Is NICE guidance for identifying lumbar nerve root compression misguided?

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Abstract

Purpose To determine the extent to which the clinical manifestations of a cohort of people undergoing surgery for lumbosacral nerve root compression satisfy those described in The National Institute for Health and Care Excellence (NICE) guidance.

Method We studied consecutive admissions for lumbar nerve root decompression surgery at two neurosurgical units. Pre-operatively, each person's clinical manifestations were documented and compared with NICE's description. Post-operatively, at three time points (within 48 h, 3 months, 12 months), each person rated their symptoms as either better, the same, or worse.

Results Pre-operatively, one person (0.8 %), from 123 admissions, under 20 different consultant neurosurgeons, had manifestations consistent with NICE's clinical description of lumbar nerve root compression. Post-operatively, self-reported benefit associated with surgery appeared high, at all three time points (78–91 %), supporting the diagnosis of symptomatic nerve root compression and the value of surgery.

Conclusions In this small sample, from two units, NICE's description of the clinical manifestations of lumbar nerve root compression did not describe 99 % of people having

surgery for it. Using NICE's definition to triage people with low back pain could result in prolonged symptoms and delayed treatment. Diagnosing lumbar nerve root compression is complex. NICE's guidance requires examination.

Keywords Radicular pain · Back pain · Guidelines

Introduction

Low back pain is extremely common. It has significant implications for individuals, populations, and economies [1]. National guidance on its management seems appropriate.

In 2009, NICE¹ published guidance for managing non-specific lower back pain. They describe this as tension, soreness and/or stiffness in the lower back region (bottom of rib cage to buttock creases) for which no specific cause can be identified. To assist the exclusion of pain due to lumbosacral nerve root compression, the guidance gives a description of its clinical manifestations: “unilateral leg pain worse than the back pain, pain radiating to the foot or toes, numbness and paraesthesia in the same distribution, which is associated with motor neurological deficit” [2]. Here, we examine, prospectively, a cohort undergoing lumbar nerve root decompression to determine the proportion meeting NICE's description.

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¹ The National Institute for Health and Care Excellence (NICE) is a non-departmental public body of the Department of Health in the United Kingdom, serving both the English NHS and the Welsh NHS.

Table 1 Sample characteristics

Characteristics	Plymouth	Bristol	Total sample
Number of patients (surgeons)	26 (8)	97 (12)	123 (20)
Men % (<i>n</i>)	53.8 (14)	49.4 (48)	50.4 (62)
Women % (<i>n</i>)	46.2 (12)	50.6 (49)	49.6 (61)
Age (years)			
Mean; SD (range)	60.1; 13.7 (28–80)	59.3; 13.3 (24–84)	59.4; 13.3 (24–84)
Duration of symptoms (months)			
Mean; SD (range)	13.6; 8.6 (5–36)	11.0; 5.1 (5–24)	11.6; 6.1 (5–36)
Surgical procedures % (<i>n</i>)			
Micro-discectomy	42.3 (11)	41.2 (40)	41.5 (51)
Inter-segmental decompression	15.4 (4)	41.2 (40)	35.8 (44)
Decompression and fusion	19.3 (5)	13.5 (13)	14.6 (18)
Lumbar laminectomy	23.0 (6)	4.1 (4)	8.1 (10)

Method

We studied sequential elective admissions at two regional neurosurgical units (Plymouth and Bristol, UK) for primary surgery to decompress lumbar nerve roots. Consecutive admissions were studied over 6 months.

Pre-operatively, one investigator (WS) interviewed and examined all participants to elicit the clinical manifestations. Information was documented on questionnaires. Specifically he recorded the site of pain (back and/or leg), which was considered worse, whether leg pain was unilateral or bilateral, the distribution of leg pain (buttock, thigh or foot/toes), and pain duration. Bedside clinical examination determined the presence of motor and sensory deficits. Each person's symptoms and signs were then compared with the NICE's description of the clinical manifestations of lumbar nerve root compression.

Symptom response associated with surgery was determined using post-operative questionnaires administered (by WS) at three time points: within 48 h of surgery (in person prior to discharge), and approximately 3 and 12 months later (by telephone). At each time point patients were simply asked to say if their pain was better, the same, or worse than before surgery. This assessment was deliberately simple to facilitate data collection and gain people's overall perspective on surgical benefit.

