Evaluation of the Activity of an Academic Rheumatology Consult Service Over 10 Years: Using Data to Shape Curriculum

KENT TA and GREGORY C. GARDNER

ABSTRACT. ***Objective.*** We reviewed rheumatology consults over the last 10 years at a major academic medical center and used these data to revise our fellowship curriculum.

Methods. The medical records of all patient consults from 1994 to 2003 at a university hospital were reviewed with regard to reason for consult, demographic data, and final rheumatologic diagnosis. For comparison we reviewed one year of data from our veterans hospital rheumatology consult service during this same period.

Results. A total of 1409 patients were seen on the university hospital consult service between 1994 and 2003. The 5 top reasons for consultation in descending order were: vasculitis, lupus, gout, rheumatoid arthritis, and soft-tissue rheumatic conditions. Specific diagnoses within each category are presented. The number of consults increased significantly over the 10 year period when compared to total hospital admissions. A total of 163 inpatient consults were seen at our veterans hospital in 2001. Crystal arthritis and noninflammatory regional musculoskeletal conditions were the top 2 reasons for consult requests. Many of these consults came from the primary care clinic and required a procedure or simple treatment plan.

Conclusion. The rheumatology consultation service at our university hospital has become busier over the last 10 years. Since many of the patients had complex problems, we have modified our curriculum approach in response to the information. The veterans hospital data suggest that part of our educational efforts might be directed toward the services requesting rheumatology consultation. (First Release Jan 15 2007; J Rheumatol 2007;34:563–6)

Key Indexing Terms:
REFERRAL CONSULTATION RHEUMATOLOGY MEDICAL EDUCATION

Rheumatology consultation is an important aspect of rheumatology fellowship training and an essential service provided by academic rheumatology divisions. Types of consultations may vary depending on hospital location, academic affiliation, and population demographics[1]. Profiling the spectrum of rheumatic diseases that rheumatology fellows might encounter on the consult service could assist in the planning of a rheumatology fellowship curriculum and also improve faculty skills. Medical curriculum development is often subjective and based on expert opinion or consensus panels[2]. Objective data would allow more accurate curriculum planning by reflecting patient problems that fellows and faculty will have to address. The anticipation is that such a data-driven curriculum would improve patient care and outcomes. We reviewed rheumatology consults over the last 10 years at a major academic medical center to revise our fellowship curriculum in response to the data.

From the Division of Rheumatology, University of Washington, Seattle, Washington, USA.

K. Ta, MD, MPH, Clinical Instructor in Medicine, Division of Rheumatology; G.C. Gardner, MD, Professor of Medicine, Fellowship Program Director.

Address reprint requests to Dr. G.C. Gardner, Department of Medicine/Rheumatology, University of Washington, Box 356428, Seattle, WA 98195. E-mail: rheumdoc@u.washington.edu

Accepted for publication October 13, 2006.

MATERIALS AND METHODS

The fellowship program at the University of Washington is a 2 to 3-year program, of which the first year is clinical. This first year includes 12 months on inpatient consult services split between the University of Washington Medical Center (UWMC) and the Veterans Affairs Medical Center (VAMC), both in Seattle, and 3 to 4 half-day clinics per week. UWMC is a major tertiary-care teaching hospital for a 4-state area in the Northwest. UWMC had an average of 377 beds available for inpatient care during the 10-year period, with an average daily census of around 300 patients. The Rheumatology Division at UWMC does not have its own inpatient service, but provides consultations to other inpatient services as well as occasional outpatient consultation. For about 20 years, a brief record of each consult has been kept in a consult book in the Division of Rheumatology. After institutional review board approval, information from this record served as the basis for collecting data on each patient seen by the consult service at UWMC over a 10-year period. The electronic medical records, paper charts, discharge summaries, and rheumatology consultation notes of consecutive inpatient rheumatology consultations from January 1, 1994, to December 31, 2003, at UWMC were reviewed for demographic data, reasons for consultation, and final rheumatologic diagnoses. For comparison, we obtained similar data for 2001 from the VAMC, a 504-bed hospital with an average daily census of about 364 patients that serves veterans in the North Puget Sound region.

The 2-tailed Fisher exact test was used to compare differences between proportions. A p value < 0.05 was considered statistically significant.

RESULTS

A total of 1409 inpatient consults were seen at UWMC in the 10-year period January 1, 1994, to December 30, 2003. The number of rheumatology consultations increased significantly between 1994 and 2003 when compared to total UWMC hospitalizations (Figure 1). The rheumatology consult service was asked to evaluate 0.61% of all hospitalized patients in 1994 versus 0.94% in 2003 ($p < 0.001$). The 5 most common reasons for inpatient rheumatology consultations were vasculitis (19% of 1409), systemic lupus erythematosus (SLE, 16%), crystal arthritis (14%), rheumatoid arthritis (RA, 9%), and bursitis/tendonitis (8%). A full listing of the major reasons for consultation are listed in Table 1. The diagnoses were similar over the 10-year span with some nonsignificant variability in the top 3 diagnoses, vasculitis, lupus, and crystal arthritis. Consultations for RA decreased significantly over the decade, representing 13% of total consultations in 1994 versus 5% in 2003 ($p < 0.0001$; Figure 2).

