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Characteristics Of The Disease Sciatica Root Caused By A Herniated Disc With Using The Methods Of Electromyography

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Abstract

Background: The spine is the support of the total human body. And the diseases of the bone apparatus have great damage to each body system. Accurate data on the incidence and incidence of sciatica root disease in Vietnam have not been recorded. Some studies give an estimated 5% to 10% of cases of lumbar spine pain with sciatica, while the prevalence of this disease varies from 49% to 70%.

The main aim was to conduct research on electro-mechanical late response to disease sciatica root cause due to herniated disc.

Materials and Methods: Late response is one of the electrical diagnostic techniques that allows evaluating the root function of the nerves, which are affected to varying degrees in lumbar root disease.

Results: There are two late responses, F wave and H reflex, which are used to investigate nerve roots. To our knowledge, there has been no research in Vietnam Specific characteristics of delayed responses in sciatica and sciatica similarities between these late responses with clinical and imaging studies.

Conclusions: Neurophysiologic investigation plays an important role in the diagnosis and prognosis of the lumbar root disease. Especially, in situations where the clinical results and imaging are negative, electrophysiological diagnosis is really helpful; whereas for cases where the clinical results and imaging are positive, it plays an additional role in the diagnosis.

Keywords: late response, electrical diagnostic, sciatica root, herniated disc, back pain.

Introduction

Pain is the signal of the body in the answer in different damages. They can have different anatomical structures failures and pathophysiological functions causes, so, each cause of pain, and the spinal pain, in particular, can have different producing a distinctive clinical profile. Lumbar pain can arise from the intervertebral disc, either acutely as a primary disc-related disorder, or be a result of the different case degradation which can be associated with chronic internal disc disruption [1]. And it is

severed important to understand all that we can about pain nature. This gives us an ability to identify and treat pain, in the way of get out the generators of the pain. And the lumbar spine chapter which has a great influence on the lifestyle quality isn't the exclusion [2-3].

We have taken into account, that low back pain has a common spreading. It is one of the most common musculoskeletal disorders and may occur in most people in different life periods. And most cases of back pain are caused by lumbar and sacral spinal damage [4-6]. And the discs hernias is the prevalence cause. The incidence of a herniated disc is fixed about 5 to 20 cases per 1000 adults annually. This is the disease of adults. In most common, intraverteblal herniation detected in people in their 3rd to the 5th life decade. And the male has the prevalence of 2:1 to female [7-8]. But the back pain nature isn't clearly in most cases. Only a small part of the patients has a well understood pathological back pain cause, like a vertebral fracture, malignancy, or some kind of infection [6].

There are data the spinal endoscopy can help in pain identification. It has two main advantages: the ability to reduce the surgical plan of care to STAGE; and the ability to directly visualize areas not just in the intervertebral disc. It opens the door to analysis of pain generators residing within a spinal motion segment that can escape traditional spinal imaging [3,9]. But we have to note, that the nature of sciatica is not well studied. And the management of sciatica that is caused by a herniated disc can considerably vary. The conservative treatment is prevalent and is primarily aimed at pain reduction. In this aim can be used analgesics or procedures which reduce the pressure on the nerve root. And in this cause is critical important to understand well the base of the problem [10-11].

So, have been put several goals to resolve **the main aim** of the study. First of all, to investigate clinical features and types of hernias in sciatica. And to investigate late responses in patients with sciatica root hernias. So, the terminal was the investigation of the correlation between clinical, hernia type, and late response abnormalities in patients with sciatica

2. Materials and Methods

A cross-sectional study described a series of cases has been made. The study has been conducted in the Department of Neurology Military Hospital 175. The Department of Neurology has been conducted both therapeutic and surgical treatment of the lumbar root disease. We have studied the sickness caused by a herniated disc L5S1 and the late response as one of the electrical diagnostic techniques that allows evaluating nerves root function.

