LOW BACK PAIN

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Introduction

Back pain is a growing medical problem in modern societies and one of the most common causes to see a physician. Because so many people are affected from back pain it is not only of medical but also of great socioeconomic importance. Back pain is the most expensive and common cause of work disability. With an aging society and a less active life style this situation is likely to worsen. Lifetime prevalence rates of up to 80% have been reported, probably still underestimating the problem[1]. Nearly every adult person suffers at least once during his life from back pain. In 90% the pain disappears with no or with conservative therapy within weeks. However, 30 to 40% of these patients will continue to experience persistent or recurrent symptoms and 10% will develop chronic disease and disability[5].

Causes of back pain

In 90% the cause of back pain is unspecific and no relevant pathological cause can be found. The pain can radiate into the legs, but usually has no radicular distribution. Often it ends above the knee. Specific back pain is usually caused by a definite cause such as mechanical nerve compression, a tumour, the fracture of a vertebra, inflammation or infection (table 1). Specific radicular pain can originate from nerve root compression by a disc herniation or by spinal stenosis. Typically in patients with spinal stenosis pain decreases on forward flexion and increases with extension. Riding a bicycle or going uphill is usually possible although overall walking distance is limited. As the causes for back pain are numerous, an elaborate diagnostic work up may be required. The challenge is to discriminate benign from serious disease and to determine when imaging studies are needed. Risk factors for developing low back pain include heavy physical work with frequent bending, lifting and rotating movements. Psychological factors such as depression, anxiety, job satisfaction, private and work related stress, low activity and low educational levels are also major risk factors but also for the development of chronic low back pain[2,4].

Prognosis

The clinical course of low back pain is usually favourable and pain will often resolve within two weeks. Overall back pain resolves in 90% of the patients within 4-6 weeks and many patients return to work already after one week. However, the longer the back pain persists and the longer the patient feels unable to work the less likely the person will return to work. Less than 50 percent of patients who have been off of work for six months because of low back pain will return to work. After two years of sick leave the chance of returning to work drops to zero[11].

Physical examination

Although not helpful to detect a specific aetiology the patient's medical history and physical examination is still important in order to decide which patient needs further diagnostic work up or even a rapid surgical intervention. The main question should include whether there an underlying systemic disease (e.g. osteoporosis, chronic infection, arthritis, recent trauma), are there psychological stress factors (e.g. job dissatisfaction, private problems, depression, drug

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abuse) and is there a neurological deficit. Palpation of the spine and assessment of motion may indicate the location of the pain but has no benefit in establishing a diagnosis or in directing a specific therapy. The type of pain reported may include back pain only, sciatica and/or both which may give first hints of the underlying structures involved. Back pain mostly originates is mostly related to musculoligamentous structures, fractures, spondylosis, a tumor or referred pain from visceral organs. Sciatia with our without neurological deficits such as sensory loss, weakness and diminished or asymmetrical reflexes may hint at nerve root compression. In serious cases the detection of a cauda equina or conus medullaris syndrome (bowel and bladder dysfunction) requires further rapid diagnostic work up. Patients with spinal stenosis report back pain as well as sciatica but also typically report about a reduced walking distance.

Imaging

As back pain improves in most patients within a couple of weeks radiological examination is not absolutely required in the early stage of the disease, especially as degenerative changes including disc herniations are seen in many asymptomatic patients. The most common imaging modalities are plain x-rays, computertomography (CT) and magnetic resonance imaging (MRI). However, the use of these modalities in the early stage of acute back pain has failed to show any benefit except some psychological aspects fort he patient. The major point is to decide which patient and when needs some imaging. Imaging is indicated in the case of alarming signs and symptoms ("red flags", table 1) when back pain is associated with severe or progressive neurological deficits, with a serious underlying disease or when evaluating patients for surgery or other invasive procedures such as epidural steroid injection. Known diseases including weight loss, fever, trauma, tumour or immunosuppression should lead to initiation of further diagnostic work up.

