

Second Affiliated Hospital of Xian Jiaotong University (Xibei Hospital)  
High Dose Vitamin C treatment of Corona virus (Feb 2020)

大剂量维生素 C 治疗新冠肺炎的交二方案

发布时间：2020-02-21 11:00:56<sup>1</sup>

Dà jiliàng wéishēngsù C zhìliáo xīnguān fèiyán de jiāo èr fāng'àn  
fābù shíjiān: 2020-02-21 11:00:56

High-dose vitamin C treatment of new coronary pneumonia (Covid-19)

Release date: 2020-02-21, 11:00:56

2020年2月20日下午，由西安交通大学第二附属国家援鄂医疗队接管的同济医院中法新城院区C10西病区又有4位重型新冠肺炎患者康复出院，医疗队正式投入工作10天来，已有8位患者康复出院。

经过医疗队10天的实践探索和专家组多次讨论，我们专家组提出联合大剂量维生素C治疗新冠的具体方案，并在临床应用中取得良好的效果。我们的治疗方案总体来说概括为“早期，足量，短程，联合”。

2020 Nián 2 yuè 20 rì xiàwǔ, yóu xī'ān jiāotōng dàxué dì èr fùshǔ guójiā yuán è yīliáo duì jiēguǎn de tóngjì yīyuàn zhōng fǎ xīnchéng yuàn qū C10 xī bìng qū yòu yǒu 4 wèi zhòngxíng xīnguān fèiyán huànzhě kāngfù chūyuàn, yīliáo duì zhèngshì tóurù gōngzuò 10 tiān lái, yǐ yǒu 8 wèi huànzhě kāngfù chūyuàn.

Jīngguò yīliáo duì 10 tiān de shíjiàn tànsuǒ hé zhuānjiā zǔ duō cì tāolùn, wǒmen zhuānjiā zǔ tíchū liánhé dà jiliàng wéishēngsù C zhìliáo xīnguān de jùtǐ fāng'àn, bìng zài línchuáng yìngyòng zhōng qǔdé liánghǎo de xiàoguǒ. Wǒmen de zhìliáo fāng'àn zǒngtǐ lái shuō gài kuò wèi “zǎoqī, zú liàng, duǎnchéng, liánhé”.

On the afternoon of February 20, 2020, another four patients with severe neocoronary pneumonia *recovered* from the C10 West Ward of Tongji Hospital in the Tongji Hospital, which was taken over by the Second Aid National Medical Assistance Team of Xi'an Jiaotong University. The medical team was formally put into work 10 days ago. Since that time, eight patients have been discharged from hospital.

After 10 days of practical exploration by the medical team and repeated discussions by the expert group, our expert group proposed a specific plan for the combination of high-dose vitamin C to treat the new coronavirus (Covid-19) and achieved good results in clinical applications. Our treatment plan is generally summarized as *early, adequate, short course, combined*.

早期：所谓“早期”，是指大剂量维生素C应在病程发展的早期及时应用。我们认为对于新冠肺炎重症及危重症患者应在入院后第一时间启动维生素C治疗方案。这是因为不管是过去的克山病、SARS和中东呼吸综合征，还是现在的新冠肺炎，患者致死的主要原因都是急性氧化应激增加所

<sup>1</sup> Source: <http://2yuan.xjtu.edu.cn/Html/News/Articles/21774.html>

致的心肺功能衰竭。当病毒导致机体氧化应激增加，毛细血管通透性增加时，早期应用大剂量维生素 C 可以起到强有力的抗氧化作用，减少炎症反应，改善内皮功能。

足量：足量是指维生素 C 的用量要大。大量研究表明维生素 C 的剂量与治疗效果有很大关系。我们既往成功抢救急性克山病的经验及目前国内外研究表明，大剂量维生素 C 不仅可提高抗病毒水平，更重要的是能够预防和治疗急性肺损伤 (ALI) 和急性呼吸窘迫症 (ARDS)。

