

## EFFICACY OF TRADITIONAL MEDICINE IN CARDIOVASCULAR DISEASES IN THE PEOPLE'S REPUBLIC OF CHINA

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**ABSTRACT:** *Since the founding of People's Republic of China, the country, made some therapeutic progress in the field of cardiovascular diseases by traditional Chinese medicine. Here the author introduces some of the major progress made in recent years.*

1. The Discovery of the Earliest Pathologically Proved Case of CHD in Medical History.

From time immemorial, there had been a case of coronary atherosclerotic heart disease in China, which was confirmed by the necropsy of a female body unearthed in 1972 from the Tomb at Changsha. It proved that such a case of CHD existed about 2100 years ago.

As shown by the necropsy, the female corpse had severe heart disease with coronary atherosclerosis. Right coronary lesions were discovered and lesions of the left coronary artery were even more severe. The lumen of the arteries was markedly narrowed and occlusion exceeding  $\frac{3}{4}$  by atherosclerotic plaques were observed. The upper one-third of the anterior descending branch of the left coronary artery was almost entirely obstructed. Unearthed simultaneously with the corpse were large amounts of aromatic and warm medicinal herbs such as *Flos magnoliae biondii*, *Rhizoma alpiniae officinarum*, *Pericarpium zanthoxyli*, *Rhizoma zingiberis*, etc. All these are conventional herbs now used in our traditional Chinese medicine for curing

“heart numbness”, or “numbness caused by cold”.

In perusal of the World medical literature, it has been revealed that the earliest case of coronary atherosclerosis disorder confirmed by autopsy was performed by Giovanni Maria Lancisi (an Italian anatomist, 1654 – 1720) and John Hunter (a Scotch anatomist and Surgeon, 1728 – 1793). However, all these had occurred as late as in the middle of the 17<sup>th</sup> Century.

The discovery of the corpse of the West Han woman with CHD reminds us of the fact that the records of symptoms and signs, which appear similar to an *gina pectoris* and myocardial infarction (MI) consequent upon CHD in many Chinese ancient classics are reliable and convincing.

The descriptions of “heart pain”, “fainting heart pain” and “serious heart pain”, etc. in *Neijing* (The Yellow Emperor's Classic of Internal Medicine), a book believed to have been written 2000 years or more ago, are very similar to nowadays *angina pectoris* and myocardial infarction. Besides, the radiated position of pain and the prognostic severity of shock complicated by AMI was also recorded in the Classic *Jinkui Yaolue*

(Synopsis of the Golden Chamber), there are Passages especially devoted to this particular subject. These records appeared 100 – 200 years earlier than those in ancient Rome. We believe that among these data, many were accumulated from the valuable experiences of treatment.

## 2. Treatment of Acute Myocardial Infarction (AMI).

After the 1960s, the combined method of traditional Chinese and western medicine was applied in many regions of our country for the treatment of AMI. In recent years, supplementation of traditional herbs in the course of treatment has also been a routine procedure. The admitted mortality of this disease decreased from 20 – 30% to about 10 – 15% in several cities. The complications of AMI also decreased, some mild and moderately severe cases recovered following treatment with traditional medicine alone. For example, we found that in a series of 98 cases treated with combined traditional and western medicine (“replenishing the vital energy and removing the stasis” mainly), the mortality was 8.2%. On the other hand, in the same period, in 151 cases basically similar in severity but treated with western medicine alone, the mortality was 29.1%. In another series of 71 cases treated purely with western medicine from, 1972 – 1974, the mortality was 16.3%, while in 74 cases treated with traditional Chinese and western medicine from 1975 – 1977, the mortality was 8.1%. More cases of older people were found in the latter group, and their infarctional sizes were larger, and there were more repeated infarction cases in the latter group. It shows clearly that traditional Chinese medicine has certain effects in reducing the mortality of AMI.

The highest mortality occurs within the first 24 hours after the attack in cases of AMI. In general, the infarctional central areas forms irreversible injury and necrosis, but if reasonable treatment is carried out in time, the lesion can also be reduced. In 1966 of 562 cases treated within 24 hours after attack with combined traditional Chinese and western medicine by Beijing CHD Coordinating Group, the mortality was 11.6%. For 948 cases treated in 1977 by the same method, the mortality was 11.2%, the rate being almost the same. For 401 cases basically similar in severity in the same stage but without traditional herbs within the first 24 hours, the mortality was 19%. The differences between the two groups is significant statistically. All these indicate that early treatment with traditional Chinese and western medicine in combination can effectively lower the mortality of AMI.

