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Review Article

Clinical evaluation and red flags of acute low back pain in primary care

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ABSTRACT

Back pain has been reported as a common cause for various patients to present in an emergency or primary care settings. Besides, the management of back pain has been associated with a huge economic burden and remarkably impacts the quality of life of the affected patients. The diagnosis of acute low-back pain can be adequately achieved by conducting proper clinical evaluation and knowing the characteristics of each condition. The present review discusses the clinical evaluation and red flags for diagnosing patients presenting with acute low-back pain. An adequate examination of patients is conducted by obtaining a thorough history and successful physical examination. It should be noted that obtaining an adequate history might not be enough in some cases, and physical examination might not show any diagnostic clues. However, we also reported various red flags for detecting serious conditions, including malignancy, infections, inflammation, and others. These might help establish a further assessment of these patients, including imaging and laboratory studies. Therefore, these cases should be managed as early as possible to enhance the prognosis and intervene against any potential complications.

Keywords: Acute low-back pain, Clinical, Assessment, Diagnosis, Treatment, Red flags

INTRODUCTION

Back pain has been reported as a common cause for various patients to present in an emergency or primary care settings. Besides, the management of back pain has been associated with a huge economic burden and remarkably impacts the quality of life of the affected patients.[1] Many etiologies have been proposed for the development of back pain. These include infections, facet joint injury, sacroiliac joint dysfunction, spinal stenosis, disc herniation, degenerative disc diseases, plexopathy, and radiculopathy. Other etiologies were also reported in the literature, including nerve root compression, osteoporosis, trauma, pregnancy, malignancy, and inflammatory conditions.[2]

It should be noted that acute low-back pain might be associated with serious morbidities that need urgent

interventions. However, due to the various etiologies of these conditions, a differential diagnosis is important in establishing a proper diagnosis. This can be adequately achieved by conducting proper clinical evaluation and knowing the characteristics of each condition. In addition, some etiologies might also have certain signs or "red flags" that might suggest serious disorders.[3] Therefore, the present literature review will discuss the clinical evaluation and red flags of acute low-back pain in the primary settings based on evidence from relevant investigations.

METHODS

This literature review is based on an extensive literature search in Medline, Cochrane, and EMBASE databases which was performed on 27 November 2021 using the medical subject headings (MeSH) or a combination of all possible related terms, according to the database. To avoid missing potential studies, a further manual search for papers was done through Google Scholar while the reference lists of the initially included papers. Papers discussing clinical evaluation and red flags of acute low back pain in primary care were screened for useful information. No limitations were posed on date, language, age of participants, or publication type.

DISCUSSION

Clinical evaluation

Basic clinical examination of patients presenting with acute low-back pain is presented in Figure 1. The first step in managing patients presenting with acute lower back pain is obtaining a thorough history and conducting a physical and clinical examination, either for adult or pediatric patients presenting in the primary care settings. Evidence indicates that the history findings are quite similar between the two populations. For instance, it has been reported that the diagnosis can be adequately established by knowing the mechanism of injury or trauma from the presenting patients. Besides, getting acquainted with the factors that provoke or alleviate back pain and whether pain radiates or not might also help with the diagnostic procedure. The intensity and quality of pain can also establish a differential diagnosis. A thorough history of previous medical history should also be obtained, which might give clinicians about any previous relevant medical conditions. Functional impairment should also be assessed in quality of life secondary to subsequent pain and previous similar painful conditions. Family and past medical history should also be obtained (including previous inflammatory and neoplastic conditions), in addition to obtaining an extensive social history (including exposure to tuberculosis, periods, exercise regimens, and duration and period of drug injection and administration).

Analyzing pain characteristics might also help determine and differentiate nociceptive from neuropathic pain. The onset of pain should also determine whether the associated manifestation or underlying etiology is acute or chronic. It should be noted that chronic pain can be excluded by some characteristics not usually found in acute pain. These include hyperalgesia, allodynia, and the pain is usually centralized. The risk of acute muscle spasm or herniated disc can also be elucidated by the mechanism of the backs. Diagnosing a compression fracture might also be enhanced by the location of the pain. Relieving and increasing factors of pain, in addition to relevant medications, might also help clinicians establish a proper differential diagnosis. Assessment of radical symptoms and other manifestations can be aided by the presence of radiating pain. The underlying pathology might also be detected by a thorough evaluation of other associated manifestations that might be suggestive of other conditions. For instance, other symptoms and manifestations might include pain awakening the patient from sleep, unexplained weight loss, chills, fever, bladder or bowel changes, difficulty with ambulation, sensory changes, and other associated manifestations as weakness. Conducting a proper physical examination is also recommended for the different age groups as long as the patient is cooperative and can respond to the physician.

