Chapter 165

Approach to Low Back Pain

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INTRODUCTION

Low back pain (LBP) is a very common symptom which can affect about 80% of the population at least once in lifetime. Each year, 15–20% of the population will have back pain. It is the second most common symptom seen in general practitioners' clinic; first being common cold.[1] It is usually a self-limiting condition but can go into chronicity in about 10% of the individuals. It is the most common cause of disability for people less than 45 years of age. Low backache which is acute and has red flag signs should be evaluated urgently to look for emergency and catastrophic causes which present with neurodeficits, absent pulses and dropping blood pressure.

BASICS OF LOW BACK PAIN

Our spine consists of series of vertebrae with intervertebral disks in between which function as shock absorbers. The vertebral column is supported by muscles and ligaments. Each vertebra consists of the body anteriorly and the vertebral arch posteriorly. The vertebral body functions mainly to support the weight. The vertebral arch consists of two pedicles and two laminae. The function of the vertebral arch is to protect the neural structures. The function of the spine is to protect the spinal cord and allow us to move. The movements of lumbar spine (LS) are flexion, extension and lateral bending. Thus, LBP could be due to a pinched nerve or a herniated disk. There are more joints in the back than intervertebral disks and more muscles than joints. Therefore, back pain can also occur when there is somatic dysfunction in one or more muscles, i.e. the muscles fail to relax. Due to this somatic dysfunction, some muscles become overactive while some become inactive.

While evaluating a patient of backache, one must take into consideration the age of the patient, the duration of backache, occupation of the patient, risk factors and presence of "red flags". Age of the patient is helpful in diagnosing low backache. Inflammatory LBP being common in 18–40 years. Degenerative conditions, malignancy and osteoporosis are common causes above 40 years. Infective causes can occur in all age groups. History of trauma can help in diagnosis of prolapsed intervertebral disk (PID), spondylolisthesis and fractures. History of taking glucocorticoids can clinch the diagnosis of osteoporosis and osteoporotic fractures. Depending on the duration, LBP can be divided into acute (4–6 weeks), subacute (6–12 weeks) and chronic (> 12 weeks).

Since there are many causes of backache, while evaluating a patient for low backache, a very good history taking often clinches the diagnosis. Backache can be a problem seen in bike riders, computer operators, drivers, tailors and many sedentary office jobs which demand sitting in one place for a long time. It can also be seen in students carrying heavy school/college bags on their back. The common risk factors for developing LBP are obesity, poor abdominal tone, bending and twisting jobs and lifting heavy weights. It is important to consider catastrophic vascular causes like rupture of aortic aneurysm, epidural hemorrhage, embolism, anterior spinal artery thrombosis and nonvascular causes like epidural abscess, spinal cord tumors and cauda equina syndrome which mandate urgent surgical intervention. Also, certain "red flags" should be picked up like history of trauma, fever, urinary incontinence, weight loss, cancer, long-term steroid use, worsening night pains or rest pains and presence of neurodeficit. These are considered as red flags which indicate a warning situation that the cause of backache merits prompt and urgent investigations and treatment. In susceptible patients, infection, inflammation, malignancy and degenerative joint problems are the common etiologies. An estimated percentage wise distribution of causes of LBP is given in **Table 1**.

CLINICAL FEATURES

Low back pain can arise from nerve roots, facet joints, disks, vertebral bodies, ligaments or soft tissues. Hence, it can present as radiculopathy (root pains), sciatica, shooting or stabbing pains, muscle weakness (myelopathy), fasciculation, numbness, urinary and fecal incontinence or urinary retention and constipation. Catastrophic vascular causes like ruptured aortic aneurysm can have poor peripheral pulses in lower limb, sudden drop in blood pressure, change in color and temperature of the lower limbs. Morning stiffness for more than 30 minutes with difficulty in turning in bed and pain radiating to hips/gluteal region in seronegative spondyloarthropathy is seen. Multiple vertebral body pain and tenderness on pressure may be seen in osteoporosis, osteomalacia, metastatic tumors to the vertebrae, multiple myeloma. Low-grade fever with evening rises in spinal tuberculosis, psoas abscess and malignancy. Continuous pain worsening with activity may be seen in mechanical backache. Abdominal pain (epigastric and lumbar) radiating to the back is seen in pancreatitis, renal stones/abscess indicates referred pain. During pregnancy, there is a risk of LBP. As high as 72% of pregnant females can complain of LBP during the course of pregnancy.[2] Chronic backache may be seen in patients who are depressed,[3] who have chronic medical disorders, adjustment problems at workplace or at home and inability to cope up with stress can present as LBP. Many female patients who have received spinal anesthesia in the past may always attribute to backache since then. LBP can get precipitated by standing/sitting/sleeping in awkward position or some awkward movement which an individual may not remember, e.g. traveling in crowded trains, buses in public transport, etc. It can also get precipitated by lifting unaccustomed heavy weights.