We have summed up some experiences in the treatment of AMI according to the differentiation of various syndromes, and suggest that the “deficiency of vital energy and blood stasis” is the chief feature in this disease. Therefore, we usually apply the method of “replenishing the vital energy and removing the stasis” supplemented with the methods of “smoothing the bowels”, “eliminating the evil foulness”, “nourishing the Yin”, “cooling the evil heat” and “reinforcing the Yang”, etc. The traditional herbs we usually use are follows:

*Astragalus membranaceus*, *Ginseng* and *Codonopsis Pilosula* (for antideficiency of vital energy).

*Salvia miltiorrhiza*, *Ligusticum wallichii*, *Paeonia obovata*, *Leonurus heterophyllus*, *Angelica sinensis* and *Milletia reticulata* (for antiblood stasis).

*Trichosanthes kirilowii*, *Pinellia ternate*, *Eupatorium fortunei*, *Agastache rugosa*, *Phyllostachys nigra* var. *henonis* and *poria cocos* (for anti – evil foulness).

*Polygonatum sibiricum*, *Polygonatum oderatum*, *Dendrobium nobile*, *Ophiopogon Japonicus* and *Schizandra chinensis* (for anti – deficiency of Ying).

*Cinnamomum cassia*, *Zingiber officinale* and *Aconitum carmichaeli* (for anti deficiency of Yang).

*Allium macrostemon* and *Cinnamomum Zeylanicum* (for communicating the Yang).

*Cyperus rotundus* and *poncirus trifoliata* (for anti-stagnation of vital energy).

*Rheum officinalis* and *cassia acutifolia* (for smoothing the bowels).

In order to probe into the mechanism of traditional herbs on AMI, we carried out a study on the commonly used Yiqihouxue remedy in our hospital. This remedy was proposed to give the action of “replenishing the vital energy and promoting the blood circulation” in traditional medical theory. It was also called “Anti – AMI mixture” (an injection, consisting of *Codonopsis pilosula*, *vata* and *curcuma aromatica*). Guided by the epicardial ECG, a 6 – hour observation was made upon the MI induced by ligation of the anterior descending branch of the left coronary artery in dogs. In 30 dogs the average size of MI was markedly smaller than that in the control group receiving saline injection ( $p < 0.05$ ). Judging by the number of leads with elevated ST – segment (NST) and the total value of ST-Segment elevation (EST), the effect of the remedy was rather evident. The mechanism of the action of *Salvia* injection lay in altering the hemarheologic

condition of the patients, i.e., lowering the viscosity of the whole blood, and accelerating the electrophoresis of the red cells, consequently improvement of the peripheral circulation and increase of the number of patent capillary networks were achieved.

### 3. Treatment of Angina Pectoris

For treating angina pectoris, we selected different ways including the therapies of “promoting the blood circulation and removing the stasis” “aromatic and warm herbs”, cleaning numbness and communicating Yang, “replenishing the vital energy and Shen” and acupuncture.

The prescription needed for “promoting the blood circulation and removing the stasis” were Coronary Heart – H (CH-2, consisting of *Salvia miltiorrhiza*, *Paeonia obovata*, *Ligusticum wallichii*, *Carthamus tinctorius* and *Dalbergia odorifera*), and *Salvia* compound mainly. The anti-anginal effective rate was 30 – 50%. Experimental research showed that CH – 2 could inhibit rat platelet aggregation in vitro, induced by ADP and collagen. After measuring the CAMP content in blood platelets, we noted that CH – 2 could increase the platelet CAMP content in rabbits. The inhibitory effect on platelet aggregation was thought to be related to the increase of the platelet AMP content.

Electron microscopic observations were made by our hospital on the action of CH – 2 in rat model with blood platelet aggregations in myocardial small vessels and myocardian damage induced by frozen water. The result showed that after the provocation all 10 animals in the control group developed platelet aggregation in myocardial small vessels and there were early manifestations of ischemic changes in

the myocardial ultrastructure (mitochondrial swelling, myofibril relaxation, glycogen reduction, etc.). Of the 10 animals in the medicated group, only 3 showed platelet aggregation in small vessels of the myocardium, and changes of the myocardial ultrastructure were basically the same as in the control group, although comparatively milder. No marked changes were observed in the remaining 7 animals.