Table 2 summarizes the initial reasons and final diagnoses of 268 consultations for vasculitis, the most common reason for consultation at UWMC. "Rule out vasculitis" made up the largest percentage of consults. Vasculitis was diagnosed in 57% of "rule out vasculitis," with the majority being small-vessel vasculitis. Of cases for which vasculitis was excluded, no diagnosis was found in 40%, infection in 35%, and malignancy in 10%.

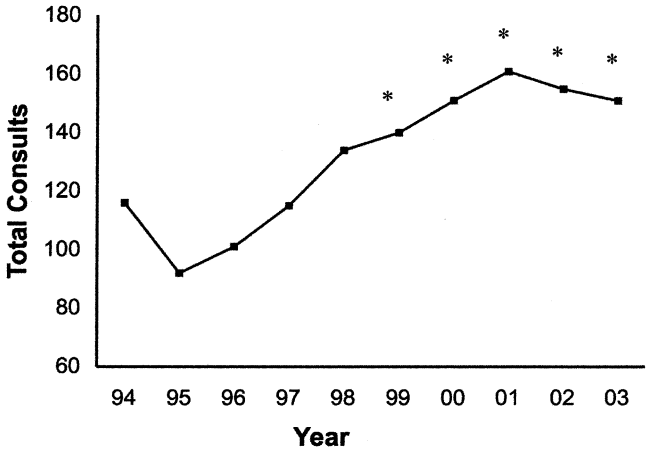

Figure 1. Annual numbers of inpatient rheumatology consultations from 1994 to 2003. *$p < 0.001$ vs 1994.

Table 1. Top reasons for inpatient rheumatology consultations at the University of Washington Medical Center from 1994 to 2003.

Reason for Consult	No. (%)
Vasculitis	268 (19)
Systemic lupus erythematosus	225 (16)
Crystal arthritis	197 (14)
Rheumatoid arthritis	131 (9)
Bursitis, tendonitis, osteoarthritis	111 (8)
Polymyositis, dermatomyositis	85 (6)
Septic arthritis	70 (5)
Scleroderma	56 (4)
Spondyloarthropathies	28 (2)
Other	238 (17)

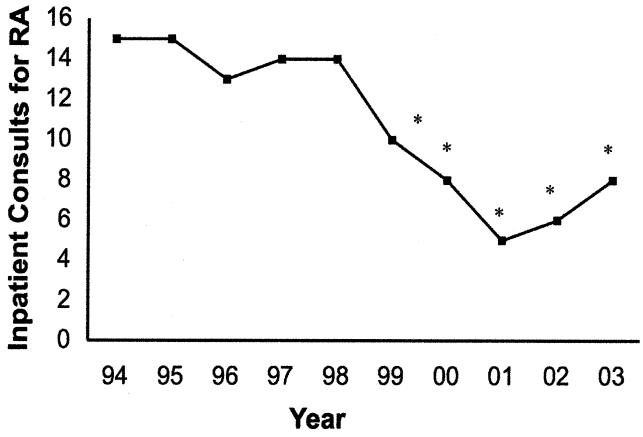

Figure 2. Inpatient consultations for RA from 1994 to 2003. *$p < 0.0001$ vs 1994.

As noted, SLE (225 consults) was the second most common reason for inpatient consultation. Lupus flare (27%), antiphospholipid antibody-associated issues (18%), and lupus nephritis (15%) made up the majority of final diagnoses for lupus consults.

The majority of the 197 consults for crystal arthritis were for management of acute gouty flares (83%). These consults were requested by the Emergency Department (35%), Cardiology (29%), Surgery (24%), and Medicine (12%). The largest group for which a consult was requested was cardiac patients, followed by transplant patients. Eighty-five percent of the crystal arthritis was due to urate gout, with the majority of the remaining consults for pyrophosphate gout (pseudogout). There were rare instances of hydroxyapatite gout and a case of basic calcium phosphate crystal arthritis.

Reasons for consults in 131 patients with RA were infection (24%), rheumatoid flare (16%), pneumonitis (13%, most often thought to be due to methotrexate), newly diagnosed RA (8%), and rheumatoid vasculitis (5%).

The other category of interest included rare conditions that rheumatologists are called to comment on and/or assume care for: sarcoidosis, serum sickness, Devic's syndrome, Still's disease, paraneoplastic arthritis, colchicine myopathy, positive antinuclear antibody, etc.; however, about 30–40% of the other group consults were situations where no categorical diagnosis was ever made by rheumatology, the primary team, or other consulting services.

