Is Blood Pressure Adequately Controlled in General Medicine Clinics?

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Abstract

To determine how well elderly-essential-hypertensives (EHT) were managed at the general medicine (GM) clinics at Siriraj Hospital when compared to those at the hypertension (HT) clinic. Adequacy of BP management (ADBP) was considered when DBP < 85 mmHg in diabetic patients with HT or < 90 mmHg in non-diabetic EHT. Sixty-seven and 63 cases were enrolled from the GM and HT clinics respectively from mid June to mid July 1999. Percentage of ADBP cases (69.8 *vs* 49.3%, p = 0.02, OR = 2.4, 95%CI = 1.2-4.9) were significantly higher in patients at the HT-clinic compared to that of the GM-clinic. Physicians' unwillingness to change the number or dosage of drugs when target BP was not achieved was found to be an independent risk factor that contributed to poor BP control of patients from both clinics (p = 0.003, OR = 9.7, 95%CI = 2.2-44.4). In conclusion, the BP of those EHT at GM-clinics was not adequately controlled compared to that of the HT-clinic. Methods to improve normalization of BP were proposed.

Key word : Elderly Hypertension, Blood Pressure Management

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It is conceivable that hypertensive patients should be managed by general practitioners at general medicine (GM) clinics. Only those who have complicated or difficult hypertension will be sent to specialists. As a consequence of this concept, general practioners, as "gatekeepers", will take care of the majority of hypertensive patients[1]. Since hypertension is one of the most common illnesses found

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in clinical practice and lowering of blood pressure has been shown to prevent cardiovascular and cerebrovascular mortality and morbidity[2-4], adequacy of ambulatory blood pressure (BP) control is important[5]. Therefore, this study was carried out to see whether those hypertensive patients were adequately managed by general practitioners compared to hypertension specialists.

Objective

To determine whether ambulatory BP management in elderly-essential-hypertensives delivered by physicians at the general medicine clinic (GM-clinic) was adequate compared to that of the hypertension clinic (HT-clinic), Department of Medicine, Siriraj Hospital, Bangkok.

MATERIAL AND METHOD

Elderly-essential-hypertensives who were receiving medical care at the general medicine clinic (GM-clinic) and hypertension clinic (HT-clinic) were studied in the Outpatient Department (OPD), Siriraj Hospital, Bangkok. Eligible patients had to meet all 3 criteria. First, their age group had to be 55 years old or more. Second, they had to receive regular treatment for at least 3 consecutive visits. Third, secondary hypertension must be excluded. In the HT-clinic, the method of BP measurement complied with the guideline recommended by the American Heart Association[6]. However, BP measurement at the GM-clinic was not generally standardized. Therefore, a proper BP measuring system was set up at the GM-clinic, 3-sets of thrice standardized BP measurements[6] at least 1 week apart were randomly taken in elderly hypertensive patients from mid June to mid July 1999. The average BP's were calculated from the last set of BP's. Medical records of these patients from the HT and GM-clinic were reviewed. Since this study was done in elderly patients whose SBP's were frequently difficult to normalize, only documented DBP's were considered. Adequacy of BP management was determined when DBP of less than 90 mmHg was achieved according to the JNC VI guideline[7]. Moreover, target BP in special groups of patients was also taken into account e.g. DBP of < 85 mmHg in diabetic or chronic renal insufficiency patients (serum creatinine > 2 mEq/L). To improve the rate of BP normalization, physicians should be aggressive enough in their practices[2]. Therefore, physicians' willingness to increase the number or dosage of antihypertensive drugs during office visits was determined. Ignorance of physicians was considered when DBP's of any patients from 2 consecutive visits was higher than the target values and no attempts to adjust antihypertensive drugs were observed.

Statistical analyses

Results were demonstrated as mean ± standard deviation (SD) or per cent (%) where appropriate. Statistical analyses were performed using Statistical Packages for Social Sciences (SPSS)[8]. Student's *t*-test and Chi-square test were used to compare the continuous and categorical data between the HT-clinic and GM-clinic, respectively. In order to identify the risk independently associated with inadequacy of BP management, multiple logistic regression analyses were performed to adjust the confounding effects of other factors. A *p*-value of less than 0.05 was considered statistically significant.

RESULTS

BP measurements in 108 patients aged 55 years or more at the GM-clinic were randomly taken. Only 67 cases from the GM-clinic were eligible for review. Case-records from the HT-clinic during the same study period were also examined. Of 264 case-records obtained, only 63 were eligible.