Zǎoqí: Suǒwèi “zǎoqí”, shì zhǐ dà jiliàng wéishēngsù C yīng zài bìngchéng fāzhǎn de zǎoqí jíshí yīngyòng. Wǒmen rènwéi duìyú xīnguān fèiyán zhòngzhèng jí wēi zhòngzhèng huànzhě yīng zài rùyuàn hòu dì yī shíjiān qǐdòng wéishēngsù C zhìliáo fāng'àn. Zhè shì yīn wéi bùguǎn shì guòqù de kè shān bìng, SARS hé zhōngdōng hūxī zònghé zhēng, háishì xiànzài de xīnguān fèiyán, huànzhě zhìsǐ de zhǔyào yuányīn dōu shì jíxìng yǎnghuà yìng jī zēngjiā suǒ zhī de xīnfèi gōngnéng shuāijié. Dāng bìngdú dǎozhì jīfǎ yǎnghuà yìng jī zēngjiā, máoxì xiěguǎn tōng tòu xìng zēngjiā shí, zǎoqí yīngyòng dà jiliàng wéishēngsù C kěyǐ qǐ dào qiáng yǒuli de kàng yǎnghuà zuòyòng, jiǎnshǎo yánzhèng fǎnyìng, gǎishàn nèipí gōngnéng.

Zú liàng: Zú liàng shì zhǐ wéishēngsù C de yòngliàng yāo dà. Dàliàng yánjiū biǎomíng wéishēngsù C de jiliàng yǔ zhìliáo xiàoguǒ yǒu hěn dà guānxì. Wǒmen jìwǎng chénggōng qiǎngjiù jíxìng kè shān bìng de jīngyàn jí mùqián guónèi wài yánjiū biǎomíng, dà jiliàng wéishēngsù C bùjǐn kě tígāo kàng bìngdú shuǐpíng, gèng zhòngyào de shì nénggòu yùfáng hé zhìliáo jíxìng fèi sǔnshāng (ALI) hé jíxìng hūxī jiǒngpò zhèng (ARDS).

Early stage: The so-called “early stage” refers to the timely application of high-dose vitamin C in the early stages of the disease course. We believe that for patients with severe neonatal pneumonia and critically ill patients, vitamin C treatment should be initiated as soon as possible after admission. This is because no matter the past *Keshan* disease, SARS and Middle East respiratory syndrome, or the current new pneumonia (Covid-19), the main cause of death of patients is cardiopulmonary failure caused by increased acute oxidative stress. When the virus causes increased oxidative stress in the body and increased capillary permeability, early application of large doses of vitamin C can have a strong antioxidant effect, reduce inflammatory responses, and improve endothelial function.

Adequate: Adequate refers to the large amount of vitamin C. Numerous studies have shown that the dose of vitamin C has a lot to do with the effect of treatment. Our past experience in successfully rescuing acute *Keshan* disease and current studies at home and abroad, show that high-dose vitamin C can not only improve viral resistance, but more importantly, can prevent and treat acute lung injury (ALI) and acute respiratory distress (ARDS).

短程：短程是指用药时间不超过 1 周。病程进展关键时期短期应用大剂量维生素 C 可以达到事半功倍的作用，并可明显减少长期应有所带来的肾结石、血尿及肾绞痛等副作用，降低恶心、呕吐、低血压、心动过速等不良反应，避免长程用药所造成的机体对外源性维生素 C 的依赖。

联合：联合是指在治疗过程中应联合其他治疗手段，制定个体化治疗方案。新冠肺炎治疗目前仍无特效药物，在刚刚公布的《新冠肺炎诊疗方案第六版》中，建议在早期试行抗病毒治疗及氧疗的基础上，积极对症治疗。因此大剂量维生素 C 的临床应用一定要结合患者情况，联合其他药物及治疗手段，这样才有望提高重危患者的救治水平。

Duǎnchéng: Duǎnchéng shì zhǐ yòngyào shíjiān bù chāoguò 1 zhōu. Bìngchéng jìnzhǎn guānjiàn shíqī duǎnqī yīngyòng dà jìliàng wéishēngsù C kěyǐ dádào shìbàngōngbèi de zuòyòng, bìng kě míngxiǎn jiǎnshǎo chángqí yīng yǒu suǒ dài lái de shèn jiéshí, xiěniào jí shèn jiǎo tòng děng fùzuòyòng, jiàngdī èxīn, òutù, dī xiěyā, xīndòngguò sù děng bùliáng fǎnyìng, bimiǎn chángchéng yòngyào suǒ zàochéng de jījī duìwài yuán xíng wéishēngsù C de yīlài.

