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CASE REPORT

Pharmacist blood pressure management programs using telemonitoring systems are useful for monitoring side effects of antihypertensive drugs in a community pharmacy

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Key Clinical Message

We previously started pharmacist blood pressure (BP) management programs using telemonitoring systems for monitoring side effects of antihypertensive drugs in a community pharmacy. The present case demonstrates that pharmacist BP management programs using telemonitoring systems are useful for monitoring side effects of antihypertensive drugs in a community pharmacy.

Keywords

Antihypertensive drugs, community pharmacy, orthostatic dizziness, side effects, telemonitoring system

Introduction

In Japan, it is estimated that there are 43 million (23 million men and 20 million women) hypertensive patients [1]. Hypertension (HT) has been reported to increase the risk of cardiovascular disease (CVD), including heart disease and stroke [2–5]. The stroke morbidity and mortality rates have been reported to be higher in East Asian countries than in Western countries [1]. Of 834,000 deaths from noncommunicable diseases and injuries in Japan, high blood pressure (BP) accounted for 104,000 deaths [1]. These findings indicate that management of HT is important in the prevention of CVD.

Previous studies found that home BP monitoring (HBPM) was readily accepted by and performed by hypertensive patients [6–8]. However, recording the results regularly might be difficult.

Home BP telemonitoring systems were found to be effective for recording routine BP measurements. Moreover, BP control was found to be better with these systems than with traditional methods [9–11]. Margolis et al. reported that BP control was better with home BP telemonitoring systems and pharmacist case management than with usual care [12]. We believed that these systems could be useful for monitoring side effects of antihypertensive drugs. Pharmacist management programs, which was conducted using BP telemonitoring systems, were recently introduced in our community pharmacy (Haruka community pharmacy) [13]. The programs were based on physician–pharmacist comanagement, and a female patient who was under one of these programs was found to have orthostatic dizziness induced by antihypertensive drugs. Here, we present the case of a patient who experienced side effects induced by antihypertensive drugs and

show the importance of pharmacist BP management programs using telemonitoring systems for monitoring side effects of antihypertensive drugs in a community pharmacy.

Case History and Examination

A 55-year-old woman with HT was advised to measure her BP regularly by her doctor. She consulted with a pharmacist at Haruka community pharmacy, and the pharmacist recommended that she participate in a pharmacist BP management program. She agreed to participate in the program and started taking antihypertensive drugs (azilsartan, 20 mg/day; cilnidipine, 10 mg/day) on the same day.

Home BP telemonitoring was initiated to check her home BP regularly. The home BP telemonitoring system involved the use of Medical LINK (Omron Healthcare, Kyoto, Japan). This system wirelessly transmits BP data to a central web server via a mobile network. The community pharmacist can examine BP data at any time via the Internet. The pharmacist advised that she measure her BP twice per day (at the time of awakening and at bedtime), and provided her with information on the importance of lifestyle modification via a printed handout before starting BP monitoring [13]. Pharmacist intervention was performed every two weeks during the monitoring period. Briefly, the pharmacist collected information regarding her lifestyle from an interview and advised her about lifestyle modification. Home BP telemonitoring was continued for a period of 101 days.

Her systolic and diastolic BP values and drug history are presented in Figures 1 and 2, respectively. Although she did not measure BP at home before the monitoring period, the frequency of BP measurement was 96.1% after starting the program (Fig. 1). The mean systolic and diastolic BP values from day 0 to day 13 were 136 mmHg and 83 mmHg, respectively. Therefore, her doctor switched azilsartan (20 mg/day) to olmesartan (20 mg/day) and cilnidipine (10 mg/day) to azelnidipine (16 mg/day) on day 15. Moreover, indapamide (1 mg/day) was added on the same day. Her body weight (50 kg) did not change from day 0 to day 15. Furthermore, to improve muscle tone, etizolam (0.25 mg/day) and afloqualone (70 mg/day) were started on the same day. She complained to the pharmacist about sustained orthostatic dizziness on day 21. The mean systolic and diastolic BP values from day 15 to day 21 were 104 and 66 mmHg, respectively. Therefore, the pharmacist believed that the antihypertensive drugs might be responsible for her orthostatic dizziness and consulted with her doctor to check whether the drugs should be changed. Indapamide (1 mg/day) was discontinued on day 22. The mean systolic and diastolic BP values from day 22 to day 29 days were 106 and 66 mmHg, respectively. The pharmacist called her on day 29 to check whether she was still experiencing orthostatic dizziness. She complained to the pharmacist that her orthostatic dizziness was still present. The pharmacist again consulted with her doctor to check whether the drugs should be changed based on her symptom and BP values. Olmesartan (20 mg/day) and azelnidipine (16 mg/day) were discontinued, and indapamide (1 mg/day) was restarted on day 29. Her orthostatic dizziness improved, and the mean systolic and diastolic BP values from day 30 to day 93 were 122 and 72 mmHg, respectively. Her

