RESEARCH

Effect of Provider Education and Feedback on Antihypertensive Prescribing in a Department of Veterans Affairs Primary Care Clinic

OBJECTIVE: This report summarizes a program to assess and modify antihypertensive prescribing in the primary care clinics of a Department of Veterans Affairs Medical Center.

SETTING: The Ralph H. Johnson VAMC is a primary, secondary, and tertiary care medical center in Charleston, South Carolina. The primary care clinics that opened in August of 1995 consist of two multidisciplinary teams, with patient care coordinated by internal medicine providers in an ambulatory setting.

INTERVENTION: The implementation of national treatment guidelines for hypertension. The treatment guidelines were presented and discussed with the primary care providers. Feedback information was presented monthly to providers about how their prescribing of antihypertensive medication related to the national treatment guidelines.

MAIN OUTCOME: The program monitored for changes in prescribing patterns of antihypertensive agents after the implementation of national treatment guidelines.

RESULTS: Six months after the implementation of national treatment guidelines for hypertension, prescribing of thiazide diuretic increased 11.5% and of angiotensin-converting enzyme inhibitors (ACEIs) increased 4%, while calcium-channel antagonist prescribing decreased by 8.8%. One year after implementation, prescribing of thiazide diuretic continued to increase, up 23% from baseline, while calcium-channel antagonist use decreased by 15%. ACEIs again increased 4%.

CONCLUSION: A structured program of provider education and feedback can significantly improve adherence to an implemented hypertension treatment guideline.

KEYWORDS: treatment guidelines, prescribing, hypertension

J Managed Care Pharm 2000: 307-10

Authors

DANIEL R. NEAL, Pharm.D., is Clinical Pharmacy Specialist, Veterans Affairs Roseburg Healthcare System, Roseburg, OR (when this manuscript was written, he was Clinical Pharmacy Specialist, Primary Care, Ralph H. Johnson Department of Veterans Affairs Medical Center, and Clinical Assistant Professor, College of Pharmacy, Medical University of South Carolina, Charleston, SC); JEFFREY T. SHERER, Pharm.D., B.C.P.S., is Pharmacy Clinical Specialist, Ambulatory Care, Methodist Hospital, Houston, TX (when this manuscript was written, he was Clinical Assistant Professor, College of Pharmacy, University of South Carolina, Columbia, SC).

AUTHOR CORRESPONDENCE: Daniel R. Neal, Pharm.D., Veterans Affairs Medical Center, Primary Care (140), 913 NW Garden Valley Blvd, Roseburg, OR 97470; Tel:541-672-4821; Fax: 541-440-1344; E-mail: Daniel.Neal@med.va.gov.

by Daniel R. Neal and Jeffrey T. Sherer

The Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure was formed to provide concise guidelines for clinicians who care for patients with hypertension.[1] The first set of guidelines was published in 1977, when there were relatively few classes of antihypertensive medications.[2] Since this seminal report, the introduction of angiotensin-converting enzyme inhibitors (ACEIs), alpha-adrenergic inhibitors, calcium channel blockers (CCBs), and angiotensin II type 1 receptor antagonists has dramatically expanded the pharmacotherapeutic options for blood pressure management.

The fourth report of the Joint National Committee (JNC-IV) published in 1988 stated that four drug classes were equally acceptable as first-line therapy: thiazide diuretics, beta-adrenergic inhibitors, ACEIs, and CCBs.[3] Between the publication of this guideline and the fifth report in 1993, several outcomes-based studies reported a reduction in cardiovascular morbidity and mortality with thiazide diuretic and beta-adrenergic inhibitor therapy.[4-7] Therefore, the fifth report (JNC-V) recommended that thiazide diuretics and beta-adrenergic inhibitors be used first-line unless they are contraindicated or an indication for a different drug class exists.[4]

Many clinicians thought of JNC-V as a step in the wrong direction.[8,9] Whereas JNC-IV had recommended that the newer drug classes (ACEIs and CCBs) be given equal consideration as first-line therapies, JNC-V suggested otherwise. The committee felt that the outcome data available with thiazide diuretics and beta-adrenergic inhibitors outweighed any theoretical benefits of the newer drug classes, namely the absence of adverse metabolic effects. Although controversial, these recommendations were much like other guidelines, including those of the World Health Organization/International Society of Hypertension, the Canadian Hypertension Society, and the British Hypertension Society.[10-12] Furthermore, a recent clinical trial has shown that newer antihypertensive agents such as ACEIs and CCBs provided no better outcomes than the older classes of thiazide diuretics and beta-adrenergic inhibitors.[13]