TABLE 1 | Common etiological causes of LBP

Degenerative joint disease 15%	Lumbar spondylosis 10% Spinal canal stenosis 3%
Post-traumatic 10%	Disk prolapse 4% Spondylolisthesis 2% Trauma to ligaments < 1% Muscle sprain 70% Vertebral fractures 1%
Acquired causes 2%	Inflammatory arthritis (spondyloarthropathy) 0.3% Infections: Bacterial, mycobacterial, fungal, human immunodeficiency virus (HIV) (abscess, diskitis) 0.01% Hemoglobinopathies (sickle cell disease) 0.01%
Malignancy 1%	Primary: For example, multiple myeloma, leukemia Metastasis: For example, Ca prostate, Ca breast, Ca ovaries
Mechanical 50%	Poor posture Pregnancy Occupational Overuse of back
Psychogenic causes 15%	Anxiety Depression Fibromyalgia Adjustment disorders at workplace or in house
Referred pain < 1%	Kidneys, Pancreas, Pelvic inflammatory diseases
Others 5%	Osteoporosis and osteoporotic fractures 4% Aortic aneurysm/dissection < 1%
Congenital < 1%	Vertebral fusion, Spina bifida

Clinical examination should always consist of straight leg raising test, ankle reflexes, dorsiflexion of the ankle and great toe, muscle power testing of the quadriceps, gluteal muscles and calf muscles. Sensations over the medial and lateral aspect of the foot should be tested. Schober's test and pelvic rock test should be done in inflammatory LBP.

Chronic LBP can be further divided into inflammatory and mechanical. There are certain differences in them which are given in **Table 2**.

TABLE 2 | Differences in inflammatory and mechanical low back pain (LBP)

Inflammatory LBP	Mechanical LBP
20–40 years	Any age
Males > Females	M = F
Subacute onset	Often acute
Morning stiffness present	No morning stiffness
Pain relieved by activity	Pain worsened by activity
Pain worsened by rest	Pain improves with rest
No neurodeficit	Neurodeficit may be present
Gluteal and hip pain often present	Absent
Seen in any profession	Commonly seen in sedentary sitting jobs

INVESTIGATIONS

Low back pain should be evaluated by a step-wise approach as depicted in the algorithm **(Flow chart 1)**. Each case of backache will have to be evaluated on case to case basis after a good history and a thorough clinical examination.

