Gout in Ambulatory Care Settings in the United States

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ABSTRACT. *Objective.* To describe the ambulatory care utilization by patients with gouty arthritis (gout) in the United States using a nationally representative sample.

Methods. A cross-sectional survey design based on the ambulatory care data from the 2002 US National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey was used to examine the ambulatory care burden for gout, the characteristics of gout patients, the types of providers who see gout patients, and prescribing patterns associated with the management of gout. Weighted analyses were performed to estimate the effect of age, sex, and ethnicity on the association with gout and prescription of allopurinol.

Results. Of the 973 million ambulatory care visits in the United States, 3.9 million were for gout. The majority of visits were for men. The average age for men with gout was lower than that for women with gout (65 vs 70 years of age). Over two-thirds of these gout visits were attended to by primary care providers, whereas visits to rheumatologists constituted only a very small proportion of these visits (1.3%). There were 2.8 million prescriptions for allopurinol, 700,000 prescriptions for nonsteroidal antiinflammatory drugs, 381,000 prescriptions for colchicine, and 341,000 prescriptions for prednisone. After adjusting for age and sex, Asians were 2.7 times more likely than Caucasians to have a gout visit. Yet these patients had lower probability of receiving allopurinol (odds ratio 0.04, 95% confidence interval 0.01–0.27).

Conclusion. The majority of patients with gout are seen by generalist physicians. Asian ethnicity is associated with higher number of visits for gout, but a lower frequency of allopurinol treatment. (First Release Feb 1 2008; J Rheumatol 2008;35:498–501)

Key Indexing Terms:
GOUT   PHARMACOEPIDEMIOLOGY   ETHNICITY
ANTIINFLAMMATORY   ALLOPURINOL

Gouty arthritis (gout) is an arthritic manifestation of chronic/severe hyperuricemia characterized by episodes of intense inflammation punctuated by periods of quiescence. In a small proportion of patients, gout becomes a truly chronic disease characterized by ongoing pain, disability, joint damage, and other end-organ damage including renal failure. Gout is one of the most common forms of inflammatory arthritis in the population and is commonly diagnosed by primary care providers[1]. Epidemiologic studies suggest that the overall disease burden of gout is substantial and growing[2]. Between the years 1988 and 1994, a prevalence rate of 2.7% for self-reported gout was calculated from the Third National Health and Nutrition Examination Survey data[3]. However, the prevalence of physician-diagnosed cases has been much lower, especially in earlier time periods (~0.04%, 1959–1964). More recent data from 1990 to 1999 indicate a small but consistent increase of ~0.2% per annum in the proportion of managed-care claims[4].

Even though gout is a common condition in rheumatology clinics, there are few recent clinical data available on healthcare utilization related to gout in the United States. Early reports suggest substantial racial differences in the occurrence of this condition, yet there is little information available on the pattern of medication prescribing among different races. In this descriptive study, we utilized the largest and most comprehensive ambulatory care survey in the US to examine the ambulatory care burden for gout, the characteristics of patients with gout, the types of providers who see patients with gout, and the prescribing patterns associated with the management of gout. In addition, we examined factors associated with the diagnosis of gout and factors associated with the prescription of medications designed to reduce serum uric acid, that is, allopurinol.

MATERIALS AND METHODS

Data source. The study utilized de-identified cross-sectional data from the

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National Ambulatory Medical Care Surveys (NAMCS) as well as the outpatient clinic part of the National Hospital Ambulatory Medical Care Surveys (NHAMCS) for the calendar year 2002 (January 1, 2002, to December 31, 2002) to identify ambulatory care visits for gout. NAMCS data are collected from a national probability sample of visits to non-federal government employed office-based physicians who are primarily engaged in direct patient care. The outpatient part of NHAMCS is designed to collect data on the utilization and provision of ambulatory care services in hospital outpatient departments.

