

# 老年阳虚患者超氧化物歧化酶与血清 锌铜关系的初步研究

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**内容提要** 本实验测定了40例老年阳虚患者超氧化物歧化酶含锌铜离子(SOD<sub>-1</sub>)和血清Zn、Cu,其结果分别为994±125ng/mgHb;63.6±12.1、72.6±10.7μg%。均显著低于正常对照组和老年对照组( $P<0.01$ ),血清Zn与SOD<sub>-1</sub>呈正相关( $r=0.34$ )。文中联系SOD<sub>-1</sub>与血清Zn、Cu在衰老中的作用,特别是金属离子Zn、Cu与SOD<sub>-1</sub>之间的关系,对老年阳虚证的发生机理做了初步探讨。

**关键词** 阳虚 超氧化物歧化酶 锌 铜

超氧化物歧化酶是含金属离子的酶蛋白,其中含锌铜离子(Zn、Cu-SOD)称为SOD<sub>-1</sub>,含锰离子(Mn-SOD)的称为SOD<sub>-2</sub>,前者主要存在于红细胞中。近年的研究表明,SOD<sub>-1</sub>与衰老以及虚证的发生密切相关,而国内在研究老年虚证时发现其血清Zn、Cu均有一定改变<sup>①</sup>。为了进一步探讨老年虚证的发病机理,我们同时测定了老年阳虚病人血清Zn、Cu及红细胞SOD<sub>-1</sub>含量,现将结果报告如下。

## 对象及方法

一、研究对象:从本院中医老年病门诊中,选择符合1983年全国中西医结合虚证辨证标准<sup>②</sup>的老年阳虚患者40例,年龄为60~84岁,其中60~69岁26例,70~79岁12例,80岁以上2例,男18例,女22例。诊断为高血压冠心病16例,老年性慢性支气管炎8例,糖尿病2例,前列腺肥大4例,多发性室性早搏2例,白细胞减少症2例,肿瘤术后4例,有证“无病”者2例。同时设立60岁以上(60例)及40岁以下(36例)、无器质性疾病的健康人为对照组,分别称为老年对照组、正常对照组。

## 二、检查方法

1.微量元素检查方法:用原子吸收法(AAS)进行。(1)仪器和试剂:用北京第二光学

仪器厂生产之WFD-Y<sub>2</sub>型原子吸收分光光度计改装,经上海有关专家鉴定,Zn、Cu母液1mg/ml、正丁醇、乙二胺四乙酸二钠(CEDTA)、去离子水。(2)血清采集及处理:用去离子水处理过的空针,试管采集静脉血3ml,37℃水浴箱中放置30min,以3000r/min离心15min,分离血清,测Zn、Cu时加6%正丁醇稀释5倍。(3)元素回收率:用本机所测Zn、Cu回收率分别为100%和98%。

2.SOD<sub>-1</sub>测定方法:取20μl指血,加入2ml双蒸水,振荡溶血后,按常规比色,测定其血红蛋白含量,再用放免法<sup>③</sup>测定其SOD<sub>-1</sub>含量,按每毫克血红蛋白所含SOD<sub>-1</sub>ng数计算。

## 结 果

一、老年阳虚患者血清Zn、Cu测定结果:如表1所示。

表1 老年阳虚患者血清Zn、Cu检测结果(μg%, $\bar{x}\pm S$ )

| 组 别  | 例数 | Zn         | Cu         |
|------|----|------------|------------|
| 老年阳虚 | 40 | 63.6±12.1△ | 72.6±10.7△ |
| 老年对照 | 60 | 70.9±11.5* | 89.0±18.2* |
| 正常对照 | 36 | 124.0±21.0 | 137.0±22.0 |

△与老年对照组比较 $P<0.05$ , \*与正常对照组比较 $P<0.01$ ,下同

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可见三组之间比较均有显著性差异,老年阳虚患者血清Zn、Cu较之健康老年人更低。

二.老年阳虚病人SOD<sub>-1</sub>测定结果:如表2所示。

表2 老年阳虚病人SOD<sub>-1</sub>测定结果 (ng/mgHb,  $\bar{x} \pm S$ )

| 组别   | 例数 | SOD <sub>-1</sub>      | Hb(g)                   |
|------|----|------------------------|-------------------------|
| 老年阳虚 | 40 | 994 $\pm$ 129 $\Delta$ | 10.5 $\pm$ 1.1 $\Delta$ |
| 老年对照 | 20 | 1206 $\pm$ 123         | 11.0 $\pm$ 0.9*         |
| 正常对照 | 20 | 1249 $\pm$ 127         | 13.2 $\pm$ 1.3          |

可见老年阳虚患者SOD<sub>-1</sub>含量与老年对照组和正常对照组均有显著性差异,但老年对照组和正常对照组之间无显著性差异,三组患者血红蛋白含量亦有显著性差异。

## 讨 论

在众多的衰老学说中,自由基理论是比较为大多数人所公认的,正常情况下,体内过多的超氧阴离子自由基对正常组织和细胞有损伤作用,由于年龄的增长,体内清除自由基的能力日趋减弱,则出现综合性衰老现象,如行动迟缓,记忆力减退,全身乏力,畏冷,齿落发白等表现,而这些症状在中医辨证中与气阳虚、肾虚等直接相关,正如《黄帝内经素问》所说:“阳气者,若天与日,失其所则折寿而不彰”。可以推想,老年阳虚很可能与自由基及其清除障碍有关,近年来SOD的研究揭示,其所含Zn、Cu的不足,可以导致该酶系统的合成障碍,从而使保护机体免受过量活性氧攻击的能力减弱,便可能出现各种病理症状及产生早衰。本文结果表明老年人血清Zn、Cu均低于非老年人( $P < 0.01$ ),而

