· 临床病例讨论 ·

Clinicopathological Conference

Double whammy: an male elderly patient with twice cardiac pulmonary resuscitation after acute myocardial infarction

(the 33rd case)

Institute of Geriatric Cardiology, Chinese PLA General Hospital

Case report

An 84-year-old male patient was admitted to the Chinese PLA General hospital because of worsening chest tightness and shortness of breath for six hours on July 20, 2008. Since 2 weeks before admission the patient had had recurrent chest distress which could not be alleviated with administration of the Chinese herbal medicine "Shuxiao Jiuxin Wan". At 1:00 in the morning of admission, the patient suddenly awakened from shortness of breath which was not eased by sitting up. The patient was sent to the Emergency Department of our hospital. An electrocardiogram (ECG) showed rS waves in leads Ⅱ, Ⅲ, AVF, and qrS waves in leads V_1 through V_4 with dynamic changes. The diagnosis of acute anterior myocardial infarction was considered. The patient was admitted to the Institute of Geriatric Cardiology for further treatment.

The patient had long history of hypertension and chronic renal failure and had received hemodialysis for more than 10 years. On physical examination: the temperature was 36.7℃, the pulse 87 beats/min, respiratory breaths 16 times/min, blood pressure 143/75mmHg. He had anemia with no jaundice, superficial lymph nodes enlargement or jugular venous distension. Both lungs were clear with normal chest appearance, symmetrical bilateral respiratory movements. Heart rate was 87 beats per minute and regular with low heart sound on auscultation. No pathological cardiac murmur was detected. The abdomen was soft, without tenderness or rebound tenderness. Neither the liver nor the spleen was palpable below the costal margin. No peripheral edema existed and the pulse of bilateral dorsal pedal arteries was poor.

The patient was given antiplatelet, vasodilators, antihypertensive and lipid-lowering agents and remained relatively stable for 3 wks. On August 25, however, the cardiac monitor showed sudden cardiac arrest and the patient was found pulseless and unresponsive. Chest compression, treachea intubation with continuous ventilator-assistance and medications to improve circulation (sodium bicarbonate, epinephrine, norepinephrine, dopamine, etc.) were administered immediately. Fifteen minutes later, sinus bradycardia rhythm returned and temporary pacemaker was implanted at bedside. After 8 hours, the patient became alert and oriented. The patient developed pulmonary infection and repeated acute heart failure after this episode. With regular hemodialysis and administration of inotropics and antibiotics, he remained hemodynamically stable. Two weeks later, the temporary pacemaker was withdrawned and the patient had a sinus rhythm of 60-90 beats/min. In October, the patient developed dry gangrene in the left foot and the right foot was in low temperature because of circulatory disturbance. The gangrene worsened despite intravenous administration of alprostadil. The cardiac function remained sta-

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ble.

On December 9, the patient had a cardiac arrest attack again. The cardiac monitor showed Ⅲ degree atrioventricular block with pulseless. After emergent CPR the temporary pacemaker was implanted and the patient was conscious during the treatment. For 3 months after the attack, the patient experienced recurrent ventricular tachycardia and fibrillation which lasted no more than 3 minutes and recovered after cardiac compression. Sputum culture showed multiple bacterial, fungal and non-mycobacterium tuberculosis infection. The temporary and white blood cell account were normal after use of antibiotics. The patient is still on continuous ventilator-assistance and pacing (66 beats/min). Regular hemodialysis and gastrointestinal nutrition were given. Now he remained stable and the vital signs were normal.

Discussion

Dr. GAO Lei: The patient recovered after twice cardio-pulmonary resuscitation, so we should consider and summarize the successful experience. First, we estimated the risk of cardiac arrest and had prepared in advance. According to the dynamic evolution of the ECG and elevated cardiac enzyme, the diagnosis of acute anterior myocardial infarction was considered. In the risk evaluation for patients with AMI, the higher of the ST-segment elevation and the more of the involved leads, the greater of the risk. The following are risk factors for cardiac arrest: advanced age (>70 years); history of previous myocardial infarction, atrial fibrillation, acute anterior myocardial infarction, pulmonary infection, hypotension and diabetes mellitus. For this patient, the ECG showed qrS of the leads of Ⅱ, Ⅲ, AVF and dynamic changes of leads V_1-V_4 after hospitalization. He had high risk of sudden death for multiple risk factors and should be paid more attention. Secondly, time is the most important for successful CPR. The cardiac compression was immediately performed (within 15 seconds after cardiac arrest) for this patient. Appropriate use of the emergent medicines, such as dopamine, epinephrine, atropine et al. was also very important. Finally we should know the indications of temporary pacemaker implantation. For most patients with cardiac arrest, temporary pacemaker was not necessary to maintain the heart rate which often recover after successful CPR and epinephrine administration. But this patient had cardiac conduction dysfunction, I degree atrioventricular block and presented Ⅲ degree atrioventricular block after the second successful cardiac resuscitation. So implantation of temporary cardiac pacemaker was very important to maintain the heart rate for this patient.