Although not very helpful in many cases plain X-rays are still in widespread use. They can give information on osseous degenerative changes and combined with flexion and extension imaging can show pathological movement of spinal segments. However,

Table 1. Causes of back pain

Unknown cause
Extravertebral
Gastrointestinal disease (diverticulitis, pancreatitis, inflammatory bowel disease)
Renal disease (nephrolithiasis, pyelonephritis)
Vascular (abdominal aortic aneurysm)
Vertebral
Tumor (primary or metastatic neoplasm)
Infection (spondylodiscitis, epidural abscess, osteomyelitis, herpes zoster)
Fractures (myeloma, osteoporosis, leukaemia, trauma)
Inflammation (rheumatoid arthritis, ankylosing spondylitis, reactive arthritis)
Degenerative disc or joint disease (disc herniation, spinal stenosis)
Metabolic disorder (Paget's disease, osteoporosis)
Congenital disease (scoliosis, kyphosis, spondylolysis)
Instability
Failed back surgery syndrome
Paget's disease, Scheuermann's disease
Other
Somatoform disorder
Fibromyalgia

Table 2. "Red Flags": Clinical indicators of possible serious underlying conditions requiring further medical intervention

Recent fever, weight loss,
age <20 and >50 years
trauma (fall, car accident)
neurological deficit (paresis, cauda-syndrome)
history of cancer
systemic inflammatory disease
osteoporosis
immunosuppression, drug abuse, steroid use, HIV,
severe structural deformity
pain resistant to therapy, pain worsening at night or when supine

this type of examination is relatively insensitive for most disease processes and with CT and MRI available in many facilities the normal x-ray has therefore lost some of its importance. CT is generally available, is more economic compared to MRI and provides excellent imaging of osseous and but only partially of soft tissue pathology. MRI is the most sensitive technique to evaluate disc disorders, nerve root compression or vertebral fractures and has become the imaging of choice in low back pain. Additional application of contrast media can provide information on tumour, inflammation, infection and discriminate between epidural fibrosis versus recurrent disc herniation in patients with previous surgery. Bone scintigraphy may be helpful in metastatic disease and infection when the location of the disease is not well defined. Myelography and postmyelo-CT have been more or less replaced by MRI but can still be helpful in selected cases or when a cardiac pacemaker does not allow MRI examination.

As degenerative changes are seen in most, even in younger patients, it is not always possible to draw a direct connection between radiological findings and clinical symptoms. Therefore results of imaging have to be discussed against the background of the physical examination and the patient's history. In 90% of cases there is no significant correlation between symptoms and pathomorphological findings of the radiological examination. In 4% fractures are the cause, in 1% tumor disease. The prevalence of disc herniation is 1-3%, that of spinal stenosis 3%[10]. Spinal infections (0.01%) and ancylosing spondylitis (0.3-5%) are rare.

Treatment

Although back pain is the second most common cause to see a physician many people do not seek medical care but treat themselves with over the counter medications and change in their daily activities. In 90% of the cases, back pain resolves within 4 to 6 weeks. It is an important aspect to stay active during this period, although an accompanying medical therapy may be of benefit in some of these patients[9]. Several studies have shown that patients who keep up their daily acitivities have a better outcome with regard to pain reduction and functional improvement than patients with bed rest. The same is true for patients with radicular pain. Multimodal treatment including exercise programs, weight loss, psycholocigal support, infiltrations and pharmacotherapy should be offered to patients with persistent pain. In addition, alternative and complementary therapies are sought after by the patients and offered by many physicians including acupuncture, massage, heat or spinal manipulation. However, the scientific background with regard to the usefulness of these therapies is limited. Surgical therapy is only indicated in cases in which a definite pathomorphological finding can explain the symptoms and surgical correction of this finding may improve the clinical symptoms.

Physiotherapy

There exist numerous therapies using kinetic, mechanical, thermical, electrical and physico-chemical qualities to treat low back pain. Although helpful in many cases, the efficacy of most of these therapies has not been proven scientifically. According to the existing data in the literature an active therapy is superior to a passive therapy for acute back pain as well as for chronic low back pain.

