

# Curative effect of amlodipine combined with enalapril in curing hypertension of the aged

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**Abstract:** This paper aims to research the clinical effect and security of using amlodipine and enalapril together to cure hypertension of aged people. Random number table was used to divide clinical data of 114 aged hypertensives into two groups: control group (treat with only amlodipine) and observation group (treat with both amlodipine and enalapril). We formulated evaluation standard and compared the effects in pretherapy and post-treatment of two groups. Results showed that the total effective rate of control group was 59.6% and the total effective rate of observation group was 87.5% and blood pressure was lower. These findings suggest that amlodipine together, with enalapril has outstanding curative effect in hypertension treatment of the aged, they can effectively control the blood pressure, the security is fine and it deserves the popularization and application clinically.

**Keywords:** amlodipine; enalapril; hypertension of the aged; combination drug therapy.

## INTRODUCTION

The damage hypertension brings to human body is not only headache and dizziness, insomnia, what's more serious is the damage to heart, brain, kidney, blood vessel and other important viscera (Zhaosu *et al.*, 2013). Hypertension even kills. In recent years, the prevalence, morbidity and blood pressure level is growing with the age. Among them, the number of the infected aged people has the tendency of consistent increase (Hanmei, 2010). It seriously jeopardizes the physical and psychological health of the patients. The survey, conducted by Jiao Changya *et al.* (Changya *et al.*, 2013), of 11517 aged hypertension patients shows to carry out general investigation of obesity and hypertension and to conduct noninvasive artery detection can help discover hypertension early and take effective measures. Besides, Professional Proposal for Feature of Hypertension of the Aged and Process of Clinical Diagnosis and Treatment (Yinqing *et al.*, 2014) indicates the special problems, common types and principle of management of hypertension of the aged, and shows the differences of hypersonic of the aged in pathogenesis, clinical manifestation and diagnose and treatment from the younger. In the clinical practice, the poor treatment rate, poor control rate and many other chronic diseases of the aged hypertension patients, the big otherness of heart failure increase the difficulty of clinic prophylaxis and treatment. So, the research of the prophylaxis and treatment of the aged hypertensions is an important task of clinical medicine. Amlodipine and enalapril both have certain curative effect in hypertension treatment, but both defective. The combination of amlodipine and enalapril can benefit us more. This research took the aged hypertension patients of our hospital as the object of study and randomly divided them

into group of amlodipine and group of amlodipine and enalapril (each group 57 people), and discussed the effect of amlodipine and enalapril in aged hypertension treatment through the contrastive analysis of blood pressure, effective rate and untoward effect in pretherapy and post-treatment of both groups.

## MATERIALS AND METHODS

### *Common material*

The objects were the 114 aged hypertensives receiving treatment in our hospital. They all satisfied the diagnose standard of WHO, that means when they haven't take any anti-hypertension drug, systolic blood pressure (SBP)  $\geq 140$ mmHg and (or) diastolic blood pressure (DBP)  $\geq 90$ mmHg; The average blood pressure value: SBP  $\geq (170.0 \pm 25.0)$  mmHg, DBP  $\geq (130.0 \pm 36.7)$  mmHg. The object patients and their relatives have all signed the informed consent. Randomly divide them into research group and control group according to their visiting sequence, each 57 people. Of these 57 patients of the research group, 32 were men and 25 women, and the average age was  $61.30 \pm 5.20$  and of those 57 patients of the control group, 37 were men and 20 women, the average age was  $62.20 \pm 4.60$ . Both groups eliminated the patients with medical history of myocardial infarction, cerebral apoplexy, serious kidney disease and serious cardiac insufficiency. These two groups were very different in age, gender, disease condition and some other aspects. They were of no statistical significance.

### *Research methods*

Those satisfy the inclusion criteria stop other hypotensive drugs. Two weeks later, the control group began to take amlodipine by 5mg/time and 1time/day. The research group took extra enalapril by 5mg/time and 2times/day. Take a month as a course of treatment. Meanwhile, after

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the patients took the drug, observe the symptom at regular intervals and inquire if there was any untoward effect such as dizziness, headache, chest distress, cough and etc.

#### **Evaluation of curative effect**

(1) Blood pressure determination: Use mercury column sphygmomanometer to measure the blood pressure level during 7:30-10:30 of every forenoon. Take the right arm as the testing arm, SBP as the first phase of Korotkoff sounds, DBP as the fifth phase of korotkoff sounds. Each time, take 3 times of measurements, and take the average value as the blood pressure value.

