

# How often is low back pain or sciatica not due to lumbar disc disease?

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## ABSTRACT

**Objective:** To determine the percentage of low back pain or sciatica referred for MRI in which the main abnormality was not disc disease.

**Methods:** This is a retrospective study of 634 consecutive lumbar spine MRI's in patients with low back pain or sciatica performed over 6-month period (January to June 2002). The study was conducted at the University Hospital of King Abdul-Aziz University, Jeddah, Kingdom of Saudi Arabia. All patients were scanned on a 1.5-T MRI system. The examination included T-1 weighted sagittal images and proton density and T-2 weighted sagittal and axial images. Contrast enhanced images were obtained selectively.

**Results:** Nine patients were eliminated because they were being followed for a known diagnosis, leaving 625

patients in the study group. Of these, 11 patients (1.7%) had a new diagnosis of metastatic disease to the bony spine, 7 of which (1.1%) had a known primary and 4 of which (0.6%) had no known primary malignancy. Two patients (0.3%) had spinal tumors: one conus ependymoma and one schwannoma. Four patients had non-neoplastic causes of low back pain including syringomyelia, discitis, spondylolisthesis, and an osteoporotic compression fracture. In all, 17 of 625 patients (2.7%) had a new diagnosis of a treatable cause of low back pain or sciatica other than disc disease.

**Conclusion:** In patients with low back pain or radiculopathy, 2.7% have significant pathologies other than disc disease.

Neurosciences 2004; Vol. 9 (2): 94-97

**A**s a result of current financial restraints, some medical care organizations and insurance agencies may tend to stop authorizing surgery for lumbar disc disease, citing the comparable outcomes for surgical versus non-surgical management after one year.<sup>1,2</sup> This may also stop authorizing MRI studies for presumed lumbar disc disease. Although this policy may help in reducing the immediate health care expenditure, it will fail to detect patients with low back pain in whom the pain is due to significant pathology other than disc disease. This study was performed to determine the percentage of patients with low back pain or sciatica in which the primary diagnosis was other than disc disease.

**Methods.** A retrospective review of 634 consecutive lumbar spine MRI studies, including 53% women and 47% men, age range 32-67 years (mean 53 years), was performed over a 6-month period from January to June 2002 in all patients referred for evaluation of sciatica or low back pain at the University Hospital of King Abdul-Aziz University, Jeddah, Kingdom of Saudi Arabia. All cases were referred from neurology, neurosurgery and orthopedic specialty clinics. To simulate the actual daily MRI practice, only the clinical information written on the MRI request form was used as the inclusion criteria. Further medical history and clinical findings were not pursued. The

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Received 8th July 2003. Accepted for publication in final form 10th August 2003.

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MR images and the previous reports in all patients were also reviewed. A second revision was used for writing this manuscript.

The imaging studies were performed on either 1.5 T Siemens symphony (Siemens, Erlangen, Germany) or a 1.5 T General Electric Echospeed LX (G.E, Milwaukee, USA). Phased array coils were used in both units. The examination included T1 weighted (TR/TE=500/15) sagittal conventional spin echo images, and T2 (TR/TE=4000/90) weighted fast spin echo images in the sagittal and axial planes. A slice thickness of 4 mm and interslice gap of 1 and 0.5mm was used for the sagittal and the axial planes. The sagittal images have a 28-cm field of view (FOV) and a 192 x 256 matrix. The axial images have a 22-cm FOV with a 256 x 256 matrix. Three repetitions are routinely used. Contrast enhanced T-1 weighted images were obtained selectively whenever an unexpected pathology was identified. This study did not require approval by the institutional ethical committee.

**Results.** Nine patients were eliminated from the study because they were being followed for a known diagnosis unrelated to disc disease. The final study group consisted of 625 patients. Seventeen patients (2.7%) had a primary diagnosis unrelated to disc degeneration. Thirteen patients (2.1%) had a completely normal MRI examination. The rest of the patients (95.2%) had variable degrees of disc degenerative changes. Of the 17 patients with the new diagnosis of non-discogenic disease, 0.6% patients had non-neoplastic causes of low back pain including an osteoporotic compression fracture, discitis (Figure 1), spondylolisthesis, and syringomyelia. A new diagnosis of metastatic disease to the bony spine was made in 11 patients (1.7%) of which 7 (1.1%) had a known primary without clinical suspicion of metastasis, and 4 (0.6%) had no known primary (Figure 2). Two patients (0.3%) had primary tumors (a conus ependymoma and a nerve root schwannoma). None of the patients composing the 2.7% population had an associated disc or facet degenerative disease.