The physical examination of patients presenting with acute low-back pain should include inspection, palpation, strength testing, range of motion, neurological evaluation (including deep tendon reflex, sensations, and limb strength), and different provocative maneuvers. Conducting the latter approaches might be helpful to identify and exclude different disorders and help establish a proper diagnosis. Among the different approaches, evidence indicates that conducting straight leg raise (SLR) test can be helpful in these events. The test can be done by elevating the patient's leg up to 30 to 70 degrees. By conducting this test, it has been shown that lumbar disc herniation can be diagnosed by the presence of ipsilateral leg pain when the leg is elevated at < 60 degrees. In addition, the negative likelihood ratio (NLR) of a straight leg raise is 0.5, while the likelihood ratio (LR) is 2. On the other hand, it has been reported that a positive test of lumbar herniation is associated with the presence of pain in the contralateral leg, with an estimated NLR and LR of 0.72 and 3.5, respectively.[4,5] Another important test that might be diagnostic is the stork test or one-leg hyperextension test. The test is conducted by making the patient stand on one leg and asking him to hyper-extend his back while the examiner supports the patient. The test should be conducted on both sides for the patient. In cases of the presence of a pars interarticularis defect, the patient will suffer from the presence of pain with hyperextension.[6]

The presence of scoliosis can also be established clinically by conducting the Adam test. It can be done by asking the patient to bend over while extending the arms and feet, and palms are approached together. Observing the patient from the front is done by the practitioner to decide whether scoliosis is present.[6] Many approaches were also reported in the literature that can be used to diagnose and evaluate the etiology and severity of acute low-back pain. However, not many of these tests have acceptable sensitivity and

practitioner inter-reliability. Accordingly, there are not preferable to be used in these settings.[7-9]

Red flags

Red flags are important features that should be looked for in patients with acute low-back pain. This is because the presence of these features can significantly increase the suspicion of certain conditions, which might be associated with remarkable complications and life-threatening events. These also indicate that imaging might be useful in detecting the underlying etiology for better management of the disease. Many red flags were reported in the literature for different diseases and conditions. Red flags for the most serious conditions are presented in Figure 2. However, evidence indicates that these vary between adults and pediatric patients, howoever, there are many red flags among adult patients.[4,10-12] For instance, it has been shown that the presence of prior lumbar spine surgery, immunosuppression, intravenous drug use, and conducting a spinal procedure within the last year on history evaluation, in addition to the presence of tenderness by palpation and other risk factors that might be discovered by physical examination are all suggestive of the presence of a malignant lesion. This was further indicated in a previous meta-analysis by Downie et al which reported similar findings.[11] On the other hand, infections should be suspected when the patient has a history of spinal procedure within the last year, previous lumbar spine surgery, immunosuppression, and intravenous drug use, and physical examination shows tenderness, localized pain, wound in the spinal region, and fever.

- Inspection: general condition, gait, asymmetry (muscle atrophy), deformities, skin changes
- Palpation of the local musculature (tone, tenderness)
- Pain on palpation and percussion of spinal structures, esp. spinous processes (fracture), and kidneys
- Range of motion of the lumbar spine (esp. for follow-up) and hip joints (hip arthritis and other joint diseases as part of the differential diagnosis)
- Nerve-stretching tests, esp. Lasègue and femoral nerve stretch test
- General testing of sensation, motor function, and reflexes (hypesthesia, hyperesthesia, allodynia; strength grading; reflexes)

Figure 1: Basic clinical examination for patients presenting with acute low-back pain.[27]

Possible etiology	*History findings*	*Physical examination findings*
Cancer	Strong: Cancer metastatic to bone Intermediate: Unexplained weight loss Weak: Cancer, pain increased or unrelieved by rest	Weak: Vertebral tenderness, limited spine range of motion
Cauda equina syndrome	Strong: Bladder or bowel incontinence, urinary retention, progressive motor or sensory loss	Strong: Major motor weakness or sensory deficit, loss of anal sphincter tone, saddle anesthesia Weak: Limited spine range of motion
Fracture	Strong: Significant trauma related to age* Intermediate: Prolonged use of steroids Weak: Age older than 70 years, history of osteoporosis	Weak: Vertebral tenderness, limited spine range of motion
Infection	Strong: Severe pain and lumbar spine surgery within the past year Intermediate: Intravenous drug use, immunosuppression, severe pain and distant lumbar spine surgery Weak: Pain increased or unrelieved by rest	Strong: Fever, urinary tract infection, wound in spine region Weak: Vertebral tenderness, limited spine range of motion

