

Grand Rounds

Chronic Lower Back Pain with Stenosis in an Older Adult Male

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ABSTRACT

Chronic lower back pain (CLBP) is a common problem in older adults and is a cause of significant disability in this population. Multiple treatment modalities exist for the treatment of CLBP but there is not one definitive intervention that has proven superiority over all other interventions. Spinal stenosis is a common complication of CLBP in older adults and although it is commonly diagnosed there are questions as to whether it is the principal pathology. This grand rounds presentation explores the management of chronic lower back pain in an older adult. The management strategies are presented from the perspectives of a chiropractor, a physiatrist, a geriatrician and a nurse. The management strategies presented will exemplify the varied approaches but is designed to give the clinician a broader view of the management of CLBP in older adults.

GRAND ROUNDS

Lumbar spinal stenosis in an older adult male

A 75 year old male presents with a history of chronic lower back pain and leg pain. The patient has a history of working as a heavy laborer for 40 years. He had some pain while working although he was never treated during that time. He has developed worsening pain over the past three years. He reports that he initially presented to his family physician who prescribed Tylenol, which was only mildly palliative. Due to persistence of the pain the patient underwent plain films of the lumbar spine, which revealed a grade 1 degenerative spondylolisthesis of L5 on S1 and moderate degenerative changes throughout the lumbar spine. He subsequently underwent stress views of the lumbar spine which were negative for instability. Magnetic resonance imaging (MRI) of the lumbar spine revealed moderate spinal stenosis at L3/4, L4/5 and L5/S1. The stenosis was secondary to both posterior osteophytosis and posterior element hypertrophy (facet and ligamentum flavum).

The patient reports that his lower back pain is a "dull constant ache" which becomes more intense with prolonged ambulation. His legs also feel "heavy" when walking greater than 50 yards and he gets some cramping in the calves with ambulation. He reports that he can sit and lie without discomfort and denies that the pain disturbs his sleep. Palliative factors include recumbence and ambulating with the aid of a four wheel walker. He reports that he has been more "clumsy" lately, but he denies any traumatic falls. He denies recent change in bowel or bladder function, although he does have a history of benign prostatic hypertrophy. He reports occasional constipation, but no recent changes. His past medical history includes: hypertension, benign prostatic hypertrophy, type II diabetes, and coronary artery disease. His medications include: lisinopril, metformin and clopidogrel. His past surgical history includes: Right Inguinal herniorrhaphy and two angioplasty procedures with stent placement. He has no history of significant trauma, although he does have a history of heavy physical labor. He is married (spouse still living). He has a 30 pack year history of smoking (quit 5 years ago) and drinks 1 beer daily.

His physical exam reveals a well-developed, well-nourished, 69-inch, 196-pound, white male in no apparent distress. He rises from a chair with a mild amount of discomfort and he has a stable and coordinated gait. Lumbar spine range of motion shows flexion to be 70 degrees if taking into account hip and thoracolumbar motion, however Schober's test revealed less than one centimeter of motion in the

lumbar spine qualifying as "severe restriction of lumbar flexion". Lumbar spine extension is 0 degrees. Right and left lateral flexion are both restricted at 0 degrees. All of these maneuvers create local lumbosacral junction pain without radiation into the lower extremity. Upon repeated end-range load testing the patient exhibited improved functional movement with flexion. Seated straight-leg raise was provocative in the left at 90 degrees for local low back pain and then the right at 90 degrees for hamstring tightness but does not create any focal radicular symptoms into the lower extremity. Supine straight-leg raise and well leg raise are both provocative at 70 degrees for hamstring tightness and low back pain with no focal radicular symptoms into the lower extremity. FABER test is provocative bilaterally for lower back pain, but no groin pain or hip pain.

NEUROLOGIC: Upper extremity reflexes are: 1+ bilaterally for biceps, brachioradialis and triceps. Upper extremity dermatome testing is symmetrical to pinprick. Muscle strength for deltoid, brachioradialis, wrist flexors and extensors, finger flexors and interossei are 5/5 bilateral. Lower extremity reflexes are 2+ bilaterally for patellar and 1+ bilaterally for achilles. Dermatome testing is symmetrical to pinprick and lower extremity strength demonstrates 5/5 strength bilateral for quadriceps, extensor hallucis longus, tibialis anterior and plantar flexors.