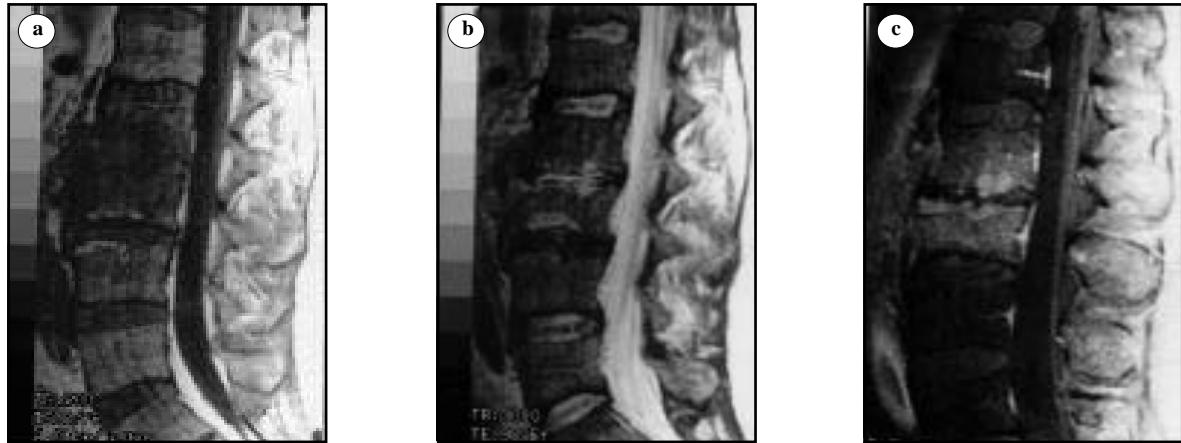
**Discussion.** Back pain is the second leading reason for visits to physicians and is considered the major cause of work-related disability. It represents a major financial burden on health care systems.<sup>3</sup> Diagnosis of the etiology of low back pain is a difficult clinical challenge since the pain is usually multifactorial and the patient's complaint is often vague. The physical examination is non-specific, and a definitive underlying cause of back pain is often not identified.<sup>4</sup> Approximately 85% of patients with low back pain cannot be given a specific diagnosis from clinical examination alone.<sup>1</sup>

Jinkins et al<sup>5</sup> studied the anatomic basis of vertebrogenic pain and autonomic syndromes associated with lumbar disc extrusion. They clearly illustrated that irritation of the recurrent meningeal nerve (sinuvertebral nerve of Luschka) results in conduction of somatic pain to the lumbosacral zone of head. Such pain is poorly localized, and similar patient symptomatology can be produced by any pathology that would irritate the recurrent meningeal nerve. Such pathological conditions include degenerative disc and facet disease, spondylolisthesis, spondylolysis, trauma, infection and neoplastic causes.

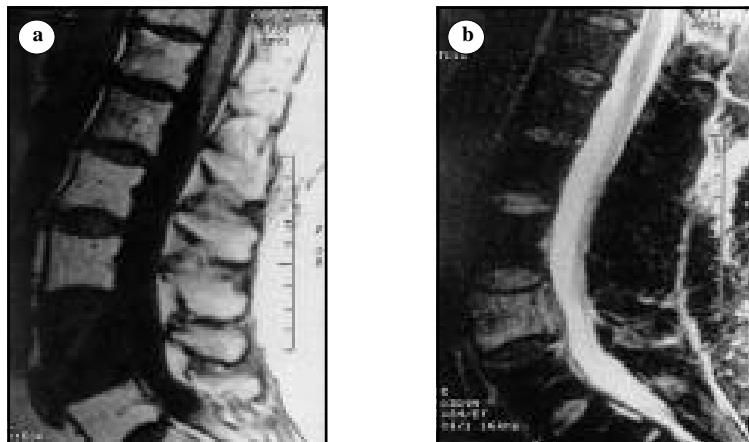
From the clinical prospective there is lack of agreement about the definition of chronic low back pain. It is sometimes defined as back pain that lasts for longer than 7-12 weeks. However, there is general acknowledgment that the underlying pathological cause cannot be well defined on a purely clinical basis.<sup>6-8</sup> This results in variable outcome of conservative management of these conditions and even some claims that patients are more satisfied with chiropractic manipulation than other treatments.<sup>9</sup> Several MR studies on a large number of asymptomatic normal subjects have revealed a significant incidence of disc bulges or protrusions.<sup>3,10-12</sup> These findings raise the suspicion about a possible coincidental relationship between lumbar spine abnormalities on MR scan and low back pain. As far as could be determined, however, no previous studies have specifically evaluated the prevalence of non-discogenic etiologies in patients with a presumed clinical diagnosis of degenerative disc disease.

