



# Difficulty in making differential diagnosis of Cervical Disc disease and shoulder discomfort

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Received: Dec 30, 2019

Accepted: Feb 11, 2020

Published Online: Feb 13, 2020

Journal: Neurology and Neurological Sciences: Open Access  
Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

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## Abstract

**Objectives:** Examination findings of cervical disc disease and shoulder disorders are similar. Therefore, it is difficult to distinguish these pathologies only by physical examination.

**Patients and methods:** In this study, both cervical and shoulder MR images of 200 patients with cervical and shoulder disturbances were examined. Both cervical disc and shoulder pathology coexist in 90% of patients.

**Results:** Depending on these complaints, the frequency of coexistence of these two pathology groups leads to difficulties in diagnosing correctly and therefore in applying the correct treatment. At this point, MR's benefit is excellent.

**Conclusion:** It is important to emphasize that in this group of patients both the cervical and the shoulder MRI should be evaluated together.

**Keywords:** Cervical disc disease; Cervical radiculopathy; Shoulder disorders; Shoulder pain; Rotator cuff; Shoulder MRIs

## Introduction

It is difficult to distinguish between cervical disc disease and shoulder discomfort with only clinical examination findings. Both cervical disc pathologies and shoulder disturbances affect almost the same body regions. Besides, in most cases, both of these disorders have unilateral pain in the shoulder and neck region. Therefore, in these conditions, it will be difficult to decide the correct diagnosis and thus to find the right treatment. In this study, the importance of MRI findings in the differential diagnosis of these pathologies was examined. The contribution that MR provides at this point is extraordinary.

## Patients and methods

In this study, 200 patients with neck and shoulder soreness who applied to our clinic for one year were studied. In all of these patients, MR studies were performed on both the cervical vertebrae and the shoulders where the discomfort is felt. Cervical disc pathologies were categorized as bulging, protrusion,

and extrusion for 5 disc spaces (C2-C3, C3-C4, C4-C5, C5-C6, C6-C7). Shoulder pathologies were also classified as impingement, tendinosis, tendon rupture in supraspinatus, infraspinatus, and subscapularis muscles, tenosynovitis in the biceps muscle, and rupture of the glenoidal labrum, biceps labral complex SLAP lesion. In addition, according to MRI scans, the number of patients who did not have only cervical disc pathology, only shoulder pathology, and neither shoulder nor cervical disc pathology were determined. In order to make comprehensive evaluations of these findings, published studies and articles on shoulder and neck disorders were systematically reviewed by using PubMed.

## Results

In this study, neither shoulder nor cervical vertebral pathology was found in only 1% of patients who underwent MRI examination of the cervical vertebra and shoulder region. 2.5% of all patients had no shoulder pathology. 8.5% of all patients



**Cite this article:** Ozdemir U. Difficulty in making differential diagnosis of Cervical Disc disease and shoulder discomfort. *Neurol Neurol Sci Open Access*. 2020; 3(1): 1013.

had no cervical vertebral disc pathology. As a result of the general table, 180 of all patients, so 90% of all patients, had both cervical disc and shoulder pathology in various forms (Table 1). When cervical disc diseases were categorized as bulging, protrusion and extrusion, 239 bulgings, 307 protrusions and 12 extrusions were detected at 5 cervical distances. The cervical disc hernia was mostly located at the C5-C6 distance (80 bulgings, 80 protrusions and 3 extrusions) (Table 2). The most frequent pathology in the shoulder was edema, which was followed by tendinosis and impingement in supraspinatus muscle. Biceps muscle tenosynovitis, tendinosis in infraspinatus and subskapularis muscles, supraspinatus partial rupture, and less frequently supraspinatus total rupture were also detected. Of all the shoulders examined, edema in 188, supraspinatus tendinosis in 120, supraspinatus impingement in 78, supraspinatus partial rupture in 41, biceps tenosynovitis in 33, and supraspinatus total rupture in only 9 were found (Table 3).

