Original article

Cervical Magnetic Resonance Imaging (MRI) Findings in Patients with Neck Pain; A Cross Sectional Study in Southeast of Iran

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Abstract:

Introduction: Neck pain is a common problem in human societies; around 67-70% of adults experience it throughout their lives. There is much controversy in the literature about chronic neck pain causes and the role of imaging in the evaluation of it. In this study, we aimed to investigate the MRI findings in patients with neck pain.

Methods: This cross-sectional study was conducted in 2014 in Zahedan, Iran. The study population was consisted of the patients with neck pain, in which a total of 700 patients were studied. After the MRI imaging, the study subjects were asked some questions and the required information was collected.

Findings: 32.3% of the subjects were males and the average age of the participants was 35.62±10.15 years. 76.8% of people had chronic pain and also 86.4% of people didn't show any abnormal finding and in the rest of them spondylosis and trauma were the most common abnormal causes. Disc bulging and protrusion were the most common finding and C_3-C_4 and C_4-C_5 were the most common level of these damages.

Conclusion: In this study, like previous studies, the most common causes of neck pain were non-specific causes and they followed by spondylosis and neck trauma.

Keywords: Cervical - MRI - Findings - Neck Pain

Introduction:

Neck pain is a common problem in human societies; around 67-70% of adults experience it throughout their lives (1,2). The neck pain, especially in middle age has the highest prevalence and can lead to severe disability in 5% of patients. The prevalence of this condition, with the progress of societies, is expanding alarmingly (3,4).

The condition is often of long duration (at least 12 weeks) and then, enters to the chronic stage that in such cases the diagnosis is chronic neck pain (1). In adults, neck pain is often caused by factors related to the job (2-4). In 70% of patients with neck pain, a diagnosis based on the structure involved is not defined and largely a series of factors can lead to this disorder. In such cases it is known as non-specific neck pain (1,2). Inter-vertebral joints destruction and functional changes, and the changes in the pattern of muscle activation are of common factors associated with neck pain (5). On the other hand, the cervical spine is a common place for degenerative changes. The most common dysfunction in the spine after the fourth decade of life is the Spondylotic myelopathy of cervical spine, which is included a wide range of degenerative changes in the cervical spine. Degenerative changes of the spine are numerous and symptoms of the disease is dependent on the type and location (6-8).

Chronic neck pain mainly has two etiologies include, post traumatic and degenerative diseases. The causes of post traumatic is divided into gross injuries and whiplash syndrome. Degenerative diseases cause of the chronic neck pain include spondylosis, degenerative disc disease and acute disc herniation. Degenerative causes may also occur following trauma. From other uncommon causes, the carotid and vertebral artery dissection, arteriovenous malformations, and neoplasms can be mentioned (9-12).

Following the introduction of Magnetic Resonance Imaging (MRI) the science of radiology and imaging methods have revolutionized. Because of the high sensitivity of MRI, the method can detect anatomical abnormalities in their early stages. As stated above, the neck pain is a common condition in middle age, and up to now few studies have been conducted on the findings from MRI on neck pain, therefore, in this study, we aimed to investigate the MRI findings in patients with neck pain in Sistan and Baluchestan, southeast of Iran, between two years.

Methods:

This cross sectional study conducted in 2014 and 2015 in the city of Sistan and Baluchestan, South East of Iran. Inclusion criteria was neck pain in people over 10 years old. 700 patients were enrolled in this period. All these patients to be examined by a neurosurgeon, and were asked to fill the data sheet (demographic and disease characteristics). Then all the people were under imaging by a GE Medical System 1.5 Tesla Wisconsin USA model MRI device. Then, the results of MRI images were examined by a radiologist. All MRI findings were entered to the researcher-made forms by the executor of plan, and after completion of the project, the above data were entered into SPSS software (version 21) for analysis.

Findings:

In this study, 700 patients who had complaints of neck pain were studied. 226 patients (32.3%) were male and 474 (67.7%) were female. The average age of them was 35.62±10.15 years. A total of 182 patients (26%) were self-employed, 91 people (13%) were workers, 119 people (17%) were employees, and 308 patients (44%) were housewives. 538 cases (76.8%) had chronic pain and 162 people (23.2%) had acute pain (Table 1).

In 47 patients (6.7%) there were observed findings in favor of spondylosis and also in 44 patients (6.3%) findings related to the trauma, in 3 patients (0.4%) the Space-occupying lesion in the spinal cord, and in 1 case (0.1%) the Space-occupying lesion in the vertebral canal were observed (table 2).

Among the subjects, 55 patients (7.9%) had a history of trauma. Of the subjects, in 61 patients (8.7%) shoulder pain, 8 patients (1.1%) muscle weakness, 6 patients (0.9 %) quadriparesis, 15 patients (2.1%) numbness, and 42 people (6%) tingling in the extremities were seen in patients (Table 3).

189 patients (27%) had no finding, but in 52 patients (7.4%) the most sever lesions were in C2-C3 level, in 166 patients (23.7%) in C3-C4 level, 154 patients (22%) in C4-C5, 104 people (14.9%) in C5-C6 level, and in 35 patients (5%) were in C6-C7 level (Table 4).

