RELATED CONTENT

MRI of the Knee and Shoulder Performed Before Radiography

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Purpose: Available data are limited on the level of adherence to established guidelines for appropriate utilization of MR in musculoskeletal imaging. This study estimates the percentage of MRI examinations for knee and shoulder pain or tendonitis performed without prior radiography, which thus may fall outside the ACR Appropriateness Criteria for the Medicare and commercially insured populations.

Methods: The percentage of MRI examinations for knee and shoulder pain or tendonitis performed without prior radiography was estimated among patients in the Medicare 5% carrier claims limited data set and among commercially insured patients in the Truven Marketscan Treatment Pathways database in 2010.

Results: Approximately 28% of all knee MRIs, and 35%-37% of all shoulder MRIs were performed without recent prior radiographs. The extrapolated expense of these potentially unwarranted MRIs in the entire fee-for-service Medicare population was between $20 and $35 million. Between 20% and 23% of patients undergoing knee MRI, and 27%-32% undergoing shoulder MRI, did not have radiographic examination at any point before the MRI in the same calendar year.

Conclusions: MRI performed without prior radiography represents a potential gap in care and should be considered as an area for establishment of performance measures.

Key Words: Appropriateness criteria, radiology, overutilization, performance measure, decision support

J Am Coll Radiol 2014;■:■-■. Copyright © 2014 American College of Radiology

INTRODUCTION

MRI use has dramatically increased over the past decade [1,2]. Among members of integrated health systems, MRI studies quadrupled from 1996 to 2010, whereas the number of radiographs has remained relatively stable [3]. In particular, musculoskeletal MRIs increased by 353.5% between 1996 and 2005; musculoskeletal radiographs increased by only 19.1% [4,5].

Approaches to reduce health care overutilization include federal legislation, insurance regulations, and evidence-based practice guidelines such as the ACR Appropriateness Criteria® (AC) [6]. However, a gap exists between the desired and delivered quality of health care, with only 50%-60% of recommended care being delivered [7,8]. Hence, quality and efficiency measurement within structures of value-based purchasing is being tested and implemented to ensure transparent, more-affordable high-quality care across health care services, including imaging [9,10].

Knee and shoulder pain, with an estimated prevalence of 13% and 7%, respectively [11], are the most frequent regional musculoskeletal disorders, with the exception of low-back pain. The AC recommendation is for radiography as the initial imaging investigation for knee and shoulder pain [12,13]. The rationale is that in a proportion of patients presenting with knee or shoulder pain, radiographs will provide all the diagnostic information necessary for clinical management, obviating the need for additional, more costly, imaging studies.

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1546-1440/14/$36.00 • http://dx.doi.org/10.1016/j.jacr.2014.05.014