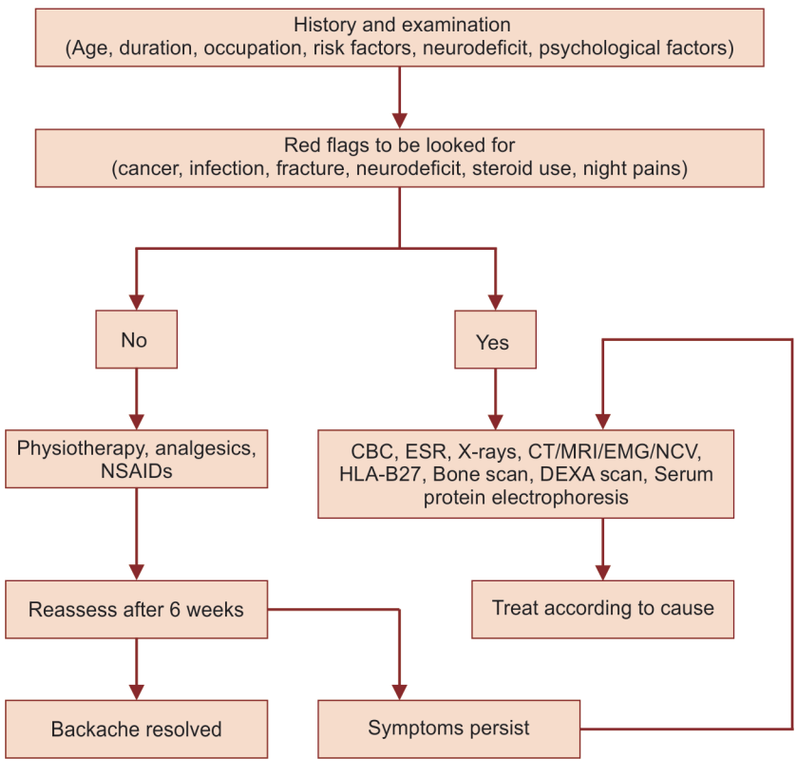
Blood investigations like hemoglobin (Hb), complete blood count (CBC), erythrocyte sedimentation rate (ESR), C-reactive protein and human leukocyte antigen B27 (HLA-B27) should be done in the evaluation of inflammatory LBP. Calcium, phosphorus, alkaline phosphatase and vitamin D_3 levels are estimated in the evaluation of metabolic bone disease. Serum protein electrophoresis and urinary Bence Jones proteins should be done in the workup of multiple myeloma. X-rays of Lumbar spine **(Figure 1)** in lumbar spondylosis, vertebral fractures; X-ray pelvis with both hip (PBH) joints **(Figures 2 and 3)** in ankylosing spondylitis, pelvic fractures and osteomalacia. Computed tomography scan/magnetic resonance imaging (CT/MRI) of the LS **(Figures 4 and 5)** are mandatory in LBP with neurodeficit. As high as 30% patients show MRI abnormalities even though they may be clinically asymptomatic, e.g. a desiccated disk or a localized bulge indenting the thecal sac. MRI of the sacroiliac (SI) joint **(Figures 6 and 7)** should be done in early cases of spondyloarthropathy and it is one of the new diagnostic criteria for diagnosing seronegative spondyloarthropathy [Assessment of Spondyloarthritis International Society (ASAS) 2011 classification criteria]. Bone scan may be warranted in the diagnosis of vertebral metastasis. Dual-energy X-ray absorptiometry (DEXA) scan is necessary to diagnose and stage osteoporosis. Rarely a bone biopsy may be required for diagnosis of infections or malignancy.

TREATMENT

Most of the backaches may be self-limiting hence require good counseling and reassurance. Patient education is the most important aspect in treating backache. When the cause is not very serious and when the pain starts resolving with analgesics or nonsteroidal anti-inflammatory drugs (NSAIDs), unnecessary battery of investigations can be avoided by gaining the confidence of the patient. The algorithm for evaluation of LBP is given below.

Paracetamol or tramadol can be used as the preferred analgesics. NSAIDs (indomethacin, diclofenac, ibuprofen, etoricoxib and aceclofenac) can be used for a short duration of 4–6 weeks. Muscle

Flow chart 1: Algorithmic approach to low backache



Abbreviations: CBC, Complete blood count; ESR, Erythrocyte sedimentation rate; CT, Computed tomography; MRI, Magnetic resonance imaging; EMG, Electromyogram; NCV, Nerve conduction velocity; HLA-B27, Human leukocyte antigen B27; NSAIDs, Nonsteroidal anti-inflammatory drugs; DEXA, Dual-energy X-ray absorptiometry

