



Diagnostic Radiology in Low Back Pain

ABSTRACT

Many clinicians believe that imaging is necessary to accurately diagnose and manage low back pain. However, there is good evidence that in the absence of “Red Flags”, there is an overuse of both routine X-rays and advanced diagnostic imaging such as MRI. When imaging is used without appropriate clinical indications, it is rare for the results to lead to a change in a treatment plan. Management is based on adequate history and confirmatory physical examination. This article uses three actual cases as the basis for exploring the place of diagnostic imaging in treating low back pain.

KEYWORDS: low back pain, diagnosis, radiology, indications, appropriate



The classic medical treatment paradigm suggests that proper management requires the most precise possible diagnosis. When applied to low back pain, this leads to the erroneous conclusion that both plain film imaging and advanced imaging, such as magnetic resonance imaging (MRI), should be offered to all patients in order to determine an accurate anatomical cause for the patient’s pain. Increasingly, patients expect a clear diagnosis for their low back pain.¹ Only then, they believe, can effective management be targeted to the anatomically determined cause of their pain.

ABOUT THE AUTHORS

Dr. Ted Findlay, D.O., CCFP, is a Clinical Assistant Professor in the Department of Medicine at the University of Calgary. He is also in a Private Family Medicine practice. In addition he is on Medical Staff at Alberta Health Services, Calgary Zone in Calgary, Alberta.

Amar Suchak, MD, FRCP(C), Clinical Assistant Professor Department of Radiology, Department of Nuclear Medicine, University of Calgary, Calgary, Alberta.



Yet there is widespread consensus by experts in the field that not only is a precise anatomical diagnosis unnecessary to determine an effective treatment plan for low back pain² but that imaging can lead to unwarranted costs and inferior results. Finding irrelevant

FINDING IRRELEVANT ANATOMIC ABNORMALITIES CAN LEAD TO DIAGNOSTIC CONFUSION AND PATIENT ANXIETY, AS WELL AS TO ADDITIONAL UNNECESSARY EXPENSES.

anatomic abnormalities can lead to diagnostic confusion, patient anxiety and additional unnecessary expenses.³ One of the early focuses of the Canadian “Choosing Wisely” campaign for family medicine is to decrease the inappropriate utilization of imaging for low back pain in the absence of clinical red flags.⁴ One recent article has pointed out that early imaging in patients greater than 65 years old was not associated with better outcomes.⁵

What then can the primary care provider learn from this conflict between conventional practice and current specialist opinion regarding the role of diagnostic imaging for low back pain?

The following three cases are based on actual patients assessed for back and leg pain at the Calgary Chronic Pain Centre. They

are intended to serve as the basis for discussion on current research, clinical practice guidelines and expert opinion regarding the use of diagnostic imaging for low back pain. A forthcoming article will explore the subject of interventional radiology.

Case 1.

Cassandra is a 36 year old single mother with a 10 year history of bilateral low back pain that dates from the birth of her first child. She is currently unemployed and last worked two years ago in a sedentary job as a small business receptionist. She is a smoker, denies alcohol or drug abuse and is currently taking 40 mg of slow release oxycodone twice daily. She is not overweight, does not have any other significant medical history and is on no other medication. She admits to difficulty dealing with stressors related to her financial situation as a single parent raising two active boys.

Her initial x-ray study was performed eight years ago and showed disc space narrowing at L3-4, L4-5, and L5-S1. MRI was performed six years ago, four years ago and again two years ago; each noted degenerative disc disease at these levels and mild bilateral facet joint arthropathy at the L5/S1 level. She has been told that these are the anatomic explanation for her ongoing back pain.

Cassandra has had trials of



manipulative therapy and found the results inconsistent and only temporarily helpful. Because of the cost she has not had any type of rehabilitation for over two years. She is not doing anything for exercise and has never been advised to do so. In fact, she has been limit-

THE TERM “DEGENERATIVE FINDINGS” ON DIAGNOSTIC RADIOGRAPHS AND MR IMAGING REPORTS OF THE LOW BACK IN ASYMPTOMATIC ADULT POPULATIONS ARE EXTREMELY COMMON AND DO NOT PROVIDE A DIAGNOSIS.

ing her activities in order to avoid worsening her low back pain.

On examination, the patient presents with an unremarkable posture and on active testing of the lumbar spine into flexion, extension, and side bending exhibits a reasonable range of motion. She complains of increased pain with lumbar extension and has tenderness bilaterally with palpation of the paravertebral muscles at the lower lumbar levels. There are no neurological abnormalities.