Introduction

Americans are living longer and many cope with a host of chronic health conditions that directly impact daily function and quality of life.¹ Previous studies have shown that 88% of people aged 65 and older have one or more chronic conditions and that more than 75% of all US health expenditures are related to treatment of chronic conditions.¹ Furthermore, epidemiological data suggest that between 2010 and 2030, the size of the 65+ population will increase more than 70%.² Lower back pain is a significant health problem in the older adult population.³ A U.S. national survey of physician visits among patients aged 75 and older revealed that back pain is the third most frequently reported symptom in general and the most commonly reported musculoskeletal symptom.⁴ Unmanaged lower back pain may contribute to depression, functional disability, compromised quality of life and increased analgesic medication usage.⁴ Thus, the identification of safe and effective interventions for chronic lower back pain in older people is critical in view of its high prevalence, negative impact on quality of life and the treatment risks associated with chronic medication use.⁵

Lumbar spinal stenosis (LSS) is a disorder that primarily affects older patients.⁶ With advances in noninvasive imaging modalities such as computed tomography (CT) and MRI, spinal stenosis is identified more often in this population and is now the most frequent cause for spinal surgery in patients older than 65 years.⁷ Neurogenic claudication is the most common disabling symptom of LSS.⁶ A patient with neurogenic claudication develops pain or cramping in the back and lower limbs some time after starting to walk or with prolonged standing, with this pain steadily increasing to the point at which the person must stop walking or change position. Thus, neurogenic claudication secondary to LSS severely limits the walking ability of the affected individual.

Current treatment options for LSS range from less invasive options such as manual therapies and medications to more invasive options including spinal injections, minimally invasive surgical procedures and other more complex surgical procedures.⁶⁻⁹ Recent trials have reported improvement with surgical intervention.¹⁰ However, Level I evidence that directly compares the effectiveness of surgical and nonsurgical treatments for LSS is lacking and significant controversy exists concerning the preferred treatment of this condition, particularly when it is complicated by such symptoms as neurogenic claudication.¹¹ The purpose of this Grand Rounds is to present multidisciplinary views on the treatment of LSS in an older male patient from the perspectives of a chiropractor, a geriatrician, a physiatrist, and a gerontological nurse. Although the views differ, it is helpful for the clinician to hear from different clinical specialties to aid in the decision of the best treatment option for a patient suffering from chronic lower back pain that may or may not be related symptomatic lumbar spinal stenosis.

DISCUSSANT 1:

Chiropractic Management: Paul Dougherty, DC

ASSESSMENT: Chronic lower back pain combined with lumbar spinal stenosis with neurogenic claudication.

PLAN: In this case I would recommend the patient undergo a clinical trial of lumbar flexion distraction therapy, neural mobilization and spinal mobilization. I would treat the patient 1-2 times per week for

three to four weeks, re-evaluating range of motion and also assessing functional status (walking distance) on each treatment. I would also prescribe home flexion exercises to be performed two times per day.

DISCUSSION: While the pathophysiology of neurogenic claudication remains somewhat controversial, some research suggests that elevated intraspinal pressure as a result of central and/or lateral canal encroachment leads to diminished cerebrospinal fluid (CSF) flow and arterial and venous blood flow.^{12,13} This causes a hypometabolic state in the nerve root. It also results in periradicular fibrosis^{14,15} and decreased nerve root mobility.¹⁵ This then leads to increased mechanosensitivity of the nerve root.¹⁶ The combination of CSF and venous stasis, arterial insufficiency and impaired nerve root mobility is thought to cause neurogenic claudication for two reasons. First, walking places increased metabolic demand on the nerve root and, second, nerve roots normally “glide” back and forth within the lateral canal with movements of the lower extremities, and periradicular fibrosis interferes with this gliding, causing traction on the nerve root.¹⁷ The use of lumbar flexion distraction therapy and neural mobilization theoretically addresses this underlying pathophysiology.^{9,18} A previous cohort study found clinically meaningful change in symptomatic lumbar spinal stenosis following the application of this treatment protocol.⁹ Lumbar flexion distraction therapy utilizing a specialized table that creates segmental distraction and mobilization, combined with “neural mobilization which improves neural mobility and mechanosensitivity of nerve roots.”^{9,18}

