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胺碘酮治疗冠心病心律失常及其对血流动力学的影响研究

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摘要 目的：研究胺碘酮治疗冠心病心律失常（CHDA）的临床疗效及其对血流动力学的影响。**方法：**选择 2015 年 1 月～2016 年 12 月于我院心血管内科治疗的 CHDA 患者 156 例，依据随机数字表法将所有 CHDA 患者分为观察组（n=78）与对照组（n=78）。对照组给予常规治疗，观察组在对照组基础上给予胺碘酮治疗。观察两组治疗后血压、平均动脉压及心率情况，治疗前后两组纤维蛋白原（Fb）、血细胞比容（HCT）、细胞沉降率（ESR）、血浆比黏度（np）、高切变率下全血黏度（nbh）及低切变率下全血黏度（nbl）等血流动力学指标，治疗前后两组 QTc 间期、PR 间期及 QRs 波时限等心电图指标，临床疗效及不良反应。**结果：**治疗后，观察组血压、平均动脉压、心率及 Fb、HCT、ESR、np、nbh、nbl 等血流动力学指标均低于对照组，QTc 间期高于对照组，差异有统计学意义（P＜0.05）。观察组总有效率（93.59%）高于对照组（78.21%），差异有统计学意义（P＜0.05）。观察组不良发应发生率（2.56%）与对照组（0.00%）差异无统计学意义（P＞0.05）。**结论：**胺碘酮治疗 CHDA 可有效改善患者血流动力学，临床疗效显著，不良反应少，值得临床应用。

关键词：胺碘酮；冠心病心律失常；临床疗效；血流动力学；不良反应

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Effect of Amiodarone on Coronary Heart Disease Arrhythmia and Hemodynamics

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ABSTRACT Objective: To study the clinical efficacy of amiodarone in the treatment of coronary heart disease arrhythmia (CHDA) and its effect on haemodynamics. **Methods:** A total of 156 patients with CHDA, who were treated in Department of Cardiovasology of No. 422 Hospital of PLA from January 2015 to December 2016, were selected and randomly divided into observation group (n=78) and control Group (n=78). The control group was performed conventional therapy, on the basis of which, the observation group was treated with amiodarone. The blood pressure, mean arterial pressure and heart rate of the patients in the two groups were observed after treatment. The hemodynamic indexes, including fibrinogen (Fb), hematocrit (HCT), erythrocyte sedimentation rate (ESR), plasma viscosity (np) and whole blood viscosity at high shear rate(nbh) and that at low shear rate(nbl), the cardiograph parameters including Q-Tc interval, PR interval and QRS duration, the clinical efficacy and adverse reactions of the two groups were observed. Before and after treatment. **Results:** After treatment, the levels of blood pressure, mean arterial pressure, heart rate, Fb, HCT, ESR, np, nbh, nbl and other hemodynamic indexes in the observation group were lower than those in the control group, the Q-Tc interval was higher than that in the control group, the difference was statistically significant (P<0.05). The total effective rate (93.59%) of Observation group was higher than that (78.21%) of control group, the difference was statistically significant (P<0.05). The incidence (2.56%) of adverse reactions in the observation group was not significantly different from that (0.00%) in the control group (P>0.05). **Conclusion:** In the treatment of CHDA, amiodarone can effectively improve the hemodynamics of patients, with significant clinical efficacy and less adverse reactions, which is worthy of clinical application.

