Degenerative lumbar spine disease

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Background

Degenerative lumbar spine disease (DLSD) is a condition involving the spine with or without neural compromise. Imaging evidence of DLSD is present in over 70% of the population. However, symptoms are less common, with fewer than 10% of symptomatic patients experiencing significant symptoms. The condition is more prevalent in the Western world, with a younger age at presentation and a higher rate of spine surgery than in other regions.

In terms of etiology, the most common factors are age, gender, and lifestyle. Other causes include congenital anomalies, infection, inflammation, and rare conditions.

Diagnosis of degenerative lumbar spine disease

The primary symptom of DLSD is axial low back pain, with or without a neurological component. The pain is usually chronic and may be exacerbated by physical activity. Imaging is essential in the diagnosis of DLSD, with MRI and CT scans being the most commonly used modalities.

Central lumbar canal stenosis typically presents chronically and with signs and symptoms of multi-nerve root dysfunction, termed spinal claudication. Thus patients complain of back and progressive leg pain, numbness, and weakness on walking with symptoms resolved at rest or on forward flexion. Intermittent claudication due to vascular insufficiency in the legs is an important differential diagnosis. Acute central lumbar canal stenosis, usually due to a large prolapsed disc, may present with cauda equina syndrome. The red flag signs are: sphincter dysfunction with painless urinary incontinence and reduced anal tone, saddle numbness, and bilateral sciatica. This is a neurosurgical emergency warranting urgent referral and treatment to avoid permanent neurological deficits. Lateral compression of a nerve root in the lumbar spine presents with characteristic dermatomal radicular pain, so-called "sciatica," with associated lower motor neuron signs and symptoms.

In terms of investigations, imaging techniques are the most useful. Plain X-rays, especially performed in flexion and extension, will help to identify any spinal instability that may be present. The imaging modality of choice, however, is the MRI scan. MRI clearly demonstrates the neural elements and defines any areas of bony, ligamentous or discal degeneration and compression (see Figure 1). CT scans remain a useful alternative in patients who are unable to tolerate a MRI scan or in whom MRI is contraindicated, such as those with pacemakers. CT scans are also useful if detailed information about the bony structure is required, particularly in patients who are to undergo instrumental spinal fixation. Electrophysiological evaluation, such as nerve conduction studies, is helpful in determining the level of relevant pathology especially in patients with difficult clinical assessment and multi-level spinal disease on MRI.

Management of degenerative lumbar spine disease

Management of DLSD requires a multi-disciplinary team approach. The team at the core of this approach consists of neurosurgeons, spine surgeons, neurologists, pain specialists, and physiotherapists. This is important to provide the patients with the most effective treatment for their specific symptoms. Although patients with DLSD represent the biggest group of patients seen in a general neurosurgical clinic, a small proportion of patients will require surgery.

In patients presenting with a subacute to acute isolated back pain, without neural compression or spinal instability, conservative measures are likely to settle the pain in the majority. Such measures include weight reduction, structured exercise programmes; analgesics such as paracetamol, non-steroidal anti-inflammatory drugs or opioids; physiotherapy; spinal manipulation by qualified osteopaths or chiropractors; and acupuncture. In patients with chronic pain (more than one year), epidural injections, transcutaneous electrical nerve stimulation (TENS) and combined physical and psychological rehabilitation programmes may be of additional benefit. The role of surgery in such patients remains controversial. Spinal fusion may benefit selected patients. When instability (degenerative spondylolisthesis) complicates back pain, spinal fusion may achieve good pain control. Percutaneous spinal instrumentation systems now available, allow minimally invasive surgery with more rapid recovery and a shorter hospital stay.
In patients with DLSD and radicular pain, conservative measures are usually sufficient to improve the symptom in six to eight weeks. If severe pain persists beyond this time, or if a motor neurological deficit, such as a foot drop, is present, serious consideration should be given to surgery. The timing of surgery is particularly important if neurological recovery is to be achieved. The aim of surgery is to decompress the neural elements and the most common operations performed are lumbar laminectomy and lumbar microdiscectomy. The recent development of endoscopic microdiscectomy technique allows day-case local anaesthetic surgery with the additional benefit of excellent cosmetic results. Spinal cord stimulation remains an effective treatment in patients with severe pain especially if pain persists despite decompressive surgery.

**Prognosis of degenerative lumbar spine disease**

The prognosis of patients with DLSD depends on the underlying diagnosis, delivery of prompt treatment and psycho-social-economic factors. Well motivated patients with a good social support network are more likely to recover well and resume work. Despite all the treatment available, some 10 percent of patients become chronically disabled, especially with back pain. In others, conservative and surgical measures are effective in improving the symptoms. Spinal claudication and radicular pain respond well to surgery with up to 90 percent pain relief. When motor weakness is present or in patients with cauda equina syndrome, the timing of surgery is crucial in determining any neurological recovery with the best results seen in patients operated within 48 hours of presentation. The prognosis for recovery of sensory defects such as numbness and paraesthesia is less predictable.

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