There were no significant differences in age, SBP, number of female cases or number of cases with history of alcohol consumption, smoking or ischemic heart disease between the cases from the HT and GM-clinics. However, Body Mass Index (BMI), duration of treatment with antihypertensive medication and number of cases with a history of hypercholesterolemia (total cholesterol >200 mg/dl or receiving lipid-lowering agents) were significantly higher in patients from the HT-clinic compared with the GM-clinic (p = 0.03, 0.001, 0.001 and <0.001 respectively). On the contrary, DBP and the number of diabetic cases were higher in the GM-clinic compared to the HT-clinic (p = 0.03 and p = 0.01 respectively) (Table 1).

The number of patients who used monotherapy in the HT-clinic was significantly less than that of the GM-clinic (Table 2). Physicians' choices in using any antihypertensive agent were not different between the GM and HT clinics (data not shown). Diuretics were the most common selected agents for monotherapy in both clinics (Table 3). Calcium antagonists were more frequently used in

Table 1. Demographic data of patients from GM and HT clinics.

	All (130 cases)	GM-clinic (67 cases)	HT-clinic (63 cases)	p-value*
Age (years old)	63.1 ± 5.6	62.5 ± 5.3	63.7 ± 5.9	0.2
Female cases (%)	70.8	71.6	69.8	0.8
Body Mass Index	24.5 ± 3.8	23.6 ± 3.5	25.8 ± 3.8	0.001**
Overweight*** (%)	34.6	32.3	63.1	0.002**
Systolic BP (mmHg)	143.4 ± 13.1	145.4 ± 14.0	142.4 ± 13.1	0.4
Diastolic BP (mmHg)	86.4 ± 8.3	88.0 ± 8.9	84.7 ± 7.2	0.03**
Duration of treatment (years)	10.7 ± 7.9	7.4 ± 5.9	12.7 ± 8.2	0.001**
(+) history of HT >10 years (%)	27.7	13.9	51.7	<0.001**
Smoking (%)	9.7	9.0	10.5	0.8
Alcohol ingestion (%)	3.8	7.5	2.4	0.08
Ischemic heart disease (%)	24.6	30.8	16.3	0.08
Hypercholesterolemia (%)	50	32.3	71.7	<0.001**
Diabetes mellitus (%)	34.9	68.8	31.3	0.01**

* p-value between GM and HT clinics
** p-value was significant at <0.05
*** BMI >24.9

Table 2. Treatment in both GM and HT clinics.

	All (130 cases)	GM-clinic (67 cases)	HT-clinic (63 cases)	p-value*
Monotherapy (%)	36.2	49	25.3	0.008**
Combination >2 drugs (%)	21.4	14.8	27.0	0.1
Calcium antagonist (%)	34.2	18.5	47.6	0.001**
Mean cost per cases (Baht)	10.6 ± 10.4	7.2 ± 9.5	13.6 ± 10.3	0.001**

* p-value between GM and HT clinics
** p-value was significant at <0.05

Table 3. Prevalence of drug groups used as monotherapy in both GM and HT clinics.

	All (130 cases)	GM-clinic (67 cases)	HT-clinic (63 cases)
Diuretic (%)	43.2	42.9	43.8
β-blocker (%)	20.5	28.6	6.3
ACEI (%)	20.5	25	12.5
Calcium antagonist (%)	15.9	3.6	37.5

the HT-clinic than the GM-clinic. (47.6 *vs* 18.5%, $p = 0.001$) The proportion of patients who used 3 drug combinations or more were found more in the HT-clinic than the GM-clinic, but the difference was not statistically significant ($p = 0.1$) (Table 2).

The proportion of cases that complied with adequate-ambulatory-BP-management criteria (DBP < 90 mmHg or DBP <85 mmHg in patients with diabetes mellitus or chronic renal failure whose serum creatinine >2 mg/dl) was significantly higher in the HT-clinic compared to the GM-clinic. (69.8 *vs* 49.3%, $p = 0.02$, OR = 2.4, 95%CI = 1.2-4.9)

Inappropriate drug combination and ignorance to adjust antihypertensive medication when

Table 4. Multiple logistic regression analyses.