Key words: Amiodarone; Arrhythmia of coronary heart disease; Clinical efficacy; Hemodynamics; Adverse reactions

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前言

冠心病心律失常（Coronary heart disease arrhythmia，CHDA）为心内科常见疾病，其发病因素为冠脉粥样硬化引发的心肌缺血[1]。资料显示，CHDA 可导致心脏泵血功能异常，引发血液动力学改变[2,3]。张秋林等[4]证明，心律失常为冠心病患者死亡的独立危险因素。在 CHDA 的治疗上，临床多以倍他乐克、比索洛尔等药物治疗[5,6]。临床实践发现，尽管上述药物治疗 CHDA 疗效较好，但在心脏局部血流动力学影响下，患者常易出现

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室颤、房颤等并发症，威胁患者生命安全[7]。我院于 2015 年 1 月～2016 年 12 月将胺碘酮应用于 CHDA 的临床治疗，以探究其临床疗效及其对患者血流动力学的影响。现总结如下。

1 资料与方法

1.1 一般资料

选择 2015 年 1 月～2016 年 12 月于我院心血管内科治疗的 CHDA 患者 156 例，其临床主要表现为胸闷、头晕、失眠、心悸等症状。纳入标准：符合《内科学（第 7 版）》[8]CHDA 诊断标准，并经心电图以及动态心电图诊断为 CHDA；30d 内未服用抗心律失常药物患者；知情同意患者。排除标准：急性心肌梗死患者；房室传导阻滞患者；局部麻醉药物过敏患者；甲状腺功能异常患者；胺碘酮禁忌症患者；肝肾等脏器严重疾病患者；依从性差患者；孕妇、哺乳期内患者。其中男 86 例（55.13%），女 70 例（44.87%）；年龄 55～89 岁，平均年龄（68.37± 6.81）岁；病程 4～19 年，平均病程（7.26± 0.83）年；心律失常：室性期前收缩 63 例（40.38%），短阵室速 51 例（32.69%），室性期前收缩并房颤 42 例（26.92%）；心功能分级：I 级 31 例（19.87%），II 级 54 例（34.62%），III 级 50 例（32.05%），IV 级 21 例（13.46%）；基础疾病：高血压 84 例（53.84%），糖尿病 69 例（44.23%），肥厚性心脏病 46 例（29.49%），病毒性心肌炎 26 例（16.67%），风湿性心脏病 23 例（14.74%），其他 14 例（8.97%）。依据随机数字表法将所有 CHDA 患者分为观察组（n=78）与对照组（n=78），两组一般资料差异无统计学意义（P＞0.05），具有可比性。见表 1。

表 1 两组基线资料比较

Table 1 Comparison of baseline data between the two groups

Indexes		Control Group (n=78)	Observation group (n=78)	x^2/t	P
Gender(male/female)		42/36	44/34	0.104	0.748
Age (age)		68.11± 6.76	68.47± 6.85	0.330	0.742
Course of disease (year)		7.24± 0.80	7.29± 0.85	0.378	0.706
Arrhythmias	Ventricular premature beats	32	31	0.036	0.982
	Short ventricular tachycardia	25	26		
	Ventricular premature beats and atrial fibrillation	21	21		
Classification of cardiac function	I grade	15	16	0.474	0.925
	II grade	26	28		
	III grade	27	23		
	IV grade	10	11		
Underlying diseases	Hypertension	41	43	0.463	0.993
	Diabetes	35	34		
	Hypertrophic heart disease	24	22		
	Viral myocarditis	13	13		
	Rheumatic heart disease	11	12		
	Others	6	8		

1.2 方法

对照组给予止痛、吸氧、硝酸酯类药物等常规治疗。观察组在对照组基础上给予胺碘酮治疗。注射用盐酸胺碘酮（生产企业：Sanofi Winthrop Industrie；国药准字：J20070056；规格：2 mL：150 mg）150～300 mg + 生理盐水 20 mL，静脉注入，注入时间 10 min，然后维持速度 0.5～1 mg/min 静脉滴注。1 次 /d，2～3 d。待患者室性早搏偶发时给予胺碘酮片（赛诺菲安万特（杭州）制药有限公司：国药准字 H19993254；规格：0.2 g/ 片）口服，0.2 g/ 次，3 次 /d，依据患者病情逐渐减至 0.2 g/ 次，1 次 /d。

