BRIEF REPORT

THE IMPACT OF A NEW RHEUMATOLOGIST ON THE MANAGEMENT OF RHEUMATIC DISEASE PATIENTS IN COMMUNITY HOSPITALS

JEOFFREY K. STROSS and GILES G. BOLE

Although only a small portion of patients with rheumatic diseases receive their care from rheumatologists (1), it has been estimated that a surplus of rheumatologists will exist by 1990 (2). The vast majority of care, however, will continue to be given by primary care providers who may or may not be properly trained to manage this specific patient population. A recent survey of rheumatology education in medical schools demonstrated that 13% of schools did not have a full time rheumatologist and another 38% had fewer than 3 full time rheumatologists. A course on musculoskeletal examination is offered in fewer than two-thirds of medical schools. Inpatient rheumatology units are used for teaching in 7%, and less than 15% of medical students participate in clinical electives in rheumatology (3). Therefore, most medical students have little chance to interview and examine patients with common musculoskeletal complaints, although these skills are considered by participating physicians to be the most important training objectives (4).

Many of these skills may be obtained during specialty training, but a recent study has demonstrated that the care given by some primary care physicians may not be adequate. Inadequate documentation of history and physical findings, inappropriate use of systemic corticosteroids, and failure to use salicylates, gold, and physical therapy were the major deficiencies identified in patient management (5). In Michigan an educational program was undertaken which successfully changed the behavior of primary care practitioners and led to a significant improvement in the process of delivering care (6). While conducting followup studies in the state, 2 communities in which a rheumatologist recently entered practice were identified. This provided us with an opportunity to study the impact of a rheumatologist upon the care given to patients with rheumatic diseases, as well as the rheumatologist's impact upon the way primary care practitioners manage patients with rheumatic disease.

Methods. A survey of rheumatologists in the state of Michigan (7) identified 2 individuals who had recently entered community based private practice of rheumatology. These communities had never had a rheumatologist in practice previously and were located at least 25 miles from a community with a formally trained rheumatologist. Each community had a population of about 50,000 and served a metropolitan area of 80,000–100,000. Two control communities that had similar characteristics to the rheumatologist communities, with the exception of not having a trained rheumatologist, were selected. The key characteristics which were similar included size, number of primary care providers, presence of an orthopedic surgeon and physical therapist, location relative to major referral areas, and the absence of undergraduate or graduate medical education programs in the communities.

From the University of Michigan Arthritis Center and the Department of Internal Medicine, University of Michigan Medical School.

Supported by Multipurpose Arthritis Center Grant 2P 60 AM 20557 from the National Institute of Arthritis, Diabetes, Digestive and Kidney Diseases.

Jeoffrey K. Stross, MD: Associate Professor of Internal Medicine and Director, Community Programs Component, University of Michigan Arthritis Center; Giles G. Bole, MD: Professor of Internal Medicine, Director, University of Michigan Arthritis Center, and Physician-in-Charge, Division of Rheumatology, University of Michigan Medical School.

Address reprint requests to Dr. J. Stross, D3211 SACB, University of Michigan, Ann Arbor, MI 48109.

Submitted for publication August 26, 1982; accepted in revised form March 30, 1983.

Table 1. Comparison of communities before arrival of a rheumatologist

Variable*	Control communities†	Rheumatologist communities†
Admissions	54	51
RA	19 (35.2)	15 (29.4)
OA	6 (11.1)	8 (15.7)
THA	23 (42.6)	21 (41.2)
Others	6 (11.1)	7 (13.7)
Length of stay (days)		
RA	12.0	10.9
OA	6.5	7.2
THA	19.7	18.6
Inpatient therapy, RA		
Aspirin	4 (21.0)	3 (20.0)
Gold	2 (10.5)	1 (6.7)
NSAID	16 (84.2)	10 (66.7)
Hydroxychloroquine	1 (5.3)	2 (13.3)
Corticosteroids	5 (26.3)	3 (20.0)
Physical therapy	13 (68.4)	10 (66.7)
Referral	2 (10.5)	2 (13.3)
Inpatient therapy, THA		
Preoperative evaluation	3.1 days	2.8 days
Transfusions	16 (69.6)	14 (66.7)
Medications		
Aspirin	6 (26.1)	6 (28.6)
NSAID	5 (21.7)	8 (38.1)
Pain medications	18 (78.3)	18 (85.7)
Ambulation		
Cane	15 (65.2)	13 (61.9)
Crutches	6 (26.1)	5 (23.8)
Walker	2 (8.7)	3 (14.3)

* RA = rheumatoid arthritis; OA = osteoarthritis; THA = total hip arthroplasty; NSAID = nonsteroidal antiinflammatory drugs.
† Numbers in parentheses represent percents.

