ORIGINAL ARTICLE

Medicare Utilization of Vascular Ultrasound From 1998 to 2013: Continued Growth in Both Radiologist and Nonradiologist Imaging

Anand M. Prabhakar, MD[a], Alexander S. Misono, MD, MBA[b], Jennifer Hemingway, MS[c], Danny R. Hughes, PhD[c], Richard Duszak Jr, MD[c,d]

Abstract

Purpose: The aim of this study was to assess national trends in the utilization of vascular ultrasound (VUS) and changing relative specialty roles in examination interpretation.

Methods: Service-specific claims data for VUS studies were identified using Medicare Physician Supplier Procedure Summary Master Files for the period from 1998 to 2013. Longitudinal national utilization rates were calculated using annual Medicare enrollment data for 1998 to 2012. Procedure volumes by specialty group and site of service were analyzed.

Results: Total annual claims for VUS studies for Medicare fee-for-service beneficiaries increased from 4,422,360 to 8,599,677 (+94.5%) between 1998 and 2013. Per 1,000 beneficiaries, overall utilization rose from 145.93 in 1998 to 264.26 in 2012 (+81.1%). However, this peaked in 2009 at 270.43 and has been slowly declining each year since. Overall market share decreased from 43% to 41% for radiology and increased from 10% to 16% and from 9% to 17% for vascular surgery and cardiology, respectively. Compound adjusted growth rate increases were 4.2% for radiology, 7.8% for vascular surgery, and 8.7% for cardiology.

Conclusions: Utilization of VUS in the Medicare population increased from 1998 through 2009 but has been declining ever since. Although radiology has maintained the dominant market share over time, relative growth by cardiology and vascular surgery has outpaced that by radiology.

Key Words: Vascular ultrasound, Medicare, radiology, vascular surgery, cardiology, utilization

J Am Coll Radiol 2015;■:■-■. Copyright © 2015 American College of Radiology

INTRODUCTION

Cardiovascular disease is the leading cause of death worldwide and accounts for one in three deaths in the United States [1]. Imaging increasingly plays a critical role in its evaluation. Over the past several decades, CT, MRI, and ultrasound have become central diagnostic tools.

Vascular ultrasound (VUS) is one such modality. Advantages of VUS include noninvasiveness, portability, avoidance of ionizing radiation, cost and price, as well as its ability to image dynamically (eg, to obtain real-time data about blood flow directionality). Common VUS examinations include lower extremity venous duplex ultrasound to evaluate for deep venous thrombosis, lower extremity arterial ultrasound for peripheral arterial disease, carotid Doppler ultrasound for carotid artery stenosis, and abdominal ultrasound for abdominal aortic aneurysm screening and evaluation. As a testament to its value, VUS volumes have grown dramatically in the past, with one study reporting a 49% increase from 1998 to 2004 [2].

Paralleling its increasing utilization, numerous health care providers have become interested in interpreting VUS examinations, notably radiologists, vascular surgeons, and cardiologists. Historically, VUS has been a required component of diagnostic radiology residencies and is a

[a]Department of Radiology, Division of Cardiovascular Imaging, Harvard Medical School, Massachusetts General Hospital, Boston, Massachusetts.

[b]Department of Radiology, Harvard Medical School, Massachusetts General Hospital, Boston, Massachusetts.

[c]Harvey L. Neiman Health Policy Institute, Reston, Virginia.

[d]Department of Radiology and Imaging Sciences, Emory University School of Medicine, Atlanta, Georgia.

Corresponding author and reprints: Anand M. Prabhakar, MD, Harvard Medical School, Massachusetts General Hospital, Department of Radiology, Division of Cardiovascular Imaging, 55 Fruit Street, Gray 2, Boston, MA 02114; e-mail: aprabhakar@mgh.harvard.edu.

The authors have no conflicts of interest related to the material discussed in this article.

1546-1440/15/$36.00 ■ http://dx.doi.org/10.1016/j.jacr.2015.09.035

Table 1. Vascular ultrasound examination CPT codes

CPT Code	Category	Description
Carotid arterial		
93880	Arterial	Duplex scan of extracranial arteries; complete bilateral study
93882	Arterial—limited	Unilateral or limited study of lower arteries of extracranial arteries
Extremity arterial		
93925	Arterial	Duplex scan of lower extremity arteries or arterial bypass grafts; complete bilateral study
93926	Arterial	Unilateral or limited study of lower arteries
93930	Arterial	Duplex scan of upper extremity arteries or arterial bypass grafts; complete bilateral study
93931	Arterial	Unilateral or limited study of upper arteries
Extremity venous		
93970	Venous	Duplex scan of extremity veins including responses to compression and other maneuvers; complete bilateral study
93971	Venous	Unilateral or limited study of extremity veins
Dialysis		
93990	Dialysis graft	Duplex scan of hemodialysis access (including arterial inflow, body of access and venous outflow)
AAA		
G0389	AAA screening	Ultrasound, real time with image documentation; for abdominal aortic aneurysm (AAA) screening
Other		
93886	Arterial	Transcranial Doppler study of the intracranial arteries; complete study
93888	Arterial—limited	Limited study—transcranial Doppler
93975	Arterial and venous solid organ	Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; complete study
93976	Arterial and venous solid organ	Limited study of 93975
93980	Arterial and venous—penile	Duplex scan of arterial inflow and venous outflow of penile vessels; complete study
93981	Arterial and venous—penile	Limited study of 93980
G0365	Vessel mapping	Vessel mapping of vessels for hemodialysis access (services for preoperative vessel mapping prior to creation of hemodialysis access using an autogenous hemodialysis conduit, including arterial inflow and venous outflow)

Note: CPT = Current Procedural Terminology.

requirement of ACGME integrated vascular surgery training programs [3]. Primary care physicians, internal medicine subspecialists, and cardiologists can also receive VUS training through vascular medicine fellowships [4]. As a result, a variety of pathways (such as the registered physician in vascular interpretation from the American Registry for Diagnostic Medical Sonography) exist for both radiologist and nonradiologist certification [5]. Although VUS is a diagnostic imaging modality, Medicare data from 2004 showed that although radiologists had 41.2% of the VUS market share, vascular surgeons and cardiologists held 26.0% and 13.4%, respectively [2].

The medical imaging landscape has changed significantly since 2004. The Patient Protection and Affordable Care Act and an ongoing shift away from fee-for-service to bundled payments and other value-based payment models increasingly emphasize physician coordination of care delivery episodes. In addition, ultrasound technology has become easier to deploy as a result of improved usability, lower purchasing price, and ongoing proliferation of ultraportable equipment [6]. These factors, along with an aging population, have likely contributed to increasing utilization of VUS. Guidelines promoting VUS have expanded as well over the past decade. For example, the US Preventive Services Task Force recently issued a