

中医心理理论与现代医学的联系

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摘 要:从解剖学、生理学和病理学方面讨论了中医心理理论与现代医学的联系,同时也讨论了中医心理理论中脏腑关系与现代医学的联系。尝试用现代医学的证据来加强医学生对中医心理理论的认识和理解。

关键词:中医心理理论;脏腑关系;现代医学

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中医有关心的论述主要集中于藏象学说,内容以人体循环系统为主,也涉及神经系统及其他系统,还涉及哲学及其他学科知识。哲学或其他学科知识对解释中医理论起到重要作用,但给知识面相对较窄的现代医学生理解中医理论带来困难,为此我们试图从现代医学的理论中寻找依据,来沟通中医心理理论与现代医学的联系。

1 心理理论与解剖学的联系

中医认为心位于胸腔之内,两肺之间,肝脏之上,形如倒垂未开之莲花,外有心包护卫^[1-3]。此观点与现代解剖学基本一致。中医在讨论心系理论及五脏制化关系理论时也涉及到了心与血管的联系。心系泛指心与其他脏腑相联系的脉络组织,张介宾对心系一词解释为“心当五椎之下,其系有五,上系连肺,肺下系心,心下三系连脾肝肾^[4]”。在讨论五脏之间制化关系时,中医认为心之合脉,主肾。肺主心,肝主肺,脾主肝,肾主脾^[5]。心主肾,可看作是心脏通过肾动脉支配肾。此外两肾血流量之和约占心输出量的1/4,也能说明肾对心的依赖性。肾主脾,可看作是脾肾韧带由肾抵达脾门,其内的脾动脉穿入脾脏为其供血。另外肾静脉在汇入腔静脉的过程中,也通过广泛吻合支汇入脾静脉。脾主肝,可看作是脾静脉汇入肝门静脉。脾静脉是门静脉主要分支,其回流量直接影响肝血窦的血量。肝主肺,可看作是肝静脉汇入腔静脉后通过右心进入肺动脉。肺主心,可看作是四条肺静脉由肺穿出融为左房,直接控制心输出量。上述制化关系与现代解剖学的血流方向和支配关系惊人的相似,绝非偶然,很可能是古人将初步的解剖知识与长期的生理、病理现象观察结合后得出的结论。

2 心理理论与生理学和病理学的联系

2.1 心主血脉 中医认为心有推动血液在全身脉管中运行的作用,并将这种推动作用称为心气。“气行血行”,“气滞血瘀”就是当心气正常或低下时血液在脉管中的不同表现。中医认为清气为阳,浊气为阴^[6],从气的物质属性上可将心阳气(清气)看作氧气,心阴气(浊气)看作二氧化碳。心气正常时心功能良好,血氧饱和度,组织灌注良好。反之组织灌注差时二氧化碳浓度高,血管扩张麻痹,血液瘀滞。

2.2 心主神志

中医认为心有主宰五脏六腑及人体生命

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活动的功能,还有主宰精神意识思维的功能。前者可以通过心主血脉实现,而后者极易与脑功能混淆。这里需要强调——中医认为五脏均与感觉和意识有关。《素问·宣明五气》说“心藏神,肺藏魄,肝藏魂,脾藏意,肾藏志”。《素问·脉要精微论》也说“头者,精明之府。夫精明即神明也。”《素问·灵兰秘典论》又说“心者,君主之官,神明出焉。”因此可以假设“头为精明之府,心为神明出焉,肺为魄出焉,肝为魂出焉等等”。如果这种假设成立,这就与现代医学的反射弧理论不谋而合。从反射弧的理论来看:神、魄、魂、意及志等感觉分别由五脏的感受器发出,经传入神经入脑整合,再经传出神经达全身效应器从而完成意识和感觉的过程。心为元神,心脏病变时的“濒死感”足以说明心对生命的主宰。而在肺性脑病、肝性脑病或尿毒症脑病发作时,若不累及心脏均不会产生“濒死感”。