Although primary neoplastic disease, metastatic disease and infection are relatively uncommon, it is important to accurately diagnose these conditions since they often present with low back pain or radicular symptoms without specific clinical findings and the patients are assumed to have disc disease. Such assumptions may have in certain conditions; such as infection and neoplasms, devastating consequences.

In this study, 17 of 625 patients (2.7%) had significant non-discogenic diseases. All these patients presented with low back pain, sciatica or both and none had any specific clinical findings to indicate a non-discogenic source for their complaint. This emphasizes the importance of performing spinal MRI for patients with persisting symptoms after a trial of proper conservative therapy. Rosomoff & Rosomoff<sup>13</sup> has stated that the chances of there being significant pathology requiring surgical or other forms of intervention may be less than 1% of those with low back pain. Our results reflect a higher percentage of significant non-discogenic pathology and indicate that some of these conditions could have serious medical consequences as well as legal liabilities if the initial



**Figure 1** - A 52-year-old man with history of low back pain of 3 weeks duration. **a**) Sagittal T1 weighted image (TR/TE=500/8). The L2-L3 disc space and the surrounding end plates are poorly visualized. **b**) Sagittal T2 weighted image (TR/TE=3000/98) demonstrate abnormal increased signal intensity within the disc space and the surrounding end plates. **c**) Sagittal contrast enhanced T1 weighted image (TR/TE=500/8) demonstrates abnormal enhancement of the disc space and the surrounding end plates. The end plates show significant surface irregularity. These findings are consistent with discitis. Biopsy was not obtained. The patient subsequently improved on antibiotics without biopsy.



**Figure 2** - A 61-year-old man with dull low back pain of 2 months duration. **a**) Sagittal T1 weighted image (TR/TE=500/15) demonstrates diffuse low signal intensity of the L4 vertebral body marrow indicating complete replacement with an infiltrative process. **b**) Sagittal T2 weighted image (TR/TE=3100/84) demonstrates the abnormal increased signal intensity of the L4 vertebral body marrow. On biopsy this was found to be a metastasis from an unknown primary adenocarcinoma.

diagnosis were unnecessarily delayed. We realize the fact that there are other medical conditions in which pain would be referred to the lower back without visible spinal pathology such as abdominal aortic aneurysm and central (thalamic) pain, however, we did not face such conditions in this study.

The majority of low back pain patients are managed by primary care physicians who must worry about differentiating significant lumbar spinal pathology from self limited low back pain. Due to the limitations of non specific physical findings and a busy clinical schedule, spinal MRI remains an important tool to reduce the number of unnecessary orthopedic and oncologic referrals which add to the over all cost of the patient care.<sup>14</sup> A "red flag" primary care system has been developed and now widely used in the management of low back pain.<sup>15</sup> In this system, signs and symptoms of serious disease such as bowel or bladder incontinence, sensory level and upper motor neuron signs are sought, and their presence is the indication for further investigations of individual patients. Although this system has a novel basis and would help in limiting non-warranted investigations, we do not agree with such a clinical scheme since the clinical basis upon which the physician decision is made is far from being ideal. We believe that since disease presentations are frequently confusing and overlapping, patient's complaints should not be dismissed under the assumption of disc disease without ruling out more ominous pathology.

With ongoing emphasis on containing cost and other changing health care policies, it is also important not to lose the opportunity to specifically diagnose these conditions. When uncertainties arise, the referring physician should order the diagnostic test most likely to distinguish the various diagnostic possibilities. A number of previous studies have shown this test to be MRI. It is currently the best imaging modality to provide the maximum amount of information when evaluating spinal disorders.<sup>16</sup>

Several limitations exist in our study, including the lack of detailed medical history and clinical findings, which may affect the results. However, we aimed to simulate the usual reporting setting and such information is frequently lacking in the daily MR practice. Similarly, no pathological confirmation is available for alternative diagnoses that are suggested by MRI. However, our study is designed to detect non-discogenic diseases that may explain the patient's symptoms regardless of the nature of these diseases. Most of these alternative conditions have MRI characteristics that would limit

their differential diagnosis (for example diskitis and metastasis). We also acknowledge that disc disease may be present in asymptomatic patients while symptoms in patients with disc abnormalities may not relate to the visualized degenerated disc and vice versa.

In conclusion, 2.7% of patients with low back pain, sciatica or both, have significant pathologies other than disc disease. Spinal MRI is crucial for diagnosing these cases.

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