There have been no randomized controlled trials specifically evaluating spinal manipulation versus another treatment modality in patients with spinal stenosis. However, the two large trials which did evaluate surgical versus non-operative care in spinal stenosis both allowed for patients to undergo spinal manipulative therapy as part of “non-operative” care.^{10,19} Although in both of these trials the surgically treated patients showed superior long term outcomes compared to the “non-operative” arm, there is a criticism that the “non-operative” arm was not systematically defined. Therefore, it is a reasonable treatment option for patients to consider undergoing a course of manual therapy, which may include the above treatment plan, prior to considering more invasive treatment options. However, there is a need to systematically evaluate through RCT’s the comparison of manual interventions to surgery for spinal stenosis.

DISCUSSANT 2:

Geriatrician: Debra Weiner, MD

ASSESSMENT: 1) Mobility Impairment, 2) Low Back Pain (LBP), 3) Leg Pain

PLAN: 1) I would like to determine if there are conditions other than lumbar spinal stenosis that are contributing to this patient's symptoms. Other conditions that commonly contribute to pain and mobility limitation in older adults and that should be evaluated in this patient include cognitive impairment, depression, anxiety, maladaptive pain coping skills, low self-efficacy, fear-avoidance behaviors, fibromyalgia syndrome, myofascial pain (e.g., of the piriformis), sacroiliac joint syndrome (suggested by the results of FABER's test) and iliotibial band pain. 2) Once all of the contributors to his pain and mobility limitation have been ascertained, I would embark on stepped-care treatment of each.

DISCUSSION: Treatment-prescribing for the patient presented should start with identifying the patient's treatment expectations so that patient-centered care can be prescribed and any misconceptions clarified. The older adult with LBP and leg pain typically has multiple contributing conditions.²⁰ Relying on imaging alone to prescribe treatment may result in suboptimal outcomes. Research has shown that as many as one in five older adults without LBP or neurogenic claudication have moderate to severe central canal stenosis of the lumbar spine.²¹ Imaging-identified anatomical stenosis, therefore, may be necessary but not sufficient to cause pain and disability. It also has been demonstrated that surgical treatment designed to eliminate stenosis results in only modest reduction of pain, with on average ~17% reduction in leg pain and ~14% reduction in back pain.²²

A key principle of aging is that "Presentation of a new disease depends on the organ system made most vulnerable by previous changes, and, because the most vulnerable organ system ('weakest link') often differs from the one newly diseased, presentation is often atypical."²³ A familiar example is that of delirium (i.e., acute confusion) in the hospitalized older adults. In these patients, the brain is the weakest link, but most commonly treatment involves removing the offending medication or treating an infection.²⁴ Similarly, for the older adult with LBP and/or spinal stenosis, it behooves the practitioner, through comprehensive history and physical examination, to identify all potential contributors to pain and disability before zeroing in on the lumbar spine. That is, in older adults with LBP, the lumbar spine

should be considered the weakest link or one of multiple treatment targets rather than the sole treatment target. This conceptualization is consistent with pain physiology. Pain is a complex physiological process contributed by peripheral nociceptive stimuli and interpretation of those stimuli by the brain. In older adults with LBP, factors outside of the lumbar skeleton that alter spinal biomechanics such as hip osteoarthritis and leg length discrepancy (e.g., following joint replacement) may drive nociception. Factors that alter perception of nociceptive stimuli (i.e., top down inhibition) such as fibromyalgia syndrome, cognitive impairment, anxiety and depression also may contribute to pain and pain-associated disability.