心主神志的正确性已被千年的临床实践证实,尽管我们很难解释其确切含义,但现代医学已揭示出许多心脑之间的独有特性。首先从细胞的再生能力看,心肌细胞和神经细胞均为永久性细胞,其数量在胚胎期已固定,后天只有减少,不可再生。其次从细胞膜离子通道的角度看,心肌细胞和神经细胞膜上的钠通道和钙通道十分相近。许多影响心电生理的药物均可影响神经电生理,而骨骼肌、平滑肌级腺体上的钠通道和钙通道与心脑细胞差异很大。再者从配体及受体后的角度看,儿茶酚胺类(如多巴胺和去甲肾上腺素)对心肌细胞和神经细胞的影响十分明显,而第二信使cAMP也是近年许多学者认为可作为心主神志的物质基础^[7-8]。脑钠肽首先从脑内分离纯化出来,后来在心肌中也分离出脑钠肽,且证实心肌分泌的量多于脑^[9]。脑钠肽具有利尿、扩血管和降血压作用,这些作用对保护心脑血管十分重要。神经调节对心脑供血影响很小,自身调节是心脑供血的主要方式^[10]。应激时,全身绝大多数血管收缩,而心脑血管却被动扩张。这种全身血流的重新分配对保证心脑供血十分必要^[11],这种对心脑的特殊恩惠是生物在遗传过程中的必然选择。

2.3 心属火,其气通于夏^[5] 心的五行属性为火,将心援物类比为火是把握了心的本质属性。心犹如阳间长明灯,其政为光明照耀,不论何因导致熄灭均为生命终止。维持长明灯的基本燃料是机体有限的气、血、营、精、液,而养心的基本条件是阴平阳秘。从现代医学的观点来看:为了维持内环境稳定,保证不可再生的心肌不停地搏动,养心或称

为养火的基本条件是节约燃料,具体讲就是降低心肌氧耗量。目前养心或称为抑心(降低心肌氧耗)已成为现代医学治疗心脏病变的总体原则。目前治疗心脏病的药物中,除洋地黄还被有限制的少量应用外,其余的治疗心脏病药物均有抑制心脏或降低心脏负担的作用。心属火的另一特征是自律性。人体的自律性细胞主要存在于心肌和小肠平滑肌(心与小肠表里),小肠平滑肌的基本电节律(自律性频率)仅为8~12次/min,而心肌高达60~100次/min。心的自律性既强调自动性,更强调不可停顿性。生命之火一旦点燃,其自动性和不可停顿性十分明显。心肌的自律性搏动是推动血液濡养周身的基本条件。也是长明之火的表现。

心与夏气相通应,其脏气为阳中之阳。夏季阳气最盛,有益于心气恢复。从实际情况看,心脏病变常在夏季转轻。从现代医学的观点看,夏季气温较高,周围血管易扩张,心血管负担减轻至使病情趋于稳定^[12]。相反,心力衰竭、冠心病、心绞痛及高血压病在冬季均有加重的现象。此外,心主汗液,心为阳脏而恶热。夏季温热病邪易犯心脏,耗伤心血,扰乱心神,导致烦躁、神昏谵语。这些表现与夏季大汗脱水而导致的中暑——高渗性昏迷相似。

2.4 心开窍于舌 《灵枢·脉度》说“心气通于舌,心和则能知五味矣,”又有舌尖属心,“舌为心之苗”的说法。舌的血流丰富,可以作为观察循环系统缺血缺氧的窗口,这与现代诊断学的观点一致。心和知五味可有“臂舌循环时间测定”佐证:取10%葡萄糖5mL,加糖精2.5g,自正中静脉缓注,同时计时,当病人报告有舌尖甜味时即停秒表。正常值为10~17s;时间大于20s见于左心衰竭、渗出性或缩窄性心包炎等症,时间小于10s见于各种心排量增多疾病,如甲状腺功能亢进、贫血、动静脉瘘等。此外,还见于先天性心脏病如法乐氏四联症^[13]。单纯右心衰竭者,臂至舌循环时间正常,同时有左心衰竭者,臂至舌时间明显延长。