Were observed a total of 46 patients with lumbar root disease to get the character data of the lumbar chapter damage. In the first stage, was got the anamnesis of each patient to understand the pain localization and the characteristics of the illness.

Were studied the clinical characteristics of Spinal Syndrome, like as evaluated the spinal pain points, lumbar spine loss, schober sign, and the restrictive motor [12-13]. The other study way was checking of the Root Syndrome clinical characteristics (pain points next to the spine; bell sign, and lasegue sign) [14-15].

3. Results and Discussion

All the patients were applied to the Military Hospital 175 with the pain symptoms which were fixed few painful positions characterized for the lumbar root disease patients. In 32.6 % of patients (15 persons) had complaints in the pain of the right leg and in 30.4 % (14 particulars) left leg was in a painful position. But the most cases were characterized by pain in both legs (37% - 17 patients). And the most patients were complicated in pain in movement (56.5 % or the 26 patients).

Mast be said, that lumbar disc herniation is the most fixed back pain cause. Peng et al. have noted, lumbar disc herniation is a cause of back pain in 66% of applications to doctors for help [16].

And checking of the pain level has shown the prevailed of the severe pain, which described the outcome of the life quality of the patients with the lumbar root disease (Table 1). This effect is caused by pressure on lumbar and sacral spinal segments. By the data of Barret and coauthors pain in the leg is caused as a result of pressure on the L5-S1 nerve root. This provides the disorders in segmental innervation to such body parts as posterior thigh, and the gluteal, anterior, posterior and lateral leg muscles [17].

Testing of the Spinal and Root Syndrome has shown uncommon results in observed patients (Table 2). So, study of the Spinal Syndrome has shown in the most cases that the spinal pain point was positive (60.1%), lumbar spine loss in more than 50% was positive, Schober sign has been redused in 60.2%, and restrictive motor was lowed in 77.1%. Root Syndrome analysis has shown almost proportional separation in each of analyzed parameter (Table 2). The exclusion was the bell sign. This parameter wasn't presented in 67.4% of patients.

The study of reflexes in sciatica root disease patients has shown that heel reflex has been lost in 8.7% (4 patients) for the right leg and in 2.2% (1 patient). In most case, the heel reflex was normal both for the left (40 persons – 87%) and right leg (22 persons – 47.8%). The reduced reflex was fixed in 43.5% (22 patients) and 10.9% (5 percipience) in the right and left one respectively.

The results of this test can be different because of disease history [16-17]. So, Peng and coauthors have showed 84.5% patients with back pain caused by lumbar disc herniation had positive in straight leg raise test, 33.9% of observed people were positive in heel tendon reflex, and 34.2% had a positive knee tendon reflex. Just only for 0.3% patients was fixed gatis [16]. This can be explained by that fact the nerve root is responsible for the plantar response (ankle reflex). The sciatic nerve innervates a large muscle number. This can be caused situation when patients may experience weakness in any or all of them. Can be reported sharp pain radiating down the buttocks and the posterior aspect of the thigh and leg distally toward the heel [17].

But all sensor effects had their cause base. So, we have studied the count of the herniation of the spinal in the observed patients with back pain (Table 3).

The estimated prevalence of symptomatic herniated disc of the lumbar spine is about 1-3% of patients. The most caused reason of the back pain is the herniated intravertebral discs. The underlying etiology like as disc disease is caused not more than 5% back pain [7]. And the most herniation cases are moderate [18]. We have fixed, hernias of intra-vertebral had different localization. More than 65% of patients had hernias' localization not only in lumbar and sacral spinal parts. And the analysis of hernias structure has demonstrated the prevalence of the disc lesion from back to the center.

3.1. Late response characteristics

We have studied the F-wave latency response. F wave follows the motor response and is elicited by supramaximal electrical stimulation of a motor nerve mixed. F waves provide a means of examining transmission between stimulation sites in the limb and the related lumbosacral cord motor neurons [19-21]. So, the minimal F wave response is presented in the table 4.

