13. LOW BACK PAIN (ACUTE)

Elizabeth A. McGlynn, Ph.D.

The principal reference for this review was the Clinical Practice Guideline (Number 14) produced by AHCPR titled Acute Low Back Problems in Adults (Bigos et al., 1994). The 23-member multidisciplinary panel based their findings and recommendations on a systematic review and analysis of the literature, their own expertise, public testimony, peer review, and some pretesting in outpatient settings.

IMPORTANCE

While there are a number of methodological challenges in estimating the prevalence of low back pain (Loeser and Volinn, 1991), studies concur that it is the second leading cause of work absenteeism in the United States (Deyo and Bass, 1989). The lifetime prevalence of low back pain has been estimated to be 60 to 80 percent and the one year prevalence is 15 to 20 percent (Andersson, 1991). Among the working age population, about half report symptoms of back pain during a one year period (Vallfors, 1985; Sternbach, 1986). About 5 to 10 percent of patients experience chronic problems (Lahad et al., 1994), but these individuals account for nearly 60 percent of expenditures for this problem.

There is evidence that many patients with low back pain who cannot perform their usual activities may be receiving care that is either inappropriate or suboptimal (Bigos et al., 1994). The evidence includes substantial variations in the rates of hospitalization and surgery for low back problems (Deyo, 1991; Kellett et al., 1991; Volinn et al., 1992) and variations in the use of diagnostic tests (Deyo, 1991). For example, in a study conducted in Washington state, the rate of surgery for low back pain varied 15-fold among the 39 counties in the state (Volinn et al., 1992). The likely explanation for this variation is difference in physician practice style. A study of the effect of practice style in managing back pain on patient outcomes found that a low-intensity intervention style characterized by self-care, fewer
prescription medications, and less bed rest produced long term pain and functional outcomes that were similar to more intensive styles and were less costly and associated with higher levels of patient satisfaction (Von Korff et al., 1994). There are also patients that appear to have more disability after treatment than before, particularly those who have undergone surgery, those treated with extended bed rest, and those treated with extended use of high dose opioids (Bigos et al., 1994).

The lack of consensus on appropriate treatments for low back pain suggests that there is likely to be considerable variation in practice across the country. The recent promulgation of a clinical practice guideline by the AHCPR offers an opportunity for developing tools for monitoring the use of both recommended and nonrecommended practices. This may provide a substantial incentive for decreasing the variation in care and reducing poor quality care.

In 1990, the direct medical costs of low back pain treatment were $24 billion (Spengler et al., 1986) and the cost to the nation when work loss days are included increases substantially. It has been estimated that the work loss time plus disability payments cost more than three times the expenditures on medical treatment (Spengler et al., 1986), suggesting that the total annual costs of back pain may exceed $100 billion.

The costs of different approaches to treating back pain vary considerably. One study that examined the costs and outcomes of three different management styles for back pain described differences in the one-year costs of treatment ranging from $428 on average for patients seen by “low intensity” physicians to $768 on average for patients seen by “high intensity” physicians (Von Korff et al., 1994). The differences were reduced somewhat (from $340 to $277) when case mix variables were taken into account. Because the lower intensity practice style produced similar outcomes, that style would certainly be judged to be more cost effective.
EFFICACY AND/OR EFFECTIVENESS OF INTERVENTIONS

Primary Prevention

There is no strong evidence to suggest that preventive strategies for low back pain are effective. The literature evaluating the effectiveness of four prevention strategies was recently reviewed (Lahad et al., 1994). The strategies included: back and aerobic exercises, education, mechanical supports, and risk factor modification. The authors did not examine worksite-specific preventive measures, although all of the prevention studies included in the review were conducted in work settings.

Exercise may offer some protection against the development of back pain; four randomized trials of exercise interventions have been conducted (Gundewall et al., 1993; Donchin et al., 1990; Kellet et al., 1991; Linton et al., 1989). The studies were relatively small, ranging from 66 total subjects to 142 subjects, were conducted in specific worksites, and none of the studies followed subjects for longer than 18 months. The trials were consistent in their findings that fewer work loss days occurred in the preventive intervention group as compared to the control group. Among epidemiological studies, seven found an association between fitness or flexibility and decreased low back pain, but four of these studies showed no protective effect of exercise (Lahad et al., 1994). The authors of the review conclude that, taken together, the studies suggest that exercise is mildly protective (Lahad et al., 1994).

