THE PREVALENCE OF POSITIVE IMAGING FINDINGS ON MRI SCANS ORDERED BY CHIROPRACTIC VERSUS MEDICAL PROVIDERS

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Conclusion: The data presented in this study suggests chiropractic and medical providers are compeer at ordering MRI for suspected pathological findings. (J Chiropr Med 2006;5:83–87)

Key Indexing Terms: Magnetic Resonance Imaging; Utilization

ABSTRACT

Objective: To determine if there is a greater yield of pathological findings identified on MRI scans of patients referred by chiropractors as compared to those referred by allopathic providers.

Methods: MRI reports authored by medical radiologists from two independent MRI centers in the Denver metropolitan area were analyzed retrospectively for pathological data related to the spinal regions studied. A pathological report data sheet was used to record pathological findings in 22 different categories. A total of 150 reports from each provider group were reviewed.

Results: Of the 22 pathological conditions studied, a statistically significant difference between doctor of chiropractic and medical doctor referrers was identified in 4 categories: central spinal canal stenosis, lateral stenosis, facet arthrosis, and negative report. The most common primary diagnoses given for MRI referral were low back pain/sciatica, neck pain, and extremity pain. Seventy-four percent of the reports evaluated were performed on patients referred with a diagnosis of pain. In 3 of the 22 categories (14%), the medical doctors had a statistically higher pathological yield than the chiropractors. However, in 4 of the 22 categories (18%), the chiropractors had a statistically higher pathological yield. In 18 of the 22 categories (82%), there was no statistical difference between the two provider groups.

INTRODUCTION

The use of sophisticated imaging procedures such as magnetic resonance imaging (MRI) has significantly impacted the diagnosis and management of patients suffering from spinal disorders. Because of its superior soft tissue contrast, spatial resolution and lack of harmful biological effects, there has been widespread increased utilization of this noninvasive imaging modality by all health care providers. In some regard, it is easier to order an MRI scan rather than extract pertinent historical facts and perform a detailed clinical examination to direct patient management. The technological advancements of diagnostic imaging modalities are thought by many to be one of the reasons for increasing health care costs over the last decade.¹ Recent MRI-related utilization patterns were studied in the Medicare population from 1993–1999 and indicate that the accessibility of this modality and willingness of third party payers to reimburse for this diagnostic procedure has led to its apparent over-utilization.^{2–4} It is our experience that some physicians and paraprofessionals in the health care industry place greater emphasis on information received from MRI scans than from clinical data. We have experienced an apparent provider bias against doctors of chiropractic (DC) by some HMOs and PPOs that restrict MRI referrals, often requiring an order from a primary care physician or other allopathic provider. As health care continues

its transition in a managed care environment, cost efficiency and maximum yield from a diagnostic testing procedure becomes an issue of great importance.

We found few studies in the current literature that have attempted to scientifically study any differences between professions in the utilization and pathological yield from MRI scans of spinal conditions. Of these studies, 2 studied condition-specific referral patterns for general practitioners compared with hospital-based clinicians and specialists in the evaluation of brain and spine disorders, as well as headaches.⁵⁻⁶

Since both allopathic and chiropractic providers have direct access to MRI scans, the intent of this study is to determine whether there is any difference in the yield of pathological findings as reported on MRI scans between these 2 groups of providers.

METHODS

Spinal MRI reports from consecutive MRI examinations performed at Boulder Community Hospital (BCH) Boulder, Colorado and Denver NMR (DNMR) in Denver, Colorado were reviewed for pathologic findings described on the MRI reports. The reports obtained from BCH were produced between 1992 and 1995 and the reports acquired from DNMR were produced between 1993 and 1995.