By employing Schatz's method, we made observations under electron microscope on the effect of traditional herbs of CHD on the platelet aggregation. It was found that tetramethylpyrazine ( $C_8H_{12}N_2$ ), one of the alkaloids of *Ligusticum wallichii*, could reduce the activity and aggregation of the platelet surface. In 20 cases of CHD, after treatment, the number of spread type platelet decreased from  $40.4 \pm 11.5$  to  $30.4 \pm 12.5$  ( $p < 0.05$ ). This action of tetramethylpyrazine is probably to its effect against  $TXA_2$ .

The prescriptions of "aromatic and warm therapy" include Quanxinsuhe pills (consisting of *Liquidambar orientalis* oil and Borneol, *Lignum santali* and *Radix aristolochiae*), Subin small pills (consisting of *Liquidambar orientalis* and Borneol), Artificial Musk (*moschus*) aerosol and Kuan-xiong aerosol (consisting of *Piper longum*, Borneol, *Asarum sieboldi*, *Alpinea officinarum* and *Lignum santali* etc). They are all quick-acting traditional herbs against anginal attack and well accepted by patients. The immediate effective rate of these prescriptions was 45-50% within 3-5 minutes. It was also found effective in some of those patients who could not tolerate nitroglycerine because of its marked side effect. Experiments showed that Kuanxiong emulsion exhibited an antagonistic effect in myocardial ischemia and anoxia caused by pituitrin judging from

ECG ST-T wave changes. Similarly, it could antagonize the excitatory action of pituitrin on rat uterus in vitro. The drugs act directly upon the smooth muscles. Experimental treatment with Kuan-xiong aerosol in dogs incompletely anesthetized with pentobarbital showed that its effect was not mediated through the blockade of B-receptor. The quick acting effects of these remedies are thought to be related to the relief of coronary artery spasm.

The immediate results of acupuncture therapy in angina pectoris were promising. This has been proved by more than 2000 cases treated by acupuncture in recent years in our country. The main acupuncture points employed by medical workers in Peking were, Shanzhong, Juiwei, Neiguan and Zusanli and the supplementary points were Tongli, Juque and Shenman etc. The marked effective rate was 47.8%. In some of the cases, the ECG improved within 1-20 minutes after needling. Acupuncture also manifested an analgesic effect in anginal attack of AMI. After acupuncture, left ventricular function improved. Both PEP and ICT were shortened, PEP/ET ratio increased and a wave percentage dropped.

#### 4. Treatment of Shock

The use of combined traditional Chinese and western medicine has brought on a reduction in the mortality from shock. In the Beijing area for instance, the mortality rate of AMI shock decreased from 56% before 1971 when only western drugs were used to below 15% in 1976. This decrease seems to be related to early application of traditional herbs (within 24 hours of attack). The remedies often used were Shengmaisan (Pulse-producing injection, consisting of Ginseng, *Ophio Pogon japonicus* and *Schisandra chinensis*) and Dushentang (Ginseng decoction). These remedies are

credited with the properties of “producing body fluid”, improving peripheral circulation, turning cool extremities to warm, increasing urine output and minimizing the necessary doses of anti hypotensive agents. Hence, they are beneficial to combat the shock. Compared to the previous treatment with pressor amines alone such as neopinephrine and aramine, the combined therapy is certainly superior. With the use of above mentioned amines, aggravation of the condition may occur in some cases, as although the blood pressure is elevated, yet the circulation remains unimproved.

AMI complicated by shock, especially by hypotension was treated in some hospital, with the Ginseng – aconitum carmichaeli injection with some effect. The injection consisted of Ginseng, Aconitum carmichaeli and Salvia miltiorrhiza. According to the principle of traditional Chinese medicine, patients with shock chiefly suffer from “loss of Yang”. This injection has the effect of raising and stabilizing the blood pressure, reducing the dependence on pressor amines, improving end circulation and mental state, and regulating the heart rate. In addition it is seldom accompanied with apparent side effects.

