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Review Article

Outcome measures for determining treatment efficacy in radiculopathy

Shamna K., Manju C. S.*

Department of Pharmacy Practice, Government Medical College, Kozhikode, Kerala, India

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***Correspondence:**
Manju C. S.,
Email: manjusreeniajith@gmail.com

ABSTRACT

Radiculopathy is a neurological disorder caused by any pathology affecting the nerve roots of peripheral nerve system, commonly manifested by pain, paresthesia and motor weakness. Lumbosacral radiculopathy, commonly referred to as low back pain, and cervical radiculopathy, referred to as neck pain, are the two most common forms of the condition. Although one of the main goals of treatment is pain alleviation, this does not always indicate that a patient has entirely recovered. Even after their pain subsides, many patients still struggle with everyday activities and emotional wellbeing. Patient reported outcomes are therefore used to determine if the treatment is effective in terms of functional quality of life of the patient. There are several scales and questionnaires available to evaluate pain and functional disability in both cervical and lumbar radiculopathies. By using these measures, efficacy of treatment may be evaluated more precisely and patient care is enhanced.

Keywords: Cervical radiculopathy, Lumbosacral radiculopathy, Treatment efficacy, Quality of life, Outcome measures

INTRODUCTION

Radiculopathy is a neurological disorder caused by any pathology affecting the nerve roots of peripheral nerve system (PNS). It is commonly manifested by pain, paresthesia and motor weakness.[1] The two most prevalent types of the ailment are cervical radiculopathy, which is a type of neck pain, and lumbosacral radiculopathy, which is sometimes referred to as lower back ache. Lumbosacral radiculopathy is defined by numbness, weakness, reflex changes, and pain due to the compression or irritation of nerve roots in the lumbosacral region of the spine.[2] Low backache affects 60–90% of the general population, of which 5-10% accounts for lumbosacral radiculopathy. Lower back discomfort ranks second in terms of reasons why employees miss work, after upper respiratory tract infections.[3] Pain that radiates to the neck, chest, arms, shoulders, and upper back is a characteristic symptom of cervical radiculopathy, resulting from compression of the spinal nerve roots. Cervical radiculopathy affects about 85 out of every 1,000,000 people. Workers who experience the pain account for 40% of work absenteeism. Both lumbosacral and cervical radiculopathy can get worse and cause decreased quality of life if left untreated.

Most patients recover the condition on conservative treatments like anti-inflammatory medications, antidepressants, anti-epileptic drugs, physiotherapy, avoiding activities that strain the affected area. Patients with pain usually have functional disability and psychological distress rather than just pain. These additional characteristics might not be relieved even if pain is alleviated after treatment.

The efficacy of a treatment is determined by how well it functions in optimal conditions, when the patients chosen are the ones who benefit from it the most. Once pain is reduced, a treatment is considered unsuccessful if the patient continues to be psychologically upset, functionally impaired, or dependent on additional medical treatments. Hence the additional disability and distress need to be addressed separately.[5]

Numerous validated instruments, like the visual analogue scale (VAS) and the numerical pain rating scale (NPRS),

or their derivatives, are accessible for assessing variations in pain intensity throughout treatment.[5] Outcome measures are required to be assessed for functional disability and psychological distress along with pain for determining treatment efficacy.

OUTCOME MEASURES IN RADICULOPATHY

Specific measures of disability are available for assessing functional outcomes in radiculopathy as shown in Table 1. These are patient reported outcomes regarding their functional disability and psychological distress as a consequence of disease and treatment.

Table 1: Outcome measure assessment scales for radiculopathy.

Outcome measures for cervical radiculopathy	Outcome measures for lumbar radiculopathy
Neck disability index	Roland Morris disability questionnaire
Patient specific functional scale	Quebec back pain disability scale
Neck pain and disability scale	Fear avoidance belief questionnaire
Cervical radiculopathy impact scale	Oswestry disability index

NECK DISABILITY INDEX

Howard Vernon created the neck disability index (NDI), which is the most established and popular tool for self-reporting neck pain-related disability.[6] The questionnaire comprises ten items, consisting of four pertaining to subjective symptoms and six related to everyday activities. The questionnaire is parted into 10 sections. First section includes statements related to intensity of pain. Second section focus on difficulty in personal care activities like washing, dressing, etc. Third section is related to difficulty in lifting and fourth section comprises of difficulties related to reading. Section 5 includes questions relating to intensity and frequency of headache which is more common during neck pain. Sixth section deals with concentration difficulties as a result of the condition. Next section includes statements regarding work difficulties as part of the condition. Section 8 assess difficulty in driving. The ninth part assesses sleep problems resulting from neck pain. The last section deals with recreational activities. The questionnaire can be administered and evaluated in 5 to 10 minutes. Responses for each item range from no disability (0) to a significant disability (5).

The total score is computed by summing all components. The scale has a maximum score of 50. A score below 4 signifies no disability, a score between 5 and 14 denotes mild disability, a score ranging from 15 to 24 reflects moderate disability, a score from 25 to 34 shows severe disability, and a score over 35 represents complete disability.[7]

NECK PAIN AND DISABILITY SCALE

VAS was used as a basis to create the neck pain and disability scale (NPAD). The severity of pain and how it affects social, emotional, recreational, occupational, and functional facets of life are measured by NPAD. Each of the twenty items in the NPAD has a VAS of 100 mm.[8] The first three items of the scale deal with current pain intensity and pain intensity on an average and at its worst. The following items of the scale assess the extent to which pain disrupts standing, sleeping, driving, walking, social interactions, occupational tasks, recreational pursuits, personal hygiene, interpersonal relationships, overall outlook on life and the future, emotional state, concentration, neck stiffness, difficulties in neck movement, challenges in upward and downward gazes, issues with overhead activities, and the efficacy of analgesics.[9] Item values range from 0, indicating no pain or activity limitation, to 5 representing maximal limitation or the highest level of discomfort. The cumulative NPAD score ranges between 0 and 100 points. Elevated scores indicate greater impairment.

