

Turf Wars in Radiology: The Overutilization of Imaging Resulting from Self-Referral

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A recent report by the Medicare Payment Advisory Commission to Congress indicated that the utilization of diagnostic imaging is growing more rapidly than that of any other type of physician service. This has engendered concern among those who pay for health care. In this article, the authors review the role of self-referral in driving up imaging utilization.

A number of studies of the self-referral factor in imaging have been conducted over the past three decades. These have consistently shown that when nonradiologist physicians operate their own imaging equipment and have the opportunity to self-refer, their utilization is substantially higher than among other physicians who refer their patients to radiologists. It has also been shown that the vast bulk of the recent increases in imaging utilization are attributable to nonradiologists who self-refer. The authors estimate that the cost to the American health care system of unnecessary imaging resulting from self-referral by nonradiologists is \$16 billion per year.

Key Words: Medical economics, diagnostic radiology, radiology, radiologists, departmental management, socioeconomic issues

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Turf wars in radiology are closely related to the issue of self-referral. When a radiology group loses a turf war to another specialty group, the encroaching group almost invariably creates a self-referral opportunity for itself. For example, assume that in hospital A, all cardiac nuclear imaging is done by the nuclear medicine division of the department of radiology. Self-referral does not occur under this arrangement, in that all of the cardiac imaging is referred from nonradiologist physicians to radiologists. A large cardiology group previously affiliated with hospital B approaches the administration of hospital A and proposes to move its entire practice to hospital A, with the proviso that it be given privileges to perform its own cardiac nuclear imaging. In an effort to recruit the cardiology group—and garner the revenue from patient admissions and outpatient services that will accompany it—the administration of hospital A agrees. Under this not uncommon scenario, the cardiology group now has the ability to self-refer all cardiac nuclear studies instead of referring them to the radiology department. In this article, we summarize the evidence that self-referral inevitably

leads to much higher utilization of imaging services and that much of this increased utilization is unnecessary and wasteful.

In March 2003, a report on medical service utilization was presented to Congress by the Medicare Payment Advisory Commission (MedPAC) [1]. MedPAC is an influential, federally appointed group of health policy experts that advises Congress and the Centers for Medicare and Medicaid Services on Medicare reimbursement policy. The report reviewed growth in Medicare services between 1999 and 2002 in four broad categories: evaluation and management (E&M), procedures, tests, and imaging. Average annual growth during that period was 1.8% for E&M services, 4.1% for procedures, and 5.6% for tests, but it was 9.0% for imaging. Anecdotal evidence from the commercial health care insurance sector suggests recent rapid growth in the utilization of imaging there as well (Mayes, Sullivan, and Ruane, personal communications). Needless to say, this has raised considerable concern among all who are responsible for paying for health care, and because radiologists are the physicians most closely identified with imaging, we are the ones often blamed for this cost escalation. However, as shown below, there is strong evidence in the literature that radiologists are not primarily responsible for the utilization increases; instead, the root cause is self-referral by nonradiologist physicians.

In the early 1990s, Hillman *et al.* [2,3] used an episode of care approach to compare the utilization of imaging among two groups of physicians: one group of physicians that owned and operated their own imaging equipment and self-referred their patients for imaging studies and another group of physicians that instead referred their patients to radiologists when they felt that imaging was needed. The episodes of care analyzed by Hillman *et al.* were common clinical conditions such

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Editor's note: This article is the second in a series of what is projected to be 14 articles dealing with the phenomenon of self-referral. The series is intended to both inform readers of the extent and impact of self-referral and advise them on how self-referral issues might be handled in their own practices. Although much of what you will read will be substantiated by published research, I have given the authors wide latitude to express their personal views and experiences.

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as chest pain, congestive heart failure, difficulty in urination, gastrointestinal bleeding, headache, knee pain, low back pain, transient cerebral ischemia, upper respiratory infection, urinary tract infection, and pregnancy. They found that depending on the clinical condition, the self-referring physicians used between 1.7 and 7.7 times the number of imaging studies as the physicians who referred their patients to radiologists. These statistics were rather startling, and some skepticism and suggestions of bias were expressed in subsequent letters to the editors of the journals in which the findings were published [4,5]. However, at about the same time that the data of Hillman *et al.* were being compiled and published, another study was being conducted by the U.S. General Accounting Office (GAO) [6]. The GAO is an arm of Congress and is hardly an organization with any bias favoring radiologists. The GAO report was based on medical claims covering 19.4 million office visits and 3.5 million imaging studies in Florida during 1990. The GAO compared the rates of utilization of imaging for physicians having their own in-practice imaging equipment with those rates for other physicians who referred their patients elsewhere for imaging (primarily to radiologists). They assessed utilization by modality, rather than by clinical condition, and found that self-referring physicians used between 1.95 and 5.13 times as much imaging (depending on modality) as those physicians who referred their patients elsewhere. This report, which essentially confirmed the findings of Hillman *et al.*, was presented to Congress in October 1994.