General education does not contribute to preventing low back pain; five randomized trials of educational interventions have been conducted (Daltroy et al., 1993; Walsh and Schwartz, 1990; Donchin et al., 1990; McCauley, 1990; Linton et al., 1989). Like the exercise studies, these trials also enrolled small numbers of subjects and were conducted in the workplace. Only one of the randomized trials of education found a decrease in subsequent low back pain (Linton et al., 1989) and because this trial included exercise, it is difficult to determine the independent role of education. Among the other four trials, three had intermediate positive outcomes and all had long-term negative outcomes.
The authors conclude that there is minimal support in the literature for the use of educational strategies (Lahad et al., 1994).

The use of orthotic devices has not been shown to prevent low back pain; two trials examining the use of corsets for the prevention of low back pain were conducted (Reddell et al., 1992; Walsh and Schwartz, 1990). One trial had a very low compliance rate for the intervention groups (58 percent of those assigned to wear a back belt stopped wearing it before the end of the study); based on an intention-to-treat analysis, the intervention group had a trend toward increased frequency of back pain (Reddell et al., 1992). The other trial found that subjects assigned to an educational plus corset intervention had a greater increase in knowledge and decrease in work loss days compared to controls (2.5 day decrease vs. 0.4 day increase). The authors of the review article conclude that, given the contradictory findings in these two trials, there is insufficient evidence to allow for a recommendation to be made regarding the use of orthotic devices for low back pain prevention (Lahad et al., 1994).

Several risk factors have been associated with increased risk of developing low back pain, including: smoking, obesity, and psychological functioning. Studies have shown an association between smoking and back pain that suggests risk is increased 1.5 to 2.5 times compared to nonsmokers (Deyo and Bass, 1989). Similarly, an association between obesity and back pain has been observed, but no interventions to change this risk factor as it relates to back pain have been conducted (Deyo and Bass, 1989). The psychological factors include depression, anxiety, and job stress but no intervention studies of changing psychological factors to prevent back pain have been conducted. The authors of the review article conclude that, while there are other health-related reasons to suggest the importance of interventions to modify these three risk factors, there is no evidence that demonstrates that a reduction in back pain will be the result (Lahad et al., 1994).

Diagnosis

The AHCPR's clinical practice guideline on the assessment and treatment of acute low back problems in adults (Bigos et al., 1994)
indicates that the medical history is important in assessing whether the patient is suffering from a serious underlying condition such as cancer or spinal infection. The guideline recommends that the history include questions about: age, history of cancer, unexplained weight loss, immunosuppression, duration of symptoms responsiveness to previous therapy, pain that is worse at rest, history of intravenous drug use, and urinary or other infection. Symptoms of leg pain or problems walking due to leg pain may suggest neurological problems (e.g., herniated disc, spinal stenosis). The elements of the suggested medical history along with estimates of the sensitivity and specificity of those elements of the history are provided in the guideline document; an algorithm is provided for the use of responses to the initial assessment. The guideline panel noted that a number of factors (e.g., work status, educational level, workers compensation issues, depression) may affect patients' responses to questions on the history regarding symptoms and may also influence treatment outcomes (e.g., time for return to work).

Elements of the physical examination (e.g., inspection, palpation, observation, specialized neuromuscular evaluation) are also reviewed and estimates of their sensitivity and specificity for making differential diagnoses are provided. The guideline concludes that for 95 percent of patients with acute low back problems, no special interventions or diagnostic tests are required within the first month of symptoms.

Treatment

There are a wide variety of treatments for low back pain that are currently in use. The clinical care methods reviewed by the panel were: patient education about symptoms, structured patient education ("back school"), medications to control symptoms, physical treatments to control symptoms, and activity modifications, bed rest, exercise, special diagnostic tests, and surgery. A summary of the panel's findings and recommendations regarding lack of these treatment approaches follows.

Symptom education. The panel recommends educating patients about: expectations for recovery and recurrence, safe and effective methods of
symptom control, reasonable activity modifications, methods for limiting recurrence of symptoms, no need for special investigations, and the effectiveness and risks of diagnostic and treatment measures if symptoms persist. The panel indicated that such educational intervention may reduce utilization of medical care, decrease patient apprehension, and increase the speed of recovery.

