

Hip spine syndrome: management of coexisting radiculopathy and arthritis of the lower extremity

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Abstract

Background context: Significant lumbar spinal stenosis and lower extremity arthritis may coexist in the elderly. This combination of lumbar stenosis with radiculopathy and lower extremity arthritis may lead to diagnostic uncertainty.

Purpose: To describe the findings of hip spine syndrome, a constellation of symptoms with extensive overlap of radiculopathy and lower extremity arthritis.

Conclusions: Evaluation of the patient with lower extremity pain in consideration for total joint arthroplasty should include functional inquiry of the spinal nerves. Diagnostic tests and injections may allow an informative weighting of the patient's symptoms, leading to a better understanding of the patient's pain syndrome. There is a group of patients who have a total hip arthroplasty and then develop or may continue to have pain of groin and buttock, secondary to sciatica of lumbar spinal stenosis. For the patient undergoing total hip arthroplasty with asymptomatic spinal stenosis, there may be increased neurological risk at surgery, related to the stenosis. The patient with both conditions may require surgical decompression of the lumbar stenosis as well as joint arthroplasty of the arthritic joint. © 2003 Elsevier Inc. All right reserved.

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Introduction

Significant lumbar spinal stenosis and lower extremity arthritis may coexist in the elderly. Which diagnosis leads to the patient's lower extremity complaints? Clinically, symptoms of lumbar spinal stenosis, radiculopathy and neurogenic claudication may be similar to the pain of an arthritic hip or knee. Additionally, an asymptomatic lumbar stenosis may become activated after a total joint arthroplasty and cause unacceptable levels of radicular pain or newfound muscular weakness, that is, foot drop, thigh or hip abductor weakness. Evaluation of the patient with lower extremity pain in consideration for total joint arthroplasty should include functional inquiry of the spinal nerves. Diagnostic tests and injections may allow an informative weighting of the patient's symptoms leading to a better understanding of

the patient's pain syndrome. The patient with both conditions may require surgical decompression of the lumbar stenosis as well as joint arthroplasty of the arthritic joint.

Osteoarthritis is the most common musculoskeletal disease of aging. It has been reported radiographically in more than 80% of individuals older than 55 years. Arthritis is present in more than 40 million US citizens. Osteoarthritis of the spine, hip and knee may result in significant impairment, disability and loss of function. Radiographic evidence of osteoarthritis of the knee has been reported in 40% of patients 80 years or older. Similarly, radiographic arthritis of the hip has been reported in 12% of those older than 80 years [1]. Likewise, spondylosis of the lumbar spine is prevalent, and lumbar stenosis, a subset of arthritis, is not uncommon. Some aspects of stenosis, such as spondylolisthesis, may be seen in 6% of men and 9% of women from a Dutch cross-section study. Computed tomography (CT) scan may be a better measure of stenosis, with reported incidence of 3.4% in individuals older than 40 years. Magnetic resonance imaging (MRI) in asymptomatic individuals may report even higher incidence of stenosis. Borenstein et al. performed MRI studies of volunteers and reported a prevalence of 60% in those older than 60 years [2].

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The causes of hip arthritis may be multifactorial and include osteoarthropathy, spondyloarthropathy and avascular necrosis. In general, these patients will have buttock and groin pain radiating to the knee, but not below, associated with decreased range of motion. As the arthritis progresses, gait disturbances may be seen. Total joint arthroplasty has made a significant positive impact on the treatment of patients with disabling arthritis. Total hip arthroplasty is one of the most successful surgical procedures. More than 120,000 primary arthroplasties are performed in the United States each year at an estimated cost of over \$2.5 billion. Because most hip replacements are done in patients older than 65 years of age, the number of procedures is expected to increase as the population ages. Outcome studies have documented marked improvements in pain, sleep, range of motion and physical ability after total hip arthroplasty. Overall, the data have documented that there is a significant improvement in functional status and quality of life.

Beattie et al. [3] looked at lumbar MRI in the symptomatic lumbar stenosis patient and found that only the most severe compression situations, such as severe foraminal encroachment or large disc extrusion, would correlate with the patient's symptoms. Mild to moderate compression, disc degeneration and central canal stenosis were not significantly associated with the reported patient pain pattern. Lawrence et al. [1] reviewed hospital discharge registry for the state of Washington from 1986 to 1988, reporting admissions for lumbar spine operations in 18,122 patients, of which 3,380 (18.6%) were for diagnosis of spinal stenosis. If 18.6% were representative of the United States, then 52,000 operations for stenosis nationwide were done yearly [1]. Stenosis may begin at an earlier age, related to developmental stenosis. Eighty percent of patients will have back and leg pain, 62% have symptoms of pseudoclaudication and 50% will have neurological deficit. Hall et al. [4] reported a known association of lumbar stenosis and peripheral vascular disease.