Variables	p-value	OR	95%CI
Physicians' unwillingness to increase dosage of medication	0.003*	9.7	2.2 - 44.4
Overweight (BMI >24.9)	0.4	0.6	0.2 - 2.2
Duration of antihypertensive treatment ≥ 10 years	0.9	1.1	0.3 - 4.5
History of diabetes mellitus	0.1	2.9	0.8 - 10.7
History of hypercholesterolemia	0.1	3.2	0.7 - 14.1

* *p*-value was significant at <0.05

target BP was not achieved, was found more often in the GM-clinic compared to the HT-clinic (40.4 *vs* 14.9%, $p = 0.005$, OR = 3.9, 95%CI = 1.5-10.3).

Finally, multiple logistic regression analyses was performed, the risk of physicians' unwillingness to change the dosage or number of antihypertensive drugs when target BP was not achieved was significantly higher in the GM-clinic than the HT-clinic ($p = 0.003$, OR = 9.7, 95%CI = 2.2-44.4) (Table 4).

DISCUSSION

Hypertension is among the most common reasons for outpatient medical visits[9]. The prevalence of elderly-hypertensives ranged from 11.3-46.4 per cent in the rural area[4,10-12] and 11.8-36.5 per cent in the urban area[13-17]. Many of these hypertensives had poorly controlled BP[10, 11,18-20]. Among elderly-Thai-hypertensives who received treatment, normalization of BP was noted only between 20.9-24.7 per cent in rural area[11, 12] and 25.5 - 41 per cent in the urban area (at that time target BP was 160/95 mmHg)[15,18]. In the Outpatient Department at Siriraj Hospital, the prevalence of known hypertension in the elderly aged >60 years was 38 per cent and newly found hypertension was 14.2 per cent[18]. There were only 25.5 per cent whose BP's were under controlled (BP <140/90 mmHg) from September 1995 to April 1996.

Clearly, detection of hypertension and inadequate control of BP are major worldwide problems. Today, normalization of BP (<140/90 mmHg) is achieved in only about 6 to 27 per cent of patients in various countries which conformed to our results[21-24].

Inadequate control of BP can be from many factors, such as limited access to medical care, financial barrier to obtain medication, patients' noncompliance with recommended therapy[12,14,25] and more importantly, physicians unwillingness to change patients' medication during office visits[26]. However, the difference in the adequacy of BP control between both clinics could not be explained by a lack of access to medical care, since our study enrolled only patients who were regular users of health care, defined by 3 regular medical visits or more. Similarly, prescriptions for poor patients were either free or cheap at both clinics.

Age, gender and per cent of using 3 drug combinations or more in both clinics were not different between the 2 groups. BMI was strongly related to the level of BP[27]. Although BMI of patients at the HT-clinic was higher than those at the GM-clinic ($p = 0.001$), achievement of target BP control at the HT-clinic was better.

Many possible factors that determined adequacy of BP management were examined. There were 11 cases of possible inappropriate drug combinations. Four cases using β-blocker plus angiotensin converting enzyme inhibitor (ACEI) was found at the GM-clinic while none was identified from the HT-clinic ($p = 0.02$). Whereas, the proportion of patients using calcium antagonists combined with diuretics from both clinics showed no statistical difference ($p = 0.33$). Although inappropriate drug combination might be a cause of inadequacy of BP control[28,29], it may be appropriate in some other conditions eg. ACEI and β-blocker combinations might be very useful in diabetic patients with ischemic heart disease etc. More diabetic patients found at the GM-clinic may explain the use of this drug combination.

Ignorance of physicians to increase the amount or dosage of medication when target BP was not reached was remarkably important[2]. Unwillingness to adjust the medication was found more frequently at the GM-clinic than the HT-clinic (40.4 *vs* 14.9%, $p = 0.005$, OR = 3.9, 95%CI = 1.5-10.3).

Co-existing diseases of patients eg. diabetes mellitus might cause inadequate BP control. Since their target BP was lower and more difficult

to achieve[30,31]. The higher prevalence of diabetic patients at the GM-clinic was, therefore, another possible factor to influence adequacy of BP management in this study (68.8 *vs* 34.9%, $p = 0.01$). To eliminate those confounding factors, multiple logistic regression analyses were performed to determine factors that might independently influence adequacy of blood pressure management. Many possible contributing factors were selected. Patients' factors such as overweight (BMI >24.9), history of hypertensive treatment >10 years, hypercholesterolemia, and particularly diabetes mellitus were included. The details of treatment such as monotherapy, calcium antagonist, cost per case and physicians' willingness to adjust medication were considered. Only physicians' unwillingness to increase the amount or dosage of medication when target BP was not achieved, was found to be an independent risk factor that contributed to poorly controlled BP in both the HT-clinic and the GM-clinic ($p = 0.003$, OR = 9.7, 95%CI = 2.2-44.4). However, there was no statistical significance when multiple regression analyses were separately performed for each clinic. There was a trend that physician's ignorance is a factor that caused inadequate control of BP when comparing the GM-clinic and the HT-clinic, because the number of cases recruited was too small to reach any statistical significance.