**Medications.** The panel concluded that both acetaminophen and NSAIDs were adequate for achieving pain relief; acetaminophen may have fewer side effects. Muscle relaxants were found to be no better than NSAIDs in relieving low back symptoms and they have greater side effects, especially drowsiness. Opioids were found to be no more effective than NSAIDs or acetaminophen in providing pain relief; side effects include decreased reaction time, clouded judgment, drowsiness and risk of physical dependence. A number of other medications (e.g., oral steroids, colchicine, antidepressants) were not recommended for the treatment of low back pain.

**Physical treatments.** Spinal manipulation for patients without radiculopathy is effective in reducing pain and may speed recovery within the first month. The evidence after one month is inconclusive. Transcutaneous electrical nerve stimulation (TENS), lumbar corsets and support belts, shoe lifts and supports, spinal traction, biofeedback, trigger point injections, ligamentous and sclerosant injections, facet joint injections, epidural injections, and acupuncture were not recommended for the treatment of acute back pain. For patients with radiculopathy, epidural steroid injections were considered an option after failure of conservative treatment and as a means of avoiding surgery.

**Activity modifications.** The panel recommended that patients with acute low back problems temporarily limit heavy lifting, prolonged sitting, and bending or twisting the spine. The activity limitations should take into account the age and clinical status of the patient as well as the demands of the patient's job. These modifications should be considered time-limited and the clinician may want to lay out goals for a return to normal activity.
**Bed rest.** Prolonged bed rest (i.e., more than 4 days) was not recommended because it may increase rather than decrease debilitation. The panel recommended a gradual return to normal activities and bed rest of short duration only for patients with severe initial symptoms of primary leg pain. A recently published randomized controlled trial found that continuing ordinary activities within the limits permitted by pain led to more rapid recovery than either bed rest or back mobilizing exercises (Malmivaara et al., 1995).

**Exercise.** The panel recommended that the initial goal of exercise programs be to prevent debilitation due to inactivity and then to improve activity tolerance with the goal of returning patients to their highest level of functioning. Exercise programs designed to improve general endurance (aerobic fitness) and muscular strength of the back and abdomen were considered particularly beneficial.

**Special Diagnostic Tests.** For patients whose symptoms with the recommended treatments listed above persist longer than one month, additional diagnostic and treatment procedures may be considered. The tests are of two types: tests for evidence of physiologic dysfunction and tests for evidence of anatomic causes of dysfunction. Tests in the former category include electromyography, sensory evoked potentials, thermography, general laboratory screening tests, and bone scan. The appropriate indications for and timing of these tests are provided in the guideline document. Tests in the latter category include plain myelography, MRI, CT, CT-myelography, discography, and CT-discography. These tests must be combined with information from the medical history, physical examination, and/or physiologic tests because these imaging studies can be difficult to interpret and many symptomatic patients may not show defects.

**Surgery.** Lumbar discectomy may provide faster pain relief in patients with severe and disabling leg symptoms who have failed to improve after one to two months of adequate nonsurgical treatment. However, there is little difference in long-term (4-10 years) outcomes of surgery as compared with conservative care and the procedure is quite expensive. Among methods of discectomy, direct methods of nerve root decompression were recommended over indirect methods. The role of
patient preferences was emphasized, but only if adequate information about efficacy, risks and expectations is presented.

Surgery for spinal stenosis was not recommended within the first three months of symptoms. Decisions about this surgery should take into account the patient's lifestyle, preferences, other medical problems, and the risks associated with surgery.

Spinal fusion was not recommended during the first three months of symptoms in the absence of fracture, dislocation, or complications of tumor or infection. Spinal fusion was recommended for consideration following decompression in patients with combined degenerative spondylolisthesis, stenosis, and radiculopathy. Patients under age 30 with significant spondylolisthesis and severe leg pain may also be considered candidates for spinal fusion.
RECOMMENDED QUALITY INDICATORS FOR ACUTE LOW BACK PAIN

The following indicators apply to women age 18-50.