So, taking into account the means and standard deviation of the results of the short-time potential difference of the F wave (1.96 and 3.56 for the patients with pain in one side; 1.2 and 1.33 for the patients with both side painted), we have counted, the median is 0.8 and 0.9 respectively. Short-time potential difference of the F wave have showed, the quartile for the patients' group with

pain in one side was 0.5 (25%) and 1.97 (75%) with maximal response 18.7; and for the group with pain on both sides it consisted 0.2 (25%) and 1.65 (75%) with maximum response 4.5. The minimal response was 0 for the both patients' groups. The longest potential difference of the F wave had some differenced points. So, for the group with pain fixed in one side, the mean was noted 2.75 with the standard deviation of 3.59; median was 1.7 with the quartile of 0.6 (25%) and 3.7 (75%); the minimal response was fixed at point 0.1 and the maximal – 18.6. For the group with painful of both sides, the mean was noted 2.38 with the standard deviation of 1.75; median was 2.2 with the quartile of 0.6 (25%) and 3.8 (75%); the minimal response was fixed at point 0.2 and the maximal – 6.1.

There were some data have showed other parameters like F wave maximum latency, chronodispersion or tachydispersion would be more sensitive than F wave minimum latency in detecting neuropathy [21-22]. And it is important, the F wave index can be significantly lower in patients with peripheral neuropathy than that of healthy persons [21].

We had founded, that good side dispersion (ms) was fixed at the point 4.33±2.07 but the party pain was fixed at 4.65±1.9 (P=0.35). If the pain has been filed in both legs dispersion on left side was in 4.21±1.85 and in right – 4.46±2.11 (P=0.89).

3.2. H reflex

Why it is important to study H reflex? This index is a sensitive test for polyneuropathies and may be abnormal even in mild neuropathies. It can make possible to involve conduction in proximal as well as distal fibers. Tested of H-reflection can define proximal nerve injury and may be abnormal even when studies of distal function are unremarkable. Guillain–Barré syndrome is characterized by the total absent H-reflexes, and this is characteristed of acute inflammatory demyelinating polyneuropathy. So, the loss of H reflexes occurs early and may be an isolated finding in patients studied within several days after onset of illness. H-reflexes may be abnormal in asymptomatic patients with possible neuropathic dysfunction, and in plexopathies and radiculopathies [23].

So, the next was the H-reflection study. The latent time H-reflection has been characterized by 22.50±10.86 ms as a latent time on good side for a group patients with pain in one side. And the amplitude on good side for this group was 2.75±2.44 mV. Amplitude on pain side was 2.42±2.20 mV (P=0.37). Latent time on pain side in this group was fixed at the range 24.21±9.55 ms (P=0.78). For the group patients with pain fixed in both sides latent time on left one was ranged in 25.59±11.69 ms; and for right one – 24.46 ±10.42 ms (P=0.86). Amplitude characteristics of H-reflection in this group was for the left side – 2.31±1.93 mV and for the right – 1.90±1.70 mV (P=0.14).

The rate between H and M ratio of H-reflection (Table 5) was fixed in the group with paned one side at the range 0.18±0.17 and 0.16±0.12 (p=0.73) as rate for a good and pained side respectively. This characteristics for the group of both sides painted was fixed at 0.18±0.17 and 0.14±0.09 (P=0.19).

Not only normal H-reflex was fixed in the observation. The normal rate was in 34.5% and 41.2% in group with one pained side and with pain on 2 sides. In the group of one side pained most tested patients have shown abnormal H-reflex – in 65.5%. In the group of 2 sides pained this index has been prevalence too: in 58.8%. Abnormal H-reflex was fixed in both groups with pained 1 side and both one (6.98±10.82 and 8.18±11.43 accordingly; P=0.15 and 0.35). For total observed patients abnormal H-reflex was in the range 7.43±10.94 (P=0.001).