1.3 观察指标

治疗 2 周后，观察两组治疗后血压、平均动脉压及心率情况；治疗前后两组纤维蛋白原（Fb）、血细胞比容（HCT）、细胞沉降率（ESR）、血浆比黏度（np）、高切变率下全血黏度（nbh）及低切变率下全血黏度（nbl）等血流动力学指标；治疗前后两组 QTc 间期、PR 间期及 QRs 波时限等心电图指标；不良反应。血流动力学指标以 Bioz.Com 数字化无创血流动力学检测仪检测；心电图指标以 BeneHeart R3 心电图机检测。

1.4 疗效评价标准

依据《内科学（第 7 版）》[8]CHDA 诊疗相关标准制定疗效评价标准。治愈：患者心电恢复正常，临床症状完全消失；显效：患者房颤、室颤及室性心动过速等心律失常指标减少＞90%，临床症状减少 80～90%；有效：患者房颤、室颤及室性心动过速等心律失常指标及临床症状减少均≥ 50%，但低于显效标准；无效：患者房颤、室颤及室性心动过速等心律失常指标及临床症状减少均＜50%，或加重。总有效 = 治愈 + 显效 + 有效。

1.5 统计学处理

采用 SPSS19.0 统计软件分析，计量资料以（$\bar{x}$± s）表示，组内比较行配对 t 检验、组间比较行独立样本 t 检验；计数资料以

例数、百分比表示，组内、组间比较用 x^2 检验，P＜0.05 为差异有统计学意义。

2 结果

2.1 两组治疗后血压、平均动脉压及心率比较

治疗后，观察组舒张压、收缩压、平均动脉压、心率均低于对照组，差异有统计学意义（P＜0.05）。见表 2。

表 2 两组治疗后血压、平均动脉压及心率比较（$\bar{x}\pm s$）

Table 2 Comparison of blood pressure, mean arterial pressure and heart rate between two groups after treatment（$\bar{x}\pm s$）

Groups	Cases	Diastolic pressure (mmHg)	Systolic pressure (mmHg)	Mean arterial pressure (mmHg)	Heart rate (order/min)
Control Group	78	85.37± 8.61	127.92± 12.69	111.67± 11.72	120.64± 12.58
Observation group	78	72.64± 7.28	110.43± 11.63	82.85± 8.31	84.77± 8.52
t		9.971	8.974	17.716	20.851
P		0.000	0.000	0.000	0.000

2.2 两组治疗前后血流动力学指标比较

治疗前，两组 Fb、HCT、ESR、np、nbh、nbl 等血流动力学指标差异无统计学意义（P＞0.05）；治疗后，两组 Fb、HCT、ESR、np、nbh、nbl 等血流动力学指标均较治疗前降低，差异有统计学意义（P＜0.05）。治疗后，观察组 Fb、HCT、ESR、np、nbh、nbl 等血流动力学指标均较对照组低，差异有统计学意义（P＜0.05）。见表 3。

表 3 两组治疗前后血流动力学指标比较（$\bar{x}\pm s$）

Table 3 Comparison of hemodynamic indexes between two groups before and after treatment（$\bar{x}\pm s$）

Groups	Cases	Times	Fb(g/L)	HCT(%)	ESR(mm/h)	np(mPa·s)	nbh(mPa·s)	nbl(mPa·s)
Control Group	78	Before treatment	389.93± 40.17^{ab}	53.19± 5.29^{ab}	23.82± 2.43^{ab}	2.14± 0.20^{ab}	6.31± 0.62^{ab}	10.40± 1.04^{ab}
		After treatment	356.78± 36.52^{c}	44.76± 4.52^{c}	18.78± 1.85^{c}	1.75± 0.17^{c}	5.30± 0.52^{c}	8.62± 0.85^{c}
Observation group	78	Before treatment	391.64± 40.24^{b}	54.34± 5.42^{b}	23.87± 2.46^{b}	2.16± 0.22^{b}	6.33± 0.64^{b}	10.41± 1.06^{b}
		After treatment	320.86± 32.74	33.26± 3.75	14.67± 1.50	1.14± 0.13	4.08± 0.41	7.14± 0.71

Note: [a]Compared with the experimental group before treatment, P＞0.05; [b] compared with the treatment group, P＜0.05 ; [c]compared with the experimental group after treatment, P＜0.05.