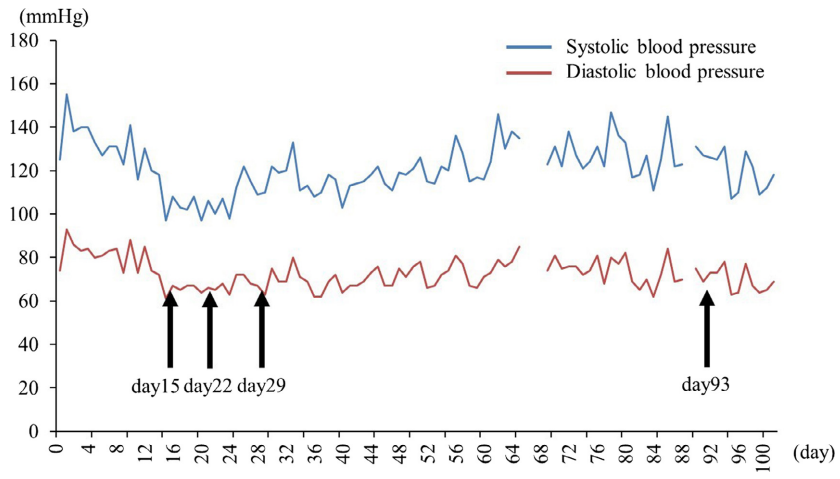

Figure 1. Mean systolic and diastolic blood pressure values. Blood pressure (BP) values are presented as the mean values per day. Systolic BP is shown as a blue line. Diastolic BP is shown as a red line. The day on which the treatment was modified is indicated with a black arrow. The BP was not measured on days 66–68 and day 90.

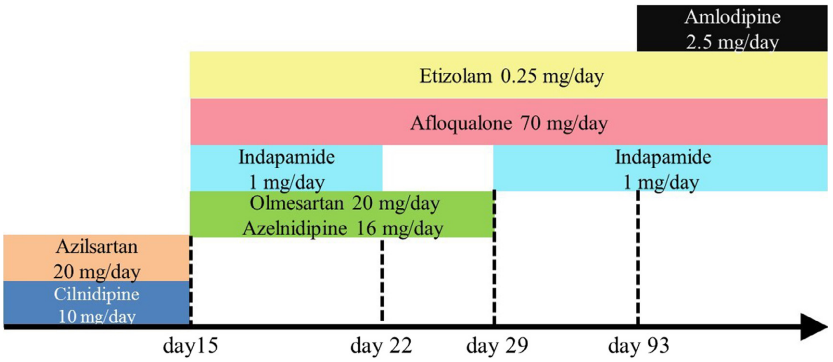

Figure 2. The drug history during the monitoring period. The patient started the antihypertensive drugs azilsartan and cilnidipine. Her doctor changed azilsartan to olmesartan and changed cilnidipine to azelnidipine on day 15. Indapamide was started on day 15. Etizolam and afloqualone were started on day 15. Indapamide was discontinued on day 22. Olmesartan and azelnidipine were discontinued, and indapamide was restarted on day 29. Amlodipine was started on day 93.

systolic BP values were over 140 mmHg on days 62, 79, and 87. Therefore, her doctor added amlodipine (2.5 mg/day) on day 93. The mean systolic and diastolic BP values from day 94 to day 101 were 116 and 68 mmHg, respectively. She did not experience orthostatic dizziness induced by antihypertensive drugs from day 94 to day 101.

Discussion

In the present case report, the pharmacist advised the patient with HT to perform HBPM, and she successfully performed monitoring at regular intervals. The pharmacist could consult with her doctor based on her symptom of orthostatic dizziness induced by antihypertensive drugs and her BP values, which resulted in the improvement of her orthostatic dizziness.

Etizolam and azelnidipine are metabolized by CYP3A4, and the blood levels of these drugs increase via drug–drug interactions. Etizolam can cause dizziness as a side effect, and dizziness may worsen if drug–drug interactions occur. Orthostatic dizziness induced by antihypertensive drugs can be improved by reducing the dose of the drugs or switching to other antihypertensive drugs. In the present case, improvement in orthostatic dizziness after modification of the treatment indicated that the patient's dizziness was induced by antihypertensive drugs. HBPM and medical interview are important to prevent symptoms induced by antihypertensive drugs. In Japan, pharmacists in a community pharmacy obtain the home BP values from self-reports or medical reports of patients; however, self-reports are less reliable than medical reports. Medical reports are based on the records of medical staff; therefore, the updating frequency is lower for medical reports than for self-reports. Although home BP telemonitoring can solve these problems, BP telemonitoring systems have been introduced in a small number of pharmacies in Japan. To our knowledge, this is the first case report of the use of a BP telemonitoring system to monitor side effects of antihypertensive drugs in a community pharmacy.

Our findings suggest that an HBPM system can improve pharmaceutical management in a community pharmacy. However, to operate this system effectively, the frequency of measuring home BP should be high. Although the frequency of measuring home BP was high in present case, further studies are required to assess the introduction of a BP telemonitoring system for patients with poor adherence.

Conclusion

Pharmacist BP management programs using telemonitoring systems might be useful for monitoring side effects of antihypertensive drugs in a community pharmacy.

Consent

Written informed consent was obtained from the patient for publication of this case report.

Acknowledgment

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Conflicts of Interest

The authors declare that they have no conflict of interests.

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