Surgical Undertreatment of Glaucoma in Black Beneficiaries of Medicare

Uday Devgan, MD; Fei Yu, MS; Eric Kim; Anne L. Coleman, MD, PhD

Objective: To identify whether there was surgical undertreatment of glaucoma in black beneficiaries of Medicare from 1991 to 1994.

Methods: We performed a retrospective cohort analysis on all argon laser trabeculoplasty or trabeculectomy surgery claims to the Health Care Financing Administration between 1991 and 1994. There were 191,287 Medicare patients who were black or white, at least 65 years of age, and resided in the United States at the time of their glaucoma surgery. Age- and sex-adjusted rates were obtained and compared with surgery rates expected based on disease prevalence.

Results: The age-sex–adjusted rate ratio of glaucoma surgical procedures for blacks to whites was 2.14. Assuming that treatments should be done in proportion to age-race prevalence, blacks undergo glaucoma surgery at approximately 47% below the expected rate.

Conclusions: Blacks underwent argon laser trabeculoplasties and trabeculectomies at half the rate of whites from 1991 to 1994. Although in 1993 and 1994 there was a slight trend toward higher surgery rates in blacks, the magnitude of this improvement was small compared with estimated differences in the surgery rates between blacks and whites.

Arch Ophthalmol. 2000;118:253-256

Glaucoma is defined as a multifaceted optic neuropathy that results in permanent visual loss. It is the most common cause of blindness in black Americans, and among the leading causes in white Americans. Currently, more than $1 billion per year is spent on federal assistance to blind glaucoma patients. Population-based studies indicate that blacks have a higher prevalence of glaucoma than whites. In the Baltimore Eye Survey, the prevalence of glaucoma increased with age in both races, giving an age-adjusted prevalence of 3.9 per 100 in blacks (3.9%) and 0.6 per 100 in whites (0.6%)—a 6.5-fold difference. Across the total population without adjusting for age, the prevalence of glaucoma was 3.3 per 100 in blacks (3.3%) and 0.7 per 100 in whites (0.7%), making the observed prevalence of glaucoma at least 4 times greater in blacks than in whites. In certain populations, the prevalence of glaucoma among blacks is even higher: the St Lucia Eye Study reported an 8.8% prevalence for black residents of that island. Not only is glaucoma more common in blacks than in whites, but it also appears to have a more severe course in blacks.

Among the many factors that influence the progression of glaucoma and the loss of vision is intraocular pressure. The intraocular pressure can be easily measured and can be influenced by pharmacological and surgical treatments. The surgical treatment of chronic open-angle glaucoma has been shown to help in the reduction of intraocular pressure and in the preservation of vision. Two widely used surgical treatments are argon laser trabeculoplasty and trabeculectomy.

Several organizations have implemented programs in recent years in an effort to increase public awareness of glaucoma. The American Academy of Ophthalmology (AAO), through the Glaucoma 2001 and the National Eye Care projects, and Prevent Blindness America are two organizations that have “increasing awareness of glaucoma” as a major goal. The AAO’s National Eye Care Project has provided free glaucoma diagnosis and treatment to hundreds of thousands of patients since 1986. In 1989, Preferred Practice Patterns on glaucoma were published by the AAO to aid ophthalmologists in the treatment of their patients. The National Eye Institute, the Glaucoma Foundation, the Glaucoma Research Foundation, and other organizations have also implemented programs to increase awareness of glaucoma.

In 2 separate studies, one covering 1986 to 1988 and the other based on...
RESULTS

During the 4-year period of our study, the total number of patients in our database was 200,207. After excluding the patients whose records indicated a race of “other” (n = 6464; 3.2%) or “unknown” (n = 2456; 1.2%), there were a total of 160,792 white patients (80.3%) and 30,495 black patients (15.2%). Black patients tended to be younger than white patients, with an age distribution showing more than half of black patients in the 65- to 74-year-old age group (Table 2). This is consistent with the US Census Bureau data that show that blacks have a shorter life expectancy than whites.19

The sex split between both blacks and whites shows an approximate female-male ratio of 2:1 (Table 3). When the frequency of argon laser trabeculoplasty or trabeculectomy is compared between whites and blacks, the data show that blacks receive argon laser trabeculoplasty less frequently as their primary surgical procedure for glaucoma (Table 4) (χ² test, P<.001).

For each age subgroup as well as for each age-sex subgroup, the rate of surgical procedures is higher in blacks compared with whites. The rate ratios comparing blacks with whites show that the ratio is 2.51 for the 65- to 74-year-age group, 1.95 for the 75- to 84-year age group, and 1.66 for the 85 years and older age group. The overall ratio of rates of primary glaucoma surgical procedures for blacks vs whites is 2.12 for all age groups combined (Table 5). The age-sex-adjusted rate ratio is 2.14 (95% confidence interval, 2.11–2.16).