Oral analgesics are fraught with numerous potential deleterious effects in older adults including death. Well-substantiated adverse effects associated with non-steroidal anti-inflammatory drugs (NSAIDs) include fatal painless gastrointestinal bleeding, renal failure, congestive heart failure, exacerbation of hypertension, myocardial infarction and stroke.²⁵⁻³⁵ Opioids can cause delirium, hip fractures and possibly sleep-disordered breathing.³⁶⁻⁴⁰ A comprehensive approach to the older adult with LBP and mobility limitation is, therefore, mandatory. For example, in the older adult with LBP and depression, treatment of the depression may significantly improve function and avoid the need for oral analgesics. For the older adult with fibromyalgia, treatment should include aerobic exercise if possible, cognitive behavioral therapy and perhaps one of several medications that are FDA approved for the treatment of this disorder (i.e., duloxetine, pregabalin, milnacipran). Once all of the underlying etiologies of the older adults pain and difficulty functioning have been comprehensively identified, the practitioner is prepared to develop a treatment plan that will optimize the benefit to risk ratio.

DISCUSSANT 3:

Physiatrist: Clifford Everett, MD

ASSESSMENT: Lumbar spinal stenosis likely foraminal greater than central narrowing with neurogenic claudication, spondylolisthesis, low back pain

PLAN: I would initially begin with a flexion to neutral biased physical therapy program with isometric

core strengthening. Focus should be paid to producing increased flexibility within the hip flexors and hamstrings as well to free the pelvis from this prefixed extension position common in this situation. A prescription level NSAID would be an addition to his medication program taking into account his diabetes and hypertension. If no change clearly determining his chief issue will allow consideration of injection options. An epidural injection, either interlaminar or transforaminal can be helpful for specific areas of spinal stenosis but are not effective in back pain alone.⁴¹ His spondylolisthesis level can play a role with microinstability and the facet arthropathy that is likely present also may play a role in this issue. Pursuing medial branch blocks diagnostically can be helpful in this regard.⁴² All of this requires that the patient has a clear description of their primary pain complaint prior to initiating injections so appropriate endpoints are agreed upon.

DISCUSSION: Neurogenic claudication as described above is a mixture of compressive mechanical factors and inflammatory factors. The inflammatory factors can be pursued through medications either oral or injected. These mechanical factors can be addressed through active exercise in some cases but ultimately may require elective surgery for relief. The SPORT trial outcomes were superior for surgery over conservative care in patients with spinal stenosis and spondylolisthesis.¹⁰ Criticism of the conservative care arm as not being standardized within this trial and in some cases non-existent has left the best treatment option in an individual patient a personal question. A clear discussion of the options and shared decision making is imperative.

DISCUSSANT 4:

Nursing: Stacie Salsbury Lyons, PhD, RN

ASSESSMENT: Chronic Pain, Risk for Falls, Activity Intolerance

PLAN: While interventions recommended by the interdisciplinary healthcare team may offer pain relief and lead to improved physical function, chronic pain management plans also must account for individual preferences and treatment goals.⁴³ Together, this gentleman and I would discuss his most salient concerns about his health status, identify his beliefs about pain, and determine the impact of chronic

pain on his and his family's everyday life. We would review his current self-care and symptom management strategies, establish his preferred pain assessment tools and acceptable pain levels, and review his previous experiences with the recommended therapies. We also would focus on two areas for health promotion: decreasing fall risk and increasing activity tolerance.

While this individual denied any traumatic falls in his initial history and physical, we do not know if he has experienced any recent trips, slips, near misses, or non-traumatic falls.⁴⁴ Further, this individual is diagnosed with several health conditions that place him at a moderately high risk for a fall with injury, including chronic back and leg pain, diabetes and prostate disease. While this individual denied any recent changes in his bladder habits, men over the age of 70 who are diagnosed with diabetes and BPH commonly experience increased lower urinary tract symptoms (LUTS) such as urinary frequency, urgency, and night-time urination.⁴⁵ One recent study found that moderate to severe LUTS increased the incidence of falls, particularly recurrent falls, in older men.⁴⁶ Functional limitations, including the use of a four-wheeled walker for ambulation, decreased trunk range of motion, difficulties rising from a chair, and reports of leg heaviness, cramping and clumsiness with walking, also increase the likelihood of a fall.⁴⁵

An in-depth fall risk assessment with gait and balance testing may identify individual risk factors and suggest targeted, low-cost interventions to reduce this risk.⁴⁷ (Table 1) For instance, while neurogenic claudication may explain the heavy sensation in his legs during ambulation, is this former construction worker also wearing his old workboots and adding to his walking difficulties? I also recommend a home assessment to determine whether factors in this man's living environment may contribute to potential falls for him - or his wife.⁴⁸ I would teach this aging family how to safely rise up from the floor following a fall and practice this skill with both individuals so that neither is injured should a fall occur to either.