3 心理中脏腑关系与现代医学的联系

3.1 心与小肠相表里 是指心与小肠通过经络属构成表里关系。《灵枢·本输》说“心合小肠,小肠者,受盛之腑。”小肠的受盛分两个方面,其一是受盛胃中所纳,其二是借助肠壁血管受盛机体的循环血量。心衰时心脏充血,心脏负担过重。由于心与小肠相表里,小肠为受盛之腑。因此可将心血疏泄于小肠,缓解心脏负担过重。这与现代医学“治疗心衰需降低心负荷”的思路完全一致。成人小肠长度7~9m,表面积巨大,是体循环容量血管的主要部位,也是缓冲回心血量、疏泄心血,降低心前负荷的主要部位。伴随着回心血量和肺血的减少,呼吸困难的症状可逐渐缓解。与此同时,小肠也会由于受盛过多的回心血量而导致小肠淤血,进而出现消化不良症状,但这正是机体要求限制进食量,要求降低消化道负荷的明确信号,只有这样才能满足心脏低负荷状态。这就是心与小肠相表里,即心脏低负荷时小肠也须低负荷。其他涉及到心与小肠的特殊联系有:心与小肠均有自律性,组织结构上均有电突触^[14]。心肌能分泌一种选择性作用于小肠的P-物质,以促进小肠的运动^[7]。小肠也能分泌一种肠血管活性肽以增强心肌收缩力^[15]。

3.2 心肾相交 心肾相交,又称心肾既济,水火既济。按照五行的理论,心属火而肾属水,二者分别具有阴阳的属性。心肾既相互依存又相互制约,这种密切相关的特点称为心肾相交。目前已有许多现代医学依据支持心肾相交理论。

现代医学认为:心、肾作为控制机体有效循环和内环境稳定的器官,在生理功能上相互依存,相互协调,这与心肾相交、心肾既济的观点完全一致。就心脏而言,一是通过控制循环血量来调节肾脏血流灌注,二是通过心钠素来调节肾血流量和肾小球滤过率,三是通过心-肾神经反射来调节肾小球滤过率,肾小管重吸收及肾素分泌^[16]。就肾脏而言,一是通过渗透压感受器-下丘脑-垂体系统,分泌抗利尿激素,控制血浆渗透浓度和心血管系统中的多种参数。二是通过肾素-血管紧张素-醛固酮系统控制血压和血容量。三是通过肾胺酶调节心脏功能和血压^[17]。

在病理状态下心肾的相互影响十分明显。首先看心脏对肾脏的影响:心肾综合征是近年提出的新概念,它特指慢性心力衰竭(CHF)引起的进行性肾脏损害,并导致肾功能不全^[18]。目前发现:在CHF失代偿期肾功能以每月下降1mL/min的速度快速减退。CHF时肾素-血管紧张素醛固酮系统亢进、一氧化氮与活性氧族之间的平衡失调、炎症和交感神经系统紊乱均可能与心肾综合征有关^[19]。而肾功能的减退又会进一步加重心衰的进展,形成恶性循环。其次再看肾脏对心脏的影响:肾性高血压易导致左室肥厚;肾功能损害时的脂质代谢异常、血浆同型半胱氨酸上升及纤维蛋白原升高均使冠心病的危险性明显增加,贫血、血电解质紊乱及酸碱平衡失调也可加重心肌的损害^[20]。近年美国心脏病学会将蛋白尿和肾小球滤过率下降列为心血管疾病进展的独立危险因素,将肾功能损伤列为CHF重要预后指标。多重危险因素干预实验成人研究中,发现血肌酐浓度仅仅轻度升高也是冠心病死亡的一个独立危险因素^[21]。近年心肾贫血综合征概念的提出也说明心血管疾病、慢性肾功能疾病、贫血三者之间有着纵横交错的联系^[22],同时从另一角度也说明心肾精血同源互化也是心肾相交的重要内容。

上述将现代医学知识与中医心理理论进行沟通联系——仅仅是初步的探索和尝试,肯定有许多缺陷,希望同仁指正,使其进一步完善,为更好地弘扬祖国医学知识而努力。

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Relation Between the Heart Theory of Traditional Chinese Medicine and Modern Medicine

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Abstract: This article discusses the relation between the heart theory of traditional Chinese medicine (TCM) and modern medicine from the anatomy , physiology and pathology. At the same time , the relation between the viscera relationship in the heart theory and modern medicine are also discussed. We try to look for the evidences from the theories of modern medicine , so as to strengthen awareness and understanding of the theory of TCM for medical students.