A combined total of 367 MRI reports of different spinal regions were obtained. In order to establish a relatively homogenous adult population study group, pediatric and elderly subpopulations were omitted. Forty-one reports were excluded because the patient's age was greater than 60 years and 9 reports were excluded because the patients were less than 18 years of age. Inadequate data or incomplete reports resulted in the exclusion of 6 reports. A total of 315 reports from separate body regions comprised the study group (209 from DNMR and 106 from BCH). Effort was made to obtain an equal number of MRI reports from both the allopathic and chiropractic provider groups. A total of 115 MRIs ordered by allopathic physicians and 160 MRIs ordered by chiropractic physicians were included in the study population. We made no effort to balance the number of allopathic reports reviewed based on subspecialty.

All of the reports were read by medically trained radiologists involved in the daily interpretation of

MRI scans. The radiology reports were retrospectively reviewed and relevant data was extracted by a chiropractic radiologist (MSB). Information from an MRI data sheet and pathological report data sheet (Fig 1) were coded and entered into a statistical software program (SPSS, SPSS Inc, Chicago, IL, USA) at the Los Angeles College of Chiropractic for statistical analysis.

Subsequently, 50 randomized reports and raw data were provided to 2 chiropractors (JCS & LDM) and one medical radiologist to ensure the accuracy of data extraction from the reports. The 3 individuals that received the 50 randomized reports were blinded as to the referring provider, patient name and all other pertinent information in an effort to avoid professional bias. All 3 reviewers concluded that each pathological data sheet contained accurate

Figure 1. Data collection form used in the study

GENERAL INFORMATION

Sex: Male/Female

Age of Patient:

Chief Complaint (or clinical signs/symptoms):

___ Cervical Spine ___ Thoracic Spine ___ Lumbar Spine

Contrast Administered: Yes/No

Radiological Facility: Denver NMR/Boulder MRI

PATHOLOGICAL DATA

- I. IVD Pathology
 - A. Degeneration
 1. Signal Loss
 2. Loss of Height
 3. Osteophytes
 - B. Anterior Bulge/Herniation
 - C. Posterior
 1. Bulge
 2. Protrusion
 3. Herniation
 4. Sequestration
- II. Neural Impingement
 - A. Spinal Cord
 - B. Nerve Roots
- III. Stenosis
 - A. Central
 - B. Lateral
- IV. Ligamentous Hypertrophy
- V. Fracture
- VI. Bone Contusion
- VII. Abnormal Marrow Signal
- VIII. Cord Pathology
 - A. Intrinsic
 - B. Extrinsic
- IX. Other
- X. Negative Report

information when compared to its corresponding original MRI report.

RESULTS

The data extracted from the radiology reports are reported in Tables 1–4. Table 1 shows the characteristics of the primary diagnosis by provider type. Table 2 provides information pertaining to the pathological findings yielded by each group of providers. This information is further analyzed by subsets of provider groups (DC vs MD and DC vs family practice MD) showing pathological findings from all cases (Table 3). Table 4 uses the same provider groupings but reports on the findings related to cervical cases only. We did not attempt to correlate pathologic findings with clinical data, clinical relevance, therapeutic intervention, or treatment outcomes.

In 3 of 22 categories (14%), the MD group (specialist and family practitioner) had a statistically higher pathological yield than the DC group. In 4 of the 22 categories (18%), the DCs had a statistically higher yield of pathological findings than the family practitioners in the MD group. In 18 of 22 categories (82%), there was no statistical difference between the DCs and the MDs.

DISCUSSION

MRI is commonly employed by both allopathic and chiropractic physicians to assess spinal disorders. The current state of the health care delivery system mandates cost-effective utilization of this modality, yet there is little scientific literature that discusses

this topic. Schoth et al⁷ evaluated the referral practices for both computerized tomography (CT) and MRI scans for patients with acute back pain. They concluded that two-thirds of the CT and MRI scans were unnecessary, while in the same study population, these modalities were under-utilized in certain clinical scenarios. In contrast, a study evaluating 198 patients referred for brain and/or spinal MRIs revealed a statistically significant difference when referral protocols by radiologists were established prior to the examination. Only 10% of the scans performed were deemed inappropriate when protocols were enforced, while 24% were judged inappropriate when no referral protocols were followed.⁸

Patterns of utilization in advanced imaging are in constant flux. Early in the use of advanced imaging, most referrals for MRI scans were ordered by allopathic specialists (eg, neurologists, orthopedists) and were ordered primarily for brain or spinal imaging.⁹ Technological advancements in MRI have expanded its utilization and subsequently increased the number of scans ordered.