**Table 1:** Distribution of patients according to cervical radiculopathy and shoulder pathologies

	Number of patients	%
Patients who have neither cervical radiculopathy nor shoulder pathology	2	1
Patients who have no cervical disc pathology	17	8,5
Patients who have no shoulder pathology	5	2,5
Patients who have cervical disc and shoulder pathology together	180	90

**Table 2:** Cervical disc pathologies

	Disk pathology	Number of pathology
C2-C3	Bulging	6
	Protrusion	8
	Extrusion	1
C3-C4	Bulging	52
	Protrusion	72
	Extrusion	1
C4-C5	Bulging	52
	Protrusion	71
	Extrusion	3
C5-C6	Bulging	80
	Protrusion	80
	Extrusion	3
C6-C7	Bulging	49
	Protrusion	76
	Extrusion	4

**Table 3:** Shoulder pathologies

Pathology in MRI	Number of shoulders with pathology
Edema	188
Supraspinatus impingement	78
Supraspinatus tendinosis	120
Supraspinatus partial rupture	41
Supraspinatus total rupture	9
Infraspinatus impingement	0
Infraspinatus tendinosis	24
Infraspinatus partial rupture	5
Infraspinatus total rupture	0
Subskapularis tendinosis	18
Subskapularis partial rupture	3
Subskapularis total rupture	0
Labral tear	15
SLAP	13
Biceps tenosynovitis	33

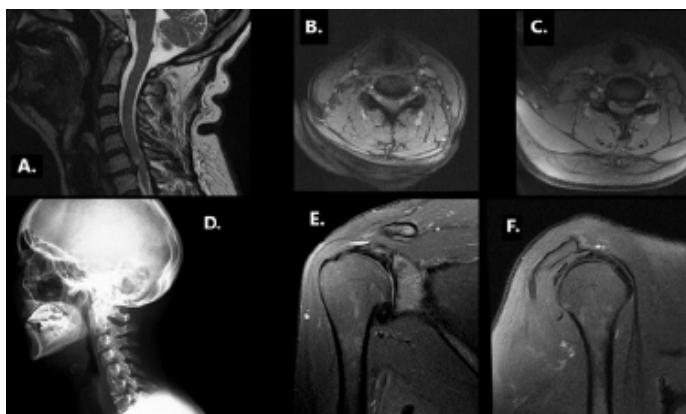
## Discussion

Neck and shoulder pain are the second and third most common musculoskeletal complaints after back pain [1,2]. It may be very difficult to separate cervical radiculitis from primary shoulder disease due to anatomical similarity of the neck and shoulder, overlapping symptoms, and similar patient groups. The presence of cervical spine pathology should also be suspected in patients with shoulder pain [3]. Although shoulder pathologies are somewhat more localized, cervical radiculopathy may also cause pain in the shoulder region, which can be confused with the rotator cuff [4]. A comprehensive history and detailed physical examination are important in differential diagnosis. Radiographic examinations and electrodiagnostic tests and anesthetic injections can be used to confirm the diagnosis and thus provide appropriate treatment. Successful results can be obtained after correct diagnosis and appropriate treatment [5]. Detailed information about the neuromuscular anatomy and cervical nerve innervations may facilitate differential diagnosis [6]. In addition, shoulder pain may occur when rotator cuff tears and cervical radiculopathy are present together. This will also affect the treatment process [7]. Combined neck-shoulder pain requires careful evaluation with a systematic approach that allows appropriate treatment [8]. Some diagnostic methods such as arm squeeze test have been found useful for differential diagnosis [9]. However, it is not sufficient for differential diagnosis. In the international index, shoulder, neck and arm pain are usually classified according to the body region (such as epicondylitis, shoulder symptoms). If the focus is not clearly known, it is generally recorded as muscle pain. For this reason, in one study, in 23% of the patient group, the symptoms were recorded as general muscle pain, ie non-region specific codes. In this study, the use of non-specific codes is also an indicator of poor evaluation [10]. In one study, the reliability of those who examined shoulder and neck complaints was calculated by applying a nonmetric multidimensional scaling procedure, based on the population distribution and clinical characteristics of the