Experiments were carried out on the effects of “pulse – producing injection”. In rabbits, cardiogenic shock was induced by ligation of the anterior descending branch of the coronary artery, we noted that this injection could, though slowly, raise the blood pressure. The shock relief rate of the treated group was apparently higher than this preparation had an inhibitory action on the myocardial cell membrane ATP – ase activity. If that is the case, it would be possible to alter the initiative transport of certain positive ions by the myocardial cell

membrane and achieve positive inotropic effect.

Frucus citrus aurantium (belonging to the rue family) is a herb in traditional medicine to regulate vital energy, dissipate indigestion and control pain. It has been found that this herb has the effect of raising blood pressure. The injection prepared from it (each ml containing an equivalent of 4 gms crude drug) was used by us to treat cardiogenic and many other forms of shocks and have achieved a marked effective rate of 69% (The initial dose given intravenously was 10 – 40 gms. Following the treatment, the systole pressure rose to above 90 mm Hg, the pulse pressure to 30 – 40 mm Hg, the heart sounds strengthened, the ends of the extremities warmed, the urine output increased, the blood pressure was kept from falling for more than 5 hours). The total effective rate was 96% with a wide margin of safety.

The effective ingredients of this drug are synephrine and N – methyltyramine. The latter has been successfully synthesized. Synephrine is a stimulant to the alphareceptor and has a long – standing action on the cardiac receptor. Observations have been made on the action of Fructus citrus aurantium injection on the blood pressure and on hemodynamics in dogs with cardiogenic shock induced by ligating the anterior descending branch or the circumflex branch of the coronary artery. In 14 dogs, after formation of cardiogenic shock, the blood pressure fell from 102.4 to 58.5, hg; the right atrial pressure rose from 3.23 to 8 mm Hg and the left atrial pressure from 2.46 to 10.78 mm Hg. After injection treatment, the blood pressure was elevated, the right atrial pressure remained unchanged, but the left atrial pressure was found obviously decreased, a fact reflecting a decrease of the left ventricular preload. No serious fatal

arrhythmia was observed throughout the experiment. However, further observations by means of monitoring in conjunctions with hemodynamic studies are necessary.

## 5. Treatment of Arrhythmia

Arrhythmia is one of the most common features of cardiac patients. Several types of arrhythmias have frequently been found in non – cardiac patients and healthy persons.

Because of the fact that patients with Sick Sinus Syndrome (SSS) usually has a “cold and insufficiency syndrome”, so they were treated with the “warm and strengthening prescriptions and herbs”, its effectiveness was rather significant. Aconitum Carmichaeli was well – known in its warm and tonic action. From this herb, we obtained a new active ingredient, named Aconitum Carmichaeli – 1 (dl – demethyl coclaurine, also called Higenamine), and found that it has marked  $\beta$  – receptor stimulating effect. Of 68 cases of bradyarrhythmic patients (including 34 cases SSS, 4 cases sinus bradycardia, 5 cases second degree sinoatrial block, 25 cases various degree of atrioventricular block) due to CHD or myocarditis, etc. treated with this drug, we noticed that it could increase the heart rate of these bradyarrhythmias about 24 beats / min. on average a few minutes after the beginning of intravenous infusion (Higenamine 2.5 mg in 5 – 10% glucose sol. 100 ml). This action was very similar to the control observations used with isoprenaline. In some patients with second degree atrioventricular block could return to normal rhythm after treatment. A few cases of complete atrioventricular block showed improvement. Aconitum Carmichaeli – 1 also showed its effect in shortening the A – H intervals of HBE in dogs.

In our hospital, a formaldehyde ring was used to destroy the sinus in rabbits and thus created in them the experimental model of SSS. The action of Aconitum Carmichaeli – 1 and isoprenaline were compared. 15 rabbits were intravenously infused with Aconitum Carmichaeli – 1 which was dissolved in normal saline, at a speed of 4 mg/kg/ min. The isoprenaline group consisting of 10 rabbits was treated with isoprenaline in the same way as for the Aconitum Carmichaeli – 1 group. The control group comprising 15 rabbits was given normal saline of the same volume. The experimental results showed that the Aconitum Carmichaeli – 1 rapidly raised the heart rate by  $34.2 \pm 17.9\%$ , restored sinus rhythm in 66.6% of the animals, normalized ST – T changes in 71.4% of the animals, and raised the fall of the blood pressure. In addition its therapeutic effect was relatively stable and lasted longer. Isoprenaline raised that heart rate by  $78.7 \pm 35.5\%$  and restored sinus rhythm in 70% of the animals. Its effect was slightly stronger than Aconitum Carmichaeli – 1. With isoprenaline, however, the ST – T changes tended to deteriorate. It was not so effective in reversing the lowering of the blood pressure. Both Aconitum Carmichaeli – 1 and isoprenaline could lower the mortality rate of experimental animals. The difference in the action of raising the heart rate and restoring the sinus rhythm between these two groups and the control group was significant.