老年阳虚患者血清Zn、Cu与正常老年人相比亦显著降低( $P < 0.05$ );老年阳虚患者的SOD<sub>-1</sub>确实比老年对照组显著降低,且血清Zn与SOD<sub>-1</sub>呈正相关( $r = 0.34$ ),似乎可以说明老年阳虚的发生,可能与微量元素Zn、Cu不足,进而导致SOD<sub>-1</sub>不足而产生一系列阳虚症状。

Reiss(4)报告大鼠肝内SOD,老年大鼠比青年大鼠降低30~70%,本文结果证明老年阳虚患者的SOD<sub>-1</sub>确比健康老年人及40岁以下的正常对照组降低,而老年对照组与正常对照组SOD<sub>-1</sub>差别不显著,此点恰能说明SOD<sub>-1</sub>的降低是产生某些虚证的重要原因之一,应当引起临床医生的重视,特别是中药及某些天然植物中所含的具有SOD活性的物质,对虚证患者的治疗与滋补作用,尤其令人鼓舞。

正如大家都知道的,锌与体内众多的酶、激素、受体、免疫等均有密切关系,也可能由于缺锌而通过其他途径和机制而引起衰老与虚损,但本文结果初步说明SOD<sub>-1</sub>降低及其相关的Zn、Cu不足,可能是老年阳虚发生的机理之一。至于Zn是如何影响SOD<sub>-1</sub>的机理,是酶的构象改变,抑或是化合价的变化,尚需进一步研究。

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## 《新编针灸治疗手册》今年10月 由中国医药科技出版社正式出版

该书是从当今针灸临床实际出发,并针对各级针灸医师、基层医务人员和将要从事针灸医疗的大专院校学生、其它有关人员的实际需要,系统总结中国中医研究院西苑医院针

灸科几十年针灸临床经验成就,撷采古今百家针灸精华编撰而成的一部实用性针灸临床治疗手册。其特点是立足临床,突出实用,融现代医学诊断与中医辨治于一体,尤其汲取了老一辈针灸专家的秘验妙法,行针施灸、选方配穴唯求高效速效,力求一针就灵,易学易用,堪称现代针灸临床治疗之锦囊。全书近20万字,每册定价3.6元,欲购者可与中国医药科技出版社联系,邮政编码100810。

reduced markedly in size and the ulcer was healed completely. These findings suggest that the effect of musk-moxa-string therapy is caused by the enhancement of immunological capacity of the patients.

**Key Words** scrofula, musk-moxa-string therapy, lymphocyte subsets, blastogenic response  
immune regulation (Original article on page 455)

### **Clinical and Experimental Study of the Effect of Kang Er Xin- I (康尔心 I 号) on Viral Myocarditis**

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Kang Er Xin- I (KEX- I) is a proved recipe used to treat viral myocarditis. It consists of *Lonicera japonica*, *Ophiopogon japonicus*, *Astragalus membranaceus* mainly and possesses the effect of clearing away heat and toxic materials and supplementing the vital energy and nourishing. The clinical study was carried out with KEX- I according to a random, paired and cross-over design. Coenzyme Q10 was used as a control and left ventricular function was observed. The result showed: after being treated with KEX- I for two weeks, the 26 patients' chief cardiac functional indexes assessed with STI improved markedly, the value of PEP/LVET and ICT/LVCT all decreased and the difference between the two groups was significant. The experimental study showed that KEX- I can inactivate directly the virus of Coxsackie B<sub>3</sub>, protect the heart cells in mice, prevent attack by Coxsackie B<sub>3</sub>, promote the growth of internal interferon and increase the NK cell's function to regulate immunity in experimental mice.

**Key Words** Kang Er Xin- I, viral myocarditis, left ventricular function, virus Coxsackie B<sub>3</sub>, NK cell, interferon (Original article on page 468)

### **Treatment of Deficiency of Spleen Energy with Zhenqi Fuzheng Chongji(贞芪扶正冲剂) and Its Effect on Zn, Cu and Mg in Serum**

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This article reports that there is a good response, with an effective rate of 96.2% in the treatment of the deficiency of Spleen energy (DSE) with Zhenqi Fuzheng Chongji (ZQFZCJ). The serous level of ZQFZCJ and the serous concentrations of Zn, Cu and Mg in 53 patients with DSE and in 83 normal subjects were measured with atomic absorption spectrometric analysis. In contrast to the normal subjects, the concentrations of Zn and Mg were decreased and that of Cu and the ratio of Cu/Zn increased in the patients before treatment ( $P > 0.01 \sim 0.05$ ). After treatment, however, the concentrations of Zn and Mg became increased ( $P < 0.001, P < 0.05$ ), and the ratio of Cu/Zn decreased ( $P < 0.001$ ). The authors conclude that there is some relationship between these three elements and DSE, and the mechanism for the treatment of DSE with ZQFZCJ. ZQFZCJ, rich in trace elements, may provide trace elements for the body, improve the metabolism, transportation and utilization of the trace elements in the body, and activate various enzymes, thus regulating and maintaining the homeostasis, i. e. "supporting in deficient patients"

**Key Words** deficiency of Spleen energy, Zhenqi Fuzheng Chongji, trace elements.  
(Original article on page 471)

### **Study on Superoxide Dismutases and Serum Zn, Cu: Changes in Senile Patients with Yang(阳) Deficiency**

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This article reports on the respective determinations, which employ RIA and AAS, of superoxide dismutases (SOD- I) and serum Zn, Cu from 40 cases of senile patients with Yang deficiency. The results, which  $994 \pm 125$  ng/mg Hb,  $63.6 \pm 12.1$   $\mu$ g%,  $72.6 \pm 10.7$   $\mu$ g% respectively, were all significantly