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Clinical Study

Diagnostic accuracy of history taking to assess lumbosacral nerve root compression

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Abstract

BACKGROUND CONTEXT: The diagnosis of sciatica is primarily based on history and physical examination. Most physical tests used in isolation show poor diagnostic accuracy. Little is known about the diagnostic accuracy of history items.

PURPOSE: To assess the diagnostic accuracy of history taking for the presence of lumbosacral nerve root compression or disc herniation on magnetic resonance imaging in patients with sciatica.

STUDY DESIGN: Cross-sectional diagnostic study.

PATIENT SAMPLE: A total of 395 adult patients with severe disabling radicular leg pain of 6 to 12 weeks duration were included.

OUTCOME MEASURES: Lumbosacral nerve root compression and disc herniation on magnetic resonance imaging were independently assessed by two neuroradiologists and one neurosurgeon blinded to any clinical information.

METHODS: Data were prospectively collected in nine hospitals. History was taken according to a standardized protocol. There were no study-specific conflicts of interest.

RESULTS: Exploring the diagnostic odds ratio of 20 history items revealed a significant contribution in diagnosing nerve root compression for ''male sex,'' ''pain worse in leg than in back,'' and ''a non-sudden onset.'' A significant contribution to the diagnosis of a herniated disc was found for ''body mass index <30,'' ''a non-sudden onset,'' and ''sensory loss.'' Multivariate logistic regression analysis of six history items pre-selected from the literature (age, gender, pain worse in leg than in back, sensory loss, muscle weakness, and more pain on coughing/sneezing/straining) revealed an area under the receiver operating characteristic curve of 0.65 (95% confidence interval, 0.58–0.71) for the model diagnosing nerve root compression and an area under the receiver operating characteristic curve of 0.66 (95% confidence interval, 0.58–0.74) for the model diagnosing disc herniation.

FDA device/drug status: Not applicable.

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CONCLUSIONS: A few history items used in isolation had significant diagnostic value and the diagnostic accuracy of a model with six pre-selected items was poor.

Keywords: Sciatica; Diagnosis; Medical history taking; Sensitivity; Specificity; Disc herniation; Nerve root compression; Magnetic resonance imaging

Introduction

Sciatica (also called lumbosacral radicular syndrome) is a clinical diagnosis characterized by radiating pain in the leg and related impairments. The most common cause of sciatica is a herniated disc [1]. The annual prevalence of disc-related sciatica in the general population is estimated at 2.2% [2]. Other causes of sciatica are non-compressive irritation of the nerve root, such as infection, lumbar stenosis, or (rarely) a tumor. Despite the presence of symptoms of sciatica, nerve root compression is not always found on magnetic resonance imaging (MRI).

The diagnosis of sciatica in clinical practice is usually based on history and physical examination. Diagnostic imaging is only necessary in certain patients, mainly when assessing the need for invasive treatment. A recent Cochrane review on physical examination for lumbar radiculopathy due to disc herniation showed poor diagnostic performance of most physical tests when used in isolation [3]. In the diagnosis of sciatica, the main component is probably history taking [4]. Although few studies have examined the value of history taking, it seems that no single history item or physical examination test has both high sensitivity and specificity in patients suspected of sciatica due to disc herniation [5]. Better performance might be obtained when history items are combined. However, because it remains unknown which combination offers the best diagnostic importance, improved understanding of the diagnostic accuracy of history taking regarding sciatica is necessary [6].

The presence of lumbar disc herniation is frequently used as outcome measure in studies on sciatica. Nerve root compression can also occur without a herniated disc, and disc herniation can exist without nerve root compression [7]. Adding that the anatomical basis of sciatic symptoms lies in compression or irritation of a lumbar or sacral nerve root (or the sciatic nerve), one may state from an anatomical viewpoint that nerve root compression might be a better outcome measure than disc herniation in studies on sciatica.

The aim of the present study was to determine the diagnostic accuracy of history taking for the presence of lumbosacral nerve root compression and disc herniation on MRI in patients with sciatica.

Methods

Design

This is a cross-sectional diagnostic study using two datasets: the baseline data of a randomized controlled trial (RCT) comparing early surgery and prolonged conservative treatment for sciatica and of a cohort alongside that trial that includes those patients who were excluded from this RCT after they had undergone MRI [8,9]. All data were prospectively collected in nine hospitals in a large region in the western part of the Netherlands. The medical ethics committees at the nine participating hospitals approved the protocol. Written informed consent was obtained from all patients. There were no study-specific conflicts of interest. Details on the methods are described in the original publications [8,9].

Study population

Patients with severe sciatica visiting their family physician or referred to a neurologist were assessed for eligibility. Eligible patients were aged 18 to 65 years and had received a diagnosis of an incapacitating lumbosacral radicular syndrome that had lasted for 6 to 12 weeks from a neurologist. Patients were excluded if they presented with cauda equina syndrome, insufficient strength to move against gravity, another episode of symptoms similar to those of the current episode during the past 12 months, previous spine surgery, pregnancy, or severe coexisting disease.

Baseline measures

Six research nurses were trained in taking history according to a standardized protocol. In the first visit to the research nurses, a total of 42 history items were assessed for each patient; patient characteristics such as age and sex were also classified as history items. Of these 42 items, 15 were patient characteristics and 27 were symptom-related items (eg, duration of symptoms and questions on provocation of pain). Most questions had a 2, 3, or 4-point answer option; however, for the purpose of the present study, response options were dichotomized. Questionnaires were not classified as history items.

Reference tests

The reference test was an MRI scan performed according to a standardized protocol tailored to a 1.5 Tesla scanner (including Gadolinium series). Both lumbosacral nerve root compression and the presence of a herniated disc as assessed on MRI were defined as reference tests (gold standard). Two radiologists and one neurosurgeon independently assessed the MRI scans according to a standardized protocol [10]. To prevent information bias, they were blinded for