Initial Management:

At the time of her initial intake assessment, it required a considerable amount of time to try to convince Cassandra that the findings of degenerative disc disease

and facet changes described on her MRI reports were normal. The doctor explained that these are common findings in asymptomatic adults and that changes seen on the images could not be said with certainty to be the explanation for her low back pain. She was initially quite resistant to this explanation and felt that our program was dismissive of what had been proven to be the cause of her trouble. However, after further discussion and explanation of the nature of chronic low back pain and potential benefits of appropriate management, she stated “Wait a minute, this means that I can get better”.

Discussion:

The term “degenerative findings” on diagnostic radiographs and MR imaging reports of the low back in asymptomatic adult populations is extremely common and does not provide a diagnosis. There is poor correlation with pain.⁶ Careful clinical correlation of any imaging results with the patient’s presentation is required and even then the correlation is difficult to prove. It is quite common to find changes on diagnostic imaging that are not associated with the patient’s symptoms. It is known that 36% of asymptomatic patients over the age of 60 have herniated discs on imaging, and 90% have either degenerative or bulging discs.³ Attributing the patient’s pain to these images may lead the patient



to believe that recovery is not possible. While medical professionals may understand a radiologist's report of "degenerative change" as a benign, age-related process, the patient hears "degenerative" and naturally believes that they are on a progressive, unrelenting downward trajectory. In Cas-

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sandra's case, as in most cases, the findings on the radiographs and MRI did not change or indeed have any impact at all on the treatment plan. This, of course, raises the question of why the MRI was considered so important that it was repeated every two years. A recent Alberta study on MRI overuse found that only 34% ordered by family physicians for low back pain had the appropriate clinical indications.⁷

Case Follow Up:

After developing an understanding that her low back pain was common, benign, and likely to

respond to an interdisciplinary program including lifestyle modification, physical and psychological modalities and appropriate medications,⁸ Cassandra enthusiastically embraced her care at the chronic pain centre. Over the following eight months, her back pain became an intermittent aggravation instead of a constant barrier to activity. She was successful in reducing and eventually discontinuing her use of opiates, and she was able to take advantage of a new opportunity to return to the work force.

Case 2.

Michael is a 48 year old single executive with a twenty year history of chronic low back pain with intermittent flare-ups that severely limits his activities. He is otherwise healthy and a non-smoker but somewhat overweight and out of shape. Over the years he has tried a number of pain medications including prescription anti-inflammatories, opiates, antidepressants and anticonvulsants but did not find the benefits of any of these medications outweighed their side effects. He is taking a non-prescription anti-inflammatory on an as-needed basis three or four days a week. His work hours are long and he cannot find the time to exercise.

Michael had X-ray and MRI findings of degenerative changes in the left facet joints at L3-L4, L4-L5, and L5-S1. Over the past two years he has had a total of 12 sets of facet



joint injections divided between the three levels using local anaesthetic and corticosteroid. On each occasion, he experienced some pain reduction that lasted between two and 24 hours. He had similar results with medial branch block injections and eventually had facet joint nerve ablations performed. He was disappointed that they did not result in any change in his pain.

On examination, Michael presents as moderately obese and with a mild lumbar scoliosis convex to the right. His right lumbar side bending is decreased compared to the left. He points to the right side of his low back as his area of pain and has myofascial trigger points over the right quadratus lumborum muscle.

Initial Management:

His upcoming fifth set of facet joint injections at the left L3-L4, L4-L5 and L5-S1 levels were cancelled. Given his past experiences and concerns with cognitive side effects, Michael was reluctant to consider alternative medications that might interfere with his work. He did agree to participate in an interdisciplinary program that included physical and psychological treatment modalities as well as the development of self-management skills.⁸

Discussion:

Michael typifies the outcome of treating abnormalities found on investigation instead of treating the patient. In spite of the fact that his low back

pain had always been right sided, the left-sided imaging abnormalities were given as the cause of his pain and, in spite of the lack of benefit, repeatedly treated by relatively invasive means. While there can be a legitimate role for facet joint injection therapy for low back pain, its use often has a minimal and temporary effect.^{9,10}

Case Follow Up:

Michael learned to self-manage his myofascial trigger points with the use of a “Shepard’s Hook”. His focus was on the site of the pain (not the site of the facet abnormalities) and on his pain’s response to physical treatment. Over time and with attention to weight loss and posture he became pain free.