Each fiscal year, the Office of Inspector General of the U.S. Department of Health and Human Services develops a work plan that targets certain areas of Medicare expenditures for scrutiny. The work plan for fiscal year 2000 identified radio-nuclide myocardial perfusion imaging (RMPI) as a medical service warranting closer scrutiny because of rapid growth in its utilization among the Medicare population in recent previous years. In response to this concern, Levin *et al.* [7] investigated overall utilization rate changes in RMPI and compared the rate changes among radiologists (who almost never have the capacity to self-refer) and cardiologists (who, because they see patients for E&M services, do have the capacity to self-refer). They examined the four primary Current Procedural Terminology codes for RMPI, as well as the two "add-on" codes for the evaluation of left ventricular wall motion and ejection fraction. Between 1996 and 1998, Levin *et al.* found that the overall utilization rate of RMPI per thousand Medicare beneficiaries increased by 19.1%, a relatively sharp increase for only two years. However, closer analysis by specialty of the provider physicians revealed that the utilization rate increase was 36.3% among cardiologists compared with only 3.7% among radiologists. In other words, the growth in utilization rate was almost 10 times as high among cardiologists as among radiologists. In addition, cardiologists were almost twice as likely to perform the add-on studies as radiologists. One might have suspected (or at least hoped) that cardiologists were using more of these noninvasive imaging tests as substitutes for invasive procedures such as diagnostic cardiac catheterization and coronary angiography. However, the data showed that the utilization of cardiac catheterization and coronary angiography among cardiologists increased by 8.7% during those two years, so obviously there was little or no substitution occurring. Moreover, the utiliza-

tion rate among cardiologists of stress echocardiography, a procedure that competes with RMPI, increased by 24.2%. We have performed a preliminary follow-up assessment of RMPI utilization growth between 1998 and 2001 (unpublished data). This revealed that the utilization rate among cardiologists increased by another 49%, whereas it actually dropped slightly among radiologists.

Maitino *et al.* [8] recently studied utilization trends for all Medicare noninvasive diagnostic imaging between 1993 and 1999, comparing radiologists and nonradiologists. Among radiologists during that six-year interval, the procedure utilization rate per thousand Medicare beneficiaries dropped by 4%, whereas the relative value unit (RVU) rate per thousand increased by 7%. The RVU rate is a better measure of workload and the complexity of services. By comparison, among nonradiologists, the procedure utilization rate increased by 25%, and the RVU rate increased by 32%. In essence, this means that the vast bulk of the increases in imaging utilization rates, workload, and billings in recent years are attributable to nonradiologists.

Increased utilization due to self-referral is not a new phenomenon, and there are several older studies that antedate the more recent ones discussed above. Childs and Hunter [9] conducted a study in 1965 on 13,000 patients enrolled in an old-age assistance program in California. The study involved the review of approximately 7300 medical records from 153 nonradiologist primary care physicians who had their own x-ray units and self-referred and 610 other physicians who referred their patients to radiologists when x-rays were needed. The investigators found that 32.2% of patients of the self-referring physicians received x-rays, compared with 15.3% of the patients whose physicians referred to radiologists. The authors commented that

the data support the conclusion that nonradiologists having economic interest in radiographic equipment make heavier use of diagnostic x-ray than do other physicians, although their choices of examination methods suggest that their knowledge of radiology is less than that of radiologists.

Hemenway *et al.* [10] studied the test-ordering behavior of a group of 15 primary care physicians in a for-profit ambulatory care center in Boston before and after a financial incentive plan was introduced. Before the plan, the physicians were paid a straight salary; after the plan was instituted, they could earn bonuses based on revenues they generated for the center. The facility had on-site radiographic equipment, and referring patients to it was one way the physicians could generate more revenue. Their utilization of radiology was compared during a winter three-month period before the incentive plan was instituted and the same three-month period a year later, after it had gone into effect. During the latter period, 11 of the 15 physicians ordered more x-rays, and overall utilization by the entire group increased by 16%. Radecki and Steele [11] studied the effect of self-referral among 5407 physicians in 10 specialties from 1976 to 1978. They reviewed office logs to determine the use of imaging over a three-day recording period for each patient office visit, then calculated the odds ratio for obtaining imaging among physicians with their own on-site imaging equipment compared with those who referred their patients to

radiologists. For 9 of the 10 specialties, the odds ratios were between 1.2 and 1.7, indicating that self-referring physicians in those specialties used considerably more imaging.