Pharmacological therapy

Although the evidence on benefits of pharmacological therapy in low back pain is limited a wide variety of medications is available for treatment of low back pain. The choice, which drug to use depends on the duration and the severity of symptoms, the expected benefit for the patient, the co-morbidity, costs

and the level of scientific evidence. Medical therapy should be considered as supporting modality as it does not seem to alter the natural course of the disease. However, it may help the patient to get through the acute phase.

In the acute period paracetamol is one of the first line options for the treatment of low back pain[3,4]. A big advantage of this medication is its high safety profile with a low risk of serious side effects. Besides paracetamol non-steroidal antiinflammatroy drugs (NSAID) are also recommended as initial treatment for either acute or chronic low back pain. However, as all NSAIDs can cause gastrointestinal bleeding and renal adverse effects, their use should be limited to the lowest dose possible and as short as possible. Both, paracetamol and NSAIDs can be prescribed with or without adjunctive use of muscle relaxants (e.g. tolperison, cyclobenzaprine and tizanidine) and benzodiazepines (clonazepam and diazepam)[3,4]. The latter drugs seem to have especial effect in patients with acute non-specific back pain, although the drug addictive potential of benzodiazepines has to be taken into consideration and therefore they should only be used with a defined time frame after non-benzodiazepine muscle relaxants have proven to have no effect.

With more severe pain medication should be switched to opioids (tilidine, tramadol, morphine, oxycodone, fentanyl), although scientific evidence to support treatment of low back pain with opioids is limited[3,4]. These medications carry the risk of respiratory depression, constipation, nausea, drug abuse and addiction. In chronic pain antidepressants can be added as some of them have pain-modulating properties. Contradicting results on the benefits have been reported, nevertheless, they may be effective in some patients, especially as depression is common in patients with low back pain. Corticosteroids can not be recommended for the treatment of patients with low back pain. Some antiepileptic drugs such as gabapentin and topiramate may be effective in chronic but not acute low back pain[6,7,14].

Invasive non-surgical procedures

The value of non-surgical invasive therapies is not based on evidence. Although patients may benefit temporarily no clear evidence based data exist to support this type of therapy. Injections and infiltration can be made into the dorsal compartment (facet joints, iliosacral joint, dorsal ligaments), the ventral compartment (intradiscally, spinal ganglia, lumbar sympathic chain) and the neural compartment (epidural, periradicular, transforaminal). Local anesthetics and steroids are usually used. Furthermore denervation of the facet joints using radiofrequency or kryotherapy are often used. Short time effects may exist for epidural injections for radicular pain pain and the blockade of the iliosacral joint. In non-specific low back pain epidural injections are not effective. Denervation of facet joints using radiofrequency or kryotherapy has been found effective in some patients up to four weeks. Intradiscal thermolesion is not superior to placebo and should not be used.

Surgery

A variety of surgical interventions is offered depending on the underlying pathology including removal of the herniated disc segment with or without nucleotomy, decompression of neural structures in cases of stenosis, spondylodesis, implantation of disc prostheses, dorsal dynamic stabilization, and interspinous spacers. The value of surgery is and has always been under controverse discussion between conservative and surgical specialists. Unfortunelately surgical procedures vary widely and are not standardised which makes it difficult to obtain reliable data in the sense of a evidence based medicine. Nevertheless surgery is indicated when the pain is clearly associated with major pathological changes such as tumors, fractures, infections or disc herniations. In patients with disc herniations pain reduction is more rapid compared to the conservative treatment although the long term outcome does not really differ[8,13]. In contrast, surgery is superior in patients with spinal stenosis and spondylolisthesis compared to the non-surgical treatment[12]. In cases in which the morphological changes are not clearly associated with the symptoms surgery is less effective. Therefore fusion or arthroplasty should not be generally suggested to patients with chronic back pain showing common degenerative changes on imaging. Only 15-40% of these patients have a good to excellent outcome after surgery, many need second or third surgery with a questionable long term improvement.