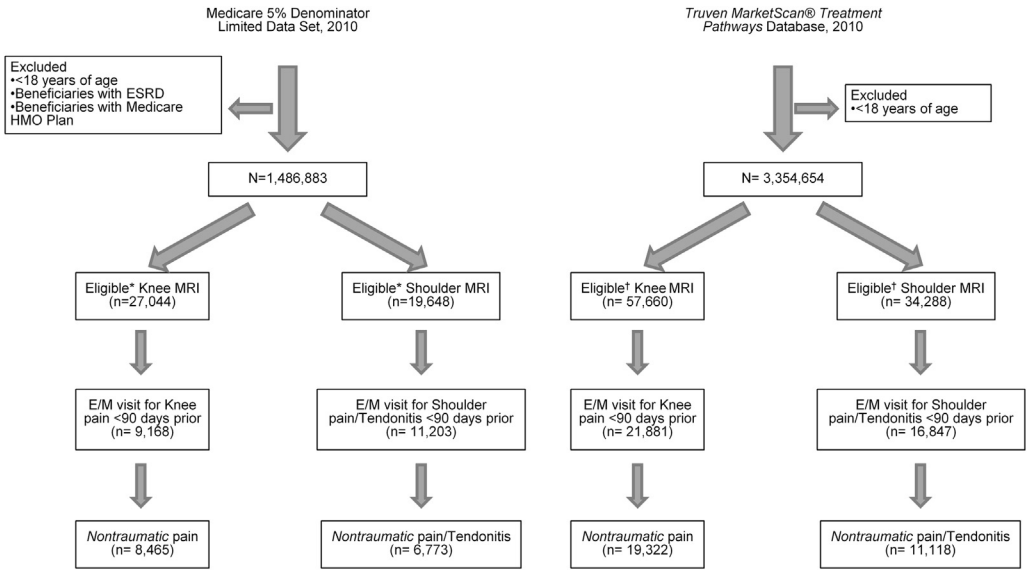

Fig 1. Study population. Note: ESRD = end-stage renal disease; HMO = health maintenance organization.
*Eligible MRIs identified by the CPT code (Appendix 1) on claims submitted for global or professional component.
†Eligible MRI claims identified by CPT code.

The current study estimates from the Medicare and the commercially insured populations the percentage of MRI examinations for knee and shoulder pain or tendonitis performed without prior radiography, which may thus have been outside the AC of the ACR.

METHODS

Patient Selection

This retrospective study utilized de-identified administrative claims data and was exempt from institutional review board approval. The Medicare 5% denominator limited data set (LDS) was used to identify Medicare patients (age ≥18 years) who were continuously enrolled in calendar year 2010 [14]. This yearly file, produced by CMS, consists of final action claims data submitted by noninstitutional providers for services performed in 2010 for a 5% sample of Medicare beneficiaries. Beneficiaries with end-stage renal disease and those participating in a Medicare health maintenance organization plan were excluded.

In addition, commercially insured patients were derived from the Truven Marketscan® Treatment Pathways commercial 10 million–patient sample database [15]. The Truven database contains integrated inpatient and outpatient medical and enrollment information for 55 million individual patients, submitted to Truven under business agreements with more than 150 employers and 200 commercial insurance carriers over 3 years. For this analysis, patients continuously enrolled in calendar year 2010 who were age ≥18 years were identified.

Study Population

Patients who underwent knee MRI and an evaluation and management (E/M) visit with knee pain within 90 days prior to the MRI (Fig. 1) were assessed for the performance of knee radiography between the MRI and the evaluation and management (E/M) visit (Fig. 2A). The study population was also assessed for the performance of shoulder radiography between a shoulder MRI and a prior E/M visit for shoulder pain or tendonitis within 90 days. In an additional analysis, individuals who underwent MRI and an E/M visit for joint pain or tendonitis within 90 days were assessed for having undergone a joint radiography at any point before the MRI in the calendar year (Fig. 2B).

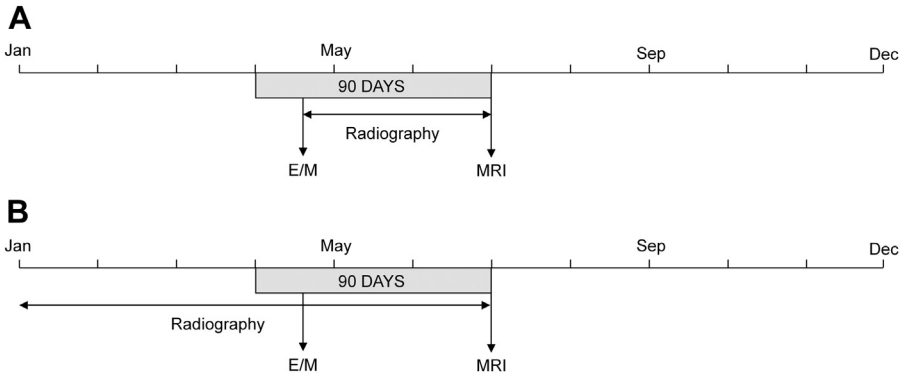

Fig 2. Data collection timeline. The timeline to assess for A: the performance of radiography between an evaluation and management visit and MRI and **B**: the performance of radiography at any point before the MRI in the same calendar year.

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