PULMONARY SARCOIDOSIS: COMPARISON OF PATIENTS AT A UNIVERSITY AND A MUNICIPAL HOSPITAL

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Charts and radiographs of sarcoidosis patients seen at a private university hospital and at a municipal hospital were reviewed to determine whether there was a difference in the severity of disease retrospectively. A standardized abstract form was used to identify and abstract information on new and continuing sarcoidosis patients seen at either Georgetown University Medical Center (GUMC) or District of Columbia General Hospital (DCGH) during a 2-year period. Because there were too few white sarcoidosis patients for comparison, analysis was done for African-American patients only.

African-American patients at GUMC were slightly older, with a higher percentage of women. For GUMC patients, 76% had private insurance and 21% had public insurance, and for DCGH patients, one-half had public insurance and 29% had no insurance. Significantly fewer GUMC patients (7% versus 36%) reported moderate to severe dyspnea. Chest radiographs showed a larger percentage of patients with stage 1 disease at GUMC and more patients with stage 4 disease at DCGH. Spirometry showed more impairment of forced expired volume in one second (FEV_1) in GUMC patients, but diffusing capacity of the lung for carbon monoxide (D_LCO) values were significantly lower among DCGH patients. Less than 8% of GUMC patients showed disease progression compared with almost one-third of DCGH patients. These results demonstrate that substantially less severe pulmonary sarcoidosis was seen in African-American patients treated at a private, nonprofit university hospital compared with a municipal hospital. Factors that determine the use of municipal hospitals, such as limited financial access to care and sources of patients, may have played a major role in the differences seen. (*J Natl Med Assoc.* 1999;91:322-327.)

Key words: sarcoidosis ◆ ethnicity ◆ university hospitals ◆ municipal hospitals

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The incidence, severity, and outcome of sarcoidosis varies widely by race in the United States. African Americans have higher rates of sarcoidosis diagnosis, more severe disease manifestations, and higher fatality rates. White patients with sarcoidosis are more likely to present with acute symptoms associated with a good prognosis.[1-4] A recent study from a health maintenance organization reflected these racial differences in prevalence and severity in a group of patients in whom financial access to care presumably was not at issue.[5] Genetic and environmental differences probably are partly responsible

for racial differences in disease occurrence and severity; however, little or no attention has been paid to sociodemographic factors.[6] One preliminary report suggested that socioeconomic indicators might contribute to differences in sarcoidosis prevalence and severity seen in African-American populations in the United States, but that study presented only limited data.[7]

There is evidence that various diseases are less severe as seen in private compared with municipal hospitals[8]; no such comparison has been conducted for sarcoidosis. This study retrospectively compared the charts of pulmonary sarcoidosis patients seen at a private, nonprofit university hospital and at a municipal hospital service of the same university in the same city; the two hospitals serve different geographic areas and patient populations.

MATERIALS AND METHODS

Study Sites and Institutional Review Board Approval

Adult patients were identified from the pulmonary clinic at Georgetown University Medical Center (GUMC), a private, nonprofit university hospital, and the sarcoidosis clinic of its DC-affiliated program at District of Columbia General Hospital (DCGH), a municipal hospital. Georgetown University Medical Center is located in northwestern Washington, DC, and serves residents of the District of Columbia and the greater metropolitan Washington, DC, area, which includes nearby Maryland counties and Virginia jurisdictions. While GUMC serves a socioeconomically diverse population, adult patients are predominantly white and insured.

The District of Columbia General Hospital is located in far southeastern Washington, DC, and serves a predominantly minority (mostly African-American), low-income patient population. The District of Columbia General Hospital is the municipal hospital for the District of Columbia. The Georgetown University affiliation includes a sarcoidosis clinic to which sarcoidosis patients are referred from the affiliated Georgetown medical, surgical and obstetrical hospital services. The GUMC institutional review board of approved the study protocol.

