

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