Radiology Imaging Second Opinions
Decreasing costs and turn around time while improving patient outcomes.

Introduction

Radiological studies play a major role throughout medicine, insurance decisions (especially workers compensation), liability causality assignments and legal proceedings. The diagnosis and treatment of injuries, both real and purported, can be objectively evaluated with radiological imaging. Musculoskeletal conditions are prevalent in many insurance situations and Workers Compensation (WC) decisions. Assignments of liability and the proper medical treatment depends on accurate visualization and interpretation of the bones and soft tissue structures that may have been injured.

First, we should abandon the term "radiology", and replace it with diagnostic "imaging". Radiology is a holdover from the times when the only tool available to physicians were X-rays. Today of course the menu of diagnostic imaging options ranges far and wide, from nuclear medicine scans to ultrasound (sonography) to MRIs, CT and PET scans. But the purpose remains the same: to obtain an accurate structural, and even better, functional, image of a body part or system in order to solve a diagnostic dilemma, develop an effective plan of therapy, and monitor the progress of a condition through to resolution.

Of course we still refer to the specialists who do this kind of work as radiologists, and not "imagists", although hospitals’ departments of radiology have increasingly rebranded themselves as “imaging services”.

Below we evaluate the advantages of a dedicated physician peer review system for completed imaging studies as an opportunity to enhance the care of our patients and decrease costs. We outline our innovative program to accomplish this: routine Second Opinion evaluation of Imaging Studies (SOIS).

Why peer review?

Peer review is a well-accepted and frequently applied modality in the insurance and workers compensation world. Everyone recognizes that there is both an art and science to the practice of medicine, and that there can be differing opinions and approaches to the evaluation and management of many conditions. Physicians’ decision-making skills and processes are formed by multiple factors: their initial medical training and level of expertise in the specific condition; their subsequent clinical experiences; their familiarity and compliance with current evidence-based medical research and guidelines; the
preferences of their patient in a particular case; and, to be realistic, the availability and profitability of various medical interventions.

Consequently peer review is considered a valuable tool in order to obtain an unbiased expert opinion. A second opinion from a physician, who has not previously been involved with the case in question, has no personal involvement or bias, has a high level of clinical expertise (board-certification and added qualifications), and has demonstrated good judgment in past reviews and analyses. These are essential elements in a well-designed and implemented system.

Peer review is performed in several ways in Workers Compensation: medical document review (as part of the utilization review process, or complex file reviews of challenging claims); peer-to-peer teleconferences to discuss the progress of a case; and independent clinical/medical examination of the patient (I.M.E.s). The scope of these peer review activities covers all medical specialties from orthopedics to cardiology to chiropractic.

So is there any reason why the work of radiologists, i.e. the technical quality of the images and the interpretation of them, should not be similarly peer-reviewed by their fellow radiologists in order to yield the same benefit?

What does the research tell us?

A classic New England Journal of Medicine article entitled "The Reliability of Clinical Methods, Data and Judgments" gathered together all of the available research on "inter-observer agreement", or the likelihood that two matched physicians of similar expertise would render congruent clinical opinions. All specialties were studied, but let's focus on the imaging-related outcomes.

- An IVP is an X-ray with dye used to evaluate kidneys. Radiologists reviewing films for the presence of pyelonephritis (an infection in the kidney) were in agreement 68-80% of the time.
- Studies measuring the reliability of identifying osteoarthritis in joint X-rays demonstrated agreement anywhere from 68%-87% of the time.
- Physicians reading chest X-rays to determine whether tuberculosis was improving agreed 70% of the time.
- Radiologists' evaluating the presence of tumors in liver scans agreed from 70%-80% of the time.

So while the physicians agreed the majority of the time, there is certainly evidence that substantial disagreement can and does occur in many of these interpretations, despite what one might intuitively think of as "black and white" data.

The authors concluded:

"The physicians studied almost always disagreed at least once in 10 cases, and often disagreed more than once in five cases, whether they were eliciting physical signs, interpreting roentgenograms (X-rays), electrocardiograms or
electroencephalograms, making a diagnosis (from incomplete information), recommending a treatment or evaluating the quality of care. Disagreements of this magnitude, if characteristic of clinical practice in general, cannot safely be regarded as inconsequential."

**How might this impact the rate of surgery?**

Spinal surgeries have become a focus of a great deal of controversy and rising costs, as the rates of these procedures have escalated. So we can use them as an illustration. Between 1979-1985 cervical spine operations in total increased by 45%; cervical fusion increased by 70%; lumbar surgery in total by 33%; and lumbar fusion by 60%. Another source reports that the number of lumbar fusions has increased 220% in the U.S. since 1990.