Dr. XUE Qiao: After hospitalization, the patient experienced twice successful emergent CPR. Heart failure after myocardial infarction is a high risk factor for sudden death. Other related factors include cardiac hypertrophy, myocardial ischemia, genetic factors, and disturbance of homeostasis, et al. In addition, there are several laboratory indicators which can be used to predict sudden cardiac death, such as T-wave alternans on the ECG, long QT interval, high level of plasma B-type natriuretic peptide or its precursors. More recently, the relationship of renal dysfunction and sudden cardiac death attracted more attention. On 2004, Erneato Paoletti et al. first observed that the patients accepted dialysis treatment had high risk of sudden cardiac death (17%), and associated risk factors include old age, myocardial ischemia and cardiac hypertrophy. On 2005, Hiroki Ito et al. suggested that renal dysfunction is an independent risk factor of sudden cardiac death, after adjusting for age, cardiac function, or coronary artery disease, but the mechanism is still unclear. Recently, some researchers classify chronic kidney dysfunction into "CHD equivalent", like diabetes. This patient had high risk of sudden cardiac death for his long history of hypertension and renal failure. As mentioned by Dr. Gao, time is the key point of successful resuscitation for sudden cardiac death. Studies have shown that the time from sudden cardiac arrest to the beginning of effective treatment had a negative correlation with survival rate: 74% survival rate

within 3 minutes, 49% survival rate after 3 minutes. Appropriate strategies should be followed to maintain effective respiratory and circulation, including the airway opening and effective ventilation and vasoactive drugs, et al. Therefore, doctors in CCU should master the technology of emergency tracheal intubation and ventilator applications. Finally appropriate administration of epinephrine and norepinephrine is particularly important. Studies showed that norepinephrine was more effective than epinephrine on spontaneous circulation restore. Norepinephrine is an α receptor stimulants without the adverse effect of vasodilation of β2 adrenergic receptor stimulants. After spontaneous circulation restore, cerebral protection is also important for conscious awareness, including ice package to reduce head temperature and administration of naloxone and citicoline to improve cerebral metabolism.

Dr. ZHAO Yusheng: Cardiac arrest can cause a series of pathophysiological changes, which have effect on the survival rate. The blood catecholamine level in the patients with cardiac arrest may increase more than 50 times. However, such a high level of catecholamines could not maintain blood pressure, which may be inhibited by some endogenous metabolites products. The mean arterial pressure and diastolic blood pressure increase after administration of exogenous epinephrine (0.01—0.1 mg/kg), which provide the theoretical basis for the use of exogenous epinephrine in cardiac resuscitation. Furthermore, the sensitivity and expression of α-adrenergic receptors decrease in patients with severe hypoxia and acidosis. Blood vasopressin, angiotensin Ⅱ and atrial natriuretic factor increase after CPR, which could enhance peripheral vascular resistance and spontaneous circulation restoration. But endogenous vasopressin and angiotensin Ⅱ are not sufficient for spontaneous circulation restoration and exogenous vasoconstrictor peptides may be beneficial for these patients. After cardiac arrest adenosine levels in blood also increased, which could enhance myocardial oxygen supply, reduce myocardial oxygen consumption, cause coronary artery dilation and inhibit automatic depolarization of cardiomyocytes. In addition, adenosine can inhibit the effects of catecholamine on cardiomyocytes. Reperfusion injury after cardiac arrest could inhibit recovery of organ functions. Although the cardiomyocytes may not die immediately, the harmful substances such as calcium ion, oxygen free radicals and iron ions may accelerate the death of cardiomyocytes. Therefore, early use of antioxidant agents can also be considered.

(Translator: LI Jian, GAO Lei)

高龄老年心肌梗死后2次心肺复苏成功1例

1 病历摘要

患者，男性，84岁，主因发作性胸闷2周，加重6h于2008年8月4日急诊入院。2008年8月4日晨起1:00患者出现发作性喘憋，坐起后症状仍不能缓解，自服速效救心丸无效，急诊就诊于解放军总医院门诊，急查心电图显示Ⅱ、Ⅲ、AVF呈rS，V_1-V_4导联呈qrS型，复查心电图V_1-V_4存在动态演变，诊断"急性前壁心肌梗死"，为进一步诊治就诊于解放军总医院老年心血管病研究所。