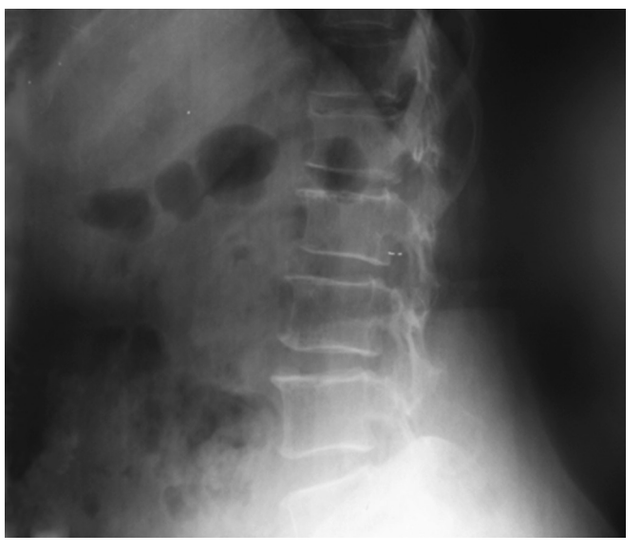


Figure 1: X-ray of LS showing lumbar osteophytes in lumbar spondylosis

relaxants like thiocolchicoside, tizanidine, chlorzoxazone can be helpful in relieving muscle spasms. Inflammatory backache requires disease-modifying antirheumatic drug (DMARD) like salazopyrine, methotrexate and biologics like infliximab, etanercept or adalimumab, in addition to NSAIDs. Calcium supplements and vitamin D_3 work excellently in rachitic and osteomalacic patients. Bisphosphonates (oral alendronate, risedronate, ibandronate or intravenous zoledronate), nasal calcitonin and teriparatide are used to treat osteoporosis. Antibiotics and antitubercular drugs are used for the treatment of bacterial and mycobacterial infection respectively. Malignancy should be treated according to the oncologist's opinion. Certain metastasis may require radiotherapy or chemotherapy. Surgical decompression may be required in certain cases of vertebral metastasis causing weakness or urinary and fecal incontinence/retention. Patients of chronic LBP should be evaluated for underlying depression and treated with tricyclic antidepressants. Patients having stress and anxiety should be treated with anxiolytic agents, stress management and cognitive behavioral therapy.

Physiotherapy should be initiated once the acute pain has settled. Supervised exercises under the guidance of trained personnel are recommended. Short wave diathermy (SWD), transcutaneous electrical nerve stimulation (TENS), massage with NSAIDs gel, transdermal patches of sustained release diclofenac can be tried in

Figure 2: X-ray of pelvis with both hip (PBH) bilateral sacroiliitis with syndesmophytes in LS giving a bamboo-spine appearance

Figure 3: X-ray of sacroiliac (SI) joint showing bilateral sclerosis in SI joint

LBP. Acupressure, acupuncture and yoga are the other modalities of treatment which are recommended by patients to each other. Randomized controlled trials (RCTs) are yet to confirm the efficacy of the alternative modalities of treatment used for LBP. Trigger points may be injected with a local anesthetic (2% lignocaine) with triamcinolone acetate. Facet block and epidural steroid injections are helpful in certain cases.

Surgical intervention consists of laminectomy, discectomy, vertebroplasty, spinal fusion depending on the primary condition in those who fail to show any benefit by conservative methods. Surgery is indicated in cauda equina syndrome, malignancies,

Figure 4: Magnetic resonance imaging of spine suggestive of destruction of the vertebral bodies and intervertebral disk suggestive of infective etiology most likely tuberculosis on T1-weighted images with post-contrast enhancement

Figure 5: Magnetic resonance imaging short-tau inversion recovery (STIR) images showing destruction of the vertebral bodies and the intervertebral disk

infections and certain fractures. Reconstructive vascular surgeries in aortic aneurysmal rupture or acute aortic dissection are life-saving emergency procedures.

Figure 6: Magnetic resonance imaging of sacroiliac (SI) joint showing chronic subchondral sclerosis

Figure 7: Magnetic resonance imaging of sacroiliac (SI) joint showing early subchondral marrow edema suggestive of early sacroiliitis

Some Practical Tips in Treatment of Patients with LBP

All patients should be instructed regarding proper posture and lifestyle modification:

- *Weight reduction*: It helps by decreasing the weight burden on the spine. Hence, watch what you eat
- Regular exercises to stay fit and stay active. Majority of the patients of LBP should be mobilized as early as possible; as very few of them require bed rest for longer duration. Begin slowly. Do not try to do too much at once. Pick a good time. We should delay exercise for an hour or two after we wake up because during the first hour after waking, the spine is three times stiff because disks have swelled overnight
- Lift the things correctly
- Maintain a correct posture while sitting and standing. Use proper back supporting chairs or pillows. A spine which is too flat or too curved causes stress on the joints and the ligaments. A normal lumbar lordosis helps to distribute stress evenly and absorbs shock when we walk or jump
- Avoid unwanted and sudden jerky movements which can trigger somatic dysfunction in the muscles. Unindicated sudden movements create a quick stretch on muscles and joints, increases pressure on disks and increases sensory stimulus to the spinal cord
- Use firm mattresses while sleeping
- Stress management techniques. Stress increases muscle tension and aggravates more pain.

Thus, not only coming to a diagnosis of LBP can be challenging, but keeping the patient pain free is a herculean task! It has multiple causes and involves various disciplines of medical specialties to treat patients. It is intriguing to know that most of the patients of LBP do doctor shopping for getting quicker and instant relief from backache and say goodbye to ooh, aah and oouch!

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