A recent prospective study by a neurosurgeon revealed that in her experience, many of these proposed procedures were deemed unnecessary. A procedure was classified unnecessary if performed solely because of the subjective complaint of pain, but "the patient has no neurological deficit and **no significant abnormal radiographic findings** on dynamic X-rays, MR, and/or CT."

The author concluded that 47 of 274 scheduled surgeries (17.2%) were unnecessary surgeries, and added:

"This is an underestimate of the percentage of unnecessary surgeries as the 274 patients included those coming for first opinions. If we only considered the patients coming for second opinions, then the percentage of unnecessary operations would have been considerably larger."

A fellow neurosurgeon submitted a commentary after this article, outlining his perspective on some causes of the problem and on the solutions, including peer review.

"A hospital reviewing surgical procedures noted that a significant number of patients scheduled for anterior lumbar interbody fusions [ALIF] did not meet criteria. The committee requested that any spine surgeon contemplating this surgery had to have the chart reviewed by another spine surgeon at that hospital. ALIF procedures dropped by 75%. Greed is not a malady of just spine surgeons. The same committee began to investigate cardiac catheterizations, which had a very high rate of normal studies. This is a big money maker for a hospital. The solution for the administration was to disband the committee. Most physicians will remember the number of cataract operations that were being done on nursing home residents, many of whom were confined to wheelchairs. At that time Medicare paid $1800 per eye – a gold mine for the ophthalmologist. Medicare solved the problem by reducing the fee to $600."

These and similar studies suggest that a critical evaluation of imaging studies, which are often used as a justification for extensive surgical procedures, may have value in identifying and preventing unnecessary surgery and its consequences.
What are the outcomes of surgery?

What is the long-term impact of preventing unnecessary surgery, aside from the immediate cost savings attributable to avoidance of the surgical procedure itself, as well as the patient’s surgical risk and potential complications?

A study comparing outcomes of matched samples of WC claimants with chronic low back pain, with or without lumbar fusion, provides some answers.

The patients who underwent surgery had a significantly higher rate of permanent disability (11.31% v. 1.52%). The control (non-operated) group returned to work (RTW) in 66.62% of the cases, whereas the operated group achieved RTW only 25.93% of the time. Total days off work were greater after surgery (1140 days v. 316) than in the non-operated group. The operated group was using opioids in 84.69% of cases, while the control group was at 48.83%.

Furthermore, 27% of the operated cases required re-operation, often more than once, and the surgical complication rate was 36%.

The authors concluded:

"In summary, this large historical cohort study suggests that lumbar fusion may not be an effective operation in workers’ compensation patients with the diagnoses of disc degeneration, disc herniation, and/or radiculopathy. This procedure is offered to improve pain and function, yet objective outcomes showed increased permanent disability, poor RTW [return to work] status, and higher doses of opioids. The combination of lumbar fusion surgery for disc degeneration, disc herniation and/or radiculopathy, opiates; prolonged work absence and legal representation appear(s) to create a diminished quality of life for the injured workers under these circumstances. Additional studies are currently underway to further investigate these factors."

Although this study did not include an economic analysis, one can safely assume that ultimately the cohort with fusions had considerably higher medical and indemnity costs than the control group.

The Solution

We have developed and implemented an integrated clinical image management platform, radiology specialist teams and patient management system. This system is secure and internet based, allowing national or international scope while enhancing patient care with the efficiencies of a dedicated medical team and worldwide secure instantaneous multiuser availability. This system decreases costs while improving patient outcomes.

Several key steps have been undertaken to create an effective Second Opinion evaluation of Imaging Studies (SOIS) network.

NightHawkRadiology®, Inc.
www.NightHawkRadiology.com
1. **Radiologists** - A group of highly qualified radiologists has been secured to perform the second-opinion readings. They function as a Radiology Review Services panel, joining other board-certified, fully credentialed physicians in different specialties and subspecialties. These radiologists are readily available to provide written diagnostic imaging interpretations and recommendations upon referral.

2. **Imaging database** - In order to efficiently operationalize this initiative, we have developed a Picture Archiving Computer System (PACS) database maintained on redundant mirrored web based “cloud” servers which are secure and easily searchable. Diagnostic facilities, e.g. your current local MRI center or imaging network upload imaging studies directly into the server, where it is stored, and easily accessible to pre-approved adjusters, claims personnel and physicians. Previously second readings required a facility, often via a claims adjuster, to produce/obtain a CD of the image and mail it to a reviewing physician, causing significant delays and additional expense. Now our clients and physicians can instantly call up and review a state-of-the-art image from their offices or any internet-connected location.