Key words: the heart theory of traditional Chinese medicine; the viscera relationship; modern medicine

There is the exposition on the heart of Traditional Chinese Medicine (TCM) largely focused on visceral doctrine. The content involves the body's circulatory system , nervous system and other systems , which also involves the philosophy and other sciences. It plays an important role that the philosophy or other disciplines of knowledge on the interpretation of TCM theory , but it also brings the modern medical students difficulties to understand TCM theory , who have the relatively narrow knowledge. Hence we try to look for the interpretation of TCM theory basis from modern medicine theories , so as to link the Heart theory of TCM to modern medicine.

1 the relation between the Heart theory of TCM and Anatomy

TCM believes that heart is located in the thoracic cavity and between the two lungs and on the top of the liver , whose appearance likes a Lotus Flower that is upside down and unopened , guarded externally by the pericardium. The above view is basically consistent with modern anatomy. When discussing the heart system theory of TCM and the relationship of restriction and generation in the five elements , it constantly involves connection between the heart and blood vessels. Heart system , broadly , refers to connection vessels between the heart and other organs of organizations. The heart system was interpreted , by Zhang Jie - bin , as: " heart is under the five vertebral , its system has five parts , one part of them is connected up the lung , the lung is connected down the heart , the heart is con-

nected down next three lines including the spleen , the liver and the kidney. In discussing the relationship of restriction and generation among the five viscera , TCM believes that the heart governs blood and pulse , and also governs kidney , heart is governed by lung , lung is governed by liver , liver is governed by spleen , and spleen is governed by kidney^[5]. Heart governs kidney , which may be regarded as heart dominants kidney through the renal artery. In addition , it also indicates the dependence of kidney on heart that bilateral renal blood flow accounts for approximately 1/4 of cardiac output. Kidney governs spleen , which may be held the view that the spleen - kidney ligament arrives at spleen door from kidney , in which splenic artery supply the blood to spleen. In addition , renal vein , in the process of entering Vena cava , also imports splenic vein through extensive collateral circulation. Spleen governs liver , which can be thought that splenic vein imports hepatic Portal vein. Splenic vein is the main branch of Portal vein , whose return flow directly affects liver sinusoidal output. Liver governs lungs , which can be thought that the blood of hepatic venous flows into the vena cava , which enters right heart through the pulmonary artery. Lungs govern heart , which may be regarded as four Pulmonary veins from the lung into the left atrium , directly controlling cardiac output.

It is not accidental that both the flow direction and the governable relations of above systems , in order , are surprisingly similar to modern anatomy. It is probably that the ancients

make a conclusion after combining the initial knowledge of anatomy with long term observation on physical and pathological phenomena.

2 the relation between the Heart theory of TCM and Physiology or pathology

2.1 The heart controls blood circulation Chinese medicine believes that the heart gives motive power for blood circulation , and which motive power is known as heart - qi. " Qi - running is followed by blood - circulating " , " blood stasis due to stagnation of Qi" which are the different manifestations in the circulation under the normal or low state of heart - qi. Chinese medicine believes that clear - qi belongs to Yang and turbid - qi belongs to Yin^[6] ,We regard the Yang - qi of heart(clear - qi) as oxygen and the Yin - qi of heart(turbid - qi) as carbon dioxide according to the substance properties of qi. If heart - qi is normal , Cardiac function will be good and the blood oxygen saturation will be high , meanwhile tissue perfusion will be fully. Conversely , if tissue perfusion is lower , CO₂ concentration will increase and blood vessels will be dilated and paralysed , meanwhile blood will be stagnated.