Agreement to participate was obtained in all communities, and since only inpatient audits were to be carried out, the medical staffs were not informed that a study was underway. The charts of all patients hospitalized with a diagnosis of a rheumatic disease were audited for the year prior to the rheumatologists' entering practice and for the first year after they entered practice. A similar 2-year time interval was used in the control communities. These charts were obtained by searching for all patients with an admitting or primary discharge diagnosis of International Classification of Disease Codes 710–715.9. These codes include rheumatoid arthritis, osteoarthritis, gout, systemic lupus erythematosus, scleroderma, polymyositis, and dermatomyositis.

Patients with secondary discharge diagnoses of rheumatic diseases were also evaluated to determine if the diagnosis was an incidental finding or actually necessitated an inpatient level of care. All charts identified were cross-checked for previous admissions that may have been missed in the initial search process. Attempts to identify additional patients included searching for charts coded for arthrocentesis and joint replacement. Physical therapy records were also audited to identify patients not found with the other methods. Demographic data, historic information, physical findings, laboratory studies, diagnostic tests, and therapeutic modalities were recorded on a standardized form. A total of 284 charts with diagnoses of rheumatoid arthritis, osteoarthritis, and total hip replacement were identified, and 278 (97.9%) were obtained and audited.

Results. Data collected in the year prior to the entry of the rheumatologists demonstrated that no significant differences existed between the control and rheumatologist communities (Table 1). When each individual community was examined, no significant differences were found. Admissions for rheumatic conditions were uncommon and accounted for less than 5% of the admissions in these hospitals. In the control communities, 25 patients were admitted with a diagnosis of rheumatoid arthritis, but only 19 (76%) had data in their medical records that fulfilled American Rheumatism Association (ARA) diagnostic criteria of probable, definite, or classic rheumatoid arthritis (8). Similar findings were noted in the intervention communities, where 15 of 22 patients (68%) fulfilled diagnostic criteria. A definitive diagnosis was not established in the 13 patients who did not fulfill criteria for rheumatoid arthritis, and based upon the available data, "nonarticular rheumatism" was the most common probable diagnosis. The length of stay was similar to that reported in other acute care hospitals for the same conditions.

In the management of rheumatoid arthritis, nonsteroidal antiinflammatory agents were commonly used and systemic corticosteroids were used in almost 25% of patients. Physical therapy was utilized in over two-thirds of the patients and referral to a rheumatologist in another community occurred in 10% of the cases. Total hip arthroplasties were the most common reason for admission, accounting for 44 of the 105 admissions (41.9%). The procedures performed, complications, medications, and outcomes were similar in each community.

In the year after the rheumatologists entered practice, a dramatic increase in the number of patients hospitalized with rheumatic diseases occurred in the communities in which the rheumatologists practiced (Table 2). While no changes were evident in the control communities, the number of admissions in the rheumatologist communities increased from 51 to 126 (147%). This increase was most evident for rheumatoid arthritis where admissions increased from 15 to 68