About type of finding, 189 patients (27%) were without lesions, 136 patients (19.4%) had disc bulging, 221 patients (31.6%) had disc protrusion, 5 patients (0.7%) had disc extrusion, 35 patients (5%) had bilateral foraminal canal stenosis, 10 patients (1.4%) had stenosis of the left foraminal canal, 11 patients (1.6%) had stenosis in right foraminal canal, 61 patients (8.7%) pressure effect of on theca, 4 patients (0.6%) had dehydrated disc, and 28 patients (4%) were observed with osteophytes (Table 5).

Conclusion:

In this study, 700 patients with neck pain were evaluated and the results are noted above. As mentioned, referring patients were more females, with the mean age of 35 years. Also, most of the participants were housewives, followed by the self-employed and employees who were the most frequent. Most of the participants also had chronic pain. Some of these patients had a history of trauma but there was no evidence of traumatic lesions in these people. The main symptom was neck pain; while some of them the neck pain was associate with other symptoms, such as shoulder pain and tingling in the extremities. In most cases, the lesions in C3-C4 and C4-C5 level were observed, and the most of the lesions were disc protrusion and disc bulging.

There much controversy in the literature about chronic neck pain causes and the role of imaging in the evaluation of it. However, what is clear is that the most common type of patients with neck pain, are the patients with chronic non-specific neck pain, in which, a neck pain is observed without any specific pathology cause such as a herniated disc, pressure on the nerve root, and bone destruction. Previous studies have rarely investigated the results of MRI in patients with chronic neck pain, and in this context the two studies can be noted: in a study conducted in 2014 by Hashmi et al, they announced

that among 342 patients with neck pain, 79% had abnormal cervical MRI, and 70% of patients had evidence of degenerative diseases. In their study, the most common findings were Disc bulging and protrusion (14).In our study, the normal finding was much more than that of above mentioned study, which can be due to the differences in sampling. But, in their study, as in our study, the most frequent lesions caused by disc protrusion and bulging.

In a study by Islam and colleagues in 2009, which was similar to our study, it was found that of 60 patients with neck pain, 51 patients had spondylotic changes, and two of them had evidence of trauma (14). The sample size in their study is much smaller than our study, and it does not seem logical to compare these two. But, the similarity between that study and study is that, in their findings the most frequent issue was spondylotic change, followed by the trauma.

In other hand in a study by Griffen and colleagues in 2003 on 3018 patients with blunt trauma in neck, it was found that CT scan is a better method than plain radiography for evaluation of blunt trauma to the neck (15). They investigated only the neck pain caused by trauma, and the researchers have suggested that CT scan, in neck pain due to trauma diagnosis, is the most preferred method.

Another study that conducted by Rhee and colleagues in 2009 showed that, about one in five patients with cervical myelopathy cannot be diagnosed based on symptoms and examination, so that, the use of imaging techniques is required. If symptoms be matched with imaging findings, we can make much better decisions to diagnose the disease (16). The study deals with the role of imaging in the diagnosis and decide on treatment. As stated, in the cases of cervical myelopathy we cannot make the final decision about the disease without imaging. Also, in determining the method of treatment the use of the imaging is very important.

Also, in a study conducted in 1991 by van der Donk and colleagues, it was found that the disc degeneration is associated with neck pain in men but this was not seen in women. Osteoarthritis of the facet joints doesn't associate with the neck pain in men and women (17). Their study examines the relationship between cervical spine diseases and the imaging findings in patients, and compares the results of it in between two sexes. In 70% of patients with neck pain diagnosis based on the structure involved is not defined, and mainly a series of factors can lead to this disorder. In such cases, it is known as non-specific neck pain.

In this study, most subjects were also with non-specific neck pains, and the only way to distinguish these cases from pathological causes is, the use of imaging methods, especially MRI.

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Tables:

Table 1: Demographic Data

Variable		N	%
Gender	Male	226	32.3%
	Female	474	67.7%
Job	Self-employed	182	26%
	Employee	119	13%
	worker	91	17%
	housewife	308	44%
Pain Duration	Acute	538	76.8%
	Chronic	162	23.2%

Table 2: Abnormal Conditions

Condition	N	%
Spondylosis	47	6.7%
Trauma	44	6.3%
Space-occupying lesion in spinal cord	3	0.4%
Space-occupying lesion in vertebral canal	1	0.1%

Table 3: Frequency of chief symptoms

Symptom	N	%
Shoulder pain	61	8.7%
Muscle Weakness	8	1.1%
Quadriparesis	6	0.9%
numbness	15	2.1%
Limb Tingling	42	6%

Table 4: Abnormal Disc level

Location	N	%

without	189	27%
Between C2 and C3	52	7.4%
Between C3 and C4	166	23.7%
Between C4 and C5	154	22%
Between C5 and C6	104	14.9%
Between C6 and C7	35	5%

Table 5: Abnormal Finding

Finding	N	%
Without	189	27%
Disc bulging	136	19.4%
Disc Protrusion	221	31.6%
Disc Extrusion	5	0.7%
Bilatral foraminal canal stenosis	35	5%
Left foraminal canal stenosis	10	1.4%
Right foraminal canal stenosis	11	1.6%
Pressure effect on Theca	61	8.7%
Disc Dehydration	4	0.6%
Osteophyte	28	4%