患者既往慢性肾功能衰竭，尿毒症10余年，长期规律血液透析治疗。入院查体：体温36.7℃，脉搏87次/min，呼吸16次/min，血压143/75mmHg。贫血貌，全身皮肤无黄染，浅表淋巴结未触及，颈静脉无怒张。胸廓对称无畸形，双肺呼吸音清晰，未闻及明显干湿性啰音。心率87次/min，律齐，心音低钝，各瓣膜听诊区未闻及病理性杂音。腹软，无压痛及反跳痛，肝脾肋下未及。双下肢无水肿，双侧足背动脉搏动差。

入院后予抗凝、抗血小板、扩冠、降压、调脂、规律床旁血滤等治疗，患者病情趋于好转。8月25日突发心跳呼吸骤停，心电监护提示心脏停搏。经即刻经胸心脏按压、气管插管呼吸机辅助呼吸、药物维持血压改善循环(碳酸氢钠、肾上腺素、去甲肾上腺

素、多巴胺等)等治疗15min后，患者自主心律恢复，因心动过缓，在床旁紧急置入临时起搏器维持。8h后神智恢复。其后患者反复肺部感染、急性心衰发作。在规律床旁血滤基础上，经强心、抗感染等治疗，病情再次趋于稳定，并于2周后拔除临时起搏电极(自主心律稳定，60～90次/min)。自10月起，患者逐渐出现肢端循环障碍。左足自拇指起，依次出现干性坏疽，右足皮温低。经前列地尔等治疗无效，坏疽部位蔓延至左足掌中部，但心功能状态维持稳定。12月9日，再次突发心跳骤停。心电监护提示Ⅲ度房室传导阻滞，心室停搏。在经胸心脏按压的同时，再次床旁紧急置入临时起搏器。救治过程中无意识丧失。其后3月中，反复出现室速、室颤等恶性心律失常，可达龙治疗效果差。每次经短暂(0.5～3min)胸外心脏按压可恢复起搏心律。曾经历多次肺部混合细菌感染、真菌感染、非结核分支杆菌感染等，经抗感染治疗均使病情趋于稳定，目前已停用所有抗生素。现以呼吸机辅助呼吸、临时起搏器维持起搏心律(66次/min)、规律床旁血滤替代肾脏功能、经胃管全胃肠营养维持代谢。近2周来病情相对稳定。

2 临床病例讨论

高磊医师：该患者两次心肺复苏，其中有诸多成功经验值得总结，首先是对该类患者发生心脏骤停风险估计较为充分，根据患者心电图动态演变及心肌酶变化，急性前壁心肌梗死诊断明确，对于急性心肌梗死患者进行风险评估，ST段抬高程度越高，受累导联越多，风险越大，如符合以下一项者为高位患者：女性、70岁以上、梗死史、心房颤动、前壁心梗、肺部啰音、低血压、心动过速、糖尿病；患者入院后Ⅱ、Ⅲ、AVF呈rS，V_1-V_4导联呈qrS型，复查心电图V_1-V_4存在动态演变，心电图受累导联数多，而且患者高龄，陈旧心肌梗死病史，新发前壁心肌梗死，尿毒症期，符合以上多个条件，为猝死高危患者。对于此类患者应给予充分警惕。事先已做好各种预案；其次心肺复苏抢救成功的关键是复苏开始时间，该患者两次心脏骤停从发现到开始心脏按压仅耗时15s左右，为后续循环恢复提供了保证；还有就是心肺复苏过程各种抢救措施的合理应用，包括多巴胺、肾上腺素、阿托品等急救药物的使用等。值得一提的是，临时心脏起搏在该患者心肺复苏过程中起到关键作用。许多心脏骤停患者经过大剂量肾上腺素和心外按压后如能恢复心跳，多不需要心脏起搏治疗，但该患者既往心脏传导功能减退，有长期Ⅰ度房室传导阻滞病史，第二次心脏复苏成功后出现Ⅲ度房室传导阻滞，此时紧急床旁植入临时心脏起搏器对患者心跳恢复是至关重要的。