For comparison of consult data by hospital, information was available from the VAMC rheumatology consult service for 2001 (Table 3). There were 163 total consults at the VAMC in 2001 compared to 161 at UWMC for the same year. The most common diagnosis by a large margin at VAMC was crystal arthritis, followed by noninflammatory regional muscu-

Table 2. Categorical classification of inpatient rheumatology consultations for vasculitis, gout, and systemic lupus erythematosus (SLE) from 1994 to 2003.

Vasculitis, n = 268 (%)	SLE, n = 225 (%)	Crystal Arthritis, n = 197 (%)
Rule out vasculitis (35)	Lupus flare (27)	Gout flare (83)
Wegener's (17)	APS (18)	Cardiac patient (45)
Hepatitis C vasculitis (10)	Nephritis (15)	Transplant patient (34)
CNS vasculitis (10)	Rule out lupus (10)	Other (5)
Giant cell arteritis (8)	CNS lupus (6)	Rule out gout (11)
Churg-Strauss (6)	Lupus pregnancy (5)	Other (6)
Behçet's disease (5)	Myocarditis/pericarditis (4)	
Other (9)	Other (13)	

APS: antiphospholipid antibyd syndrome; CNS: central nervous system.

Table 3. Top reasons for inpatient rheumatology consultations at the Veterans Affairs Medical Center for 2001.

Reason for Consult	No. (%)
Crystal arthritis	67 (41)
Bursitis/tendonitis/osteoarthitis	26 (16)
Rheumatoid arthritis	16 (10)
Vasculitis	14 (9)
Septic arthritis	8 (5)
Miscellaneous connective tissue disease (Sjögren's, polymyalgia rheumatica, dermatomyositis/polymyositis, antiphospholipid syndrome)	11 (7)
Systemic lupus erythematosus	4 (2.5)
Spondyloarthropathies	4 (2.5)
Nonrheumatologic	12 (7)

loskeletal problems, followed by RA, vasculitis, and septic arthritis. Lupus was a distant seventh, making up only 2.5% of the consults that year. Sixty percent of the crystal arthritis was caused by urate gout and 40% by pyrophosphate gout (compare 85% and 15%, respectively, at UWMC). Among the 14 patients with vasculitis, 5 were giant cell arteritis, 3 were central nervous system vasculitis, 2 were Wegener's granulomatosis, one was hepatitis C-associated vasculitis, and 3 were nonspecific vasculitis. One-third of the consults for crystal arthritis and noninflammatory regional conditions were requested by the primary care clinic, which is staffed in large part by nurse practitioners, and 80% of these consults were requested by this group of practitioners. Many of these consults were for diagnostic and therapeutic procedures.

DISCUSSION

In our report, the reasons for consultation, final diagnoses, and temporal trends for an academic rheumatology consult service at a tertiary care university hospital were analyzed. The strength of our report is attributable to its large sample size of 1409 consecutive patients spanning 10 years. In addition, we were able to compare these data with a sample of similar information from our Veterans Hospital consult service.

We identified the 5 most common reasons for rheumatology consultation at UWMC as vasculitis, SLE, gout, bursitis/tendonitis, and RA. These persisted annually to account for more than two-thirds of all consults over the decade.

We found a decreasing trend for consultations specifically for RA over the 10-year period. The significant decline in annual consultations for RA may reflect the success of the mid-1990 model of early aggressive DMARD therapy[3].

On the other hand, annual rheumatology consults at UWMC have increased in spite of a decrease in inpatient consults for RA. There are several possible reasons for this observation. First, this could be due to an increased prevalence of rheumatic diseases in the population[4]. Second, this could be a result of an increased pressure on inpatient services to facilitate rapid turnover by ordering subspecialty consultation[5]. Finally, it is possible that because of financial issues, ill patients with significant rheumatologic illness are being increasingly introduced into the tertiary care system. Regardless of the cause, this increase signifies that the rheumatologist will continue to play a role in inpatient care at academic medical centers.

The one-year data from the VAMC shows a somewhat different spectrum of patients when compared to UWMC. The patients at the Veterans Hospital generally appear to be less complex than those at the University Hospital and require a skill set that is weighted toward procedures associated with crystal arthritis and noninflammatory, regional musculoskeletal conditions. A large percentage of consults for these conditions are generated from the primary care clinic at the VAMC, and in particular from nurse practitioners.