2.2 The heart governs the mind. TCM believes that heart controls the function of the five Zang - organs and six Fu - organs and is in charge of the activities of human life. TCM also believes that heart controls the function of the mental consciousness and thinking activities. The former is completed by the heart governing the mind. The latter is easily confused with brain function. Here it should be pointed out that the five viscera are related to feeling and consciousness. It is said by *Suwen • Xuanming Wuqi pian* that the mind is stored in the heart , the spirit is stored in the lung ,the mood is stored in the liver , the mental activities is stored in the spleen and the memory is stored in the kidney. *Suwen • Maiyao Jingwei Lun* also says that the head is smart house and the smart means the mind. Meanwhile *Suwen • Linlan Midian Lun* again stresses that the heart is the monarch of all the organs and the heart is a exiting part of the mind. It can therefore be assumed that the head would be smart house , the heart would be a exiting part of the mind , the lung would be a exiting part of the spirit ,the liver would be a exiting part of mood and so on. If this assumption is established ,this point will coincide with the reflex arc theory of modern medicine. From the reflex arc theory: The feelings including the mind , the spirit , the mood , the mental activities and the memory are issued by the sensor of five organs respectively. These feelings ,which enter the brain from afferent nerve , are integrated in the brain , then they reach the effector of all body by their efferent nerve in order to complete the process of awareness and perception. The heart is like the God of body. Symptom with sense of "dying" , during Myocardial lesions , is full enough to illustrates essence that the heart dominates life. Meanwhile if there is not Myocardial lesions ,the symptom with sense of " dying" will not be produced during pulmonary encephalopathy , hepatic encephalopathy or uremic encephalopathy attacks.

The theory that the heart governs the mind has been confirmed by a thousand years of clinical practice. Although it is difficult to explain the exact meaning of the theory , modern

medicine has still revealed many unique characteristics between the heart and brain. Firstly , from the perspective of cellular regeneration ,both myocardial cells and neurons are permanent cell. Their quantity is fixed in the embryonic stage ,after birth of body , myocardial cells and nerve cells have only reduced and not regenerated. Secondly , from the perspective of the ion channel in cell membrane , both sodium channels and calcium channels of Myocardial cells are very similar to those of nerve cells. For many drugs acting on myocardial electrophysiology is the same effect on neural electrophysiology. And the sodium channels or calcium channels in skeletal muscle cells and smooth muscle - glands cells are very different with those in heart and brain cells. Moreover , from the point of view on ligand and receptor rear , catecholamines (such as dopamine and norepinephrine) have very obviously effect on myocardial cells and neurons cells.

In recent years , many scholars also believed that second - messenger ,cAMP , can be used as the physical basis of the heart governing the mind^[7-8] . The brain natriuretic peptide is firstly isolated and purified from the brain. Later , it is isolated from the myocardium. And the brain natriuretic peptide is confirmed that the amount of myocardial secretion is more than cerebral secretion. The brain natriuretic peptide has effect of vasodilator , diuretic and antihypertension , which is the importance to protect the heart and brain. Neuromodulation has a little impact on the blood supply of heart and brain. Self - adjustment is the main method of blood supply of heart and brain^[10] . When stress ,the vast majority of blood vessels of the body are constricted , but the blood vessels of heart and brain are dilated passively at the same time. This reallocation of systemic blood flow is necessary to ensure blood supply of heart and brain^[11] . This kind of special grace to heart and brain is inevitable choice during biological genetic process.

2.3 The heart corresponds to the fire The heart Qi connects summer^[5] . The Five - Elements properties of the heart is the fire. It is the essence of the heart that heart has the property of fire. Heart is like the light which never turns off during a life. The work of the heart is shining for a light life. Whatever reasons induce heart fire to be extinguished , which is considered as the end of life. The basic fuels of maintaining the bright light are Qi , blood , nutrition and body fluid , which are limited in body. The basic condition of nourishing the heart is Yin and Yang in a harmonious state. From the view of modern medicine , in order to maintain stable of the internal environment of body and to keep non - regeneration myocardium beating continuously , the basic condition of nourishing the heart , which is also called nourishing the fire , is to save fuel. Specifically the nourishing heart is reducing myocardial oxygen consumption. At present the nourishing heart , or called inhibiting heart (reducing myocardial oxygen consumption) , has become the general therapeutical principle of heart disease in modern medical treatment. Currently among the drugs to treat heart disease , except that a small amount of digitalis has also been applied within limits , the rest of therapeutic drugs for heart disease have action on inhibiting heart function or reducing the heart burden. Another characteristic for heart corresponding to the

fire is autorhythmicity.