Guidelines established for physicians ordering MRI scans are necessary and often provide assistance in the administration of quality patient care plans. Excluding the rapid onset of myelopathy, cauda equina syndrome, and progressive extremity motor dysfunction, spinal MR imaging should be reserved for patients that fail to respond to 4–6 weeks of conservative treatment.¹⁰ In certain circumstances, MRI may also be effective in the early detection of occult osseous and/or soft tissue pathology, such as

TABLE 1
CHARACTERISTICS OF PRIMARY DIAGNOSIS BY PROVIDER TYPE

DIAGNOSIS	ICD-CODE	TOTAL # PERCENT	DC CASES	MD CASES
CERVICAL PAIN	723.1	86	52 (60%)	34 (40%)
INJURY TO CERVICAL SPINE	959	18	11 (61%)	7 (39%)
CERVICAL NERVE ROOT	353.2	4	2 (50%)	2 (50%)
C/S RADICULOPATHY	729.2	1	1 (100%)	
C/S STENOSIS	723	1		1 (100%)
TOTAL		110 (36%)	66 (60%)	44 (40%)
LOW BACK PAIN	724.2	125	57 (46%)	68 (54%)
L/S NERVE ROOT	353.4	11	9 (82%)	2 (18%)
+ SCIATICA	724.3	3	1 (33%)	2 (67%)
L/S D.J.D.	722.52	1		1 (100%)
L/S STENOSIS	724.02	1		1 (100%)
L/S FRACTURE	805.4	1		1 (100%)
TOTAL		142 (46%)	67 (47%)	75 (53%)
EXTREMITY PAIN	729.5	19 (6%)	9 (47%)	10 (53%)
MISC. DIAGNOSIS		38 (12%)		
GRAND TOTAL		309	142 (52%)	129 (47%)

TABLE 2
SUMMARY OF ALL PATHOLOGICAL FINDINGS BY DC AND MD

PATHOLOGY	TOTAL (N)	DC CASES %	MD CASES %	P VALUE MANTEL-HAENZEL
IVD SIGNAL LOSS	151	71 (47%)	80 (53%)	0.1993
IVD POSTERIOR	98	43 (44%)	55 (56%)	0.0995
IVD HEIGHT LOSS	96	41 (43%)	55 (57%)	0.0578
IVD POST HERNIATION	94	49 (52%)	45 (48%)	0.7578
CENTRAL STENOSIS	79	31 (39%)	48 (61%)	0.0178
THECAL SAC	70	30 (43%)	40 (57%)	0.1327
IVD OSTEOPHYTES	70	32 (46%)	38 (54%)	0.3359
IVD POST.	62	26 (42%)	36 (58%)	0.1201
LATERAL STENOSIS	57	20 (35%)	37 (65%)	0.0089
NERVE ROOT	41	25 (61%)	16 (39%)	0.1627
FACET ARTHROSIS	37	13 (35%)	24 (65%)	0.0429
SPINAL CORD	33	15 (45%)	18 (55%)	0.5174
DEGENERATION	21	7 (33%)	14 (67%)	0.0981
ABNORMAL MARROW	20	9 (45%)	11 (55%)	0.5929
ANNULAR TEAR	17	9 (53%)	8 (47%)	0.8557
LIG. HYPERTROPHY	16	6 (37%)	10 (63%)	0.2757
INTRINSIC CORD	8	2 (25%)	6 (75%)	0.1400
IVD POSTERIOR	8	3 (37%)	5 (63%)	0.4469
IVD ANTERIOR BULGE	7	4 (57%)	3 (43%)	0.7344
FRACTURE	7	3 (43%)	4 (57%)	0.6715
EXTRINSIC CORD	3		3 (100%)	0.0775
BONE CONTUSION	1		1 (100%)	0.3096
NEGATIVE/NORMAL RPT.	60	39 (65%)	21 (35%)	0.015

* = 4 CATEGORIES OF STATISTICALLY HIGHER PATHOLOGICAL YIELD BY DCs IN TABLE 3.