Manolio and colleagues examined prescription and disease-state data compiled by IMS America, Inc.[14] Physicians completed data-collection forms when treating patients for hypertension and listed drugs that they would be likely to dispense, prescribe, or recommend. The authors used these drug mentions as a surrogate for prescribing. From 1982 to 1993 CCBs increased as a

percentage of total drug mentions from 0.3% to 27% and ACEIs increased from 0.8% to 24%. Thiazide diuretic mentions fell from 56% in 1982 to 27% in 1993, despite the fact that numerous studies during this period documented a decrease in morbidity and mortality with thiazide diuretic therapy. Despite the near unanimity that thiazide diuretics be used first-line for most patients, compliance with this recommendation has been poor.

Since the guidelines that were in place for most of this period recommended that four drug classes be given equal consideration as first-line therapy, this study did not evaluate the impact of the JNC-V recommendations on prescribing patterns. However, Siegel and Lopez in tabulating data from retail pharmacies showed similar results to those of Manolio and colleagues.[15] They found that in 1992 CCBs accounted for 33% of all antihypertensive drugs prescribed versus 38% in 1995. ACEI use also rose, from 25% in 1992 to 33% in 1995. Use of thiazide diuretics, though specifically recommended as first-line therapy for most hypertensive patients, fell from 16% pre-JNC-V to only 8% post-JNC-V. An accompanying editorial asks if the message of these evidence-based guidelines is getting through to prescribers; it would appear that the answer is a firm no.[16]

This report summarizes our experience in assessing and modifying antihypertensive prescribing in the primary care clinics of a Department of Veterans Affairs Medical Center (VAMC).

Methods

Setting. The Ralph H. Johnson VAMC is a primary, secondary, and tertiary care medical center in Charleston, South Carolina. In August 1995 the center adopted a primary care patient-care model. The result was a shift in emphasis from inpatient specialty care to an appointment-based system of ambulatory care. The Primary Care Program then consisted of two independent teams, each enrolling about 5,000 patients. Each team consisted of five internal medicine physicians, two nurse practitioners, and one physician's assistant, supported by four registered nurses, five licensed practical nurses, one clinical pharmacist, one dietitian, and two social workers.

Interventions. The Medical Advisory Panel for the Pharmacy Benefits Management Strategic Health Group (MAP) published the first revision of the Veterans Affairs (VA) Guidelines for the Pharmacologic Management of Hypertension in December 1996.[17] These were based on nationally recognized guidelines, current literature, and expert opinion from across the VA system. The MAP guidelines were very similar to the recommendations in JNC-V.

The first step in gaining prescriber acceptance was to present the MAP guidelines to all primary care providers, to generate discussion and promote awareness of the data and recommendations. The group was advised that the guidelines could be modified. At two meetings prescribers had their concerns addressed and controversial aspects of the document were debated. The MAP guidelines were then unanimously accepted.

After providers agreed on the guidelines, the clinical pharmacists and pharmacy residents assigned to the primary care teams began additional education. A one-hour presentation reviewed the evidence that thiazide diuretics reduce morbidity and mortality and the rationale behind their being preferred first-line antihypertensive agents. Clinical pharmacists were also available to provide information and therapeutic recommendations during patient visits.

The final intervention was monthly feedback reports to prescribers with data on each individual's prescribing and cost information for available antihypertensive agents.

Data collection. Data were collected via a computerized search for active prescriptions sorted by drug class and provider. Classes were thiazide diuretics, CCBs, ACEIs, beta-adrenergic inhibitors, and alpha-adrenergic inhibitors. Reports were generated at baseline and after six and twelve months. Data are expressed as the percentage by drug class of total antihypertensive drugs prescribed by each provider. A total of 5,953 prescriptions written between November 1995 and October 1996 were reviewed for baseline data; 4,918 prescriptions between November 1996 and April 1997 were reviewed for six-month data; and 6,259 prescriptions from December 1996 through November 1997 were reviewed for one-year data.