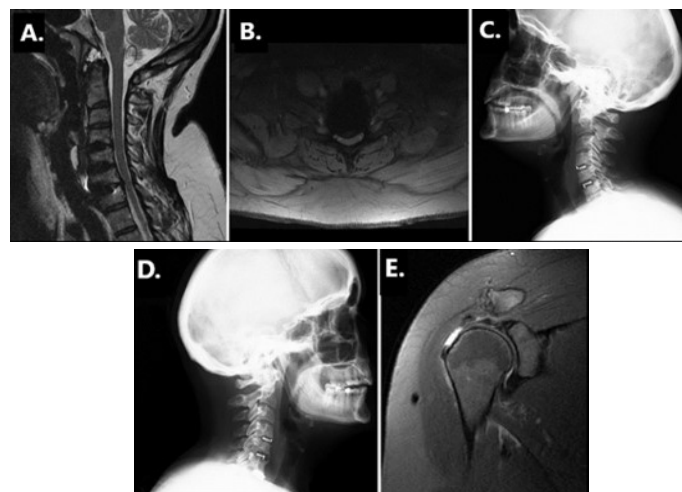
patients. According to the results of the research, although the observers were different, the physical examination findings and the results were reliable [11].

## Conclusion

In our study, only 1% of 200 patients with cervical and shoulder region complaints had neither cervical disc nor shoulder pathology. In 180 patients both cervical disc and shoulder pathology were present together. The coexistence of these two groups of pathologies makes difficult to diagnose correctly. Therefore, it is difficult to find the right treatment. MR is an excellent helper in this regard. We can demonstrate this with examples of clinical cases we encountered. The first patient we selected as an example was a 41-year-old female with bilateral shoulder, neck and arm pain. As a result of clinical findings and MRI, cervical discectomy was performed for this patient. Postoperatively, the patient's left-sided pain improved, but right-sided pain persisted. Then, right shoulder MRI was performed. In this MRI, superior labral tear, tendinosis and rotator cuff tear were seen on the right shoulder. The patient was referred to the orthopedia clinic for arthroscopy (Figure 1). A more interesting example was a 46-year-old female patient with right-sided neck, shoulder and arm pain. This patient underwent cervical discectomy twice, but his right arm, neck and shoulder pain did not improve. After a long and painful follow-up, right shoulder MRI was performed. This MRI showed a full-thickness supraspinatus tendon rupture. The patient underwent arthroscopy by the orthopedia clinic. The patient recovered (Figure 2). From these data, it is seen that cervical spine and shoulder MRIs should be evaluated together in all patients with neck and shoulder disorders in order to make a correct diagnosis. From these data, it is seen that cervical spine and shoulder MRIs should be evaluated together in all patients with neck and shoulder disorders in order to make a correct diagnosis.



**Figure 1:** A 46-year-old female patient with right-sided neck, arm, and shoulder pain. Although the patient had undergone two operations at different levels for cervical discal hernia, the pain did not improve. Right shoulder MRI was then performed. MRI showed a full-thickness tear of the right supraspinatus muscle tendon. Therefore, shoulder arthroscopy was performed by the orthopedia clinic for the patient. Then the patient recovered. A. Postoperative cervical MR sagittal section. B. Postoperative cervical MR axial section. C. Postoperative ((after the first surgery)) cervical x-ray. D. Postoperative (after the second surgery) cervical x-ray. E. Rotator cuff tear on right shoulder MRI.



**Figure 2:** A 46-year-old female patient with right-sided neck, arm, and shoulder pain. Although the patient had undergone two operations at different levels for cervical discal hernia, the pain did not improve. Right shoulder MRI was then performed. MRI showed a full-thickness tear of the right supraspinatus muscle tendon. Therefore, shoulder arthroscopy was performed by the orthopedia clinic for the patient. Then the patient recovered. A. Postoperative cervical MR sagittal section. B. Postoperative cervical MR axial section. C. Postoperative ((after the first surgery)) cervical x-ray. D. Postoperative (after the second surgery) cervical x-ray. E. Rotator cuff tear on right shoulder MRI.

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