As noted, one reason for undertaking this study was to help in the development of the fellowship curriculum that would prepare our fellows to better address the clinical problems that they will encounter on the UWMC consult service. Medical curricula in general are developed via consensus panel and individual experience rather than being data-driven[2]. This is partly because useful data are not available. The Accreditation Council for Graduate Medical Education (ACGME) requirements for subspeciality training in rheumatology consist of a

simple outline (available at: www.acgme.org), while the fellowship core curriculum through the American College of Rheumatology is encyclopedic in its scope (available at: www.rheumatology.org). While both are useful, neither is weighted to reflect real-world situations that clinicians encounter. With a limited time for didactic teaching, it makes sense to concentrate on situations our faculty and fellows will need to address, and to position that information where it would be most useful. Similar efforts in the outpatient clinic and even in community practice could also provide useful information for future curriculum development and potentially customize curricula to the future career plans of the fellows.

Family practice educators have evaluated data from practice surveys to help shape residency programs. For example, Rosenblatt, *et al* used national and local data to develop a list of frequent diagnoses to be used for family practice curriculum development[6]. Kahl did a local practice survey specifically looking at rheumatologic diagnoses over a 15-week period, cataloged the common musculoskeletal problems encountered, and suggested a weighted emphasis in family practice curricula[7].

How did the data from this study help us shape our fellowship curriculum? We reorganized our fellowship lecture series to include a "kick-start" program, a series of lectures given over the first 10 weeks of fellowship that includes topics uncovered by this study. These topics had been part of the fellowship didactic series, but many were presented later in the year; now they are positioned early in the fellowship program. We have also developed a fellowship library of electronic articles on kick-start topics as well as articles previous fellows have found helpful while on the consult service. We recently started an evening journal club for faculty and fellows to review papers on topics that consult services find challenging: complicated lupus, diagnosing and treating vasculitis, and treating antiphospholipid syndrome. We have included additional clinical topics such as central nervous system vasculitis in our rheumatology grand rounds this year to improve the knowledge of both fellows and faculty. We also recently invited a colleague in sports medicine to our kick-start period to discuss musculoskeletal examination and treatment for noninflammatory musculoskeletal conditions. We were not aware until we saw these data that such conditions were commonly encountered by our fellows (16% of consults at the Veterans Hospital, 8% at the University Hospital). Finally, our data quantified the frequency of "unknown inflammatory illness" we see. We are currently considering how to better prepare our fellows to deal with diagnostic and therapeutic uncertainty.

The data from the Veterans Hospital suggest that some of our educational time might be well spent educating nurse practitioners at the primary care clinic specifically on the diagnosis and treatment of crystal arthritis and noninflammatory musculoskeletal disorders. On the other hand, these data suggest our primary care-bound internal medicine residents might be better served spending time on the VAMC rheumatology service (rather than the UWMC service), where they will see and treat rheumatologic illness that they are likely to encounter in clinical practice and where they can become more experienced in procedures.

Our report has several limitations: we did not examine the influence of inpatient rheumatology consultation on patient outcome. Additionally, we do not have information on consultations in non-academic institutions. There might be topics that are encountered in private practice that we do not commonly see in the academic setting for which we should be preparing our practice-bound fellows.

Evaluating the types of patients encountered on a rheumatology consult service can guide the education of rheumatology fellows and potentially other care providers. Unchanged trends of hospital consultations for vasculitis, SLE, and gout emphasize their educational importance, especially for incoming fellows in the early months of clinical training at our institution. A current popular phrase in business is "What is measured is improved." We hope that by measuring the patient problems encountered on our rheumatology consult services and modifying our curriculum, the education of our fellows will improve, ultimately improving care of our patients. Future projects will include looking at private practice consultation data and outpatient rheumatology visit data in both the academic and private practice settings.

REFERENCES

1. Epstein WV, Henke CJ. The nature of US rheumatology practice, 1977. Arthritis Rheum 1981;24:1177-87.
2. Green ML. Graduate medical education training in clinical epidemiology, critical appraisal, and evidence-based medicine: a critical review of curricula. Acad Med 1999;74:686-94.
3. Wallis WJ, Furst DE, Strand V, Keystone E. Biologic agents and immunotherapy in rheumatoid arthritis. Progress and perspective. Rheum Dis Clin North Am 1998;24:537-65.
4. Kirwan JR, Averns H, Creamer P, et al. Changes in rheumatology out-patient workload over 12 years in the South West of England. Rheumatology Oxford 2003;42:175-9.
5. Cai Q, Bruno CJ, Hagedorn CH, Desbiens NA. Temporal trends over ten years in formal inpatient gastroenterology consultations at an inner city hospital. J Clin Gastroenterol 2003;36:34-8.
6. Rosenblatt RA, Cherkin DC, Schneeweiss R, et al. The structure and content of family practice: current status and future trends. J Fam Pract 1982;14:681-722.
7. Kahl LE. Musculoskeletal problems in the family practice setting: guidelines for curriculum design. J Rheumatol 1987;14:811-4.