Recent Payment and Utilization Trends in Radionuclide Myocardial Perfusion Imaging: Comparison Between Self-Referral and Referral to Radiologists

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Purpose: The aim of this study was to examine the effects of self-referral by comparing recent trends in payments and utilization rates for radionuclide myocardial perfusion imaging (MPI) among radiologists and cardiologists between 1998 and 2006.

Materials and Methods: Nationwide Medicare Part B claims databases for 1998 through 2006 were used. The 4 primary MPI codes were selected. Using Medicare's physician specialty codes, physician providers were identified as radiologists, cardiologists, or other physicians. Payments for MPI to the 3 groups were tracked over the study period. Trends in utilization rates in both hospital and private office settings were also compared among the 3 groups. In addition, utilization trends were studied for related procedures, such as stress echocardiography (SE) and invasive diagnostic coronary angiography (CA).

Results: Between 1998 and 2006, Medicare Part B payments to radiologists for MPI increased from $72.6 million to $84.0 million (+16%), while among cardiologists, payments increased from $242.6 million to $972.0 million (+301%). Private office utilization rates per 1,000 Medicare beneficiaries increased by 215% among cardiologists, compared with 32% among radiologists. In hospital settings, the rate changes were much more modest. Hospital utilization rates were consistently higher among radiologists than cardiologists; in hospital settings in 2006, the rate was 15.3 per 1,000 among radiologists, compared with 11.8 per 1,000 among cardiologists. Between 1998 and 2006, the utilization rate for SE among cardiologists increased by 20%, and the rate for diagnostic CA among cardiologists also increased by 20%.

Conclusion: In recent years, there have been very sharp increases in the costs and utilization of MPI among cardiologists compared with radiologists. Most of the growth occurred in cardiologists' private offices. In hospital settings, radiologists still do more MPI examinations than cardiologists. Because MPI is a highly reimbursed procedure and there is no evidence that coronary disease is increasing in frequency in the Medicare population, this trend raises a concern about inappropriate self-referral. This is particularly true in view of the facts that the utilization of a competing procedure such as SE also continues to increase among cardiologists and that MPI is not substituting for an invasive procedure such as diagnostic CA.

Key Words: Medical economics, myocardial ischemia, myocardium, radionuclide studies, radiology and radiologists, socioeconomic issues

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Considerable concern has been expressed recently by influential federal agencies about the rapid rise in the utilization of imaging in the Medicare population. A presentation to the Medicare Payment Advisory Commission in September 2008 pointed out that between 2000 and 2006, imaging grew more rapidly than any other physician service [1]. Similar concerns have been expressed by the Office of Inspector General of the US Department of Health and Human Services [2] and the US Government Accountability Office [3].

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One of the principal causes of the increased utilization of imaging is self-referral by nonradiologist physicians. Many previous studies of the issue have shown that self-referral inevitably leads to higher utilization than occurs when imaging is referred to radiologists [4-11]. A particularly good model to use in studying this problem is radionuclide myocardial perfusion imaging (MPI), an advanced imaging technique that is relatively expensive and is done in large numbers by both radiologists and cardiologists. Cardiologists usually perform MPI through self-referral or through same-specialty referrals from members of their groups. This creates a potential conflict of interest, in that there is a financial incentive to order more procedures. On the other hand, when cardiologists or other physicians refer MPI studies to radiologists, they have no financial incentive or other conflict of interest.

A previous study demonstrated that between 1998 and 2002 in the Medicare population, the utilization rate of MPI per 1,000 beneficiaries among radiologists grew by 2%, compared with 78% among cardiologists [12]. The present study was a follow-up to that earlier one. It extended the period of observation by another 4 years and also introduced an assessment of Medicare Part B costs for MPI.

MATERIALS AND METHODS

Our data source was the Medicare Part B Physician/Supplier Procedure Summary Master Files for 1998 through 2006. These files are the summary tables for the nationwide Part B data sets for all beneficiaries in the Medicare fee-for-service program (83% of the total Medicare population in 2006). They are public-use files containing nonidentifiable, person-specific information, and population analyses of the files are exempt from institutional review board review. The files provide data on each code in the *Current Procedural Terminology*®, 4th edition (*CPT*®-4), manual. The data include examination volume throughout the country, the specialties of the physicians filing the claims, payments by Medicare Part B, and the places of service where the examinations were performed. In tabulating data by physician specialty, Medicare's 108 specialty codes are used. Physicians were categorized as radiologists, cardiologists, and all other physicians as a group. The specialty codes for diagnostic radiologists, interventional radiologists, and nuclear medicine physicians were included in the category of "radiologists." There is a single specialty code for cardiologists. Physicians in all specialties other than radiology and cardiology were included in the category of "other physicians." We excluded a small number of claims (0.6% in 2006) under certain Medicare "specialty" codes that are not true medical specialties and in which the actual specialties of the physician providers could not be determined; examples are multispecialty groups and independent diagnostic testing facilities. In tabulating data by place of service, Medicare's place-of-service, or location, codes were used. The 3 primary locations where imaging studies are conducted are hospital inpatient settings, hospital outpatient departments, and private offices. Total Part B payments by Medicare were determined by including all payments for global, technical-component, and professional-component claims. Utilization rates per 1,000 Medicare beneficiaries were calculated by dividing examination volume under global and professional-component claims by the number of thousands of beneficiaries each year. For this calculation, we did not include technical-component-only claims, because this would have led to double counting of examinations. We used data only for paid claims, not those for which payment was denied.

We examined the 4 primary Current Procedural Terminology codes for radionuclide MPI examinations, as shown in Table 1. Our study had 3 principal elements. First, we assessed trends in the costs of MPI to Medicare Part B according to physician specialty in all places of service. Second, we analyzed trends in utilization rates among radiologists, cardiologists, and other physicians in hospital settings (both inpatients and outpatients) compared with private offices. Third, we studied utilization rate trends in diagnostic adult cardiac catheterization and coronary angiographic procedures that would be used in patients with suspected coronary artery disease (codes 93510, 93511, 93526, 93539, 93540, 93543, and 93545) and stress echocardiography (code 93350). These procedures are performed almost exclusively by cardiologists and provide information that is comparable with or augments that provided by MPI. The purpose of this part of the study was to see if increases in the utilization of MPI might lead to a reduction in the use of diagnostic cardiac catheterization or stress echocardiography.

Table 1. Radionuclide myocardial perfusion imaging (MPI) codes

CPT-4 Code	Descriptor
78460	MPI; (planar) single study, at rest or stress
78461	MPI; (planar) multiple studies, at rest and/or stress, and redistribution and/or rest injection
78464	MPI; tomographic (SPECT), single study at rest or stress
78465	MPI; tomographic (SPECT), multiple studies, at rest and/or stress, and redistribution and/or rest injection

Note: *CPT*-4 = *Current Procedural Terminology*®, Fourth Edition; SPECT = single photon-emission computed tomography.