From traditional herb Dichora febrigua active ingredient, a new potent anti – arrhythmic drug Changrolin (4 – (3, 5 – bis [N – pyrrolidinyl) ethyl] phenyl) – 4' – hydroxyphenyl > aminoquinoxaline) was synthesized in Shanghai. The antiarrhythmic effect of Changrolin in various arrhythmias especially in ventricular extrasystoles and atrial extrasystoles was about 80% and was similar to antazoline and verapamil.

Experimental research showed that this drug could markedly prolong the effective refractory period of atrial and atrioventricular node, and could also raise the ventricular fibrillation threshold by electric stimulation in animals. But, some of the patients might have such side – effects as skin-colour changes after taking this drug.

## 6. Treatment of Hypertension

In our country the incidence of hypertension is about 5 – 10% in urban districts which is relatively higher than that in the rural areas. With this and an average annual incidence of 1% hypertension is recognized as a common disease in the field of internal medicine.

Among the registered population of 600,000 in the district of Haidien, Beijing, where the Xi-yan Hospital is situated, the highest cause of death is cerebral vascular disease which is closely related to hypertension. This situation is quite the same all over the country, therefore a large amount of research has been focused on its traditional treatment.

According to the theory of our traditional medicine, we hold out the view of unifying the body together as an integral whole, thus we place emphasis on the regulation of body functions, so as to correct the symptoms to a more effective degree. This is a special and interesting method in treating hypertension. Usually the lowering of blood pressure and correction of symptoms are not always in parallel with each other. Patients under therapy can have their blood pressure lowered significantly but still complain of intolerable symptoms such as headache and dizziness. Therefore, we improve the symptoms and the blood pressure with the following herbs, such as *Pueraria lobata*, *Gastrodia elata* and *Uncaria rhynchophylla*,

etc. Experiments have also proved that the drug Tienma – Goteng Yin (consisting of *Gastrodia elata* and *Uncaria rhynchophylla*) can ameliorate the functions of the cerebral cortex in dogs.

As to the research on the anti-hypertensive effect of single herb treatment, we have attained some progress. The extract of Fanchinin (alkaloids of the plant *Stephania tetrandra*), can be used to treat hypertensive crisis, cardiac failure in acute hypertension and cerebral vascular accidents. Significant improvement of cure rates are up to 56.6%. Its function may be manifested through the reflexive vasodilation reaction, inhibition of the vasomotor centres and the sympathetic nervous system, and through the M – cholinomimetic receptors. Besides, herbs like *Clerodendron trichotomum*, *Apium graveolens*, *Chrysanthemum indicum*, *Trachomitum lancifolium*, *Aristolochia debilis*, *Paeonia suffruticosa*, *Baicalin* and *Catharanthus roseus* also have hypotensive effect in various degrees.

By screening 498 traditional medicines, we found that 136 species of herbs and 56 prescriptions of allied herbs actually possess the desired effect of lowering blood pressure. Among them 77.3% belong to the category of “cold” herbs (including – bitter cold, sweet cold, mild cold, both bitter and sweet cold) and 11.4% belong to the “hot” and “warm” herbs. These are all effective herbs and usually adopted in our clinical practice.

In some regions, different therapies in acupuncture (including ear – acupuncture and seven – star – needle) and magnetic forces applied on points, and “Qi – gong” treatment of exercise in breathing, etc., all proved to be effective, thus enriching our clinical practice in curing high blood pressure.

