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EDITORIAL

Self-Referral in Neuroradiology

Self-referral in radiology is a complex and contentious topic that has received a great deal of attention recently. In addition to radiologists, others expressing concern about this phenomenon are Congress, the Centers for Medicare and Medicaid Services (CMS) and other payers, state legislatures, consumers, journalists, and so forth. We know who cares about the problem, but here is the key question: Why do they care and what can be done to limit the ill effects of self-referral and still maintain the benefits that are purported by its proponents to accrue to patients and the health system as a whole from this pattern of practice?[1-10]

The case for self-referral rests on 3 principal arguments: First, access, convenience, and coordination of care are touted; second, expertise is invoked; and third, economic efficiency is asserted. These can be taken in turn. The argument regarding access is relevant to the lower technology modalities such as plain films and sonography, which are frequently provided at the time of a patient visit in primary care, orthopedic, and obstetrics and gynecology practices. The data show rather convincingly that same-day service is not often the case with respect to CT and MR imaging studies, those of most interest to the neuroscience and investor community. With respect to access, there are no well-conducted studies, to my knowledge, that support the notion that an inadequate supply of scanners in underserved communities results in the installation of imaging instruments by clinical neuroscience physicians. To the contrary, the data suggest that the safety-net payers are underrepresented in practices that are organized on principles of self-referral. The argument based on improved coordination of care falls flat when one considers that increased imaging occurs in self-referring practices after the installation of the referring physician by the owned or leased instrument and that patients imaged in a physician-owned facility are more likely to undergo invasive treatment rather than conservative management of back pain, for example. Self-referral may facilitate more expensive and aggressive treatments than are well-grounded in a rigorous evidence base.

Some advocates of self-referral practice models imply that the expertise of clinical physicians in the neurosciences is superior to that of radiologists. Again the data do not support this hypothesis. Some consider investigation of the question to be absurd because the degree of training and experience, associated in other areas of medicine with better patient outcomes, are demonstrably far superior with respect to the performance and interpretation of imaging examinations among neuroradiologists compared with members of other specialties. We need not rely on an argument from first principles; we can actually look at data. Radiologists as a group are better at reading imaging studies than members of other specialties. Paradoxically, this seems to be the case both when clinical information is available and when it is not. Evidently, the patient presentation is simultaneously a distracter and lodestar in diagnosis. One must concede that when a specific piece of clinical information is available to 1 physician and not to another, related diagnoses are likely to be superior when all the information is taken into account. However, this argues for communication, not commercialization.

Economic efficiency demonstrably favors the separation of the clinical and imaging functions. Costs are generally higher in self-referral situations than in standard referral relationships, and costs of episodes of care are higher when self-referral for imaging is part of the pattern of care. This is true for a number of reasons including classic business principles and behavioral economic effects. From the standpoint of business organization, the essence of economic efficiency in advanced imaging rests on the amortization of capital costs and fixed operating costs over the largest possible number of studies. This is because the large fixed costs are, by definition, constant regardless of the number of scans actually performed. A referral base larger than 1 or a few self-referring specialists decreases the cost of each scan, theoretically making it possible to provide services at the lowest possible prices. One must say "theoretically" because the economic theory of marginal prices converging on marginal costs rests on the assumption that transparent frictionless competition prevails and that barriers to entry and exit are low. These conditions do not prevail in health care at present.

Behavioral and classical economic models suggest that individuals will act in their self-interest as they define it. We do not need to dwell long on the concept that a referring physician will tend to order more studies when he is paid to do so from the proceeds of those imaging tests, because this has been repeatedly observed. We do not need to agonize as to the theoretic and practical implications because the increases in imaging are well documented across the imaging spectrum. That

these phenomena apply equally to the neurocsciences and continue to apply during the most recently available data collection periods are important contributions reported in this issue of the *American Journal of Neuroradiology* by Babiarz et al.[9] It is crucial, however, that we understand the extent to which self-delusion of well-defined sorts can mask our understanding of reality when we humans are confronted with circumstances in which our interests conflict with those of our patients. These are well-recognized in regulations, laws, codes of ethics, and current practice with respect to pharmaceuticals, but our understanding of these principles seems to have lagged with respect to imaging. We can safely say that the testimony of those who suggest that there are no adverse impacts on the doctor-patient relationship as a result of self-dealing in imaging are deceived, not least by themselves.

These arguments, compelling as they are, do not address the fundamental ethical principle at stake in the practice pattern of self-referral. It has long been a tenet of medical ethics and the ethical foundation of the agency relationships among all of the professions that the physician, lawyer, accountant, and so forth must put the interests of the client ahead of his or her own. The modern history of the medical profession owes much to the separation of dispensing of medication from the prescribing of medicines, and we can infer by analogy that similar improvements in patient care accrue from the separation of the dispensing of imaging from the ordering of diagnostic tests. Existing federal and state laws and regulations prohibit only some of the most egregious examples of self-referral arrangements, but these practices still prevail, in part because existing laws are not always vigorously enforced. This illustrates the magnitude of the incentives that drive self-referral and the ability of these incentives to cloud the judgment of those who partake.

A discussion of these issues would not be complete without addressing the role of radiologists in self-referral. Our most direct contribution to the phenomenon is through direct self-referral to ourselves and each other when we request further imaging. We indirectly promote our own referrals by illustrating uncommon causes for common clinical symptoms when we educate other physicians about imaging. Also, we contribute when we participate by interpreting the studies performed on equipment owned by self-referring physicians from other specialties. This may mitigate the adverse impacts of self-referral to some degree by providing some independence of the interpretation of the study from treatment decisions that often provide financial rewards that are orders of magnitude greater than the net revenues of imaging.

Radiologists directly contribute to the problem of self-referral through the practice of recommending further imaging. To some extent, of course, this represents accepted standards of excellence in clinical practice. However, to the extent that radiologists differ from each other in ways that are not obviously related to improved patient outcomes or that differ from rates that prevail in clinical trials that justify the imaging studies themselves, they are contributors to excessive use that can reasonably be assigned to the broad category of self-referral. We know that radiologists differ systematically from each other in rates of recommendations for further studies based on their level of experience. Those with more experience suggest further imaging at half the rate of their less experienced colleagues. This suggests that education may be the solution to this sort of self-referral. Additionally, evidence from mammography screening suggests that at least some recommendations in excess of those that are data-driven can be eliminated without adversely affecting patient outcome. To the extent that neuroradiologic studies are performed for indications in which the prior probability of structural abnormalities are indiscernibly different from those in the general population, it is likely that differences among radiologists are significant drivers of differences in imaging recommendations in these populations. It is important to note that classically self-referred patients are more likely to resemble screening patients because the threshold for ordering imaging tests seems to be lower in self-referral practices.

Solutions to the problem of self-referral are likely to be the same as the solutions to the other problems faced by our health care system. After all, self-referral is merely a symptom of these larger problems. Payment methodologies that reward efficient care that results in better patient outcomes will eliminate self-referral practices that do not result in greater value for a given level of expenditure. Such methodologies are under consideration by CMS and other payers. Direct legislative action at the federal and state levels would also be beneficial, but efforts in this direction seems to have bogged down. Tort reform would certainly be welcomed by many physicians for a number of reasons, not least of which would be the reduction of defensive imaging by referring physicians and radiologists alike.

In summary, self-referral is inefficient and unethical. It results from distorted incentives in the health care finance system. Most important, it is detrimental to good patient care, and it ought to be eliminated. We can no longer justify the practice as beneficial to patients, so what are we waiting for?

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