2.3 两组治疗前后心电图指标比较

治疗前，两组 QTc 间期、PR 间期、QRs 波时限差异无统计学意义（P＞0.05）；治疗后，两组 QTc 间期高于治疗前，差异有统计学意义（P＜0.05）。PR 间期、QRs 波时限治疗前后差异无统计学意义（P＞0.05）；治疗后，观察组 QTc 间期较对照组高，差异有统计学意义（P＜0.05）。两组 PR 间期、QRs 波时限差异无统计学意义（P＞0.05）。见表 4。

2.4 两组临床疗效比较

观察组总有效率（93.59%）较对照组总有效率（78.21%）高，差异有统计学意义（P＜0.05）。见表 5。

表 4 两组治疗前后心电图指标比较（$\bar{x}\pm s$）

Table 4 Comparison of ECG indexes before and after treatment between two groups（$\bar{x}\pm s$）

Groups	Cases	Times	QTc 间期(s)	PR 间期(s)	QRs 波时限(s)
Control Group	78	Before treatment	0.37± 0.08^{ab}	0.140± 0.02^{ab}	0.076± 0.011^{ab}
		After treatment	0.40± 0.08^{c}	0.143± 0.03^{c}	0.080± 0.016^{c}
Observation group	78	Before treatment	0.36± 0.07^{b}	0.141± 0.02^{b}	0.075± 0.012^{b}
		After treatment	0.43± 0.10	0.144± 0.03	0.079± 0.014

Note: [a]Compared with the experimental group before treatment, P＞0.05; [b]compared with the treatment group, P＜0.05 ;[c]compared with the experimental group after treatment, P＜0.05.

2.5 两组不良反应比较

观察组不良发应发生率（2.56%）与对照组不良发应发生率（0.00%）差异无统计学意义（P＞0.05）。见表 6。

3 讨论

CHDA 是冠心病心肌缺血引发的心脏搏动节律及频率异常[9]。资料显示，CHDA 可加重心肌缺血，导致血流动力学改变，严重影响患者预后，增加病死率[10]。调查发现，与非心率失常冠心病患者相比较，CHDA 患者不但多表现为血流动力学改变，更易引发心源性死亡[11]。研究证明，心肌缺血可引发心肌细胞膜电位波动，致使心肌细胞除极与复极紊乱[12]。心肌缺血还可增加心肌的复极弥散性，降低心输出量，缩短心脏舒张时间，使患者表现为胸闷气短、乏力心悸等症状[13,14]。

表 5 两组临床疗效比较[n(%)]

Table 5 Comparison of clinical efficacy between two groups [n(%)]

Groups	Cases	Cure	Excellent	Effective	Invalid	Total effective
Control Group	78	18(23.08)	30(38.46)	13(16.67)	17(21.79)	61(78.21)
Observation group	78	24(30.77)	35(44.87)	14(17.95)	5(6.41)	73(93.59)
x^2						7.620
P						0.006

表 6 两组不良反应比较 [n(%)]

Table 6 Comparison of adverse reactions between two groups [n(%)]

Groups	Cases	Nausea and vomiting	Decreased blood pressure	Total
Control Group	78	0(0.00)	0(0.00)	0(0.00)
Observation group	78	1(1.28)	1(1.28)	2(2.56)
x^2		1.007	1.007	2.026
P		0.316	0.316	0.155