The true incidence of the combination of lumbar stenosis and hip arthritis is unknown. There can be a substantial overlap in symptoms of stenosis and hip arthrosis. The stenosis may be asymptomatic while the hip is symptomatic. Clinical symptoms arising from the hip often prompt medical treatment. Or the stenosis may be the more obvious problem, demanding more immediate surgical attention. Lumbar stenosis or spondylolisthesis causing radiculopathy is usually recognized and treated. There is a group of patients who have a total hip arthroplasty and then develop or may continue to have pain of groin and buttock, secondary to sciatica of lumbar spinal stenosis.

Diagnosis

Although a careful history and physical examination often may differentiate pain of radicular versus joint origin, sometimes the distinction is difficult. Leg pain should be described in detail to see whether it simulates a dermatomal

pattern. The most common symptom of lumbar spinal stenosis is neurogenic claudication. Neurogenic claudication, or pseudoclaudication, refers to pain radiating to the lower extremities that begins and worsens as the patient ambulates. The pain worsens with the increased lordosis of the lumbar spine, with standing and walking, which may relatively pinch close the foramina and narrow the canal with infolding of the ligamentum flavum. The pain often resolves spontaneously or resolves rapidly as the patient bends forward or sits down. In contrast, muscular claudication of vascular origin will produce symptoms with walking up hills or bicycling. Alternately, absence of pulses below the hips, rubor and pallor changes with elevation are classic for vascular claudication but not neurologic claudication. In uncertain cases vascular Doppler, flow studies or arteriography may be required. Patients who present with concomitant osteoarthritis of the lower extremities (hip, knee, ankle), causing restricted and painful joint range of motion will require special consideration. In certain individuals, there may be isolated areas of extremity pain at the hip, knee, calf, ankle or heel, with asymptomatic areas between painful foci [5].

The most important features of the physical examination in stenosis are the strength, reflex and the palpatory examinations. Strength deficits, such as partial foot drop and hip flexor or quadriceps weakness may be subtle. In patients with more severe chronic lumbar spinal stenosis, there may be visible atrophy of calf musculature. The patient may be unable to walk. Reflexes often are diminished at the ankles in patients with more significant lumbar stenosis. Straight leg raising, a helpful clinical sign in disc herniation, usually is negative in patients with spinal stenosis, except in patients in whom disc herniation is superimposed in a region of stenosis. However, the femoral stretch test often is positive, even when only L5 and S1 roots are involved. This may occur because of the end effect of increasing lordosis and pelvic tilt increasing the stenosis and stretching the femoral roots. Areas of sensory deficit usually correlate poorly with patients' pain and disability. Decreased range of motion of joints, with pain at extremes of motion, is commonly found in arthritis of the hip and knee. There may be an effusion or induration of the knee, associated with arthritis of the knee. The clinician must evaluate leg pain carefully. Leg pain not attributable to radiculopathy may result from hip bursitis, osteoarthritis of the hip or knee or myofascial pain.

Plain radiographs may demonstrate osteoarthritis of the hip and lumbar spine (Fig. 1). The plain radiographs are poor measures of lumbar stenosis, and CT myelography or MRI scanning is far better at defining stenosis. A block with local anesthetic at the most symptomatic location may be of diagnostic benefit. A hip injection with local anesthetic may allow the confident diagnosis of hip disease. Kleiner et al. [6] report injection of 10 mm of bupivacaine HCl into the hip with X-ray localization to discern the origin of hip pain [6]. They reported identification of the hip as the correct source of pain in 88% of the total cases. Alternately, in the case of a suspected radiculopathy, a nerve root block with anesthetic will be nondiagnos-

tic. However, the addition of a steroid may give therapeutic pain relief [7]. If the radiculopathy is within a dermatome, implying a single or perhaps two nerve roots, these nerve roots may be anesthetized with a fluoroscopic guided selective block, but there is low specificity with such blocks. Adjacent nerve roots are affected by an injection, and in other cases there may be some effect of distal injection on referred pain.