Assessment

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Quality of evidence</th>
<th>Literature</th>
<th>Benefits</th>
<th>Comments</th>
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<tbody>
<tr>
<td>1. Patients presenting with acute low back pain should receive a focused medical history and physical examination. The history should include questions about at least one of the following “red flags”:</td>
<td>III</td>
<td>Bigos et al., 1994; Deyo et al., 1992; Waddell et al., 1982</td>
<td>Prevent disability and potential premature mortality.</td>
<td>A thorough exam and history will increase the likelihood of identifying serious systemic disease that requires further testing and specialized treatment.</td>
</tr>
<tr>
<td>a. Spine fracture red flags: trauma, prolonged use of steroids</td>
<td>III</td>
<td>Deyo et al., 1992; Waddell et al., 1982</td>
<td>Prevent patient debilitation. Reduce pain.</td>
<td>Plain film or CT or MRI of the spine recommended if spine fracture suspected. Approximately 4% of patients in primary care will prove to have a spine fracture.</td>
</tr>
<tr>
<td>b. Cancer red flags: history of cancer, unexplained weight loss, immunosuppression</td>
<td>III</td>
<td>Deyo et al., 1992; Waddell et al., 1982; Deyo and Diehl, 1988</td>
<td>Prevent patient debilitation. Reduce pain.</td>
<td>CT or MRI recommended if cancer suspected. Approximately 0.7% of patients presenting for acute low back pain have primary or metastatic bone cancer, which may be appropriately treated with radiation therapy.</td>
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<tr>
<td>c. Infection red flags: fever, IV drug use</td>
<td>III</td>
<td>Deyo et al., 1992; Waddell et al., 1982</td>
<td>Prevent patient debilitation. Reduce pain.</td>
<td>Urinalysis recommended if infection is suspected. Approximately 0.01% of patients in primary care will prove to have an infection (e.g., urinary tract infection, skin infection), which may lead to epidermal abscess.</td>
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<td>d. Cauda equina syndrome or rapidly progressing neurologic deficit red flags: acute onset of urinary retention or overflow incontinence, loss of anal sphincter tone or fecal incontinence, saddle anesthesia, and global progressive motor weakness in the lower limbs.</td>
<td>III</td>
<td>Deyo et al., 1992; Waddell et al., 1982</td>
<td>Prevent permanent neurologic deficit. Reduce pain.</td>
<td>CT or MRI recommended if CES or neurologic deficit is suspected. Approximate prevalence of CES among patients with low back pain is 0.0004. A diagnosis of CES requires immediate surgery (or radiation therapy).</td>
</tr>
<tr>
<td>2. The examination should include neurologic screening and straight leg raising.</td>
<td>III</td>
<td>Deyo et al., 1992; Waddell et al., 1982</td>
<td>Prevent debilitation.</td>
<td>Neurologic screening includes ankle and knee reflexes, ankle and great toe dorsiflexion strength, and distribution of sensory complaints. These examination procedures are undertaken to identify lumbar disk herniations and facilitate appropriate course of treatment (e.g., NSAIDs, brief bed rest, surgery). Surgery is indicated in approximately 2-10% of patients. Multiple findings increase the likelihood that a herniated disk will be found at surgery.</td>
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### 3. If no red flags identified, diagnostic testing should not be undertaken in first 4 weeks of symptoms.

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<tr>
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<th>Literature</th>
<th>Benefits</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Prevent patient from undergoing unnecessary tests or procedures.</td>
<td>III</td>
<td>Bigos et al., 1994</td>
<td></td>
<td>Diagnostic testing: EMG, SEPs, ESR, CBC, UA, bone scan, pain myelography, MRI, CT, CT-myelography, discography, CT-discography.</td>
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### Treatment