Results

In 6 months, 123 consecutive people had lumbar nerve root decompression surgery by 20 different consultant

Table 2 Pre-operative clinical manifestations and post-operative self-reported symptom change

Pre-operative clinical manifestations	% (<i>n</i>)
Presence of back and or leg pain	
Back pain	100 (123)
Leg pain	100 (123)
Unilateral	59.3 (73)
Bilateral	40.7 (50)
Leg pain worse than back pain	69.1 (85)
Distribution of leg pain	
Buttock	12.2 (15)
Thigh	51.2 (63)
Foot and toes	36.6 (45)
Neurological signs	
None	57.7 (71)
Sensory only	33.3 (41)
Motor only	5.7 (7)
Sensory and motor signs	3.2 (4)
Post-operative symptom change	
Time point	Change category
48 h	Better: 78.9 (97)
	Same: 21.1 (26)
	Worse: 0.0 (0)
3 months	Better: 78.0 (96)
	Same: 20.4 (25)
	Worse: 1.6 (2)
12 months	Better: 91.1 (112)
	Same: 8.9 (11)
	Worse: 0.0 (0)

surgeons at the two units. Table 1 shows the sample's demographic characteristics. Most people (64 %; *n* = 79) were 65 years old or less and therefore still of a “standard” working age. The average duration of symptoms was almost a year (5–36 months), implying prolonged and clinically important manifestations. The commonest surgical procedures were single-level micro-discectomies (42 %), and single-level bony decompression (36 %).

Table 2 shows the sample's pre-operative clinical manifestations, and their post-surgical responses. Although everyone had back and leg pain, only one person in this sample (0.8 %) fulfilled NICE's description of radicular pain due to nerve root compression. Nearly one-third (31 %) reported the back pain to be worse than the leg pain. Almost half (41 %) reported bilateral rather than unilateral leg pain. One-third (36 %) reported radiation to foot or toes, and hardly any (3 %) had demonstrable motor and sensory deficit. The vast majority of people reported less pain at all three time points 78–91 %.

Discussion

These results support our clinical impression that the symptoms and signs associated with lumbosacral nerve root compression in the NICE guidelines on non-specific low back pain differed from that we observed in clinical practice. Only one person from 123 consecutive admissions for lumbar nerve root decompression surgery had clinical manifestations consistent with NICE's description. The remainder had heterogeneous manifestations. Only 66 % had unilateral leg pain, 70 % leg pain worse than back pain, 37 % pain radiating to the feet or toes, 33 % had sensory signs, and 3 % motor neurological deficit. Therefore, a clear discrepancy was observed between NICE's description and the observations made in this sample.

One explanation for the discrepancy we have observed is potential methodological weaknesses, particularly sampling bias and a crude outcome measure of surgical effectiveness. The extent to which our small sample, from two neurosurgical centres, is representative of the UK population with symptomatic lumbar nerve root compression is unclear. Our sample could represent a cohort with atypical presentations referred to neurosurgeons and investigated with MRI because their persistent and problematic symptoms were unexplained. Whilst we hope that results from 20 independent surgeons represent, to some extent, broader spinal surgical experience we recognise the importance of studies recruiting all comers with lumbar nerve root compression to test the reproducibility of our findings. We also recognise that surgeons from different specialties manage people with lumbar nerve root compression and that they may have different experiences. We recognise that our study alludes to a problem with the NICE's description of the clinical manifestations of lumbosacral nerve root compression, but can neither confirm nor quantify it.

The effectiveness outcome “measure” we used, a three-level categorisation of symptoms as better, same or worse, is certainly crude but we consider an appropriate method to assess the response to surgery for this study. This is because the purpose of the follow-up was to determine whether or not decompressing the compressed nerve root improved the patient's pain. Improvement in pain 3 months following the surgery would support the hypothesis that the pain was a consequence of nerve root compression. Options for measuring pain before and after surgery include visual analogue scales, which are well known to have limitations as measures. Here, we chose to use a simple categorisation of the effect of surgery on the pain. The follow-up was not to determine the efficacy of surgery, the outcome of which would be a comprehensive assessment of how people feel and function and any negative consequences attributable to the surgery. Even then, multi-

item rating scales purporting to have superior reliability, validity and responsiveness exist for measuring spinal surgical outcomes. However, we have identified concerning measurement problems with these [3–5]. Nevertheless, the choice of post-operative outcome measure should not influence the extent to which the pre-operative clinical manifestations of consecutive people undergoing surgery for lumbosacral nerve root compression met NICE's description.

An alternative explanation for our findings is that lumbar nerve root compression rarely conforms to a homogeneous description. Indeed, we are not aware of a universally agreed definition or description of the pain and other clinical manifestations [6]. Our clinical experience is that lumbar nerve root compression has highly variable clinical presentations, and can be difficult to diagnose without a low index of suspicion and a low threshold for MRI scanning. Even then, the relationship between clinical manifestations and radiological appearances is notoriously variable. We have also found particularly valuable multi-disciplinary discussion with experienced neuro-radiologists and, occasionally, additional diagnostic tests including diagnostic dorsal root blockade and radiculography.