Liánhé: Liánhé shì zhǐ zài zhiliáo guòchéng zhōng yīng liánhé qítā zhiliáo shǒuduàn, zhìdìng gètī huà zhiliáo fāng'àn. Xīnguān fèiyán zhiliáo mùqián réng wú tèxiào yàowù, zài gānggāng gōngbù de "xīnguān fèiyán zhēnlíáo fāng'àn dì liù bǎn" zhōng, jiànyì zài zǎoqī shíxíng kàng bìngdú zhiliáo jí yǎng liáo de jīchǔ shàng, jījī duìzhèng zhiliáo. Yīncǐ dà jìliàng wéishēngsù C de línchuáng yīngyòng yīdìng yào jiéhé huànzhě qíngkuàng, liánhé qítā yàowù jí zhiliáo shǒuduàn, zhèyàng cái yǒuwàng tígāo zhòng wēi huànzhě de jiùzhì shuǐpíng.

Short-term: Short-term means that the treatment protocol does not exceed one week. Short-term application of large doses of vitamin C, in the critical period of disease progression, can achieve twice the result with half the effort, and can significantly reduce the side-effects such as kidney stones, hematuria and renal colic that can occur in the long-term, reduce nausea, vomiting, hypotension, tachycardia, etc., adverse reactions that might occur due to the body's dependence on exogenous vitamin C caused by long-term treatment.

Combination: Combination refers to the combination of other treatment methods in the treatment process to develop individualized treatment plans. New crown pneumonia (Covid-19) treatment is still *without* specific drugs. In the just-released *New Crown Pneumonia Diagnosis and Treatment Program, Sixth Edition*, it is recommended that active symptomatic treatment be based on early trials of antiviral and oxygen therapy. Therefore, the clinical application of high-dose vitamin C must be combined with the patient's situation and combined with other drugs and treatment methods, so that it is expected to improve the treatment of critically ill patients.

此外在应用该方案治疗时应注意由于浓度较高，故可能刺激血管引起疼痛，建议给药后给予等渗液快速冲洗血管，减轻对血管的刺激，另外我们采用间断缓慢给药的方式不但有助于维持血维生素 C 的有效浓度，另外可以最大程度降低了给药对血管局部的刺激。最后因为维生素 C 可能会干扰血糖监测结果，对于糖尿病患者应避免在输注即刻测定血糖。

最后基于维生素 C 的各种药理学特性，临床上存在以下情况的患者不宜使用这种治疗方案：1.对维生素 C 过敏；2.预期寿命不到 24h；怀孕和/或哺乳期妇女；气管切开或有家庭氧疗病史；6. 间质性肺病、恶性肿瘤、弥漫性肺泡出血、糖尿病酮症酸中毒或活动性肾结石病史。

Cǐwài zài yìngyòng gāi fāng'àn zhìliáo shí yīng zhùyì yóuyú nóngdù jiào gāo, gù kěnéng cǐjī xiěguǎn yǐnqǐ téngtòng, jiànyì gěi yào hòu jǐyǔ děng shèn yè kuàisù chōngxǐ xiěguǎn, jiǎnqīng duì xiěguǎn de cǐjī, língwài wǒmen cǎiyòng jiànduàn huǎnmàn gěi yào de fāngshì bùdàn yǒu zhù yú wéichí xuè wéishēngsù C de yǒuxiào nóngdù, língwài kěyǐ zuìdà chéngdù jiàngdīle gěi yào duì xiěguǎn júbù de cǐjī. Zuìhòu yīnwèi wéishēngsù C kěnéng huì gānrǎo xiětáng jiāncè jiéguǒ, duìyú tángniàobìng huànzhě yīng bìmiǎn zài shū zhù jíkè cèdìng xiětáng.

Zuìhòu jīyú wéishēngsù C de gè zhǒng yàolǐ xué tèxìng, línchuáng shàng cúnzài yǐxià qíngkuàng de huànzhě bùyí shǐyòng zhè zhǒng zhìliáo fāng'àn:

1. Duì wéishēngsù C guòmǐn;
2. Yùqí shòumìng bù dào 24h; huáiyùn hé/huò bǔrǔ qí fùnǚ; qìguǎn qiē kāi huò yǒu jiāting yǎng liáo bìngshǐ;
6. Jiān zhí xìng fèibìng, èxìng zhǒngliú, mímàn xìng fèipào chūxiě, tángniàobìng tóng zhèng suān zhòngdú huò huódòng xìng shèn jiéshí bìngshǐ.

In addition, when using this regimen, it should be noted that due to the high concentration, it may irritate the blood vessels and cause pain. It is recommended that isotonic fluids be given to flush the blood vessels quickly after administration to reduce the irritation of the blood vessels. In addition, we use intermittent and slow administration. This helps to maintain the effective concentration of vitamin C in the blood, and can also reduce the local stimulation of blood vessels to the greatest extent.