Identification of Patients

All patients aged ⩾18 years with confirmed or suspected sarcoidosis seen at least once at one of the study sites between July 1992 and December 1994 were eligible for participation in the study. Accepted diagnosis of sarcoidosis was based on clinical diagnosis (history, physical findings, and chest radiograph compatible with sarcoidosis), with or without tissue biopsy evidence. All confirmed and presumed cases of disease were accepted. To identify potential study patients, a computerized search was made of hospital databases on account, invoice, transaction, and registration levels for patients with the *International Classification of Diseases, Ninth Revision* code of 135, indicating sarcoidosis.

Data Collection

When a patient attending one of the two study sites was identified as having sarcoidosis, project researchers reviewed the medical chart at the site of care. If the patient met the participant criteria, the laboratory data and the sociodemographic, economic, and general health status information as well as current disease status (determined by radiographic staging), number and type of clinical symptoms, and patient history contained in the chart were abstracted using a standardized form. This information was entered into the Georgetown University Sarcoidosis Registry.

Seventeen percent of medical records from patients seen in pulmonary and sarcoidosis clinics were abstracted twice, each time by different researchers, and compared. In the event of a discrepancy, the chart was pulled for a third time and the question was reinvestigated. Of the 20 medical records abstracted more than once, four contained discrepancies; these discrepancies were errors of omission.

Clinical Data

Dyspnea was evaluated using the Modified Medical Research Council Dyspnea Scale.[9] For both institutions, pulmonary function tests were performed according to standards set by the American Thoracic Society.[10-14] Approximately 10% of raw pulmonary function data from DCGH was recalculated at GUMC with 100% agreement. Radiographs were read by staff radiologists at the radiology departments and reviewed by pulmonologists at GUMC and DCGH. Radiographs were classified according to Scadding's classification,[15] except that the films with definite fibrosis and/or upper lobe loss of volume were rated as stage 4.[16] Approximately 10% of radiographs were cross-read by pulmonologists at both GUMC and DCGH, and consensus was reached on approximately 95%.

Table 1. Sociodemographic Characteristics of Pulmonary Clinic Patients

Characteristic	% Total Sample (N=91)	% GUMC Patients (n=34)	% DCGH Patients (n=57)
Median age (yr)	42	44	41
Mean age (yr)	42 (10)*	44 (10)	41 (10)
Female	66	71	58
Private insurance	42	76	21
Public insurance	39	21	50
No insurance	19	3	29

*Numbers in parentheses are standard deviations.
GUMC=Georgetown University Medical Center and DCGH=District of Columbia General Hospital.

Table 2. Self-Reported Dyspnea of Pulmonary Clinic Patients

	% All Pulmonary Patients (N=57)	% GUMC Patients (n=29)	% DCGH Patients (n=28)
No dyspnea	37	48	25
Mild dyspnea	42	45	39
Moderate/Severe dyspnea	21	7	36

GUMC=Georgetown University Medical Center and DCGH=District of Columbia General Hospital.

Data Analysis

All data were entered and analyzed using SPSS for Windows (Version 6.1.2). The majority of analysis consisted of simple descriptives (eg, frequencies and measures of central tendency). Where applicable, data analysis also included cross-tabulations using the nonparametric contingency coefficient (C) to determine the degree and significance of an association between the site of care and several sociodemographic, health status, and medical services use variables. The contingency coefficient, based on the chi-square test, is a nonparametric test for use with nominal level variables. C values ranged from 0 to 1, with 0 indicating no association between variables and 1 indicating complete association. The significance level indicates the probability that a likely association exists within the population represented by our sample.[17]

RESULTS

It was our original intent to compare populations of both African-American and white patients in terms of disease severity; however, there were too few white patients at either site for comparison by site. The DCGH sarcoidosis clinic population is almost entirely African American, whereas the GUMC pulmonary population is more heterogenous, but also predominantly African American. To avoid potential confounding relating to race, analyses were conducted only on African-American patients from both clinics.