We have collaborated in this program, with insurance companies and several diagnostic network vendors, so that thousands of high-volume participating facilities all across the country can upload their images into our database when the patient is identified as a claimant.

While primarily intended to enable our radiology consultants to provide second opinions, these images are equally accessible to other peer reviewers, e.g. an orthopedist reviewing a prospective surgery, such as rotator cuff repair on the shoulder, as part of the utilization review process, can immediately review the MRI images and second opinion report (SOIS) to make a truly fully-informed decision on the medical necessity of a claim or procedure. Images are retained for a minimum of seven years, allowing comparison of recent studies with previous studies.

3. **Workflows and guidelines** - We have shown and other organizations and clients have independently confirmed, that this method is potentially valuable for any type of medical imaging exam both to confirm diagnoses and establish rational evidence-based treatment plans. This program is likely to yield the greatest benefits for certain body regions, spine and joint conditions, injuries and planned surgery. Internal guidelines prioritize and establish criteria for the use of second-opinion reviews to ensure targeted use and actionable results of this system. **Streamlined workflows ensure that information and reports flow quickly** among utilization review and case management nurses, radiology reviewers and reviewers from other specialties engaged in the claims and medical management process.

4. **Age of injury (AOI) reports** - In addition to the attributes described above, radiology second opinion reviews permit a focus on assessment of the AOI, an
element which is often neglected by radiologists in the community as they are not particularly focused on issues of causality/compensability.

An “Age of Injury” (AOI) report is a methodical analytical process by which a skilled radiologist reviews a diagnostic image or image set (MRI, CT, X-ray, ultrasound, etc.) along with the corresponding diagnostic report that was completed by the primary reading radiologist at the time of the clinical event with the associated pertinent clinical data, clinical information and clinical findings relevant to a specific question and injury in relation to a specific time frame.

An expert radiologist is able to make determinations by identifying specific objective signs of acute (recent) injury versus signs of degenerative changes that are evidence of chronic (long standing) conditions.

5. Injury Causality Analysis - An Injury Causality Analysis provides further in-depth analyses. This may provide evidence of acute re-injury intensifying or exacerbating chronic long-standing conditions or older injuries. The more in-depth the analysis the greater the requirement for more clinical and imaging data, and information describing the historical sequence of events. As in most things, the greater the analysis, the greater the accuracy, but the greater the time requirement.

The Injury Causality Analysis report represents a methodical analytical process of review and analysis of the submitted diagnostic image set provided along with the corresponding diagnostic report that was completed by the primary reading radiologist at the time of the clinical event. Additionally the analysis incorporates submitted associated pertinent clinical data, clinical information, clinical findings, prior imaging exams and prior imaging reports, which are relevant to the specific injury in relation to a specified time frame.

As with the Age of Injury Report, this analysis identifies specific objective signs of acute (recent) injury versus signs of degenerative changes that are evidence of chronic (long standing) conditions. This methodology and analysis may be limited by acute re-injury intensifying or exacerbating chronic long-standing conditions or older injuries. All analyses are dependent upon the quality and quantity of the information provided, however with the addition of pertinent clinical medical records, imaging records/reports, clinical data, clinical information and clinical findings relevant to the specific injury, this more in-depth analysis allows for evaluation of and determination of causality.

This is a useful tool for claim adjusters and peer reviewers, as they are required to render determinations on causality. Utilizing the objective findings evident on the diagnostic images and the relevant specific circumstances of the specific case, our radiologists are able to provide an expert independent professional medical opinion with the required high degree of clinical certainty as to whether the findings demonstrated are likely related or unrelated to a specific event. This is the standard for most legal and insurance situations.
Outcomes

As with any other innovative product or program, it is critical to design a methodology that establishes key metrics, monitors outcomes, and refines the program accordingly to maximize value. Our medical and analytics teams are actively engaged in this process and periodically report on activities and outcomes. An analysis of our SOIS outcomes for a leading national third-party administrator to employers and insurance companies has shown that in 26.32% of SIOS reviews with “Agreement” the Second Opinion evaluation of Imaging Studies (SOIS) process still added additional important clinical information not contained in the initial reports, which may affect claims management and/or patient management. Additionally that in 28.30% of SIOS cases the Second Opinion evaluation of Imaging Studies process uncovered significant disagreements, which would affect claims management and/or patient management. Therefore the SOIS program provided significant cost savings and reduced liability while enhancing patient care, improving patient outcomes and decreasing turn around times.

References