TABLE 3
PATHOLOGICAL FINDINGS FROM ALL CASES BY DC VS MD AND BY DC VS FAMILY PRACTICE MD GROUPS

FINDING	TOTAL	DC	MD	P VALUE
CENTRAL STENOSIS	80	31 (39%)	49 (61%)	0.013
LATERAL STENOSIS	57	20 (35%)	37 (65%)	0.009
FACET ARTHROSIS	37	13 (35%)	24 (65%)	0.043
NEGATIVE (NORMAL REPORT)	60	39 (65%)	21 (35%)	0.015

FINDING	TOTAL	DC	FP-MD	P VALUE
CENTRAL STENOSIS	53	31 (58%)	22 (12%)	0.04
FACET ARTHROSIS	25	13 (52%)	12 (48%)	0.04

TABLE 4
PATHOLOGICAL FINDINGS FROM ONLY CERVICAL ICD-9 CODED CASES BY DC VS MD AND BY DC VS FAMILY PRACTICE MD

FINDING	TOTAL	DC	FP-MD	P VALUE
CENTRAL STENOSIS	15	9 (60%)	6 (40%)	0.028
LATERAL STENOSIS	19	12 (63%)	7 (37%)	0.031

neoplasm, infection, bone marrow edema, osteonecrosis, subtle fracture, cord contusion/hemorrhage, and syrinx. Unfortunately, MRI is also capable of detecting anatomic lesions that are of questionable clinical relevance. Findings that are incidental or inconsequential may result in additional invasive tests or treatment with potential complications. Taylor et al¹¹ suggest that the recent increase in rates of lumbar spine surgery (laminectomy, discectomy and fusion) may be directly related to the availability of

new imaging techniques. An improperly educated physician may add to condition-related anxiety by lending credence to the anatomic finding(s) detected on the MRI scan without carefully correlating the imaging information to the patient's clinical examination and symptomology. For example, several studies have shown that disc abnormalities may be observed on MRI examinations in the asymptomatic population.^{12,13,14} Therefore, evaluation with MRI should be reserved for cases where the information derived from this examination would significantly affect patient management. In cases of disc abnormality, the level of pathology should be closely correlated to the patient's presenting symptomatology.

This study showed little significant difference in the yield of pathologic findings on MRIs between chiropractic and allopathic providers. This differs from

conclusions reported in a recent study by Kilmer¹⁵ that suggested a difference in findings between chiropractors and general practice allopathic providers of 10%. One potential difference in our study populations is the inclusion of specialty medical (tertiary care) physicians in the group of allopathic providers. One possible explanation for this difference is that by the time the specialist or tertiary provider is consulted, the patient is more likely to have a more serious condition or at least a condition that hasn't responded to a trial of non-interventional (conservative) management. Review of the data suggests that the DCs and the MDs are compeer at ordering MRIs for suspected pathological findings of the spine.

CONCLUSIONS

Patterns of utilization for MRI have changed dramatically over the past 2 decades. MRI has established its place in the assessment of patients with spinal disorders. As with any procedure, clinical justification for the procedure must be apparent. Physician education and adherence to established diagnostic-imaging algorithms should help to streamline patient evaluation and improve pathological findings. It may be unwise to limit provider access to this modality based on specialty or discipline, as this study suggests that there is no significant difference in the yield of pathological findings between chiropractic and allopathic providers when ordering MRIs of the spine.

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