Results

Our baseline data were similar to the results of published surveys.[14, 15] The most-prescribed antihypertensive medications were the CCBs (34%) and ACEIs (23%), with only 13% of prescriptions being for thiazide diuretics and only 16% being beta-adrenergic inhibitors (Figure 1).

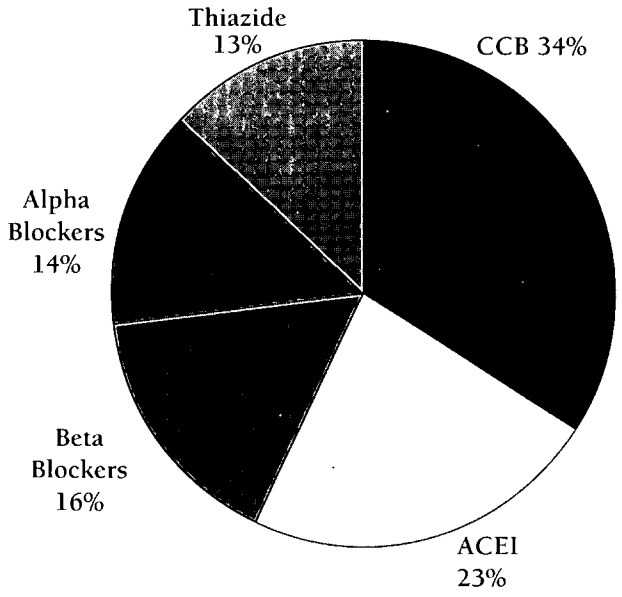
Six months later, after presentation of the MAP guidelines and provider education, thiazide diuretic usage had increased by 11.5%, though there was no change in prescribing of beta-adrenergic inhibitors. CCB usage had decreased by 8.8%. ACEI use increased by 4%, possibly because of an increased awareness of its benefit in hypertension patients who also have diabetes mellitus (Figure 2).

The one-year data (Figure 3) showed a further increase in the prescribing of thiazide diuretics, 23% from baseline, and a decrease in the use of CCBs of 15%. Prescriptions continued at similar rates as at six months: thiazide diuretics, 16%; beta-adrenergic inhibitors, 16%; ACEIs, 24%; and CCBs, 29%.

Our final review evaluated 6,252 prescriptions. Effects on drug costs were determined by comparing the final prescribing pattern of the primary care providers against the baseline pattern. A mean cost per month was calculated for each antihypertension drug class, then multiplied by the number of prescriptions for that class.

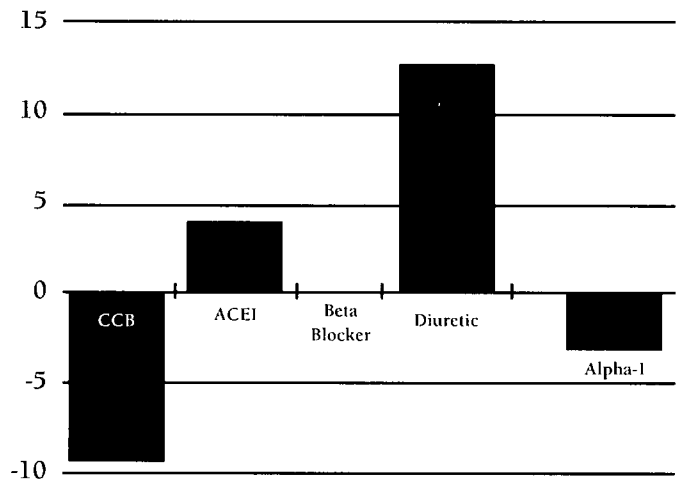
If the baseline prescribing patterns for antihypertensive agents had continued, the correlating drug cost would have

FIGURE 1 Antihypertensive Agent Use in Primary Care at Baseline



Notes: CCB is calcium channel blocker. ACEI is angiotensin-converting enzyme inhibitors.