Sampling methodology in NAMCS. The details of the NAMCS and NHAMCS sampling methodology have been described[5]. NAMCS used a multistage probability design involving geographic samples of primary sampling units (PSU), physician practices within PSU, and patient visits within practices. The first stage of sampling included PSU representing geographic locations of the US, the second stage involved a probability sample of practicing physicians selected from the master files of the American Medical Association (AMA) and the American Osteopathic Association (AOA). Only office visits to physicians who were not employed by the government and were engaged primarily in direct patient care (except anesthesiology, pathology, and radiology) were sampled. The final stage was selection of patient visits from the practices of sampled physicians using a 2-step process. In the first step, the total physician sample was divided into 52 groups. Each of the groups was assigned to 1 week per year. In other words, each physician was assigned 1 week per year to contribute patients to the survey. In the second step, the physicians performed a systematic random sample of patient visits during the reporting week. The sampling rates for this final step varied from 20% of large, busy practices to 100% for small practices and were determined a priori during a presurvey interview. Physicians were instructed to keep a daily listing of all the patient visits during the assigned reporting week using an arrival log or similar method. Visits were selected from the list using a random start and prespecified number of visits for the week and the number of days the physician was expected to see patients that week. Based on the sampling, roughly 30 visits were sampled per physician in the NAMCS and about 200 visits per hospital outpatient clinic in the NHAMCS. These data were subjected to completeness checks and clerical error checks. Medical and drug coding were performed centrally and were subjected to quality control procedures. The nonresponse rates are generally less than 5% or less. Data collection is done through the physician aided by his/her staff. The visit report form contains information regarding patient sociodemographics, physician specialty, diagnoses, procedures, and prescription drugs associated with the visits.

Sampling methodology in NHAMCS. The NHAMCS used a 4-stage sampling system. The first was a geographic sample based on the PSU utilized in the National Health Interview Survey (NHIS). The second level of sampling was performed to choose hospitals. The sampling frame in the NHAMCS was based on published hospital databases that listed hospitals that had an average length of stay less than 30 days. Very small hospitals (less than 6 beds) and federally owned hospitals were excluded. The group of hospitals was further divided into 16 groups so that each group contributed in the survey for only one 4-week period. The third sampling step was to select hospital clinics. If the hospital had only 5 outpatient clinics, all were chosen to be included in the survey; if there were more than 5 clinics, 5 were chosen randomly based on a predetermined protocol to take into account clinic type and size. The fourth sampling stage was selection of individual patient visits. Typically, about 200 visits were chosen in a systematic random method per hospital clinic in the 4-week study period.

Case definition. The case definition of gout was based on the presence of at least one occurrence of the International Classification of Diseases, Clinical Modification-9 (ICD-9) code for gout (274.X) in any of the 3 listings of diagnoses for the ambulatory care visit. In addition, outpatients who had prescription of specific uric acid reduction medications, that is, allopurinol or probenecid, were also included.

Other information. The physician specialties were identified from the AMA and AOA master file. Information on race was based on self-report, and classified based on US census groups. Data on Hispanic ethnicity were also collected. There was no specific effort for over- or undersampling any racial groups. Gout-related medications were broadly classified into those that reduce uric acid and those that do not. The former group included 2 medications — allopurinol and probenecid. The latter included colchicine and nonsteroidal antiinflammatory drugs (NSAID). We did not exclude those visits where subjects were taking allopurinol along with cancer chemotherapy.

Statistical analyses. Strictly speaking, the primary metric of our study was patient visits, not individual patients. However, given the sampling procedure, it is very unlikely that each individual contributed to more than one visit. Data from the NAMCS and NHAMCS are multistage probability samples that require use of probability weights for analyses. The data were analyzed using the SVY suite of Stata SE 8.0® (Stata Corp., College Station, TX, USA). Description of the demographic and provider variables was based on a calculation of weighted means and 95% confidence interval (95% CI) for the weighted estimates. Unless otherwise specified, the weighted results are given. Multivariable weighted logistic regression analysis was used to identify factors associated with the diagnosis of gout and factors associated with prescription of allopurinol or probenecid. In these regressions, the presence or absence of a prescription was the dependent variable and age, sex, and other factors were the independent variables.