The autorhythmic cells of body mainly exist in the myocardium and intestinal smooth muscle (the heart and intestine being exteriorly and interiorly related). The basic electrical rhythm of intestinal smooth muscle (autorhythmic frequency) is only 8 – 12 times/min, and the myocardium is up to 60 – 100 times/min. The heart autorhythmicity stresses both the automatism and non – standstill. Once the fire be lit up, the autorhythmicity and non – standstill of heart will be obvious. The autorhythmic beating of heart is the basic condition to push about circulation and nurture body and is also the appearance of the fire which never extinguishes.

The heart connects summer – Qi. Its visceral – Qi is practically the Yang – Qi within Sun. In summer the Yang – Qi is the strongest, which is beneficial to recover weak heart – Qi. Heart disease, reality, often become improved in summer. From the theory of modern medicine, the higher temperature of environment easily results in expansion of peripheral vascular of body in summer, these reduction of Cardiovascular burden make the heart illness tendency to be more stable^[12]. On the contrary, there is a phenomenon that the heart diseases, including heart failure, coronary artery disease, angina and hypertension, become deterioration in winter. Besides, the heart is in charge of the sweat fluid and the heart is aversion to heat as a result of the characteristics of Yang organs. In summer, pathogenic heat may easily consume and exhaust the blood of the heart, causing coma, delirium, mania. These clinical manifestations is similar to hyperosmolar coma which is heat stroke resulted from sweat dehydration in summer.

2.4 The tongue as the window of the heart It is said by *Lingshu • Maidu* that the heart – Qi connects with the tongue, if the heart is normal the tongue will identify five kinds of flavors. There is also another statement that the tip of tongue belongs to the heart and the tongue is the sprout to the heart. The tongue is rich in the blood, which may serves as the window of the observing the ischemia and hypoxia of circulatory system. These standpoints are consistent with the views of points of modern diagnostics. One of the evidences on the tongue as the window of the heart is the measurement of cycle time between arm and tongue: Get 10% glucose 5mL, with saccharin 2.5g. These agents are injected into middle vein of upper limb by intravenous injection slowly, and cycle time is recorded simultaneously. When it is reported that patient's tongue tastes sweet, discontinue recording time with Stopwatch. The normal value is from 10 to 17 seconds. If the cycle time exceeds 20 seconds, the patients are considered as left heart failure, exudative or constrictive pericarditis. If the cycle time is less than 10 seconds, the patients are considered as various diseases accompanied by increase in cardiac output such as hyperthyroidism, anemia, arteriovenous fistula, etc. In addition, it is also seen in congenital heart disease such as tetralogy of fallot, etc^[13]. The normal cycle time of the arm to the tongue may be seen in the only right heart failure. If the one is complicated with left heart failure at the same time, the cycle time will be significantly prolonged.

3 The relation between the viscera relationship in the

heart theory and modern medicine

3.1 The heart and the small intestine form a relationship of exterior and interior, which means that the heart and small intestine constitute the relationship between exterior and interior through the system of channels and collaterals. It is said by *Lingshu • Benshu* that the heart is connected, in functional, with the small intestine which receives both transformation and absorption of the food contents. The containing of the small intestine is divided into two types: one type is to receive contents from the stomach, the other type is to receive circulation volume of the body with the blood vessels of the intestine wall. The heart has overloaded when congestive heart failure. In this condition, the small intestine may receive circulation volume of the body and reduce overload of the heart, since the heart and small intestine constitute the relationship between exterior and interior. This view is exactly consistent with thinking of modern medicine that the one of therapeutic methods of heart failure is to reduce heart load. The small intestine of adult is 7 – 9 m in length and has the enormous surface area, which is the main part of the systemic capacity vessels and is also the main part of the buffering returned blood volume, purging heart – blood and lowering cardiac preload. Accompanied by reducing of pulmonary blood volume and reducing of returned blood volume, the symptoms of dyspnea will gradually be eased. At the same time, the excessive returned blood volume received by small intestine may result in congestion of intestine and symptoms of indigestion, but this is a clear signal of requiring to lower load of digestive tract by limiting the intake of the body, this is only way to meet the low load state of the heart. This is the relationship of exterior and interior between the heart and the small intestine, the small intestine is also necessary to low load when the heart is in low – load state. Other particular connection involving between heart and small intestine is as follows: both heart and small intestine are of autorhythmicity and are of electrical synapse in tissue. The myocardium can secrete a P – material which effects on intestine selectively and promotes the movement of small intestine^[7]. The small intestine can also secrete a vasoactive intestinal peptide, which enhances myocardial contractility.

