
Choosing MRI Wisely: Part 1

Low Back Pain
Knee Pain

EFW Radiology Medical Brief

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MRI for Low Back Pain and Knee Pain: When can it positively impact patient outcome

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Physicians, policy makers, and elected officials are all acutely aware and concerned about rising healthcare costs. Data from the Organization for Economic Cooperation and Development (OECD) shows that Canada spends just over 11% of its GDP on healthcareⁱ. The recent Government of Alberta budget for 2014/15 allocates 45% of all operational spending to healthcareⁱⁱ. There is great interest and engagement in proposing solutions to curb costs. One such solution can be broadly described as a critical examination of the decisions physicians make when ordering tests. While no two patient encounters are identical, efforts are being made to support physicians as they strive to provide efficient, high quality, evidence based care to their patients. An example is the Choosing Wisely® initiative of the American Board of Internal Medicine Foundation (ABIM) launched in February 2012ⁱⁱⁱ. In Canada, the Choosing Wisely Canada campaign has recently been announced and the Canadian Association of Radiologists (CAR) is amongst the first wave of participating societies^{iv}.

MRI, perhaps because of media spotlight on wait times, receives a great deal of attention. The Canadian Institute for Health Information (CIHI) data indicates that 80% of outpatient MR is for imaging the head, spine and extremities^v. The purpose of this paper is to provide evidence based (please see bibliography for sources), appropriateness guidelines for MR imaging of these body parts in four common clinical scenarios – headache, dementia, low back pain, and knee pain. The goal is to help the reader maximize the chances that diagnostic MRI studies are ordered when they can improve clinical outcomes for patients.

MR Imaging for Low Back Pain (LBP)

It is estimated that in the United States over \$90 billion is spent on direct health care expenditures related to LBP and that 75% of adults report at least one episode during their lifetime^{vi}. The evidence also shows that in patients with acute or sub-acute LBP without any red flags, imaging tests do not alter outcome as measured by pain, function, quality of life or overall improvement. In an era when patients demand a specific diagnosis, or equate not having an MRI as low quality or sub-optimal care, how is a primary care physician to distinguish the small segment of patients with LBP who would genuinely benefit from an MRI examination? The most rigorous and evidence based guidelines have been jointly developed by the American College of Physicians and American Pain Society^{vii}. The table below is a summary of these guidelines together with CAR and ACR published guidelines and highlights cases where MRI is an appropriate investigation for patients with LBP.

MRI appropriate only after 6-week course of therapy including 2-weeks of NSAIDS	MRI appropriate as urgent imaging test
Unremitting pain	Cauda equine syndrome
Radiculopathy and candidate for surgery/intervention	Unexplained weight loss or fever
Suspected Spinal stenosis and candidate for surgery/intervention	Focal Neurologic deficit and/or progressive motor weakness
	Immunosuppressed
	History of cancer
	I.V. Drug use
	Osteoporosis or prolonged corticosteroid use and suspected compression fracture

MR Imaging for Knee Pain

In the Netherlands, an analysis of primary care practice patterns showed that after LBP, knee complaints are the second most frequent musculoskeletal presenting complaint^{viii}. The same rigorous evidence used in developing guidelines for the use of MRI in LBP is not available for MRI in investigating knee pain. However, the Alberta Health Services Bone and Joint Clinical Network, Soft Tissue Injury Working Group indications for MRI in acute and non-acute knee injuries together with ACR guidelines are summarized below. MRI of the knee should not be performed in the absence of appropriate history and physical examination and an accompanying X-ray examination. Weight bearing views of the knee are essential in cases of chronic knee pain to evaluate for joint space loss and osteoarthritis.

MRI appropriate for acute knee injury	MRI appropriate for chronic knee pain
Normal X-ray and unable to weight bear	Suspected avascular necrosis on X-Ray
Distinguish between locked knee and stiff knee	Severe clinical problem of > 3 months duration, X-ray does not show significant joint space narrowing, non surgical treatment has failed and clinical diagnosis is not clear
Acute Locked Knee*	Recurrent or new symptoms in post-op knee > 1 year after surgery
ACL/MCL or ACL/LCL with valgus/varus angulation in static visualization	
ACL/PCL/Knee dislocation	
Hemarthrosis in skeletally immature	
Osteochondral fracture or defect	
Discordance between history and physical finding	

* Locked Knee = normal flexion and mechanical block to complete extension and is different from stiff knee which is associated with loss of both flexion and extension.

In conclusion, the application of evidence based, appropriateness guidelines such as these should increase the utility of MRI in a community based, primary care practice and increase the likelihood of MRI positively impacting patient outcomes.

Reference Articles:

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- iii. ABIM Foundation. [Choosing Wisely 2014](#). Accessed March 10, 2014
- iv. Levinson W, Huynh T. [Engaging physicians and patients in conversations about unnecessary tests and procedures: Choosing Wisely Canada](#). *CMAJ*. 2014 Feb 18. [Epub ahead of print] *PubMed*
- v. Canadian Institute for Health Information. [Waiting for health care in Canada: what we know and what we don't know](#). Ottawa: *The Institute*; 2006. Accessed March 10, 2014
- vi. Chou R, Deyo RA, Jarvik JG. [Appropriate use of lumbar imaging for evaluation of low back pain](#). *Radiol Clin North Am*. 2012 Jul;50(4):569-85.
- vii. Chou R, Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians; American College of Physicians; American Pain Society Low Back Pain Guidelines Panel. [Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society](#). *Ann Intern Med*. 2007 Oct 2;147(7):478-91. Erratum in: *Ann Intern Med*. 2008 Feb 5;148(3):247-8.
- viii. Swart NN, van Oudenaarde KK, Algra PP, Bindels PP, van den Hout WW, Koes BB, Nelissen RR, Verhaar JJ, Bloem HJ, Bierma-Zeinstra SS, et al. [Efficacy of MRI in primary care for patients with knee complaints due to trauma: protocol of a randomised controlled non-inferiority trial \(TACKLE trial\)](#). *BMC Musculoskelet Disord*. 2014 Mar 3;15(1):63.

Guidelines: Alberta Health Services Guidelines; [CAR Guidelines](#); the American College of Radiology, [ACR Appropriateness Criteria](#)[®] .

MRI

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