In 2007 the Maryland Medical Examiner noted a potential cluster of fatal vascular access hemorrhages among hemodialysis patients, many of whom died outside of a health-care setting. To examine the epidemiology of fatal vascular access hemorrhages, we conducted a retrospective case review in District of Columbia, Maryland, and Virginia from January 2000 to July 2007 and a case-control study. Records from the Medical Examiner and Centers for Medicare and Medicaid Services were reviewed, from which 88 patients were identified as fatal vascular access hemorrhage cases. To assess risk factors, a subset of 20 cases from Maryland was compared to 38 controls randomly selected among hemodialysis patients who died from non-vascular access hemorrhage causes at the same Maryland facilities. Of the 88 confirmed cases, 55% hemorrhaged from arteriovenous grafts, 24% from arteriovenous fistulas, and 21% from central venous catheters. Of 82 case-patients with known location of hemorrhage, 78% occurred at home or in a nursing home. In the case-control analysis, statistically significant risk factors included the presence of an arteriovenous graft, access-related complications within 6 months of death, and hypertension; presence of a central venous catheter was significantly protective. Psychosocial factors and anticoagulant medications were not significant risk factors. Effective strategies to control vascular access
Vascular access hemorrhages contribute to deaths among hemodialysis patients. Further delineation of warning signs are needed.