PATIENT-SPECIFIC FUNCTIONAL SCALE

The patient-specific functional scale (PSFS), developed by Stratford and colleagues, is a self-reported, patient-specific outcome measure utilized to assess changes in functional status resulting from musculoskeletal issues, especially in instances of cervical radiculopathy. Patients are requested to identify up to five activities that their condition renders challenging. Subsequently, they assess their difficulty using an 11-point rating scale, with 0 indicating an inability to perform an action and 10 signifying the capacity to execute it at the same level as before.[10] Patients are asked to score these same activities that during the follow-up period following an intervention. They are also given the opportunity to report any new crisis that may have emerged during that time. This measure assesses changes in what each patient view as relevant for themselves, and not what other people think is significant.[11] This scale is widely applicable and easy to use clinically.

CERVICAL RADICULOPATHY IMPACT SCALE

This scale is a disease-specific questionnaire that consists of questions relating to the complaints of the arm and possible limitations that the patient may experience as a result of these complaints. The questionnaire consists of 21 items with three subscales- complaints, pain and limitations to activities, posture, and actions.[12] First three questions are related to complaints which include pain intensity, strength of the arm and stiffness of the neck. The second part addresses pain intensity in the arm, shoulder, and neck regions. Questions related to limitations include limitations in taking personal care, limitations in posture change, limitations in writing, opening a lid, cutting and holding things in the hand. Each item in the questionnaire contains varying responses with scores ranging from

none/never/not limited to very severe/always/very severely limited. This scale is considered as one of the best ways to assess the functional quality of life in patients with cervical radiculopathy.

OSWESTRY DISABILITY INDEX

The Oswestry disability index (ODI), also referred to as the Oswestry low back pain disability questionnaire, is regarded as a gold standard evaluation instrument that may be applied to lumbosacral radiculopathy of various severity. It was developed by Fairbank JCT. The questionnaire comprises 10 sections: pain intensity, personal care, lifting, walking, sitting, standing, sleeping, sexual life, social life, and travel. Each section has 6 varying responses which the patient is requested to choose the most appropriate option. Every response is evaluated on a scale from 0 to 5. A maximum score of 50 is achievable. The patient's percentage disability is determined by dividing the obtained score by 50 and thereafter multiplying the result by 100. According to ratings, severity can be categorized as bedridden or having exaggerated symptoms (81–100%), having debilitating back pain (61–80%), having a severe disability (41–60%), having a moderate impairment (21–40%) and minimal impairment (0-20%).[13]

ROLAND MORRIS DISABILITY QUESTIONNAIRE

The Roland Morris disability questionnaire (RMDQ) is a self-claimed outcome measure used to determine how disabled someone is with low back pain. There are 24 statements about how the individual views their back pain and related limitations, including physical activity, sleep/rest, psychological, managing household affairs, eating, and the frequency of pain.[14] The number of items ticked are added up and 0 refers to no disability and 24 being maximal disability. Questionnaire scores can be analyzed to determine clinical improvement over time. For instance, the patient is said to have improved by 10 points if, at the start of treatment, their score was 12, and at the end of treatment, it was 2. Therefore, we would estimate that the situation has improved by 83% (10/12×100).[15]

QUEBEC BACK PAIN DISABILITY SCALE

The Quebec back pain disability scale (QBPDS) is a questionnaire specifically designed to assess the degree of functional impairment related to low back pain. The scale includes 20 items which the patient may find difficult to perform due to back pain. These activities include sleep/wake up, driving, sitting, standing, walking, running, eating, holding and moving things. Every item has varying answers, with 0 denoting no difficulty to 5 denoting inability. Scores vary between an initial score of 20 to up to a maximum of 100. Greater disability is indicated by higher scores. After adding all the scores, an equation is used to determine the percentage of disability.[16]

$$\text{The maximum disability percentage} = \{(\text{Obtained score}) - 20)\}/80 \times 100\%$$

FEAR AVOIDANCE BELIEF QUESTIONNAIRE

The fear avoidance belief questionnaire (FABQ) was specifically designed to assess the functional quality of life in people with low back pain. Patients may develop fear-beliefs of pain and its challenges based on past experiences of how their pain affects physical activity. This anxiety may result in inactivity, impaired functioning, and not wanting to engage in activities. In addition to measuring fear-avoidance attitudes, this questionnaire is used to identify individuals who are potentially vulnerable for long-term disability.[17] Each of the 16 statements on the test can be evaluated using a 7-point Likert scale, with 0 indicating total disagreement and 6 indicating total agreement. The work subscale (FABQw) and the physical activity subscale (FABQpa) are its two subscales. Stronger fear avoidance beliefs are indicated by a higher score.[18]

CONCLUSION

Radiculopathy is a neurological disorder caused by any pathology affecting the nerve roots of PNS, commonly manifested by pain, paresthesia and motor weakness. Reducing pain alone is not enough to treat radiculopathy. Even if pain subsides, patients may still have emotional stress and difficulty with everyday activities. The whole impact of the disease cannot be fully understood by traditional pain rating scales alone. Treatment efficacy can be determined by assessing functional quality of life of the patient through patient-reported outcome measures. Cervical radiculopathy can be assessed using scales like cervical radiculopathy impact scale and neck disability Scales while questionnaires like Oswestry disability index, Roland Morris questionnaire are used to assess lumbar radiculopathy. The scorings from these scales provides the impact of the condition on the overall health of the patient and improvements shown after treatment.

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