目前，临床上多以 K^+、Ca^{2+}、Na^+ 等通道阻滞剂及 β 受体阻滞剂治疗 CHDA[15,16]。胺碘酮为 K^+ 通道阻滞剂与肾上腺素受体阻滞剂，可通过抑制 K^+、Ca^{2+} 通道，促进有效不应期及动作电位的延长，延长 QT 间期，抑制房室结与窦房结的正常功能，延长房室传导时间，降低心率，进而达到抵抗心律失常的目的[17-19]。胺碘酮可有效扩张冠状动脉，降低周围血管阻力，减少心脏负荷及心肌氧耗，提高心输出量，改善患者临床症状[20-22]。胺碘酮还可提高心肌细胞 Mg^{2+} 水平，激活 ATP 酶，促进 Ca^{2+} 泵以及 Na^+-K^+ 泵功能，使 K^+、Ca^{2+}、Na^+ 等离子浓度从低梯度回升到高梯度，抑制心肌细胞 K^+ 流失，提高其 K^+ 水平，改善 QT 间期，避免发生尖端扭转型室速[23-25]。此外，胺碘酮还具有无明显负性肌力作用的特点，临床使用更为安全[26,27]。动物实验证明，胺碘酮可提高± dp/dtmax，降低 LVEDP，改善心肌顺应性，纠正血流动力学失衡状态[28]。罗兴文等[29]发现，胺碘酮可显著改善 CHDA 患者 nbh、nbl 等血流动力学指标，延长 QTc 间期，提高临床疗效。符丽萍[30]将胺碘酮应用于 CHDA 患者的临床治疗，结果表明，患者室性期前收缩数显著减少，QTc 间期显著增加，提示胺碘酮可有效改善 CHDA 患者心功能，且患者均为出现心功能恶化，皮肤、神经等不良反应。在本研究中，治疗后观察组血压、平均动脉压、心率、血流动力学、QTc 间期等指标显著改善，且改善水平显著优于对照组，其总有效率显著高于对照组，且未见较为严重的不良反应，与上述研究较为一致，提示胺碘酮治疗 CHDA 具有较高的应用价值。

综上所述，胺碘酮治疗 CHDA 可有效纠正患者心电失衡状态，改善血流动力学，临床疗效显著，不良反应少，值得临床应用。

参 考 文 献(References)

[1] Xue X, Guo D, Sun H, et al. Wenxin Keli suppresses ventricular triggered arrhythmias via selective inhibition of late sodium current[J]. Pacing Clin Electrophysiol, 2013, 36(6): 732-740

[2] Ferrari R, Fox K. Heart rate reduction in coronary artery disease and heart failure[J]. Nat Rev Cardiol, 2016, 13(8): 493-501

[3] Wang X, Wang X, Gu Y, et al. Wenxin Keli attenuates ischemia-induced ventricular arrhythmias in rats: Involvement of L-type calcium and transient outward potassium currents [J]. Mol Med Rep, 2013, 7(2): 519-524

[4] 张秋林,魏延津,尹传贵.瑞舒伐他汀对老年急性心肌梗死患者室性心律失常的影响[J].中国心血管病研究, 2012, 10(1): 38-42
Zhang Qiu-lin, Wei Yan-jin, Yin Chuan-gui. The effect of rosuvastatin with different doses on ventricular arrhythmias in elderly patients suffered from acute myocardial infarction[J]. Chinese Journal of Cardiovascular Review, 2012, 10(1): 38-42

[5] 易旭岚,周红燕,袁轶如.心通口服液联合倍他乐克治疗冠心病心律失常 39 例[J].中国中医药现代远程教育, 2016, 14(21): 85-86
Yi Xu-lan, Zhou Hong-yan, Yuan Yi-ru. Xintong Oral Liquid combined with Betaloc in the Treatment of Coronary Heart Disease Arrhythmia for 39 Cases[J]. Chinese Medicine Modern Distance Education of China, 2016, 14(21): 85-86

[6] 王学胜,张学平,陈慧.稳心颗粒联合美托洛尔治疗老年人冠心病心律失常的临床疗效观察 [J]. 中华老年医学杂志, 2013, 32(11): 1159-1160
Wang Xue-sheng, Zhang Xue-ping, Chen Hui. Clinical effect of Wenxin granule combined with metoproloi on arrhythmia in elderly patients with coronary heart disease[J]. Chinese Journal of Geriatrics, 2013, 32(11): 1159-1160