(2) Effect evaluation: refer to the relevant evaluation standards of the curative effect of aged hypertension. Marked effect: the pressure was decreased to 130/80mmHg or less, or SBP is decreased by 20mmHg or more, or DBP decreased by 10 or more. Effective: The blood pressure hasn't lowered to 130/80mmHg, but SBP lowered 110-19mmHg or DBP decreased by less than 10mmHg. No effect: those that failed the standard above. Marked effect and effective together is total effect. Take the average blood pressure of the first 7days of using both two drugs as the basis of curative effect judgment (Biao and Fensheng, 2011).

#### **Statistical Methods**

Statistical analysis was performed using SPSS 16.0 software. The measurement data was expressed as average value  $\pm$  standard deviation (Mean  $\pm$ SD). Comparison among groups was calculated with t-test. The  $\chi^2$ -test was used to determinate the comparison among groups of enumeration data. All results were considered statistically significant as  $P < 0.05$ .

## **RESULTS**

#### **Comparison of the curative effect of two groups**

The total efficiency of the control group was 59.6%, 21 cases had marked effect and 13 cases were effective. The total efficiency of the observation group was 87.5%, 29 cases had marked effect, 20 cases were effective. Thus it can be seen, the total efficiency of the research was higher than the control group. The specific observation result is shown in table 1.

#### **The Comparison of the blood pressure control of these two Groups**

There was no obvious change, before the treatment. After two courses of treatment, the blood pressure of the research was lowered more than the control group, specifics shown in table 2.

#### **Comparison of the untoward effect of two groups of drug**

During the treatment, through observing the symptom of these two groups, it was found that, there were 1 case of

headache, 2 cases of dizziness, 3 cases of irritable cough and 4cases of edema on ankle or anterior tibial in the control group; there were 1 case of headache, 1 case of dizziness and 1 case of edema on ankle in the research group. None of these altered the curative effect. And the result showed that the total untoward effect of the research group was obviously fewer than the control group. The specific comparison result is shown in table 3.

## **DISCUSSION**

#### **Clinical manifestation of aged hypertension**

Hypertension is one of the common diseases that severely jeopardize the health of the aged. The disease can itself damage the physical and psychological health and meanwhile, it can be a risk factor, which can cause many complications and deuteropathies. When treating aged hypertensive, we should formulate an individualized drug therapeutic schedule corroding to the pathological and physiological feature and mechanism. Meanwhile, we should emphasize the subservience and basic function of non-drug treatment and the importance of taking life-long medicine. The clinical manifestation of hypertension of the aged includes: (1) the rising of the SBP is the main feature (Daping *et al.*, 2013; Fumao, 2010). From the view of clinical medicine, it is isolated systolic hypertension, the condition of which is  $SBP \geq 140$ mmHg,  $DBP < 90$ mmHg. This isolated systolic hypertension has a lot to do with the decline of elasticity of their aortic. At present, isolated systolic hypertension is the critical cause that leads to the death of patients caused by angiopathy (Longyan, 2010). (2) The hypertension of some aged people is the mixed type hypertension. The blood pressure of these people is abnormal in their mid-age. The hypertension now is caused by the primary hypertension in their mid-age. (3) The organ of aged hypertensive, such as heart, brain and etc, are injured in different degree. This brings negative effects to hypertensive. So, in the treatment of hypertension, we should completely inspect the patient to make sure no other problem happens.

#### **Clinical feature of the hypertension of the aged**

The clinical features of the hypertension of the aged shows in the following 4 aspects: (1) the variation of the blood pressure is big which easily causes hypotension. The sensibility of the baroreceptor of the aged declines, the arterial wall gets thicker and the elasticity declines. They fluctuate a lot as the day and night, the season, the position of body changes. They demands more close observation when in the treatment with antihypertensive drugs. Postural hypotension of the aged occurs frequently, and it can be very lethal as the patient get elder (Zhengze and Ping, 2010). Once the patient gets uncomfortable, the detection frequency should be increased (Jingli *et al.*, 2013). (2) The prevalence rate of isolated systolic hypertension is high. At present, the population of isolated systolic hypertension is large and SBP increases

**Table 1:** The comparison of curative effect of depressurization

Group	Marked effect	Effective	No effect	Total efficiency (%)
The control group (n=57)	21	13	23	59.6
The research group (n=57)	29	20	8	87.5