Figure 2: Red flags for the most serious conditions that might be associated with acute low back pain.[10]

Besides, red flags for fractures include a history of age >70 years old, osteoporosis, prolonged administration of corticosteroids, and significant trauma. Physical examination shows palpation-induced tenderness over spinous processes, abrasions, and contusions. In another context, cauda equina syndrome can be diagnosed by having a history of new fecal incontinence, urinary incontinence or retention, and progressive sensory or motor loss. Physical examination shows significant motor deficits of multiple myotomes, anal sphincter atony, and saddle anesthesia. On the other hand, red flags for the conditions mentioned above might be slightly different based on data from other investigations in the literature.[13,14] For instance, it has been shown that malignancy should be suspected when the child has a history of nighttime pain, and his age is <4 years old. On

the other hand, infections should be suspected when a history of exposure to tuberculosis, in addition to the presence of nighttime pain, and age is <4 years old. Moreover, evidence shows that fractures should be suspected when children have a history of activities or sports with repetitive lumbar hyperextension (including gymnastics, cheerleading, football linemen, and wrestling). Moreover, physical examination should show a positive stork test and palpation-induced tenderness over the spinous process.[15,16]

Further evaluation

It should be noted that conducting history and physical examination might be adequate in establishing the relevant diagnosis. However, it should be noted that further evaluation might be needed in certain conditions, especially when red flags have been discovered. For example, worse prognosis and more treatment requirements are associated with early imaging of adults, where enhanced treatment outcomes are not usually anticipated.[17,18] Moreover, imaging is usually conducted during the whole management plan and duration for adults and conducting adequate conservative management approaches for at least six weeks.[18] Imaging is also indicated in children who have protracted pain. However, evidence regarding the definition of this pain is not adequately established in the literature. An underlying bone pathology can be adequately detected using lateral and anteroposterior plain films. On the other hand, magnetic resonance imaging (MRI) might be needed when certain conditions are suspected. Some of these include the presence of inflammatory conditions of the spine and related tissues, malignancy, nerve cord or root compression by a bulging disc, and associated soft tissue lesions.[19,20] Conducting bone scans might also help diagnose many disorders, including stress reactions, discitis, and osteomyelitis. However, it has been reported that the presence of these lesions should be better established by MRI, which has better sensitivity and specificity.[21]

Studies also show that using computed tomography is recommended when MRI indicates the presence of disc herniation to evaluate the presence of apophyseal ring separation, which has been estimated to occur 5.7% in these events.[22] Furthermore, electromyography or nerve conducting studies might be used in complex cases and patients with prior spinal surgeries. These approaches are recommended to evaluate a potentially underlying plexopathy or radiculopathy. In cases when injury or trauma to the sacroiliac joint is suspected, it has been recommended that a diagnostic injection together with empirical treatment should be approached. It should also be noted that conducting laboratory studies might be favored in cases when red flags were reported. However, it should be noted that conducting rheumatological assays, including rheumatoid factor (RF), Lyme, antinuclear antibody (ANA), HLA-B27, in these events is not significantly helpful in establishing the diagnosis. This is because these modalities are not usually specific for disorders leading to acute back pain.[23-25] On the other hand, other tests might be helpful, including erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). Moreover, evidence shows that conducting blood cultures and complete blood pictures might also in diagnosing certain conditions, as malignancy, infections, and inflammation. The presence of bone marrow turnover in patients with leukemia might also be established by assessing the levels of uric acid and lactate dehydrogenase.[26]

CONCLUSION

An adequate examination of patients is conducted by obtaining a thorough history and successful physical examination. It should be noted that obtaining an adequate history might not be enough in some cases, and physical examination might not show any diagnostic clues. However, we also reported various red flags for detecting serious conditions, including malignancy, infections, inflammation, and others. These might help establish a further assessment of these patients, including imaging and laboratory studies. Management of these cases should be conducted as early as possible to enhance the prognosis and intervene against any potential complications.

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