Pain after arthroplasty

Although total hip arthroplasty is one of the most successful procedures in orthopedic surgery, a small percentage of patients have pain after surgery. A systematic approach to the evaluation of this pain, with careful attention to the patient's history, physical examination and laboratory and radiographic studies, is necessary to reach a correct diagnosis. The time of onset of hip pain is important. Pain that occurs early after surgery and is out of proportion to the usual postoperative pain may indicate a postoperative infection, an unstable implant, heterotopic ossification or radiculopathy. Late pain may result

from component loosening, hematogenous infection, soft-tissue problems such as tendonitis or bursitis or radiculopathy of lumbar stenosis. The location of the pain is important in identifying its source. Groin pain usually is caused by acetabular component loosening, which can also cause buttock pain. Iliopsoas inflammation is more common with collared implants overhanging the medial calcar, or impingement on prominent cementless sockets causing groin pain. Groin pain also may be caused by an L4–L5 stenosis [8]. Elderly patients with L4–L5 protruding herniation of the annulus fibrosus were most likely to experience groin pain. The sinuvertebral nerve that innervates the posterior annulus fibrosus, the posterior longitudinal ligament and the dura was indicated as the afferent nerve causing groin pain [9]. Thigh or knee pain may be the result of femoral component loosening.

The coexistence of lumbar stenosis with hip arthritis may be an increased risk factor for neurologic injury with total hip arthroplasty. Pritchett [10] reported 21 patients with lumbar stenosis who developed foot drop after total hip arthroplasty. This implies that less nerve compression is re-