[7] 雷利群, 薛莉,肖顺林.复方罗布麻片结合胺碘酮治疗冠心病室性心律失常[J].中国实验方剂学杂志, 2014, 20(20): 203-205
Lei Li-qun, Xue Li, Xiao Shun-lin. Fufang Luobuma Pills Combined with Amiodarone in Treatment of Coronary Heart Disease Ventricular Arrhythmia [J]. China Journal of Experimental Traditional Medical Formulae, 2014, 20(20): 203-205

[8] 陆再英. 内科学[M]. 7 版.北京:人民卫生出版社, 2009: 204-210
Lu Zai-ying.Medicine [M]. The 7 edition. Bei Jing: People's Medical Publishing House, 2009: 204-210

[9] Wang X, Wang X, Gu Y, et al. Wenxin Keli attenuates ischemia-in-duced ventricular arrhythmias in rats: Involvement of L-type calcium and transient outward potassium currents[J]. Mol Med Rep, 2013, 7(2): 519-524

[10] 齐欣,郭书文,陈剑明.益气活血法联合酒石酸美托洛尔治疗冠心病心律失常的临床研究[J].中华中医药学刊, 2017, 35(2): 279-282
Qi Xin, Guo Shu-wen, Chen Jian-ming. The Clinical Study of Yiqi Huoxue Combined with Metoprolol Tartrate in the Treat ment of Coronary Heart Disease Arrhythmia [J]. Chinese Archives of Traditional Chinese Medicine, 2017, 35(2): 279-282

[11] Xue X, Guo D, Sun H, et al. Wenxin Keli suppresses ventricular triggered arrhythmias via selective inhibition of late sodium current [J]. Pacing Clin Electrophysiol, 2013, 36(6): 732-740

[12] 张桂艳,程德君,杨玲.动态心电图与常规心电图在冠心病患者心肌缺血及心律失常诊断中的应用价值 [J]. 江苏医药, 2014, 40(8): 918-920
Zhang Gui-yan, Cheng De-jun, Yang Ling. A comparison of dynamic electrocardiogram and routine electrocardiogram in diagnosis of myocardial ischemia and arrhythmia of patients with coronary heart disease[J]. Jiangsu Medical Journal, 2014, 40(8): 918-920

[13] Reibis R, Salzwedel A, Falk J, et al. Return to Work after Acute Myocardial Infarction[J]. Dtsch Med Wochenschr, 2017, 142(8): 617-624

[14] Funck KL, Laugesen E, Øvrehus K, et al. Increased high-risk coronary plaque burden is associated with arterial stiffness in patients with type 2 diabetes without clinical signs of coronary artery disease: a computed tomography angiography study [J]. J Hypertens, 2017, 35 (6): 1235-1243

[15] 张海勤.稳心颗粒联合胺碘酮治疗冠心病心律失常的效果分析[J].中国继续医学教育, 2015, 7(32): 194-195
Zhang Hai-qin. Analysis Effect of Wenxin Granules Combined With Amiodarone in Treatment of Coronary Heart Arrhythmia [J]. China Continuing Medical Education, 2015, 7(32): 194-195

[16] Cadrin-Tourigny J, Shohoudi A, Roy D, et al.Amiodarone and Beta-Blockers in Patients With Heart Failure and Atrial Fibrillation [J]. JACC Heart Fail, 2017, 5(4): 312-313

[17] Tsanaxidis N, Aidonidis I, Hatziefthimiou A, et al. Ranolazine Added to Amiodarone Facilitates Earlier Conversion of Atrial Fibrillation Compared to Amiodarone-Only Therapy[J]. Pacing Clin Electrophysiol, 2017, 40(4): 372-378