FIGURE 2 Percent Change in Hypertension Medication Prescribing in Primary Care 11/96–4/97



Notes: CCB is calcium channel blocker. ACEI is angiotensin-converting enzyme inhibitor. Alpha-1 is alpha-adrenergic inhibitor.

been $560,124 for the year. Increased use of thiazide diuretics and decreased use of calcium-channel antagonists avoided $48,008 in costs.

Discussion and Limitations

This study has several limitations. First, we did not collect data on hypertensive complications. No evidence suggests that other drug classes reduce hypertension-related morbidity and mortality more than thiazide diuretics. Therefore, if the blood pressure reduction achieved with a thiazide diuretic is equal to that of other classes, at this time it is reasonable to assume that the rate of complications will be decreased equally. Although we did not collect data on changes in blood pressure, three randomized, controlled studies have shown that all major drug classes, with the possible exception of alpha-adrenergic inhibitors, reduce blood pressure similarly.[18-20]

A further limitation is that we did not collect data on drug indications. Antihypertensive agents may be used for a variety of other cardiovascular and even noncardiovascular indications; we have no doubt that many patients in our primary care population were receiving these drugs for reasons other than hypertension.

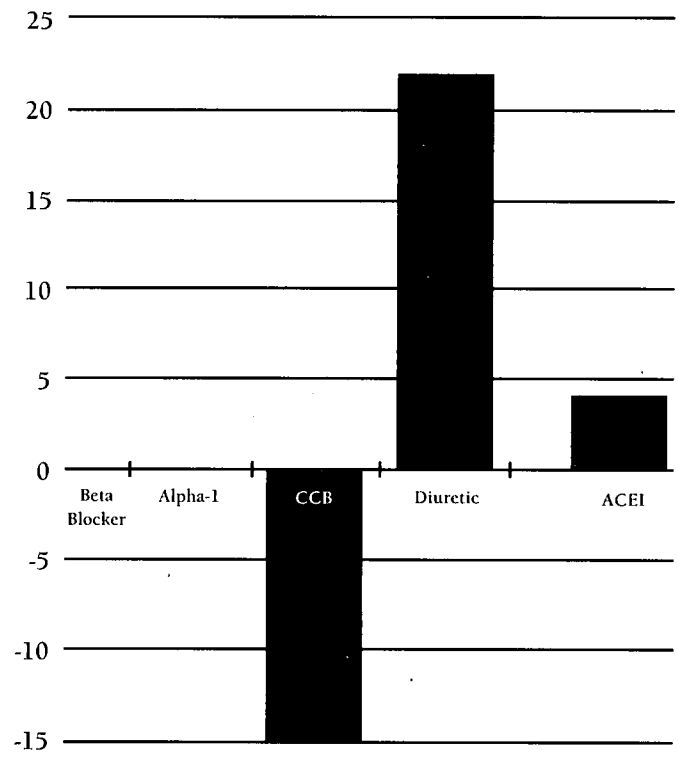
It is simplistic to state that a thiazide diuretic is the most appropriate agent for all antihypertensive patients. Therefore, it is possible that the changes observed in prescribing patterns reflect changes in indications or concomitant diseases rather than true changes in drug selection. We did not assess the appropriateness of therapy. If prescribing patterns changed because of changing concurrent indications, a dramatic decrease in patients with an indication for a blood pressure-lowering drug other than hypertension must have occurred.

An additional explanation is that the number of patients with concomitant diseases calling for an antihypertensive agent other than a thiazide diuretic may have decreased. We believe this to be unlikely because the study period was short. Nor did we note any dramatic changes in the clinic population.

There was no control group in this study. Therefore, it is possible that the results observed would have occurred naturally. We believe this is unlikely. Considering our baseline data, we see no reason why prescribing habits would have spontaneously changed other than the pharmacy interventions. Studies showing decreasing usage of thiazide diuretics even as evidence supporting their use mounts further diminishes this possibility.