Financial incentives are not the only motivating factors driving the increased utilization of imaging in a self-referral environment. For example, Strasser *et al.* [12] assessed the utilization of chest radiography in two facilities operated by a single family medicine department at the University of Western Ontario. All patients in the study had chest-related diagnoses. One of the two facilities had on-site x-ray equipment, whereas patients at the other facility were referred to an outside radiology office when chest radiography was needed. The family medicine physicians did not own the x-ray equipment or interpret the films and thus had no financial incentive to refer patients. Nevertheless, patients seen in the facility having the on-site x-ray equipment were 2.4 times more likely to have chest radiographs than patients seen in the facility with no x-ray equipment. In another study, Oguz *et al.* [13] examined the effect of the installation of a computed tomography (CT) scanner in their hospital's emergency department on the utilization of central nervous system (CNS) CT scans by the emergency medicine physicians. The scanner was owned by the hospital, and the studies were interpreted by the radiology department. In 1998, a year before the scanner was installed, 7.9% of all patients seen in the emergency department received CNS CT scans. In 2000, the year after installation, 13.0% of all patients received CNS CT scans. In addition to this sharp increase in utilization, the incidence of significant positive findings dropped from 22.1% the year before to 15.0% the year after the scanner was installed. It was clear that the installation of the CT unit in the emergency department had lowered the threshold for ordering a CNS CT scan among the emergency medicine physicians, and the authors speculated that the scanner was simply being used as a surrogate triage instrument. The latter two studies indicate that even in the absence of financial incentives, the mere availability of imaging technology in a nearby convenient location will lead to increased utilization.

As a group, the studies reviewed above clearly demonstrate that noninvasive diagnostic imaging will be used to a substantially greater extent when nonradiologist physicians have imaging equipment in their own practice settings instead of referring their patients to radiology facilities. There is also evidence that image-guided invasive procedures will be used at higher rates when the opportunity for self-referral exists, but that will be discussed in a later article in this series. How much of this increased utilization represents unnecessary care? The relationship is difficult to prove because of the ambiguity over what represents truly "appropriate care," but there is some literature to suggest that most of the incremental utilization of imaging accruing to self-referral is unnecessary. A recent study by Fisher *et al.* [14] assessed Medicare spending on patients with hip fractures, colorectal cancer, and acute myocardial infarctions in 306 hospital referral regions (HRRs) and correlated expenditures with clinical outcomes. They found that in the highest spending quintile of HRRs, patients received 60% more physician services than in the lowest spending quintile, including 65% more imaging. Despite this disparity, there was no difference in clinical outcome. A bit of quick math suggests,

therefore, that in some parts of the country, 40% or more of imaging studies may be unnecessary.

How much is self-referral for imaging costing our health care system? The 2001 Medicare Part B database showed that Part B payments (primarily the professional component) for noninvasive diagnostic imaging were approximately \$6.699 billion, of which \$2.686 billion went to nonradiologists. The data of Hillman *et al.* [2,3] suggest that self-referring nonradiologist physicians perform approximately two to eight times as many imaging studies in a given clinical circumstance as physicians who refer their patients to radiologists. Let us assume that the number of referrals to radiologists delineate the necessary and appropriate utilization rate of imaging and that the additional studies accruing to self-referral are largely unnecessary. Let us further take the most conservative estimate from the data of Hillman *et al.*, which is that self-referring nonradiologists do twice (rather than eight times) the amount of imaging that is truly necessary. This would mean that approximately half of all imaging by nonradiologists is unnecessary. Half of the \$2.686 billion paid by Medicare Part B for professional component imaging services to nonradiologists is \$1.343 billion. Because Medicare accounts for approximately one-third of all imaging in the United States, this suggests that approximately \$4 billion is paid by all payers to nonradiologists for the professional components of unnecessary imaging services. But of course, professional component reimbursement represents only about one quarter of the total cost of imaging services, with the technical component representing the remaining three quarters. This means that as much as \$16 billion per year is spent by our health care system to cover the cost of unnecessary self-referred noninvasive diagnostic imaging. Note that this does not include the costs of image-guided invasive procedures. The level of waste resulting from self-referral in imaging is indeed staggering.

CONCLUSIONS

What should you do with all this information? We suggest that you read the references, familiarize yourself with the data, make up your own PowerPoint presentation, and be prepared to give it at the appropriate time. You will probably be able find a number of audiences that will be quite receptive to your information, especially because it is evidence-based. Hospital officials, for one, are not anxious to relinquish the revenue they derive from their outpatient imaging facilities to the private offices of nonradiologist physicians. Health care insurers (and ultimately government and employers) are not anxious to pay the far higher costs resulting from self-referral in imaging. State and federal legislators and policy-making bodies such as MedPAC are not anxious to see costs spiral out of control in health care programs for which they have responsibility. Many of these individuals are not aware how much self-referral is costing them. The data presented herein not only should be of interest to those audiences but can also serve as pertinent debating points in any confrontation with other specialists who try to encroach on diagnostic imaging in your practice setting.

The next article in this series will deal with other aspects of the overutilization of imaging: What are the other causes of it? What are the possible justifications for self-referral? What is the

extent of self-referral among radiologists? What steps might be taken to curb overutilization?

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