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Topics in diagnostic imaging

Radiograph utilization and demographics in a chiropractic college teaching clinic

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Abstract

Objective: The purpose of this study is to present radiograph utilization at a chiropractic college teaching clinic, the associated patient demographics, and the utilization rates by body region.

Methods: Data for outpatient services over a 3-year period were extracted from a college clinic administrative software program. Radiographic data were matched with patient demographic information providing the age, sex, and financial class for all patients.

Results: The overall radiograph utilization rate was 8%, with the highest frequency occurring in the spine in the order of lumbar, cervical, and then thoracic regions. Spinal radiographs made up 66% of the total radiographs taken. The utilization rate increased as the age of the patients increased. The average patient age was 46, and 48% were female.

Conclusion: The radiograph utilization rate at this teaching clinic was lower than previous studies. This study provides new information regarding overall and regional radiography rates and associated patient demographics from an American chiropractic college.
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Introduction

Practitioners of musculoskeletal medicine occasionally require radiographic imaging to help establish or clarify a clinical diagnosis. The decision to use radiography should be based on clinical indicators such as trauma (past or present), abnormal neurologic, blood or history and physical examination findings, and failure to respond to therapy.[1] Findings from radiographic imaging may alter patient management, care, and/or prognosis. Such findings include significant anomalies (congenital or biomechanical); fractures, dislocations, pathologies, or other conditions that are contraindications to high-velocity/low-amplitude vector forces; age-related conditions; and degenerative processes.[1-3]

Diagnostic imaging utilization rates may be important for a variety of reasons to many audiences such as

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policy makers, insurance companies, office managers, practitioners, health care educators, and patients. Utilization rates provide background data to answer the question of over- or underutilization and help provide foundational information that may help shape future guidelines for chiropractic and other health care professions.

In the larger health care arena, routine imaging of patients with low back pain presenting without red flags has been demonstrated to increase harm and cost without improving outcomes.[4-8] In addition to the direct costs involved with obtaining radiographs, indirect costs are incurred from incidental findings on the images as the health care provider attempts to further clarify the nature of the finding. Radiographic imaging exposes the patient to low levels of potentially harmful radiation, the risk of which should be balanced against the benefit of the information that might be obtained from the images.

The value of plain film radiography specific to the chiropractic profession has been a point of debate, with little evidence of the actual impact on care.[9-11] Opponents of routine imaging argue its limited value, cost, and harm,[9,10] whereas proponents suggest that it may reveal underlying issues of concern,[1,12] may allow for better care,[11] or may provide useful information with less exposure to ionizing radiation compared with a computed tomographic scan[13] and significantly less cost than computed tomography or magnetic resonance imaging.[14]

According to the 2010 National Board of Chiropractic Examiners Chiropractic Practice Analysis,[15] chiropractors review more radiographs than they take or order, and take radiographs on a weekly basis to rule out fracture, dislocation, or pathology. Chiropractors also use radiology on a weekly basis to identify spinal listings or chiropractic subluxations, but less commonly than for ruling out fracture, dislocation, or pathology.[15] Reported chiropractic radiograph utilization rates in United States and Canada are quite variable, ranging from 6% to 93%, and came from a handful of studies dating back over 3 decades. Much of the data were derived from doctor or patient surveys regarding real or hypothetical patients.[16-21] Two studies from the 1990s using data from clinical records from 2 different American states showed utilization rates as 6% to 14%.[16,17] From a 3-year study (1986-1990) at a Canadian chiropractic college, the overall utilization rate was 35%.[22] A 3-year study (1999-2001) of Ontario, Canada, insurance billing showed the overall radiograph utilization rates as 8% for work-related injuries and 14% for non–work-related injuries.[21] From that same Canadian study, there were less work-related radiographs taken on female patients (35%) when compared with the non–work-related radiographs taken (53%).[21]

The purpose of this article is to describe the radiograph utilization rate and associated patient demographics of a chiropractic college teaching clinic derived from objective data from administrative software.

Methods

A retrospective analysis of radiographic images obtained over a 3-year period (2008-2010) at a chiropractic college teaching clinic was conducted by 2 employees of the college with approval from the college's Institutional Review Board. Data were extracted from the clinic's administrative software (version 9.5.0; Raintree Systems, Inc) and then sorted, filtered, and analyzed with Microsoft Excel (versions 2003 and 2007; Microsoft, Redmond, WA). Data extraction was conducted by one coauthor with full access to clinic information and then deidentified for the other coauthor for analysis. Blinding before analysis was done to protect patient privacy and conform with Health Insurance Portability and Accountability Act regulations.

The data collected were all radiographic series entered by Current Procedural Terminology code into patients' visit ledgers for each calendar year from January 1, 2008, through December 31, 2010. Chiropractic students and their dependents, outreach clinic patients, and radiographs taken for local community doctors were excluded from the study. Excel "Unique records only" data filter determined annual unique patient lists, as patients may have had multiple series on a single visit, within a year, or from year to year. To calculate the age of patients in the total unique patient list, the middle date of a year (day 183 or July 2) was subtracted from the date of birth. This approach was used because multiple radiographic views may have been taken on the same patient on different dates during any 1 year.

All radiographs were taken at the chiropractic college facility on a Quantum Odyssey High-Frequency Radiograph Generator and through a 200-line 10:1 Bucky onto digital cassettes. They were processed with an AFGA CR35-X digital processor. Radiographs were ordered by the clinician responsible for the patient's case and in accordance with the campus clinic guidelines for absolute and relative radiologic

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