Table 1. Environmental Assessment for Fall Risk in an Older Male with LSS

Does the condition of the floors or the presence of clutter pose a trip hazard or make it difficult for the person to walk or use an assistive device (e.g. cane, walking stick or walker)?
Is the most used chair seat at a height to allow easy and painless movement from a seated to standing position? Does the chair have supportive arms to assist when rising from it, or does the individual pull up from the chair using an assistive device (e.g. wheeled walker)?
Are grab rails available in the bath and positioned in such a manner than the person does not need to twist the back to use them?

Are the bedroom and bathroom on the same floor as the living areas? If not, how does stair climbing impact pain symptoms, as well as other health complaints, such as the urinary symptoms common to BPH and diabetes?

What modifications might this aging family make to their home environment, which options are acceptable, and who will pay for these changes?

In addition, I would work with this individual to determine his goals, ability, preferences, and readiness to improve his activity tolerance and functional status by engaging in a program of physical exercise. His chiropractor has prescribed home flexion exercises while his physiatrist recommends exercises that include isometric core strengthening, but we do not know if this man has done similar exercises in the past and what his success with them was. We would identify his favorite types of exercise, whether he prefers to exercise on his own or with a group, and if he might benefit from physical activity counseling.⁴⁹ We also would determine how best to schedule his pain medication in relation to his new exercise routine.

DISCUSSION: Whether the recommended manual therapies, physical therapies, exercises, medications or possible surgical consults will result in an improvement in low back pain for this older adult with lumbar spinal stenosis is not known. What may be assumed, however, is that this individual, a 75-year old married male, may live with his numerous chronic illnesses, including hypertension, diabetes, heart disease, and prostate disease, for many years to come. Nursing interventions for this individual and his family would focus on the protection, promotion, and optimization of his health and abilities, prevention of further illness and injury, and alleviation of suffering from his response to these health challenges.⁴⁴ In this case, identifying strategies to self-manage chronic pain, prevent falls, and improve activity tolerance through physical exercise, are the highest nursing priorities for this individual.

CONCLUSION

Chronic lower back pain with and without symptomatic spinal stenosis is a common cause of morbidity in older adults. The discussants responses have highlighted the need to comprehensively evaluate the older adult with these symptoms. The discussion from the chiropractor and the physiatrist emphasize the need to physically evaluate the patient to best address the mechanical and neurologic components of the patient. The discussion from the nursing perspective highlights the need to evaluate the

environmental factors as well as the medical co-morbidities that play a role in this patient's pain. There is also a need to evaluate the psychosocial factors that may play a role in pain syndromes in older adults, particularly pain syndromes that result in loss of mobility and independence. The discussion from the geriatrician highlights the need to be cognizant of the unique health concerns of the older adult and choosing the appropriate intervention to assure the most appropriate outcome with the least risk to the patient. This emphasizes that while symptomatic spinal stenosis may be considered with this patient, there is a need to consider that other co-morbidities may be playing a factor and need to be considered prior to initiating any treatment plan. Also emphasized in the differing views is the controversy over pharmacological management of the older adult. It emphasizes that geriatricians play an important role in assisting in the management of the complex co-morbidities of this population. Overall these authors have highlighted the need for a "holistic" approach to the older adult with chronic lower back pain. Therefore, although each of these discussants approach is certainly reasonable, the key is to consider all the different approaches that can be used for the patient and then to involve him or her in the decision process. By taking this comprehensive approach, it is hoped that the older adult will achieve a superior clinical outcome.

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