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REVIEW ARTICLE

Informed appropriate imaging for low back pain management: A narrative review

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Abstract Most patients with acute low back pain (LBP), with or without radiculopathy, have substantial improvements in pain and function in the first 4 weeks, and they do not require routine imaging. Imaging is considered in those patients who have had up to 6 weeks of medical management and physical therapy that resulted in little or no improvement in their LBP. It is also considered for those patients presenting with suspicion for serious underlying conditions, such as cauda equina syndrome, malignancy, fracture and infection. In western country primary care settings, the prevalence has been suggested to be 0.7% for metastatic cancer, 0.01% for spinal infection and 0.04% for cauda equina syndrome. Of the small proportion of patients with any of these conditions, almost all have an identifiable risk factor. Osteoporotic vertebral compression fractures (4%) and inflammatory spine disease (<5%) may cause LBP, but these conditions typically carry lower diagnostic urgency. Imaging is an important driver of LBP care costs, not only because of the direct costs of the test procedures but also because of the downstream effects. Unnecessary imaging can lead to additional tests, follow-up, referrals and may result in an invasive procedure of limited or questionable benefit. Imaging

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should be delayed for 6 weeks in patients with nonspecific LBP without reasonable suspicion for serious disease.

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Introduction

Low back pain (LBP) is defined by the location of pain, typically between the lower rib margins and the buttock creases. It is commonly accompanied by pain in one or both legs, and some people with LBP have associated neurological symptoms in the lower limbs. LBP has a high prevalence, affecting up to two-thirds of adults at some point in their lifetime. According to the Institute for Clinical Systems Improvement, the duration of 0–6 weeks is defined as acute LBP, 6–12 weeks as subacute LBP and >12 weeks as chronic LBP [1]. The economic impact of chronic LBP stems from prolonged loss of function, resulting in loss of work productivity, treatment costs and disability payments. Back pain treatment is costly and frequently includes overuse of treatments that are unsupported by clinical guidelines.

LBP is a symptom not a disease and can result from several different known or unknown abnormalities or diseases [2]. For most patients presenting with LBP, the specific nociceptive source cannot be identified, and those affected are classified as having “nonspecific LBP”. The initial evaluation, including a history and physical examination, of patients with LBP should attempt to place patients into one of the following categories: (1) nonspecific LBP; (2) LBP associated with radiculopathy or spinal stenosis; (3) LBP referred from a nonspinal source or (4) LBP associated with other specific spinal causes (Table 1). The medical history should include questions about osteoporosis, osteoarthritis and cancer as well as a review of any prior imaging studies. Review of symptoms should focus on unexplained fevers, weight loss, morning stiffness, gynaecologic symptoms, and urinary and gastrointestinal problems. The physical examination should include the straight leg raise and a focused neuromuscular examination. Testing deep tendon reflexes, strength and sensation can help identify which nerve roots are involved [3].

Overuse of imaging for LBP is common in clinical practice [4]. Though overuse of imaging for LBP has long been noted as a problem, yet the use of imaging [particularly computed tomography (CT)/magnetic resonance imaging (MRI)] continues to increase. Despite numerous published guidelines for the management of LBP, one US study [5] shows a substantial inappropriate increase in advanced diagnostic imaging for LBP during the 12-year period from January 1999 to December 2010. Some of the key challenges to implementing good practice for LBP imaging include short consultation times, clinicians’ misconceptions about clinical guidelines, fear of litigation in the event of missed rare serious pathologies and a desire to maintain harmonious relationships with patients [6]. It has been shown that implementation of recommended guidelines needs regular repetition or to be continuous to effectively change the practice for LBP [7]. To be effective, efforts to reduce

imaging overuse should be multifactorial and address clinician behaviours, patient expectations and education and financial incentives [8]. The examples from USA and UK showed that good supports can change clinical practice, such as the use of a special radiograph requisition form that allowed only guideline-appropriate indications, which led to a 36.8% reduction in lumbar spine imaging [9], and the addition of short educational messages to all reports of lumbar spine MRIs reduced imaging rates by 22.5% [10]. This review describes the recent guidelines of imaging for LBP and updates the available evidences on relevance of degenerative spine abnormalities for LBP.

Current position of the American College of Physicians, American Pain Society, American College of Radiology and European guidelines on imaging for LBP

Most cases of uncomplicated LBP are assumed to result from muscle sprains and strains, ligamentous injuries and spinal degenerative changes. Lumbar imaging abnormalities are common in persons without LBP and are only loosely associated with back symptoms [11]. The presence of imaging abnormalities does not mean that the abnormalities are responsible for symptoms [12]. No evidence suggests that selecting therapies on the basis of the presence of the most common imaging findings improves outcomes compared with a generalised approach [13]. A prospective study found that among patients with lumbar imaging abnormalities before the onset of LBP, 84% had unchanged or improved findings after symptoms developed [14].

Most acute episodes of LBP are self-limiting, and imaging has limited utility because most patients with LBP have nonspecific findings on imaging studies [15]. The American College of Physicians and American Pain Society LBP guideline [13], as well as the appropriateness criteria of the American College of Radiology [16], recommend selective imaging for patients in whom imaging examination is clinically indicated. Nearly all other guidelines, such as the national guidelines of European countries [17–20] and the guideline on chiropractic management of LBP [21], made similar recommendations. Those deemed to be interventional candidates, with LBP lasting for >6 weeks having completed conservative management with persistent radiculopathic symptoms, may seek imaging. Diagnostic imaging is indicated for patients with LBP if they have severe progressive neurologic deficits or signs or symptoms that suggest a serious or specific underlying condition. Serious underlying conditions associated with LBP include cancer, infection and cauda equina syndrome. About 0.7% of patients with LBP in primary care settings have metastatic cancer, 0.01% have spinal infection and 0.04% have cauda

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