Of the 91 African-American patients, 34 (37%) were seen at GUMC and the remaining 57 (63%) were seen at DCGH. Table 1 summarizes sociodemographic characteristics for both sites. The median age of all pulmonary patients was 42 years. Patients at GUMC were older than patients at DCGH (44 versus 41 years), and a higher percentage were female. Seventy-six percent of GUMC patients had private insurance versus 22% of DCGH patients. Ten times as many DCGH patients had no insurance, and twice as many had public insurance (ie, Medicaid, Medicare, or CHAMPUS) compared with GUMC patients. This strong correlation (C=0.48) between site of care and type of insurance was significant to the .001 level.

Table 2 summarizes health status characteristics by site of care. Significantly fewer GUMC patients (7% versus 36%) reported moderate to severe dyspnea. There were no significant differences in vital capacity (VC) by site of care; however, forced expired volume in one second (FEV_1) measurements (percent predicted) showed more impairment among GUMC patients (C=0.27; significant to the .05 level). Diffusion lung capacity for carbon monoxide (D_LCO) values were significantly lower among DCGH patients (C=0.29; significant to the .04 level) (Table 3).

Table 4 shows the differences in radiographic stage of disease in patients from the two sites. Of particular note was the fact that only one-fourth as many GUMC patients as DCGH patients had stage 4 disease (C=0.39; significant to the .001 level). Furthermore, <8% of GUMC patients showed disease progression compared with almost one-third of DCGH patients (C=0.30; significant at the .05 level) (Table 5).

DISCUSSION

Georgetown University Medical Center, a pri-

Table 3. Pulmonary Function Tests of Pulmonary Clinic Patients*

	% All Pulmonary Patients (N=74)	% GUMC Patients (n=30)	% DCGH Patients (n=45)
Normal VC values	76	79	74
Mild VC Impairment	11	7	13
Moderate/Severe VC impairment	14	14	13
Normal FEV_1 values	59	43	71
Mild/Moderate decrease in FEV_1	30	43	21
Severe decrease in FEV_1	11	13	9
Normal D_LCO values	20	34	11
Mild/Moderate D_LCO impairment	49	45	51
Severe D_LCO impairment	31	21	38

*Pulmonary function values were classified as follows: VC: normal, ≥80% of predicted; mild impairment, ≥70% and ≤80%; moderate/severe impairment, <70%. FEV_1: normal, ≥80%; mild/moderate impairment, ≤80% and ≥60%; severe impairment, <60%. D_LCO: normal, ≥80% of predicted; mild/moderate impairment, ≤80% and ≥50%; severe impairment, <50%.
GUMC=Georgetown University Medical Center; DCGH=District of Columbia General Hospital; FEV_1=forced expired volume in one second; D_LCO=diffusion capacity for carbon monoxide; and VC=vital capacity.

Table 4. Radiographic Staging of Pulmonary Clinic Patients*

Stage	% All Pulmonary Patients (N=77)	% GUMC Patients (n=25)	% DCGH Patients (n=52)
1	15	28	8
2	29	20	33
3	31	44	23
4	25	8	33

*Stage 1, hilar adenopathy only; stage 2, hilar adenopathy and pulmonary infiltrates; stage 3, pulmonary infiltrates only; and stage 4, pulmonary infiltrates and definite fibrosis and/or upper lobe loss of volumes.[16]
GUMC=Georgetown University Medical Center and DCGH=District of Columbia General Hospital.

vate, nonprofit university hospital, had more female and white sarcoidosis patients than DCGH, a municipal hospital, but sarcoidosis patients at both sites were predominantly African American. The gender distribution at DCGH was affected by referral of patients from the DC prison system, which has a large male, African-American population. Patients entering the prison system are routinely screened with radiographs, which could have led to detection of early sarcoidosis. Indeed, 11% of DCGH sarcoidosis patients were from the DC correctional system, and all of them were male. As prison inmates are primarily male, screening and referral of prisoners selectively at DCGH could have identified male sarcoidosis patients who otherwise might not have been seen at DCGH. This referral procedure could account for the lower proportion of females among sarcoidosis patients seen at the municipal hospital for a disease that affects more women than men.