RESULTS

Demographics. In calendar year 2002, there were 973 million outpatient visits in the US, of which 3.9 million were for gout (0.4%, 95% CI 0.3%–0.5%). The average age of those with a visit with a gout diagnosis, 66 years (95% CI 63–69), was substantially higher than the average age for all ambulatory care visits, 43 years (p < 0.001). Thirty-four percent of those with gout visits were women (1.3 million). Overall, the proportions of gout visits for men and women were 65/10,000 and 23/10,000, respectively. Women with gout visits were older than men with gout visits (70 vs 65 years of age; p < 0.05). About 82% of those with gout visits were Caucasian (n = 3.2 million), 10% were African American (n = 373,000), 6% were Asian and Pacific Islander (n = 239,000), and 8% were of other racial groups. Information on Hispanic ethnicity was not available on 13% of the sample. Where available, among those with a gout visit, 11% (n = 25,000) reported Hispanic ethnicity, a proportion not significantly different from the overall proportion of Hispanics in the NAMCS sample. This distribution was not statistically significantly different from the overall race distribution. Caucasians with a gout visit were more likely to have private insurance (46%) compared to African Americans (11%; p < 0.001).

Physician specialty. An estimated 94% (95% CI 91%–96%) of encounters occurred in the physician's office in contrast to 6% (95% CI 4%–10%) in a hospital outpatient setting. These differences reflected the overall pattern of physician visits. The type of physician encountering gout in the ambulatory care setting is given in Table 1. Generalists (internists/family practitioners and general practitioners) saw the largest proportion of gout patients. Interestingly, rheumatologists accounted for only 1.3% (95% CI 0.2%–7.0%) of these visits. Physician assistants took care of 1.8% of all ambulatory

Table 1. Distribution of visits to specialists among patients with a gout visit (none were seen by pediatricians, neurologists, or psychiatrists).

Specialty	Visits for Non-Gout Reasons	Visits for Gout	Proportion of All Gout Visits to This Specialty, %	Overall Number of Visits
General/family practice	213,965,547	1,500,425	38.34	215,465,972
Internal medicine	155,488,884	1,203,310	30.75	156,692,194
Orthopedic surgery	38,018,169	9,710	0.25	38,027,879
Cardiovascular diseases	20,430,843	390,774	9.99	20,821,617
Dermatology	32,207,648	19,450	0.5	32,227,098
Rheumatology	3,437,744	46,019	1.18	3,483,763
Other specialties	103,586,205	388,049	8.74	100,490,491
Unknown/not available	83,103,414	235,656	6.02	83,339,070
Total	969,406,505	3,913,056	100	973,319,561

care visits. However, the number of gout patients they treated was too small to be estimated reliably.

Factors associated with a diagnosis of gout in ambulatory settings. In univariable analyses, each year of increasing age was associated with increasing risk for gout by 5% (95% CI of the odds ratio = 1.04–1.06). Male sex was associated with an odds ratio of 2.8 (95% CI 1.5–5.2) compared to women. Risk for individual ethnicities did not differ significantly in univariable models. However, after adjustment of age and sex in a logistic regression model, Asian ethnicity was associated with an odds ratio of 2.7 (95% CI 1.1–7.7) for a diagnosis of gout compared to Caucasian ethnicity.

Medications prescribed for gout in ambulatory care. For this analysis we estimated drug prescription rates for the year 2002. Overall, there were 2.8 million prescriptions (95% CI 1.9–3.7 million) of allopurinol. We estimated the number of probenecid prescriptions to be ~8000. However, this relatively small number is not a robust estimate (95% CI ranged from 0 to 25,511). An estimated 381,000 (95% CI 81,000–681,000) prescriptions of colchicine were written in the study period. The utilization of colchicine among those with gout was 4.6% (95% CI 2%–12%). Prednisone, the most commonly used oral corticosteroid, was prescribed in 341,000 gout visits (95% CI 44,700–638,000), which represents 8.9% (95% CI 4%–18%) of all gout visits (n = 340,000 visits). Use of NSAID was more common than colchicine or prednisone among those with gout. NSAID were prescribed on 18% of visits (95% CI 11%–28%), while among those without gout the proportion of visits where NSAID was prescribed was lower: 7% (95% CI 6%–8%, p < 0.001). In absolute terms, the number of NSAID prescribed to gout patients was 700,000 (95% CI 300,000 to 1.1 million).