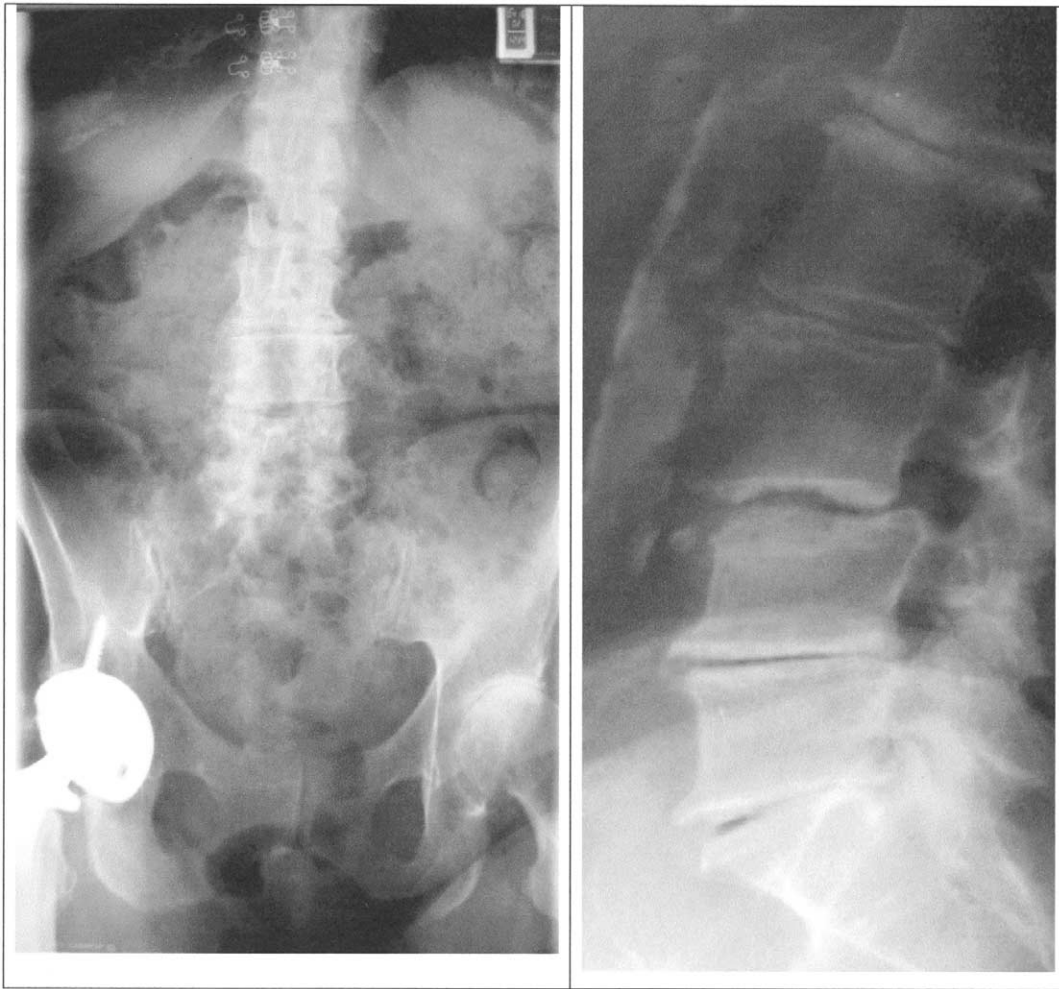


Fig. 1. Lumbar spinal stenosis Anteroposterior lateral radiographs. (Left) Previous total hip arthroplasty on right hip. (Right) Severe arthritis, left hip. Note associated aortic vascular calcification on lateral.

quired to produce symptoms in the presence of these coexisting conditions. Pritchett concludes that if nerve injury occurs after hip surgery, lumbar spinal stenosis should be considered, and some patients will improve after lumbar stenosis decompression. Bohl and Steffee [11] theorized that increased walking endurance afforded by the new hip arthroplasty may unmask neurogenic claudication, in patients incapable of walking that distance before total hip arthroplasty [11]. Although clinically apparent nerve injury is uncommon, detectable neurological loss after total hip arthroplasty is more common than postoperative infection. Schmalzried et al. [9] found a 1.7% incidence of postoperative neuropathy, mostly sciatic, noted clinically. In most patients the cause of the neuropathy is unknown. This author did not comment about associated lumbar stenosis. McNamara et al. [12] report 14 patients who underwent lumbar stenosis release after total hip arthroplasty [12]. Five patients initially presented with symptoms of both joint disease and spinal stenosis. Nine patients began to have radicular pain after their total joint replacement. Eight of nine who underwent decompression of lumbar stenosis after the total joint arthroplasty were rated as “well” to “excellent” outcome. The authors noted the average time to presentation with symptoms for spinal stenosis after arthroplasty was 9.3 months.

It is important to determine whether the patient has pain with activity, pain at rest or both. Pain caused by component instability usually is activity related. Lumbar spinal stenosis with radiculopathy may be painful at rest or have a pseudoclaudication nature that may be confused with pain of component instability. Clinically, a history of “start-up” pain may indicate a loose component. The patient may report that after 5 or 10 steps there is less pain in the groin. Pain with a loose component often is triphasic in that the first few steps cause acute sharp pain, the pain lessens with more walking and then with a moderate amount of walking, pain again increases. With loose components, the pain is either in the groin or thigh, with occasional buttock pain caused by a loose socket. Pain that occurs at night, or at rest, should suggest the possibility of spinal stenosis. It also is important to determine the presence of peripheral vascular disease, because activity-related pain may also result from vascular claudication.

Treatment

Which element should be treated first? McNamara [12] recommended total joint arthroplasty first because of the demonstrable excellent results with arthroplasty. In patients with concomitant stenosis and coxarthrosis, the patient should be counseled that two operations may be required to treat the problem, a hip arthroplasty and a lumbar decompression. For the patient with asymptomatic spinal stenosis undergoing total hip arthroplasty, there may be increased neurological risk at surgery, related to the stenosis. However, the authors would not recommend a decompression of an asymptomatic lumbar stenosis. Again, the patient may be counseled that although the stenosis may be asymptomatic

now, a lumbar decompression may be required in the future if the stenosis becomes symptomatic.

Although progressive neurologic deficit or cauda equina syndrome in association with lumbar spinal stenosis are indications for urgent operative intervention, Bohl and Steffee [11] suggested that nonprogressive neurologic deficit (pin prick, vibration, reflexes, leg muscle power) correlated poorly with pain and physical disability and therefore should not be a reason for operative intervention.

Summary

Significant lumbar spinal stenosis and lower extremity arthritis may coexist in the elderly. Evaluation of the patient with lower extremity pain in consideration for total joint arthroplasty should include functional inquiry of the spinal nerves. Diagnostic tests and injections may allow a better understanding of the patient’s pain syndrome. There is a group of patients who have a total hip arthroplasty and then develop or may continue to have pain of groin and buttock, or neuroclaudication secondary to sciatica of lumbar spinal stenosis. For the patient undergoing total hip arthroplasty with asymptomatic spinal stenosis, there may be increased neurological risk at surgery, related to the stenosis. The patient with both conditions may require surgical decompression of the lumbar stenosis as well as joint arthroplasty of the arthritic joint.

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