**Table 2:** The variation of the blood pressure of these two groups in pretherapy and post-treatment (Mean  $\pm$ SD, mmHg)

Group	Before treatment		After treatment (mmHg)			
			2nd week	4th week	6th week	8th week
The control group	SBP	163.7 $\pm$ 6.2	158.2 $\pm$ 6.3	155.2 $\pm$ 6.9	151.5 $\pm$ 6.7	148.2 $\pm$ 8.3
	DBP	96.5 $\pm$ 7.2	95.2 $\pm$ 5.3	93.5 $\pm$ 4.7	91.6 $\pm$ 5.3	90.3 $\pm$ 7.3
The research group	SBP	162.8 $\pm$ 7.3	151.6 $\pm$ 6.5	147.8 $\pm$ 7.1	140.3 $\pm$ 4.5	138.4 $\pm$ 7.6
	DBP	97.2 $\pm$ 7.1	90.5 $\pm$ 5.4	89.7 $\pm$ 6.5	88.6 $\pm$ 5.7	82.2 $\pm$ 5.3

**Table 3:** Comparison of occurrence rate of untoward effect of two groups of drug

Group	N	Edema on ankle or anterior tibial	Irritable cough	Headache, dizziness	Flushing	Occurrence rate (%)
The control group	57	4	3	3	2	21.1%
The research group	57	1	1	2	1	8.8%

gradually as the patients get elder. The DBP begin to decline during the age of 50 to 60, while the pulse pressure increases gradually (Jiahua and Changlin, 2014; Vanessa *et al.*, 2012). It has great relationship with the age of patient. (3) The organ function degenerates, complication increases. The hypertension of the aged is always along with arteriosclerosis, diabetes, hyperlipemia, benign prostatic hyperplasia, senile dementia and etc. These diseases worsen each other and make the treatment more complex (Caili and Jinbin, 2013). If long-term hypertension has not been controlled or treated, the death rate angiopathy is obviously higher than those of the same age. So, in order to access the target blood pressure, two or more antihypertension drugs might be applied (Cailing, 2014).

### Pharmacy principle

From the view of medical science, amlodipine belongs to dihydropyridine calcium antagonist of new generation. It can act directly on vascular smooth muscle, decrease vascular resistance, and then reduce blood pressure (Ying and Taoli, 2010). To be specific, the molecule of amlodipine, with positive charge, united with the cytomembrane with negative charge in the patient's body. The combination of positive charge and cytomembrane with negative charge can retard the calcium channel of vascular smooth muscle cell, and then control the morning blood pressure surge. Enalapril is inhibitor of angiotensin converting enzyme. This drug can reduce angiotensin, thus benefits the vasodilatation of the whole body, and then efficiently reduce the blood pressure. The feature is that its function and result is smooth and steady, it has powerful influence to glycometabolism and lipid, and it can protect the target organ and reverse the damage. The combination of enalapril and amlodipine can restrain the activation enalapril brings to RAS gene, and it also

can efficiently reduce the resistance of peripheral vessel. The antihypertensive efficacy is complement to enalapril. Enalapril can reverse the myocardium tension caused by long-acting calcium antagonists, and further prevent congestive heart-failure (Xumei, 2010). In this research of the combination of amlodipine and enalapril, we found among the 58 patients of the research group, the total efficiency was 87.5%, 20 cases were efficiently cured; as to the control group, the total efficiency was 59.6%, 13 cases were efficiently cured. The otherness of these two groups is obvious. The research results shows, the combination of amlodipine and enalapril can be efficiently applied to the treatment of hypertension of the aged. The curative effect is better than amlodipine. To observe the SBP and DBP, we found the blood pressure of the patients was almost under control.

In conclusion, the combination of amlodipine and enalapril can not only improve the antihypertensive efficacy but also remit the increasing of heart rate caused by calcium antagonists, and edema of anterior tibial and ankle. It can strengthen the antihypertensive efficacy and make the pharmacy safer.

### CONCLUSION

In conclusion, amlodipine alone can, to some degree control the blood pressure when treating hypertension of the aged. But the curative effect is not as good as its combination with enalapril, and what's worse, when treat the patients with solely amlodipine, the occurrence rate of untoward effects such as headache, dizziness and irritable cough is high while the drug combination has less untoward effect and thus is more security.

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