Factors associated with uric acid reduction prescriptions. We examined sociodemographic variables associated with prescription of only allopurinol because the prescription of probenecid was too infrequent. African Americans were less likely than Caucasians to receive allopurinol (42% vs 80%, respectively). However, an even lower proportion of Asian Americans with gout were likely to receive allopurinol (19%). In univariable models, neither age nor sex was sig-

nificantly associated with allopurinol prescription. In both univariable and multivariable models, Asian race was associated with a markedly lower probability of receiving an allopurinol prescription (OR 0.07, 95% CI 0.01–0.32). Similarly, African Americans were also less likely to receive an allopurinol prescription than Caucasians. Patients with other races were not statistically more or less likely to receive allopurinol (Table 2).

DISCUSSION

Principal findings. Our analyses show a relatively small but significant burden of healthcare utilization attributable to gout in the US. Of roughly 973 million ambulatory care visits, 3.9 million were for gout. The ambulatory care burden of gout was greatest among men. Healthcare utilization for gout increased substantially in the older age group, particularly among women. We observed a relatively higher age- and sex-adjusted chance for individuals of Asian ethnicity to seek care for gout. The vast majority of gout visits were attended by generalists/primary care providers. Rheumatologists accounted for a very small number of such visits (1.3%). Allopurinol was the most widely prescribed uric acid reduction treatment, with ~2.8 million prescriptions per year. Probenecid use was surprisingly low. NSAID prescription with a gout visit (18%) was about 2.5 times the rate of NSAID prescription for all other ambulatory care visits. This proportion is smaller than that recorded by Mikuls, *et al*[6], perhaps reflecting different practice patterns. Individuals of Asian race received disproportionately fewer prescriptions of allopurinol, even though they were at higher risk of gout.

Significance of findings. Ethnic differences in the frequency of gout in specific Asian subgroups has been well described[7]. Asians have traditionally been noted to underutilize ambulatory care in general[8]. Yet there are disproportionately higher numbers of Asians seeking ambulatory care for gout, a pattern consistent with higher prevalence of this disease among this ethnic group. Studies have shown substantially higher relative prevalence of hyperuricemia and/or gout among Asian populations such as native Taiwanese[9] as

Table 2. Results of weighted logistic regression for predictors of allopurinol prescription.

Factor	Odds Ratio	95% CI		p
Each year of increasing patient age	1.02	0.98	1.06	0.44
Women	Referent			
Men	0.80	0.22	2.86	0.73
Caucasians	Referent			
African Americans	0.18	0.04	0.78	0.02
Asians	0.07	0.01	0.32	0.00
Native Hawaiian/other Pacific Islanders	0.23	0.01	4.79	0.34

well as Taiwanese of Han ancestry[10], Filipinos[11,12], Micronesians[13], Maoris/Polynesians[14], and Fijians[15]. It is hypothesized that Asians, genetically accustomed to a high carbohydrate/low animal protein dietary pattern, might have impaired renal clearance of uric acid when faced with a Westernized diet[14]. Paradoxically, we found lower utilization of uric acid-reducing medications among this ethnic group. Further research is warranted into the causes of this disparity.

A new observation we have made is the small proportion of those with gout seeking care with rheumatologists, generally considered "experts/specialists" in this condition. While this may reflect that gout is, by far, a relatively self-limited and intermittent disease, the policy implication is that any steps to increase quality of care for these patients are better aimed at generalist physicians.

The National Ambulatory Medical Care family of surveys is probably the only survey mechanism based on a national probability sample survey of physician-patient encounters and is designed to give a representative "snapshot" of ambulatory care in the US. Yet these data exclude heathcare settings such as veterans health clinics, military facilities, and several other federal healthcare facilities. To our knowledge, there are no other datasets that can provide a similar range of information. The data collection strategies of NAMCS are robust and well tested. Within this dataset, the diagnosis of gout is based on physician attribution, which may not correlate with predefined diagnostic criteria. Further, little information is available on laboratory testing results, extent of disease (presence of erosions, tophi, etc.), and the primary indication for the visit (acute vs intercritical gout), limiting the inferences that can be drawn. In addition, the duration of use of each medication, such as NSAID, is not available. Over the counter use of NSAID has not been accounted for in this study. The data also do not allow us to be more specific with regard to different ethnicities within the category of Asian race. Nevertheless, epidemiological studies such as ours provide important perspectives into the significance of gout in the general population.

We describe, for the first time, healthcare utilization of patients with gout in ambulatory settings. While the sex disparity in this condition is common knowledge, we observed significant ethnic disparities in the prevalence and treatment of gout in patients of Asian origin.

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