Based on prevalence information from the Baltimore Eye Survey, the rate ratio would be 4 or higher if one assumes that the same proportion of blacks and whites with glaucoma undergo surgery.2 In our study, the overall rate for whites was 1.38 glaucoma surgical procedures per 1000 person-year of enrollment. If one assumes that blacks have surgery at an equivalent rate to whites, then the rate would be 5.52 glaucoma surgical procedures per 1000 person-year of enrollment. The adjusted rate we found for all blacks, 2.95 primary glaucoma surgical procedures per 1000 person-year of enrollment, is 47% below this target rate.
There appears to be a small increase in the rate of glaucoma surgical procedures in blacks compared with whites, in 1993 and 1994 (rate ratio, 2.28) compared with 1991 and 1992 (rate ratio, 2.16) (Table 6).

**COMMENT**

The rate of argon laser trabeculoplasties and trabeculectomies in blacks was less than expected in 1991 to 1994, given the prevalence of the disease. This is similar to what was reported for all glaucoma surgical procedures in 1986 to 1988 and in 1991.12,13 Thus, despite programs that have been implemented by organizations such as the AAO, the National Eye Institute, the Glaucoma Foundation, the Glaucoma Research Foundation, Prevent Blindness America, the Lions Club International, and many other national, state, and local groups in an effort to increase awareness of glaucoma, surgical undertreatment of glaucoma in elderly blacks still exists.

The existence of differences in the rates of other medical procedures for black Medicare beneficiaries compared with white Medicare beneficiaries has been reported in other medical fields.20,21 Black Medicare beneficiaries have lower rates of percutaneous transluminal coronary angioplasty, coronary artery bypass graft surgery, total knee replacement, and total hip replacement.20 The reasons for this undertreatment may be lack of access, although Wang and coauthors13 reported that the undertreatment of blacks for glaucoma and cataracts persists even when the analysis is restricted to those who use eye care services.

Lack of public education and societal biases may also play a role.21 Fifty percent of subjects with glaucoma in a population-based study were unaware that they had a
diagnosis of glaucoma. Even when subjects know that they have glaucoma, their compliance with glaucoma medications may be poor. This lack of education about glaucoma is not limited to patients but is also seen with physicians. In surveys of nonophthalmologist physicians at medical society meetings, Richard Mills, MD, MPH, found that large numbers of nonophthalmologist physicians do not know the current definition of glaucoma, the risk factors associated with glaucoma, or the preferred diagnostic and treatment strategies. Blacks and whites respond differently to certain surgical procedures, so some physicians may view differences in treatment as medically justified. However, differences in treatment have also been documented in settings where medical justification is lacking, which may contribute to undertreatment of black Medicare beneficiaries.

There may be other reasons for this apparent undertreatment of black Medicare beneficiaries. One possibility is overtreatment of white Medicare beneficiaries. In addition, it is possible that blacks may have more glaucoma surgery before the age of 65 years than whites, since blacks tend to have more severe glaucomatous damage at the time of diagnosis and are more likely to have a progressive course. Because our study is based on patient data for Medicare beneficiaries who are 65 years or older, we cannot determine whether surgery in blacks younger than 65 years is more prevalent than that in whites. However, because the prevalence of glaucoma in blacks increases with age, it seems unlikely that the deficit of surgical treatment seen here would be balanced by an excess of surgical procedures before age 65 years in blacks.

Another potential bias in our study is misclassification error, since there may be coding errors. Other authors have reported 96% to 98% sensitivity in coding procedures in the Medicare database. In addition, the data we obtained from HCFA does not contain information on patients who are enrolled in Medicare health maintenance organizations or Veterans Affairs hospitals, since claims for these patients are not submitted. The number of patients in Medicare health maintenance organization programs has been steadily increasing from 5.9% of the total Medicare population in 1991 to 7.4% in 1994.

Although the rates of argon laser trabeculoplasties and trabeculectomies range between 3.72 and 4.05 per 1000 person-year for blacks from 1991 to 1994, the adjusted rate ratios for blacks compared with whites are higher in 1993 and 1994 than in 1991 and 1992. This small change for the better may represent the impact of the many glaucoma education and screening programs or improved access to eye care by the National Eye Care Project of the AAO, the Glaucoma Awareness Project of the AAO, and the National Eye Health Education Program of the National Eye Institute.

Although the surgical undertreatment of glaucoma in black Medicare beneficiaries compared with white beneficiaries appeared to persist during the 1991-1994 period, there is a trend in our data that suggests that the gap may be narrowing. A major change in the public health policies in the United States may be needed if we hope to see a further narrowing of the gap of surgical treatment of glaucoma between blacks and whites.