薛桥医师：在该患者病程中，多次成功救治心跳骤停是患者病情逐步得以控制的基础。心肌梗死后心衰是心源性猝死的高危因素。与此相关的因素还有心肌肥厚、心肌缺血、遗传因素、内环境等。除此之外，还有一些实验室指标可用于预测心源性猝死，如心电图上的T波交替、长QT、B型钠尿肽及其前体等。近年来，肾功能不全与心源性猝死的关系逐渐引起人们的重视。2004年，Erneato Paoletti等首次注意到透析患者中心源性猝死的比例极高(17%)，其相关危险因素包括高龄、心肌缺血性和心肌肥厚。2005年，Hiroki Ito等的研究认为肾功能不全是心源性猝死的独立危险因素，与年龄、心功能状态、甚至冠脉病变无关，但其具体机制不详。近来国内也有学者把慢性肾功能不全与糖尿病相比，称其为急性心肌梗死的等位症。该患者有多年高血压和肾衰血透病史，新近发生心肌梗死，是发生心源性猝死高危患者。心源性猝死救治成功的关键点在时间。研究表明，从心脏骤停到有效救治的时间与存活率呈负相关，3min内存活率可达74%，3min后存活率下降至49%。其次是正确的策略：保持呼吸道通畅和有效呼吸量、维持有效循环(包括血管活性药物)等。所以监护室医生要熟练掌握紧急气管插管技术和呼吸机的应用。在血管活性药物的应用中，肾上腺素和去甲肾上腺素的合理应用尤为重要。有研究表明，去甲肾上腺素比肾上腺素在自主循环的恢复能力方面高2倍。其原因可能是去甲肾上腺素单纯的α受体兴奋作用，没有肾上腺素兴奋β2受体后扩血管效应带来的对复苏的不利影响。在自主有效循环恢复后，及时采用保护大脑措施对患者意识恢复极其重要，除了冰袋降低头部温度，用纳洛酮促醒、胞二磷胆碱改善脑代谢都很有助益。

赵玉生医师：心脏骤停后会引起体内一系列病理生理变化，掌握好这些有利于指导我们复苏成功后的治疗。(1)血循环中儿茶酚胺水平升高，甚至可达原有水平的50倍。但如此高水平的儿茶酚胺却不足以维持动脉血压，可能是一些内源性的代谢产物抑制了儿茶酚胺的作用。当给予外源性肾上腺素0.01～0.1 mg/kg后，血浆肾上腺素水平、平均动脉压及舒张压均比未用肾上腺素者明显升高，这就是应用外源性肾上腺素进行心脏复苏的理论依据。

(2)肾上腺素能受体在心跳停止后,由于严重的缺氧和酸中毒造成肾上腺素能α受体脱敏感或受体下调。(3)血中血管加压素、血管紧张素Ⅱ和心房利钠因子较复苏前均有明显升高,这反映了机体对缺血缺氧和心肺复苏时再灌注的神经内分泌反应。血管加压素、血管紧张素Ⅱ的增加有助于提高外周循环阻力,恢复自主循环,心跳停止后虽有内源性血管加压素、血管紧张素Ⅱ的增加,但并不足以恢复自主循环,而外源性补充这些缩血管肽类可能对复苏有利。(4)血中腺苷水平升高心跳停止后,作为代谢产物之一的腺苷水平明显升高,腺苷能增加心肌氧供、减少心肌氧耗,可以引起冠脉扩张,抑制心肌自律细胞的自动除极,窦房结和房室结的抑制则可引起心动过缓、房室传导阻滞,另外,腺苷还能抑制儿茶酚胺对心肌的激动效应。(5)再灌注损伤心脏骤停后,组织灌流停止,心肌细胞并不立即死亡,而再灌注所带来的有害物质如钙离子、氧自由基、铁离子等可能会加速心肌细胞死亡,导致复苏失败,因此在复苏过程中不要忽略应用清除氧自由基的药物。

(参加讨论医师:高磊、薛桥、赵玉生,等)

(李健、高磊 整理)

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·消 息·

《现代肿瘤医学》征稿、征订启事

《现代肿瘤医学》(ISBN1672-4992,CN61-1415/R),是国家科技部、新闻出版总署批准国内外公开发行的国家级肿瘤专业学术期刊,中国抗癌协会系列期刊。本刊系科技部中国科技论文统计源期刊、中国科技核心期刊、《中国学术期刊综合评价数据库》统计源期刊;美国《化学文摘》、《中国科学引文数据库》、《中国期刊网》、《中国学术期刊(光盘版)全文数据库》、《中国核心期刊(遴选)数据库》、《中国生物医学文献数据库》、《中文科技期刊数据库》收录期刊;《万方数据-数字化期刊群》全文上网期刊;《中国学术期刊文摘》来源期刊、《中国医学文摘·肿瘤学》来源期刊、《CAJ-CD规范》执行优秀期刊。刊物主要介绍当前肿瘤学领域的最新成果及国内外肿瘤诊疗技术的新进展,新动向;刊登肿瘤基础研究,临床诊断、治疗方面的成果以及有创新性,科学性的新方法、新发明、新经验,努力为肿瘤学术交流及学科发展服务。主要栏目有专题专稿、论著、基础研究、临床报道、综述、流行病学、短篇报道、经验交流、中西医结合等。

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