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<tr>
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<tbody>
<tr>
<td>4. If the patient is placed on medication for acute low back pain not due to spine fracture, cancer, infection, or cauda equina syndrome, one of the following should be used as a first-line agent: acetaminophen or NSAIDs.</td>
<td>I</td>
<td>Bigos et al., 1994; Postacchini et al., 1988; Amlie et al., 1987; Basmajian, 1989; Berry et al., 1982</td>
<td>Reduce pain.</td>
<td>No other medications listed as “options” were found to be superior to acetaminophen or NSAIDs (e.g., muscle relaxants, opioid analgesics) given the balance between effectiveness of pain relief and probability of serious side effects, although high doses of acetaminophen can lead to liver damage and gastrointestinal problems may be a side effect of NSAIDs.</td>
</tr>
<tr>
<td>5. Patients should not be taking any of the following medications for treatment of acute low back pain:</td>
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<tr>
<td>a. phenylbutazone</td>
<td>III</td>
<td>Bigos et al., 1994</td>
<td>Avoid aplastic anemia and agranulocytosis.</td>
<td>Increased risk for bone marrow suppression.</td>
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<tr>
<td>Prevent side effects.</td>
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<tr>
<td>b. dexamethasone</td>
<td>I</td>
<td>Haimovic and Beresford, 1986</td>
<td>Prevent side effects.*</td>
<td>Effectiveness of pain relief has not been demonstrated.</td>
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<tr>
<td>Prevent side effects.</td>
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<tr>
<td>c. other oral steroids</td>
<td>III</td>
<td>Bigos et al., 1994</td>
<td>Prevent side effects.*</td>
<td>Has not been proven to be effective for pain relief.</td>
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<tr>
<td>Prevent side effects.</td>
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<td>d. colchicine</td>
<td>I</td>
<td>Meek et al., 1985; Schnebel and Simmons, 1988; Simmons et al., 1990</td>
<td>Prevent side effects including gastrointestinal irritation, chemical cellulitis from intravenous infiltration, skin problems, and bone marrow suppression.</td>
<td>Evidence on pain relief for persons with gout is conflicting.</td>
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<tr>
<td>Prevent side effects.</td>
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<td>e. anti-depressants</td>
<td>I</td>
<td>Aicoff et al., 1982; Goodkin et al., 1990; Jenkins et al., 1976</td>
<td>Prevent side effects such as urinary retention, orthostatic hypotension, constipation, and mania.</td>
<td>No studies have been done in patients with acute low back pain and no significant differences found in studies of chronic low back pain.</td>
</tr>
<tr>
<td>Prevent side effects.</td>
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| 6. Patients should not be receiving the following physical treatments for acute low back pain: |                      |                                                                           |                                               |                                                                                              |
| Prevent side effects.                                                    |                     |                                                                           |                                               |                                                                                              |
| a. transcutaneous electrical nerve stimulation | Melzack et al., 1983; Deyo et al., 1990; Gemignani et al., 1991; Graff-Radford et al., 1989; Hackett et al., 1988; Lehmann et al., 1983; Lehmann et al., 1986; Thorsteinsson et al., 1977; Thorsteinsson et al., 1978 | Benefits are inconclusive but the risks are low. Decrease time to recovery. | Evidence is inconclusive on effectiveness. Use of an ineffective treatment may delay recovery if more effective treatments are foregone. |
| b. lumbar corsets & support belts | Coxhead et al., 1981; Reddel et al., 1992; Walsh and Schwartz, 1990; Million et al., 1981 | Decrease time to recovery. | No evidence of efficacy in patients with acute low back pain. Use of an ineffective treatment may delay recovery if more effective treatments are foregone. |
| c. spinal traction | Coxhead et al., 1981; Mathews et al., 1987; Mathews et al., 1988; Larsson et al., 1980; Mathews and Hickling, 1975; Pal et al., 1986; Weber et al., 1984 | Prevent debilitation. | Prolonged traction may lead to debilitation. |
| d. biofeedback | Asfour et al., 1990; Bush et al., 1985; Flor et al., 1983; Nouwen, 1983 | Decrease time to recovery. | No studies in patients with acute low back pain and conflicting evidence in patients with chronic low back pain. Use of an ineffective treatment may delay recovery if more effective treatments are foregone. |
| 7. Patients should not be on prolonged bed rest (> 4 days). | Evans et al., 1987; Postacchini et al., 1988; Deyo et al., 1986; Gilbert et al., 1985 | Prevent debilitation. | May lead to debilitation. Evidence that prolonged bed rest may increase probability of debilitation. |

*Side effects from long-term use include fluid and electrolyte disturbance, hyperglycemia, pituitary-adrenal function, demineralization of bone, and immunosuppression. High-dose complications include avascular necrosis of bone, myopathy, subcapsular cataract formation, and central nervous system disturbance.*
Quality of Evidence Codes:

I: RCT
II-1: Nonrandomized controlled trials
II-2: Cohort or case analysis
II-3: Multiple time series
III: Opinions or descriptive studies
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