There are data about registration of the abnormal H-reflex registration in the cause of the protrusion of intervertebral disc. For the cervical section the abnormal percentages of the nerve conduction were ranged from 10.1% to 32. 2% [24].

There were not fixed correlation between H-reflection and number of disk herniation or the hernia nature. It can be explained by that H-reflection has its change in each cause of spinal damage. There are data, when H-reflex is absent in observing the patients with nerve root conduction problems often is fixed an absent or depressed ankle reflex. H-reflection can showed not only the current injury but may been changed as a result of a previous ones [25].

Conclussions

Back pain caused by a herniated discs is a common disease in whole world.

The methods of electromyography with nerve conduction and F-wave determinations are useful methods in the assessment of injure of nerve root. They can have both clinical value and practice introduction on confirming the diagnosis of radiculopathy.

H-reflexes are a sensitive test for polyneuropathies. It can be more informative in radiculitis and inflammation diagnostics and treatment than the F-wave test.

There are not been fixed a correlation between H-reflection and number of disk herniation or the herniation nature.

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Table 1. The primary observed characteristics of the tested patients

Observed parameter	Characteristic	Cases	Proportion %
Painful position	Right leg	15	32.6
	Left leg	14	30.4
	Two legs	17	37.0
Nature of pain	Pain at rest	2	4.3
	Constant pain	18	39.1
	Pain in movement	26	56.5
Pain level	Mild pain	3	6.5
	Moderate pain	8	17.4
	Severe pain	20	43.5
	Very severe pain	13	28.3
	Worst possoble pain	2	4.3
Observed Patients		46	100.0

Table 2. Characteristics of the Spinal and Rood Syndrome in the study

Study position	Clinical characteristics		Number of cases	Proportion %
Spinal Syndrome	Spinal pain points	Yes	28	60.9
		No	18	39.1
	Lumbar spine loss	Yes	27	58.7
		No	19	41.3
	Schober sign	Normal	16	34.8
		Reduction	30	65.2
	Restrictive motor	Yes	13	28.3
		No	33	77.1
Root Syndrome	Pain points next to the spine	No	11	23.9
		Right	9	19.6
		Left	11	23.9
		Both	15	32.6
	Bell sign	No	31	67.4
		Right	7	15.2
		Left	5	10.9
		Both	3	6.5
	Lasegue sign	No	13	28.3
		Right	15	32.6
		Left	12	26.1
		Both	6	13
	Sensory of right leg	Loss	0	0
		Reduce	19	41.3
		Normal	27	58.7
	Sensory of left leg	Loss	1	2.2

	Reduce	19	41.3
	Normal	26	56.5

Table 3. Intervertebral hernias localization in patients with back pain.

Studied parameter		Number of cases	Proportion, %
Hernias localization	L5-S1	16	34.8
	L5-S1 and others	30	65.2
Hernia's occasion place	Back to the center	32	69.6
	Right deviation	6	13
	Left deviation	8	17.4
Total observed patients		46	100.0

Table 4. The characteristics of the F wave response in patients with back pain

The patients' group	The shortest latency time on good side (ms)	The shortest latency time on pain side (ms)	The shortest latency time on left	The shortest latency time on right	**p**
Minimal F wave latency					
Pain group on one side (n=29)	42.86±5.93	43.81±4.73			0.57
Group pain on both sides (n=17)			46.33±5.25	46.02 ±4.85	0.86
Maximal F wave latency					
Pain group on one side (n=29)	47.18 ±7.08	48.47 ±5.25			0.16
Group pain on both sides (n=17)			50.54 ±5.71	50.48 ±5.46	0.82

Table 5. Characteristics of H and M ratio of H reflection

Tested patients' group	Mean (Standard deviation)	Median	Quartile		Min	Max
			25%	75%		
Group pain on one side (n=29)	0.10 (0.12)	0.06	0.02	0.15	0	0.58
Group pain on both sides (n=17)	0.09 (0.11)	0.08	0.02	0.11	0	0.45