Summary

Low back pain is a widespread disease which is has no identifiable specific course in most patients. In most of these patients low back pain will resolve with minimal intervention in a short period of time. Early imaging has no influence on the course of the disease. Therefore extended management and diagnostic work up mainly depends on accompanying risk factors ("red lfags"), the presence or absence of neurological symptoms or deficits and the duration of the symptoms. Treatment includes pharmacological, physical therapy and non-surgical invasive therapies as well as surgery in cases in which pathomorphological changes can explain the symptoms and their correction may provide the chance of improvement for the patient. As so many different treatment strategies exist the level of evidence for many therapies is low and the decision which treatment should be used has often to be made on a patient specific background.

Reference

1. ANDERSSON GB. Epidemiology of low back pain. Acta Orthop Scand Suppl 1998; 281: 28-31.
2. BAIR MJ, ROBINSON RL, KATON W, KROENKE K. Depression and pain comorbidity: a literature review. Arch Intern Med 2003; 163: 2433-2445.
3. CHOU R. Pharmacological management of low back pain. Drugs; 70: 387-402. 2010.
4. COHEN SP, ARGOFF CE, CARRAGEE EJ. Management of low back pain. BMJ 2008; 337: a2718.
5. HENSCHKE N, MAHER CG, REFSHAUGE KM, HERBERT RD, CUMMING RG, BLEASEL J, YORK J, DAS A, MCAULEY JH. Prognosis in patients with recent onset low back pain in Australian primary care: inception cohort study. BMJ 2008; 337: a171.
6. KHOROMI S, PATSALIDES A, PARADA S, SALEHI V, MEEGAN JM, MAX MB. Topiramate in chronic lumbar radicular pain. J Pain 2005; 6: 829-836.
7. MUEHLBACHER M, NICKEL MK, KETTLER C, TRITT K, LAHMANN C, LEIBERICH PK, NICKEL C, KRAWCZYK J, MITTERLEHNER FO, ROTHER WK, LOEW TH, KAPLAN P. Topiramate in treatment of patients with chronic low back pain: a randomized, double-blind, placebo-controlled study. Clin J Pain 2006; 22: 526-531.
8. PEUL WC, VAN HOUWELINGEN HC, VAN DEN HOUT WB, BRAND R, EEKHOF JA, TANS JT, THOMEER RT, KOES BW. Surgery versus prolonged conservative treatment for sciatica. N Engl J Med 2007; 356: 2245-2256.
9. TURNER JA. Educational and behavioral interventions for back pain in primary care. Spine (Phila Pa 1976) 1996; 21: 2851-2857.
10. VAN TULDER M, KOES B. Chronic low back pain. Am Fam Physician 2006; 74: 1577-1579.
11. WADDELL G. The clinical course of low back pain. The Back Pain Revolution. Edinburgh: Churchill Livingstone, 1998: 103-117.
12. WEINSTEIN JN, LURIE JD, TOSTESON TD, HANSCOM B, TOSTESON AN, BLOOD EA, BIRKMEYER NJ, HILIBRAND AS, HERKOWITZ H, CAMMISA FP, ALBERT TJ, EMERY SE, LENKE LG, ABDU WA, LONGLEY M, ERRICO TJ, HU SS. Surgical versus nonsurgical treatment for lumbar degenerative spondylolisthesis. N Engl J Med 2007; 356: 2257-2270.
13. WEINSTEIN JN, TOSTESON TD, LURIE JD, TOSTESON AN, HANSCOM B, SKINNER JS, ABDU WA, HILIBRAND AS, BODEN SD, DEYO RA. Surgical vs nonoperative treatment for lumbar disk herniation: the Spine Patient Outcomes Research Trial (SPORT): a randomized trial. JAMA 2006; 296: 2441-2450.
14. YAKSI A, OZGONENEL L, OZGONENEL B. The efficiency of gabapentin therapy in patients with lumbar spinal stenosis. Spine (Phila Pa 1976) 2007; 32: 939-942.