Response rate of calcium antagonists using as monotherapy ranged from 55 - 84 per cent in all age groups[32]. Dose-responsiveness of this drug made it a more reliable drug to achieve target BP. It was used more in the HT-clinic ($p = 0.001$).

Since calcium antagonists cost more, higher cost of antihypertensive drugs per patient was observed in the HT-clinic. However, aggressive treatment to reach the target BP by choosing effective agents and appropriate drug combinations seemed to be cost-effective.

Too many patients per physician is a time constraint in managing hypertensive patients. It may cause inadequacy in BP control at GM-clinics. Reducing uncontrolled hypertension to no more than 50 per cent, as a national public health goal for the year 2000[33] may be impossible, if we cannot reduce the number of patients. Alternatively, improvement of the process of care i.e. providing enough time for patient counseling by well-trained nurses, accurate BP measurements, updating physicians and medical auditing may improve the rate of BP normalization.

Linking process and outcome measures has long been the goal of health services research because it is such a powerful tool for assessing and improving care[34]. Setting up a HT-clinic is another modality to improve medical care as shown in this study, since it is easier to educate and administer limited teamwork. Similarly, to follow-up and contact a limited number of hypertensive patients, is more practical and effective.

SUMMARY

In conclusion, BP was not adequately controlled in elderly patients at the GM-clinic compared to the HT-clinic. More aggressive management of hypertension by updating physicians, medical auditing, patient counseling, training medical personnel and using appropriate drug-combinations may improve adequacy of ambulatory BP management at GM-clinics.

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การศึกษาประสิทธิภาพในการรักษาโรคความดันโลหิตสูงในคลินิกอายุรศาสตร์ทั่วไป

เมธา ผู้เจริญชนะชัย, พ.บ., พีระ บูรณะกิจเจริญ, พ.บ., ปร.ด.*, สุรชัย สราวิช, พ.ว.ก.*, กวี เจริญลาภ, พ.บ.**

ได้ทำการสำรวจภาคตัดขวาง ผู้ป่วยความดันโลหิตสูงอายุตั้งแต่ 55 ปีขึ้นไป 67 รายที่คลินิกอายุรศาสตร์ทั่วไป เปรียบเทียบกับคลินิกโรคความดันโลหิตสูง 63 ราย ที่แผนกผู้ป่วยนอกภาควิชาอายุรศาสตร์, โรงพยาบาลศิริราชระหว่างเดือนมิถุนายน-เดือนกรกฎาคม พ.ศ. 2542 พบว่าจำนวนผู้ป่วยที่ควบคุมความดันโลหิตได้อยู่ในเกณฑ์น่าพอใจ (แรงดันเลือดไดแอสโตลิคน้อยกว่า 85 มิลลิเมตรปรอท ในผู้ป่วยเบาหวานที่มีความดันโลหิตสูง หรือน้อยกว่า 90 มิลลิเมตรปรอท ในผู้ป่วยความดันโลหิตสูงทั่วไป) ในคลินิกโรคความดันโลหิตสูงพบในอัตราที่สูงกว่าคลินิกอายุรศาสตร์ทั่วไป (ร้อยละ 69.8 เทียบกับร้อยละ 49.3, p = 0.02) ทั้งนี้ยังพบว่าปัจจัยเสี่ยงอิสระสำคัญที่ทำให้การควบคุมระดับแรงดันเลือดไม่ได้ตามเกณฑ์มาจากแพทย์ไม่ใส่ใจในการปรับขนาดหรือเพิ่มจำนวนยา (p = 0.003) การศึกษานี้บ่งชี้ว่ามีความจำเป็นต้องจัดบริการรักษาผู้ป่วยความดันโลหิตสูงที่มีประสิทธิภาพมากขึ้น

คำสำคัญ : ความดันโลหิตสูงชนิดปฐมภูมิในผู้ป่วยสูงอายุ, ประสิทธิภาพในการรักษาโรคความดันโลหิตสูง

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