[18] Nielsen DG, Nielsen JC, Trolle C, et al. Prolonged QT interval and cardiac arrest after a single dose of amiodarone in a woman with Turner's syndrome[J]. Clin Case Rep, 2017, 5(2): 154-158

[19] Bocchini N, Giantin M, Crivellente F, et al. Molecular biomarkers of phospholipidosis in rat blood and heart after amiodarone treatment[J]. J Appl Toxicol, 2015, 35(1): 90-103

[20] 纪铭月. 胺碘酮在冠心病快速室性心律失常中的应用及对心电变化的影响[J].医学综述, 2015, 21(22): 4195-4196
Ji Ming-yue. The Application of Amiodarone in Rapid Arrhythmia of Coronary Heart Disease and the Impact on ECG Changes[J]. Medical Recapitulate, 2015, 21(22): 4195-4196

[21] Millard DC, Strock CJ, Carlson CB, et al. Identification of Drug-Drug Interactions In Vitro: A Case Study Evaluating the Effects of Sofosbuvir and Amiodarone on hiPSC-Derived Cardiomyocytes [J]. Toxicol Sci, 2016, 154(1): 174-182

[22] Bocchini N, Giantin M, Crivellente F, et al. Molecular biomarkers of phospholipidosis in rat blood and heart after amiodarone treat-ment [J]. J Appl Toxicol, 2015, 35(1): 90-103

[23] Silva AF, Bonatti R, Batatinha JA, et al. The Selective Late Sodium Current Inhibitor Eleclazine, Unlike Amiodarone, Does Not Alter Defibrillation Threshold or Dominant Frequency of Ventricular Fibrillation[J]. J Cardiovasc Pharmacol, 2017, 69(3): 178-182

[24] McBride ME, Marino BS, Webster G, et al. Amiodarone Versus Lidocaine for Pediatric Cardiac Arrest Due to Ventricular Arrhythmias: A Systematic Review[J]. Pediatr Crit Care Med, 2017, 18(2): 183-189

[25] Somberg J, Molnar J. Sotalol versus Amiodarone in Treatment of Atrial Fibrillation[J]. J Atr Fibrillation, 2016, 8(5): 1359

[26] Millard DC, Strock CJ, Carlson CB, et al. Identification of Drug-Drug Interactions In Vitro: A Case Study Evaluating the Effects of Sofosbuvir and Amiodarone on hiPSC-Derived Cardiomyocytes [J]. Toxicol Sci, 2016, 154(1): 174-182

[27] Vilvanathan VK, Srinivas Prabhavathi Bhat BC, et al. A randomized placebo-controlled trial with amiodarone for persistent atrial fibrillation in rheumatic mitral stenosis after successful balloon mitral valvuloplasty[J]. Indian Heart J, 2016, 68(5): 671-677

[28] 金钦阳. 无血管活性药物支持下静脉快速推注胺碘酮对急性心肌梗死兔模型血流动力学的影响 [J]. 中国医药导报, 2014, 11(28): 23-27
Jin Qin-yang. Hemodynamic influence of Amiodarone by bolus vein injection without vasoactive agent on rabbits model with acute myocardial infarction[J]. China Medical Herald, 2014, 11(28): 23-27

[29] 罗兴文,史海燕.盐酸胺碘酮片对老年冠心病合并心律失常患者血流动力学的影响[J]. 中国老年学杂志, 2015, 35(14): 4042-4043
Luo Xing-wen, Shi Hai-yan. Effect of Amiodarone Hydrochloride Tablets on hemodynamics in elderly patients with coronary heart disease complicated with arrhythmia[J]. Chinese Journal of Gerontology, 2015, 35(14): 4042-4043

[30] 符丽萍.胺碘酮治疗冠心病室性心律失常的效果分析[J].实用心脑肺血管病杂志, 2013, 21(4): 81-82
Fu Li-ping. Effect of amiodarone on ventricular arrhythmia in patients with coronary heart disease [J]. Practical Journal of Cardiac Cerebral Pneumal and Vascular Disease, 2013, 21(4): 81-82