If reproduced, our findings would be jarring for decades of literature that has implied lumbosacral nerve root compression has homogeneous clinical manifestations that can be confidently differentiated from other causes of back pain [7–11]. The inclusion criteria used in clinical trials of lumbosacral nerve root compression might be expected to be a source for evidence-based diagnostic criteria. However, this does not appear to be the case. Two broad types of inclusion criteria appear to have been used. The first type of trials is those that included people with clinical manifestations satisfying clinical descriptions similar to that stated in the NICE, for example, the SPORT study [12]. The results of our study suggest that this description represents a subgroup of people with lumbosacral nerve root compression, perhaps even a very small subgroup. The second type of trials is those that included people who were diagnosed by individual surgeons as having lumbosacral nerve root compression [13, 14]. How each surgeon reached a diagnosis and the criteria they used are not specified. It is important to recognise that our study concerns a related but different issue: can non-specialists be provided with guidance that enables them to identify the vast majority of people with symptomatic lumbosacral root compression so that they can be managed appropriately?

The complexities of diagnosing lumbar nerve root compression have implications for guidance which seeks to triage people with low back pain. The guidance labels people in whom a diagnosis cannot be made by a non-specialist as having non-specific low back pain. They are diverted away from specialist evaluation which

paradoxically appears most needed. Our findings imply that the NICE's description represents a subgroup of people, perhaps even a small minority, with lumbosacral nerve root compression. If this is the case a notable proportion of people with lumbosacral nerve root compression may be misdiagnosed as “non-specific” low back pain. However, we recognise the limitations of our study. We anticipate that extensive further research will be required because of the complexity of this clinical problem. We suggest a starting point would be a careful and systematic documentation of the clinical and radiological manifestations of people with pain referable to their lumbar spine, seeking medical attention.

Only 80 % of participants reported symptom improvement at discharge and 3 months after surgery, albeit using a very simple outcome categorisation method. Although this increases to 90 % at 12 months, distant recall of symptoms and symptom changes makes these results less easy to interpret. However, our findings are broadly consistent with published outcomes for people undergoing lumbar nerve root decompression surgery [12–16]. Nevertheless, if 20 % of surgical procedures for apparently proven lumbar nerve root compression fail to improve people's symptoms, research is required to explain this anomaly and determine how it might be predicted. Our study cannot throw light on this question.

Our findings suggest that NICE's guidance requires updating if it is to assist the diagnosis and management of people with low back pain. Fortunately, the guidance revision process has started and the scoping document acknowledges that “people who have lumbosacral radiculopathy (sciatica) often present with similar symptoms to simple non-specific low back pain with referred leg pain” [17]. Whilst we believe this to be an important development in the guidance, the document does not provide evidence-based recommendations of differentiating, clinically, lumbosacral radiculopathy from simple non-specific low back pain with referred leg pain. Also, the document does not appear to address the more complex fact that people with lumbosacral nerve root compression can present with very heterogeneous clinical manifestations, and how these people might be diagnosed accurately. Explicit evidence-based guidance is required for documents aimed at the non-specialist.

Perhaps most importantly, our study highlights knowledge gaps that undermine evidence-based guidance for non-specific low back pain and lumbar nerve root compression. We think three research questions require answering: what are the manifestations of symptomatic lumbar nerve root compression; what is the best way of confirming the diagnosis; which factors predict surgical outcomes? Also, we think that use of the term “non-specific low back pain” warrants reconsideration. This label

implies that specific causes have been excluded by appropriate clinical opinions and investigations. It also implies that people with this symptom label can be managed using a common pathway, which may not be appropriate if the underpinning diagnoses are different. It seems more likely to us that people labelled with non-specific low back pain have pain from a spectrum of aetiologies, the distribution of which depends—to some extent—on how hard clinicians look for underlying causes. Our results support this view.

Guidance documents are particularly important for clinical situations where evidence underpinning them is limited or absent. Our observations suggest recommendations for these documents. They emphasise the importance of acknowledging that the guidance is preliminary, and will be critiqued, validated, and developed further.

We recognise that our study has limitations and is a small first step towards more definitive studies. However, it is one of the first studies, to our knowledge, to highlight issues around the manifestations of and difficulty diagnosing lumbosacral nerve root compression. In addition, it has exposed a weak evidence-base underpinning our understanding of the clinical manifestations of lumbosacral nerve root compression and has questioned received wisdom.

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