Table 2. Comparison of communities after arrival of a rheumatologist

Variable*	Control communities†	Rheumatologist communities†
Admissions	49	126
RA	16 (32.7)	68 (54.0)
OA	6 (12.2)	11 (8.7)
THA	23 (46.9)	35 (27.8)
Others	4 (8.2)	12 (9.5)
Length of stay (days)		
RA	11.2	9.1
OA	7.1	8.0
THA	19.0	18.2
Inpatient therapy, RA		
Aspirin	4 (25.0)	23 (33.8)
Gold	2 (12.5)	17 (25.0)
NSAID	13 (81.3)	58 (85.3)
Hydroxychloroquine	0	8 (11.8)
Corticosteroids (systemic)	4 (25.0)	10 (14.7)
Corticosteroids (intraarticular)	0	38 (55.9)
Physical therapy	12 (75.0)	61 (89.7)
Referral	1 (6.3)	18 (26.5)
Inpatient therapy, THA		
Preoperative evaluation	2.7 days	1.8 days
Transfusions	10 (43.5)	12 (34.3)
Medications		
Aspirin	9 (39.1)	17 (48.6)
NSAID	7 (30.4)	15 (42.9)
Pain medications	19 (82.6)	33 (94.3)
Ambulation		
Cane	14 (60.9)	13 (37.1)
Crutches	6 (26.1)	11 (31.4)
Walker	3 (13.0)	11 (31.4)

* RA = rheumatoid arthritis; OA = osteoarthritis; THA = total hip arthroplasty; NSAID = nonsteroidal antiinflammatory drugs.
† Numbers in parentheses represent percents.

(353%) but was also present for total hip replacement, 21 to 35 (67%). While some of this increase resulted from multiple admissions (10 patients had 24 admissions among them), most of the increase was from patients who had single admissions and had not been hospitalized in the previous year. Sixteen of 20 patients (80%) in the control communities had adequate documentation that confirmed a diagnosis of rheumatoid arthritis. This was dramatically better in the rheumatologist communities, where only 2 of 70 patients (2.9%) did not fulfill ARA diagnostic criteria.

In the management of rheumatoid arthritis, the number of patients using aspirin and gold increased, but this change was not statistically significant. Hydroxychloroquine was used in 8 patients (11.8%) whereas it had been used in 2 previously (13.3%). Corticosteroids were extensively used by the rheumatologists; however, in 38 of the 48 patients receiving them (79.2%), intraarticular steroids were the sole form used. Intraarticular corticosteroids had not been used in the prior year in these community hospitals.

In the year prior to the rheumatologist entering practice, 10 physicians were responsible for the 15 admissions for rheumatoid arthritis, 4 for the 8 osteoarthritis admissions, and 4 for the 21 total hip replacements. In the next year, the 2 rheumatologists admitted 60 of the 68 patients with rheumatoid arthritis (88.2%), none of the 11 patients with osteoarthritis, 8 of the 12 other patients, and only 4 of the 35 patients who had hip replacements. They were frequently consulted and saw an additional 22 patients by consultation requests. Therefore, they admitted 72 patients and were consulted on an additional 22, so that they were directly involved in 94 of the 126 admissions (74.6%). There were only 8 of 91 nonsurgical rheumatic disease admissions in which they did not participate (8.8%).

The number of total hip replacements increased by 67% but no changes in complications, medications, or outcomes were identified.

Discussion. A recent study described the first 1,000 patients a rheumatologist saw in private practice (9). Over 75% were referred from other physicians, with almost 50% of referrals coming from primary care practitioners. While that outpatient population was well characterized, inpatient activity was not described. In the present study, the inpatient care of patients with rheumatic diseases was evaluated and the findings are consistent with the previously noted outpatient study (9). There was a dramatic increase in hospitalizations for rheumatic diseases, primarily rheumatoid arthritis, but also for total hip replacements. We are assuming no change in disease rates within the communities, and our ongoing studies in 12 other communities substantiate this. Almost 60% of the patients in this study were previously being cared for in their home communities, another 25% were seeking care from rheumatologists in other communities, and data were not available for the remaining patients.

The reasons for hospitalization also changed: prior to the intervention, it was well documented in the charts that all patients were admitted for increased disease activity. Afterwards, one-third of the patients were admitted for rehabilitative services or institution of a conservative management program. While the length of stay actually decreased from 10.9 to 9.1 days, those patients admitted for rehabilitation had a longer stay, averaging 13.4 days. The other patients had an average stay of 7 days, significantly shorter than in the control communities. It may be questioned whether an inpatient level of care was indicated for these patients, but that decision relates to whether one believes in the

value of a conservative program stressing bedrest, physical therapy and antiinflammatory agents for the management of rheumatoid arthritis.