Finally, because vitamin C may interfere with blood glucose monitoring results, patients with diabetes should avoid measuring blood glucose immediately after infusion.

Finally, based on the various pharmacological properties of vitamin C, this treatment should not be used in patients with the following clinical conditions:

1. Allergy to vitamin C;
2. Life expectancy less than 24h; pregnant and / or lactating women; tracheotomy, have or have a family history of oxygen therapy;
6. Interstitial lung disease, malignancy, diffuse alveolar hemorrhage, diabetic ketoacidosis, or a history of active kidney stones.

	首日	2-5 天
重症	100mg/kg, 溶于 100 ml 5%葡萄糖溶液中, 静脉滴注 (不小于 60min), 12 小时一次	100mg/kg, 溶于 100 ml 5%葡萄糖溶液中, 静脉滴注 (不小于 60min), 每日一次
危重症	200mg/kg, 溶于 100 ml 5%葡萄糖溶液中, 静脉滴注 (不小于 60min), 12 小时一次	100mg/kg, 溶于 100 ml 5%葡萄糖溶液中, 静脉滴注 (不小于 60min), 每日一次

	First day	Days 2-5
Severe cases	100 mg of soluble vitamin C / kg body weight, in 100 ml of grape glucose 5% solution, intravenous drip, delivered in not less than 60 minutes, every 12 hours	100 mg of soluble vitamin C / kg body weight, in 100 ml of grape glucose 5% solution, intravenous drip, delivered in not less than 60 minutes, once a day
Critical cases	200 mg of soluble vitamin C / kg body weight, in 100 ml of grape glucose 5% solution, intravenous drip, delivered in not less than 60 minutes, every 12 hours	100 mg of soluble vitamin C / kg body weight, in 100 ml of grape glucose 5% solution, intravenous drip, delivered in not less than 60 minutes, once a day

Editor’s notes:

About “Keshan disease.” From Wikipedia:

*Keshan* disease, named after Keshan County of Heilongjiang province, Northeast China, is a congestive cardiomyopathy caused by a combination of dietary deficiency of selenium and the presence of a mutated [*sic*] strain of Coxsackievirus [*sic*] ...

Often fatal, the disease afflicts children and women of child-bearing age, characterized by heart failure and pulmonary edema.

These symptoms were later found prevalent in a wide belt extending from northeast to southwest China, all due to selenium-deficient soil. The disease peaked in 1960–1970, claiming thousands of lives. ... supplementation with selenium reduced this affliction.

... Current research suggests that the lack of selenium results *in a more virulent strain* of the coxsackievirus becoming the dominant viral species present in the population of virus, but the *mechanism* of this selection event is unclear. See Beck et al. (2003); Ren et al. (2002)

*Keshan* disease can also lead to higher rates of cancer, cardiovascular disease, hypertension, and strokes. In addition, an individual can experience eczema, psoriasis, arthritis, cataracts, alcoholism, and infections.

#### References on Keshan disease:

Beck MA, Levander OA, Handy J (May 2003). “Selenium deficiency and viral infection.” *J. Nutr.* 133 (5 Suppl 1): 1463S–7S. doi:10.1093/jn/133.5.1463S.

Ren LQ, Li XJ, Li GS, Zhao ZT, Sun B, Sun F (November 2004). “Coxsackievirus B3 infection and its mutation in Keshan disease.” *World J. Gastroenterol.* 10 (22): 3299–302. doi:10.3748/wjg.v10.i22.3299.

#### Pertinent information about Coxsackievirus (Wikipedia)<sup>2</sup>

Coxsackieviruses are *enteroviruses* that belong to the Picornaviridae family ... which also includes poliovirus and echovirus.

Enteroviruses are among the most common ... human pathogens, ordinarily transmitted by the *fecal-oral* route.

Coxsackieviruses are among the leading causes [*sic*] of aseptic meningitis (the other usual *suspects* being echovirus and mumps virus).

In general, group A coxsackieviruses tend to infect the skin and mucous membranes, causing herpangina; acute hemorrhagic conjunctivitis; and hand, foot, and mouth (HFMD) disease.

Group B coxsackieviruses tend to infect the heart, pleura, pancreas, and liver, causing pleurodynia, myocarditis, pericarditis, and hepatitis .... Coxsackie B infection of the heart can lead to pericardial effusion.

---

2 <https://en.wikipedia.org/wiki/Coxsackievirus>