Data obtained from epidemiology indicate that lowering blood pressure can effectively reduce mortality from cerebrovascular diseases. Therefore many medical workers have expressed great enthusiasm in the work of mass prevention and treatment of hypertension. In our traditional practice, programmes are being planned to find new methods for the improvements of symptoms and organic function. The search for long-term and quick-active plants in the regulation of blood pressure are also on the way. And in order to achieve results in clinical observation, it is suggested that patients with stable hypertension should be selected, because interference due to variations in blood pressure and mental stress must be avoided. Furthermore, research on the mechanism of maintaining homeostatis by the traditional plants has also been put into consideration in our programme.

## 7. Treatment of Hyperlipemia

Since the seventies, a great deal of work has been done by Chinese medical workers in the study of traditional antihyperlipemic drugs, as by workers in many other countries. As a result of these studies, a certain number of natural ingredients with the properties of lowering lipids have been discovered. In general, traditional herbs which proved to have some effect may be classified as follows.

(1) Inhibition of cholesterol synthesis: *Alisma orientalis* is a herb capable of “removing dampness” and “decreasing excessive body fluid”. The Japanese researchers found that the netriterpene separated from it might influence the resolution of datty acid and reduce the sources of material for cholesterol synthesis (synthesis of acetyl coenzyme

A). We also found that it was clinically effective in lowering the level of cholesterol and triglyceride.

(2) Inhibition of cholesterol absorption from the intestine: Traditional herbs such as *Polygonum multiflorum*, *Semen cassiae torae*, *Polygonum cuspidatum*, *Bupleurum*, *Cortex eucomiae* and *Flos lonicerae* etc. all have this effect. The first three contain emodin which enforces intestinal peristalsis and inhibits intestinal absorption of fat and cholesterol.

*Polygonum multiflorum* is a herb employed in traditional Chinese medicine for “preservation of youth” and as a tonic agent for the “Shen”. Of 178 cases of hypercholesterolemia treated with this herb in the form of tablets, the cholesterol level dropped by 14.4% on an average. Some units reported even better results for the IIa type of hyperlipemia. Medication with drugs of the herb in addition to its decoction was more effective. In rabbits, it showed the action of inhibiting the formation of plaques over the inner coat of the aorta and lipid sedimentation. It is said that many other compounds using this herb as the principal ingredient were effective too.

*Semen cassiae torae* and *Polygonum cuspidatum* were reported effective by many hospitals, but ineffective by a few others. Since the dose given is usually large, post medication diarrhea and nausea are possible.

(3) Promotion of cholesterol excretion : *Artemisia capillaris* has the action of “cleaning the evil heat” and “removing the dampness”. Coumarin, the ingredient of *Artemisia capillaris* has



the activity of lowering blood lipids. But pleurum also has the effect of promoting cholesterol excretion.

- (4) Promoting serum lipoprotein transport and lipid elimination : Both *Artemisia capillaris* and *Polygonum multiflorum* showed these effects, as did herbs such as *Fructus crataegi*, *Ganoderma lucidum*, and *Cynanclum paniculatum* and certain other blood circulation – promoting remedies.

Workers in Beijing as well as in other parts of our country noted that *Carthamus tinctorius*, an element of CH – 2, can reduce experimental rabbit atherosclerotic lesions. However, in clinical practice, we haven't found that they have any marked effect in lowering lipid. Medical workers from Shanghai thought that *Salvia miltiorrhiza* was effective in promoting fat oxygenization within the liver.

*Ganoderma lucidum* is recognized to be a youth – preserving herb. It regulates and strengthens the function of the vital organs and tissues, and increases the ability of the body to be adapted to unfavourable environment and extrinsic pathogenic factors. Its action of lowering lipids is believed to lie in lipid

transformation. Furthermore, it delays the formation of atherosclerosis plaques. Clinically, it is especially evident in cases complicated by Qixu (weakening of the vital energy) and Xinyinxu (weakening of Yin of the heart). Several medical units found its effectiveness against hyperlipemia IIa and III. A comparative study of *Ganoderma lucidum* and *Beniol* revealed that both were similarly effective.

The antilipidemic activity of *Allium scrodoprasum* essential oil was confirmed to be effective clinically and in animal experiments.

To sum up, traditional herbs employed in the treatment of cardiovascular diseases are many, and in fact there exists a great potentiality in curing or improving by administering these medicinal plants. Nature, like a grand garden and breeding plantation, affords us promising materials for our scientific efforts in the search of effective traditional medicinal plants for cardiovascular diseases.

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