However, the referral pattern could not account for the increased severity of disease seen among DCGH patients. Our results indicate that disease severity and status were correlated with economic indicators: site of care (private or municipal hospital) and insurance status (private, public, or no insurance). African-American sarcoidosis patients seen at GUMC had less severe disease and less progression of their disease than those seen at DCGH. Georgetown University Medical Center patients reported less dyspnea, and had less impairment of their lung diffusion capacities and their chest radiographs, compared to the municipal hospital patients, although the forced vital capacities were not significantly different in the two groups. More of the former had private insurance, whereas the latter overwhelmingly had Medicaid or no health insurance. It was surprising that GUMC patients had a slightly greater impairment of their FEV_1 than municipal hospital patients, which may have been related to differences in tobacco use or other nonsarcoidosis-related factors, although sarcoidosis can cause airway obstruction in and of itself.[18] Chart data were inadequate for smoking history. Sharma and Johnson[19] found 63% of African-American sarcoidosis patients had airway obstruction due solely to sarcoidosis.

Both sarcoidosis disease presentation and progression among African-American patients differed by

Table 5. Radiographic Staging of Pulmonary Clinic Patients

Radiographic Status	% Total Sample (N=37)	% GUMC Patients (n=25)	% DCGH Patients (n=12)
Unchanged or improved	84	92	64
Worse	16	8	33

GUMC=Georgetown University Medical Center and DCGH=District of Columbia General Hospital.

the type of hospital providing care, with the municipal hospital serving more poorly insured patients with more severe disease. This is consistent with the literature on other chronic diseases[20-23] and suggests that studies of sarcoidosis presentation and outcomes from single hospitals are affected by factors peculiar to the presentation of patients to that hospital. For diseases that disproportionately affect financially disadvantaged minority patients, such as sarcoidosis, studies from single institutions may be particularly misleading as to clinical characteristics, depending on the hospital's policies regarding the care of those financially disadvantaged. Financial access to care is a particular problem for young African-American patients, perhaps delaying presentation of disease or continuation in treatment, both of which would be reflected in more severe disease. In addition, the source of patients, particularly characteristics such as those seen with the prison patients in this study, may affect the presentation of disease among a municipal hospital's cases. Young patients, those between ages 18 and 44, the major age group affected by sarcoidosis, are more likely to be uninsured.[24] African Americans <65 years are more likely to be insured than whites (23% versus 16%).[25]

There are many limitations of this study, being dependent as it is on data available in patient charts. Some of the data were not readily available and were expressed as completely as could be ascertained. For example, only 57 of 91 patients had dyspnea described in sufficient detail for it to be classified. Similarly, 74 of 91 patients had classifiable radiographs, and 77 of 91 had obtainable pulmonary function tests. Furthermore, not all cases were similarly diagnosed, followed for a fixed period, or similarly treated. To obtain more complete and comparable data on disease severity and its relationship to financial access, a telephone survey is being conducted. In addition, generalizations and conclusions should be drawn from this study with caution because the study was conducted on a small number of patients treated in two hospital clinics and was limited to African-American patients.

CONCLUSION

There were significant differences in insurance status and disease status and severity in African-American patients treated at two different hospitals. Variations in disease status and severity may have been related to differences in financial access, and referral of patients to health-care services.

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COMMENTARY

Are Sociodemographic Factors Important in Sarcoidosis?

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The article entitled "Pulmonary Sarcoidosis: Comparison of Patients at a University and a Municipal Hospital" by Yeager et al[1] in this issue, is a collaborative, retrospective comparison of the effects of sociodemographic aspects of sarcoidosis on the course and prognosis of patients under care at two types of institutions. The authors have shown that the differences in outcome found in samples from each hospital were related to sociodemographic status, health care insurance or lack thereof, and access to care–all highly suspect, but previously unsubstantiated by hard data.

The study is a clinically (as well as statistically) significant one, in that it emphasizes differences in outcome affecting poor minority populations with sarcoidosis, not previously addressed. By controlling for race, a confounding variable has been eliminated. Marked geographic variability occurs in sarcoidosis.[2,3] Yeager et al[1] pointed out that the private university hospital serves a more geographically diverse population than does the municipal hospital, a differ-

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