3.2 Coordination between the heart and the kidney

Coordination between the heart and the kidney, which is also called coordination between water and fire. According to the five elements theory, the heart belongs to fire and the kidney belongs to water. They are categorized as possessing yang and yin properties respectively. The heart and the kidney are closely related, with a mutually dependent and restrictive correlation within each other. This close relationship is called coordination between the heart and the kidney. There are many modern medical evidences for supporting theory of coordination between the heart and kidney.

Modern medicine studies have showed that the heart and the kidney, as the organs of the body which control effective circulation and maintain homeostasis, are capable of interdependence and interaction mutually on the physiological function.

These views are completely consistent with intersects be-

tween the heart and the kidney. As far as the heart is concerned, firstly it is necessary to control circulating blood volume so as to adjust the renal blood perfusion. Secondly, the heart may regulate renal blood flow and Glomerular filtration rate by atrial natriuretic peptide. Thirdly, the heart may regulate glomerular filtration rate, renal tubular reabsorption and secretion of Renin by cardiac - renal nerve reflex^[16]. As far as the kidney is concerned, firstly it may control multiple parameters in plasma osmolarity and cardiovascular system by osmotic pressure sensors - hypothalamic - pituitary system which secretes antidiuretic hormone. Secondly, the kidney may control blood pressure and blood volume by the Renin - angio - tensin - aldosterone system. Thirdly, the kidney may regulate the heart function and blood pressure by reninase^[17].

The interaction between heart and kidney is very obviously under pathological conditions. Firstly, we are concerned about the effects of cardiac on kidney. The heart kidney syndrome is a new concept, in recent years, which refers to kidney damage caused by chronic heart failure (CHF) and renal insufficiency resulted from CHF eventually^[18]. It is found, at present, that kidney function may decline quickly at speed of 1mL/min every month in the decompensation stage of CHF. During CHF, the heart kidney syndrome may be associated with the hyperfunction of Renin - angiotensin - aldosterone system, imbalance between the nitric oxide and the species of reactive oxygen, inflammation and inordinance of sympathetic nervous system^[19]. Meanwhile, the impairment of kidney function will further deteriorate heart failure, resulting in vicious circle. Secondly, we are concerned about the effects of kidney on cardiac. The renal hypertension easily induces to the left ventricular hypertrophy. During renal dysfunction, all of these including abnormal lipid metabolism, the increase of plasma homocysteine and fibrinogen may significantly strengthen the risk of coronary artery disease. On the other hand these conditions including Anemia, water - electrolyte imbalance and acid - base imbalance can also aggravate myocardial damage^[20].

In recent years American Heart Association has listed proteinuria and the decline of glomerular filtration rate as independent risk factors for cardiovascular disease progression and has listed the renal injury as an important prognostic indicator of CHF. In the adult studies of Multiple Risk Factors Intervention Experiment, the studies indicate that it may also be an independent risk factor for the death of coronary heart disease that serum creatinine concentration rises only mildly^[21].

That the Concept of Cardio - renal anemia syndrome was put forward in recent years has also shown that there may be an interconnected links among the cardiovascular disease, chronic renal disease and anemia^[22], meanwhile which indicates, from another angle, that it is also an important element of coordination between the heart and the kidney that the essence and blood of heart and kidney are homologous each other.

The views above discussion try to communicate the knowledge of modern medicine with the theory of heart in TCM, which is only a preliminary exploration and trial. Surely, there are many defects in my views, I hope that the defects would be corrected by our colleagues and the theory would be perfected,

so as to better carry forward TCM.

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