The number of physicians admitting patients to the hospital for rheumatoid arthritis also dropped significantly: the rheumatologists were responsible for 88% of the admissions. Therefore, it seems apparent that primary care practitioners commonly refer patients to a rheumatologist in outpatient settings, and expect them to take responsibility for their inpatient management as well. It remains to be seen whether this increase in hospitalization is transient and due to a backlog of patients or will continue to increase because of improved diagnoses and more vigorous approaches to therapy. Prior to the rheumatologists entering practice, it was often difficult to confirm the diagnosis of patients with rheumatoid arthritis and to classify patients into a particular class or stage because of the paucity of data contained in the charts. The medical records of the rheumatologists' patients were far more extensive and allowed categorization and classification without difficulty. Because of this improved documentation, we are confident that the increased number of admissions actually represents an increased number of patients with rheumatoid arthritis.

Inpatient management of patients with rheumatoid arthritis cared for by rheumatologists followed generally accepted guidelines. Increasing use of aspirin, gold, hydroxychloroquine, intraarticular corticosteroids, and physical therapy were noted, but only the increased use of intraarticular corticosteroids reached statistical significance. While these are process items, attempts to document improved outcomes as a result of these treatment modalities could not be carried out because of the short time interval. No change in patient management was noted in the control communities. It is obvious that the cost of providing medical care to patients with rheumatic diseases increased in those communities where a rheumatologist entered practice, but we are unable to determine the cost effectiveness at this time.

Rheumatologists entering practice should have a direct impact upon patients they care for as well as an indirect effect upon others through the educational process. One impact is obvious, as judged by the referral patterns noted by Bohan (9) and the hospitalization data from this study. The impact through the educational process is subtle and more difficult to ascertain. Each rheumatologist has actively participated in hospital continuing education programs and used the referral process as an educational opportunity. The major impact to date has been the referral of patients, rather than a change in how the primary care physician manages them. Since primary care physicians care for the vast majority of patients with rheumatic complaints, the rheumatologist must function as a valuable resource for referral, as well as for educating his or her colleagues about how to best manage their patients. This educational impact usually takes place over a long period of time since the dissemination process is a slow one. Documentation of this is under way and will continue over time.

Although the experience of 2 rheumatologists entering communities where there were no previous rheumatologists may not be generalizable, the changes seen are consistent with other studies and are what would be predicted (10). The increased number of hospitalizations and more appropriate clinical management suggest that the process of providing care has improved. Whether this will result in improved outcomes and be cost effective remains to be determined.

REFERENCES

1. National Commission on Arthritis and Related Musculoskeletal Diseases: Report to the Congress of the United States. April 1976
2. Government Relations Note. National Health Council, Inc. Vol. 6, No. 10, November 18, 1980
3. Goldenberg DL, Mason JH, De Horatius R, Goldberg V, Kaplan SR, Keiser H, Lockshin MD, Rynes R, Sandson JI, Schumacher HR, Skosey J: Rheumatology education in United States medical schools. Arthritis Rheum 24:1561–1566, 1981
4. Samuelson CO Jr, Cockayne TW, Williams HJ: Rheumatology: what should students know? Arthritis Rheum 22:290–293, 1979
5. Stross JK, Bole GG: Continuing education in rheumatoid arthritis for the primary care physicians. Arthritis Rheum 22:787–791, 1979
6. Stross JK, Bole GG: Evaluation of a continuing education program in rheumatoid arthritis. Arthritis Rheum 23:846–849, 1980
7. Bole GG: The American Rheumatism Association, 1990: Presidential Address to the American Rheumatism Association, June 4, 1981. Arthritis Rheum 25:1–9, 1982
8. Ropes MW, Bennett GA, Cobb S, Jacox R, Jessar RA: 1958 revision of diagnostic criteria for rheumatoid arthritis. Bull Rheum Dis 9:175–176, 1958
9. Bohan A: The private practice of rheumatology: the first 1,000 patients. Arthritis Rheum 24:1304–1307, 1981
10. Schumacher HR, Lockshin M: Manpower and fellowship education in rheumatology, 1980. Arthritis Rheum 24:1168–1172, 1981