Case 3:

Maria is a 68 year old lady who arrives at the clinic with her daughter who acts as translator. Maria was referred to us for the medical management of chronic right shoulder pain resulting from advanced osteoarthritis. She had declined surgical intervention. On further questioning it becomes apparent that she has pain affecting not only both shoulders, but also neck pain, upper extremity weakness and numbness and tingling radiating distally into both hands. She has become increasingly “clumsy” in recent weeks, dropping cups and saucers in the kitchen and having trouble with her handwriting. She is having trouble rising out of a chair and maintaining her balance. Although she has fallen



she did not want to use a walker or cane. She reports that after walking more than half a block she starts to have progressively worse low back and leg pain, which improves when she sits down. She has managed her leg pain when shopping for groceries by leaning forward over the cart but this is becoming difficult as she is losing her hand grip. She did not report bowel or bladder abnormalities.

On examination, she had a spastic gait, normal reflexes but bilateral up-going plantar responses. There was notably weak grip strength in both hands.

Initial Management:

Maria presents with a number of the “Red Flags” of potentially significant pathology including indications of spinal cord involvement and widespread neurological signs.⁸ Her story is highly suggestive of both cervical myelopathy and lumbar spinal stenosis,¹¹ which justify urgent MRI evaluation.^{8,11,12,13}

Case Follow Up:

Maria had MRI imaging of the cervical and lumbar spine, which revealed both cervical stenosis with myelopathy and severe lumbar spinal stenosis. (Figures 1 and 2) Based on her clinical presentation and supported by the concordant imaging results, she was offered surgical decompression at both levels.

Discussion:

Figure 1: Sagittal and transverse axial T2 MR images revealing multilevel spinal stenosis in the cervical spine (arrows).



These three cases are illustrative of the fact that in the absence of clinical “Red Flags”, diagnostic imaging is not required to successfully diagnose and manage low back pain. It is extremely rare that the results of diagnostic imaging will lead to a change in the patient’s treat-





CME

Post-test Quiz

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ment plan.³ The decision for surgery or other interventional therapy is made primarily on the patient's history and physical examination. This assessment is confirmed by the concordant images, which also provide the necessary anatomical information for the procedure.¹³ Unless there is the clear potential for harm, it is not appropriate to withhold treatment while awaiting the results of an investigation, such as an MRI, for which the patient could be on a lengthy wait list. Furthermore, abnormalities commonly found on advanced diagnostic imaging require careful clinical correlation before being presented as the explanation for the patient's symptoms.

While clinicians may feel that advanced imaging is required to allay the patient's anxiety, there is in fact evidence that due to the potential discovery of inconsequential anatomical abnormalities, the opposite is true.³

There are well established clinical practice guidelines and clinical pathways for the management of low back pain⁸ that can help the clinician who is uncertain about the need to imaging their patient. Additional online resources for patients and their doctors include Bone and Joint Canada¹⁴ and BackCareCanada.¹⁵ The Towards Optimized Practice website¹⁶ also includes patient information handouts and video links which, along with constructive discussion may help to reassure patients that their

Figure 2: Sagittal and transverse axial T2 MR images revealing multilevel spinal stenosis in the lumbar spine (arrows).



back pain complaints are being taken seriously and are being properly managed, while deferring imaging until the appropriate criteria are met.

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SUMMARY OF KEY POINTS

1. While imaging may be required in the management of specific cases of low back pain particularly when “Red Flags” are present, it is rare that unexpected findings will result in a change of the treatment plan.
2. Be very cautious about the terminology used to describe the results of imaging studies and whenever possible normalize the results for the patient. Many abnormal findings may be “normal” for patients in older age groups. Many may be present in patients who are pain free.
3. Ensure that the patient understands that the results of the images are not necessarily a barrier to recovery.
4. Although CT is useful for determining bony abnormalities an MRI is usually preferred for evaluating soft tissue pathology like a herniated disc.
5. Be very cautious about attributing the cause of a patient’s pain to the results found on imaging. Careful correlation with the clinical presentation is required before deciding on any change in treatment.

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CLINICAL PEARLS

In the absence of “Red Flags” the initiation of non-invasive pain management does not need to wait for the imaging results.

It is never appropriate to delay treatment for mechanical low back pain to wait for an imaging procedure.

Prepare the patient, before advanced imaging is performed, that there is a very high likelihood that the investigation will find “abnormalities” but that these changes are usually the result of natural aging and no cause for concern.

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