At the time of this study, clinical pharmacy services had been part of the primary care clinics for several years. We feel strongly that the team-oriented culture at our institution made this dramatic change in antihypertensive prescribing possible. In addition, our approach was able to overcome several barriers to successful implementation of clinical practice guidelines described by Cabana et al.[21] Our educational interventions promoted familiarity with the guidelines. Agreement with guideline content was promoted by education but also by discussing points with which prescribers disagreed (e.g., choice of medication in noncompliant patients, use of ACEIs in diabetic patients with and without proteinuria) until the issues were

FIGURE 3 Percent Change in Use of Hypertension Medication in Primary Care 11/96–11/97



Notes: CCB is calcium channel blocker. ACEI is angiotensin-converting enzyme inhibitor. Alpha-1 is alpha-adrenergic inhibitor.

resolved. Providers were shown that the guidelines both could and should be followed, overcoming what Cabana et al. called "lack of self-efficacy" and "lack of outcome expectancy."[21] What Cabana et al. called the "inertia of previous practice" was addressed by providing monthly feedback, both verbal and written, to prescribers so they could measure their progress against their own previous prescribing habits.[21] All these factors contributed to the success of this project.

Summary and Conclusion

Though prior studies document that prescribers are unlikely to follow published guidelines for the pharmacologic management of hypertension, a simple yet structured program of prescriber education and feedback can significantly improve adherence to treatment guidelines.

References

1. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Sixth report. Arch Intern Med 1997; 157: 2413–46.

2. Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. Report: a cooperative study. JAMA 1977; 237: 255–61.

3. Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. The 1988 report. Arch Intern Med 1988; 148: 1023–38.

4. Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. The fifth report. Arch Intern Med 1993; 153: 154–83.

5. SHEP Cooperative Research Group. Prevention of stroke by antihypertensive drug treatment in older patients with isolated systolic hypertension: final results of the Systolic Hypertension in the Elderly Program (SHEP). JAMA 1991; 265: 3255–64.

6. Dahlöf B, et al. Morbidity and mortality in the Swedish Trial of Old Patients with Hypertension (STOP-Hypertension). Lancet 1991; 338: 1281–85.

7. MRC Working Party. Medical Research Council trial of treatment of hypertension in older adults: principal results. BMJ 1992; 304: 405–12.

8. Weber MA, Laragh JH. Hypertension: steps forward and steps backward: the Joint National Committee Fifth Report. Arch Intern Med 1993; 153: 149–52.

9. Tobian L, et al. Modern strategies to prevent coronary sequelae and stroke in hypertensive patients differ from the JNC V consensus guideline. Am J Hypertens 1994; 7: 859–72.

10. Subcommittee of WHO/ISH Mild Hypertension Liaison Committee. Summary of 1993 World Health Organization-International Society of Hypertension guidelines for management of mild hypertension. BMJ 1993; 307: 1541–46.

11. Ogilvie RI, et al. Report of the Canadian Hypertension Society Consensus Conference, 3: pharmacologic treatment of essential hypertension. Can Med Assoc J 1993; 149: 575–84.

12. Sever P, et al. Management guidelines in essential hypertension: report of the second working party of the British Hypertension Society. BMJ 1993; 306: 983–87.

13. Hansson L, et al. Randomised trial of old and new antihypertensive drugs in elderly patients: cardiovascular mortality and morbidity; the Swedish Trial in Old Patients with Hypertension-2 study. Lancet 1999; 354: 1751–56.

14. Manolio TA, et al. Trends in pharmacologic management of hypertension in the United States. Arch Intern Med 1995; 155: 829–37.

15. Seigel D, Lopez J. Trends in antihypertensive prescribing: do the JNC-V recommendations affect prescribing? JAMA 1997; 278: 1745–48.

16. Lenfant C. JNC Guidelines: is the message getting through? JAMA 1997; 278: 1778–79.

17. Department of Veterans Affairs Medical Advisory Panel on Hypertension. The pharmacologic management of hypertension. Washington: Veterans Affairs, Veterans Health Administration, 1996: Publication no. 93-003.

18. Neaton JD, et al. Treatment of Mild Hypertension Study, final results. JAMA 1993; 270: 713–24.

19. Materson BJ, et al. Single-drug therapy for hypertension in men: a comparison of six antihypertensive agents with placebo. N Eng J Med 1993; 328: 914–21.

20. Philipp T, et al. Randomised, double blind, multicentre comparison of hydrochlorothiazide, atenolol, nitrendipine, and enalapril in antihypertensive treatment: results of the HANE study. BMJ 1997; 315: 154–59.

21. Cabana MD, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. JAMA 1999; 282: 1458–65.