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# 多巴酚丁胺联合胺碘酮在ICU心律失常患者中应用及对相关蛋白影响\*

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**摘要 目的:**探讨ICU心律失常患者在临床治疗中,应用多巴酚丁胺联合胺碘酮这一治疗方案进行治疗的效果。**方法:**抽取我院2019年4月至2022年5月收治的72例ICU中发生心律失常的患者,以平均法分为对照组和实验组,各36例,对照组予以多巴酚丁胺治疗,实验组应用多巴酚丁胺+胺碘酮治疗,对比两组心功能指标、BNP和hs-CRP水平、心律失常发生次数、平均心率、临床疗效、不良心血管事件发生情况及药物安全性。**结果:**治疗前两组患者的LVEF、LVEDD、LVESD水平无差异( $P>0.05$ ),治疗后两组患者的LVEF水平升高,LVEDD、LVESD水平均降低,并且治疗后实验组患者的以上指标变化幅度大于对照组( $P>0.05$ );治疗前两组患者的BNP、hs-CRP水平无差异( $P>0.05$ ),治疗后两组水平均降低,并且治疗后实验组BNP、hs-CRP水平均较对照组低( $P>0.05$ );治疗前两组患者的心律失常发生次数及平均心率无差异( $P>0.05$ ),治疗后两组患者的心律失常发生次数及平均心率均降低,并且治疗后实验组心律失常发生次数较对照组少,平均心率较对照组低( $P>0.05$ );实验组患者临床治疗有效率为94.44%,对照组患者的临床治疗有效率为69.44%,实验组患者临床治疗有效率高于对照组( $P>0.05$ );实验组不良心血管事件发生率和不良反应发生率均较对照组低( $P>0.05$ )。**结论:**多巴酚丁胺联合胺碘酮对改善ICU心律失常患者心功能,减少心律失常次数,稳定心率,降低脑钠肽水平和超敏C反应蛋白水平有显著的治疗效果,且患者在治疗后发生的不良心血管事件及药物不良反应少,有着令人满意的药物安全性。

**关键词:**ICU;心律失常;多巴酚丁胺;胺碘酮;蛋白

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## Application of Dobutamine Combined with Amiodarone in Patients with Arrhythmia in ICU and Its Effect on Related Proteins\*

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**ABSTRACT Objective:** To explore the effect of dobutamine combined with amiodarone in the clinical treatment of arrhythmia patients in ICU. **Methods:** 72 patients with arrhythmias in ICU treated in our hospital from April 2019 to May 2022 were divided into matched group and experimental group by average method, with 36 cases in each group. The matched group was treated with dobutamine, while the experimental group was treated with dobutamine + amiodarone. The cardiac function indexes, BNP and HS CRP levels, the frequency of arrhythmias, average heart rate, clinical efficacy, adverse cardiovascular events and drug safety were compared between the two groups. **Results:** There was no difference in the levels of LVEF, LVEDd and LVESD between the two groups before treatment ( $P>0.05$ ). After treatment, the levels of LVEF increased and the levels of LVEDd and LVESD decreased in the two groups. After treatment, the changes of the above indexes in the experimental group were greater than those in the matched group ( $P<0.05$ ); Before treatment, there was no difference in the levels of BNP and hs CRP between the two groups ( $P>0.05$ ). After treatment, the levels of BNP and hs CRP in the two groups decreased, and after treatment, the levels of BNP and hs CRP in the experimental group were lower than those in the matched group ( $P<0.05$ ); Before treatment, there was no difference in the number of arrhythmias and average heart rate between the two groups ( $P>0.05$ ). After treatment, the number of arrhythmias and average heart rate in the two groups decreased, and after treatment, the number of arrhythmias in the experimental group was less than that in the matched group, and the average heart rate was lower than that in the matched group ( $P<0.05$ ); The effective rate of clinical treatment in the experimental group was 94.44%, and that in the matched group was 69.44%. The effective rate of clinical treatment in the experimental group was higher than that in the

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matched group ( $P<0.05$ ); The incidence of adverse cardiovascular events and adverse reactions in the experimental group were lower than those in the matched group ( $P<0.05$ ). **Conclusion:** Dobutamine combined with amiodarone has a significant therapeutic effect on improving cardiac function in ICU arrhythmia patients, reducing the number of arrhythmias, stabilizing heart rate, and reducing the level of brain natriuretic peptide and high-sensitivity C-reactive protein, and the patient develops after treatment. There are few adverse cardiovascular events and adverse drug reactions, and it has a satisfactory drug safety.

**Key words:** ICU; Arrhythmia; Dobutamine; Amiodarone; Protein

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## 前言

心律失常属于老年患者中的常见病,对于 ICU 患者来说,患者常合并一种或多种器官衰竭,更易发生心律失常<sup>[1,2]</sup>,心律失常是冲动的形成异常以及传导异常,冲动形成异常包括窦性心律失常和异位心律。异位心律包括:房扑、房颤、室扑、室颤等。冲动传导异常包括生理性的冲动传导异常。特别是处于代偿期心脏突然发病的急性心力衰竭患者,更容易发生心律失常<sup>[3,4]</sup>。心律失常会影响患者心脏泵血功能,进而影响血流动力学,若未给予及时有效的治疗可能会诱发心血管不良事件,预后不佳,严重者可危及患者的生命健康<sup>[5,6]</sup>。临床治疗时主要以控制病情,改善临床症状为主要治疗目的。因此探寻有效的药物进行心律失常的治疗便十分重要。多巴酚丁胺可激活  $\beta_1$  肾上腺受体,增加排血量,减轻心脏后负荷,但其单一治疗效果欠佳<sup>[7,8]</sup>。除此之外,还需要选择抗心律失常的药物以提高疗效。胺碘酮作为临床常见抗心律失常的药物,与多巴酚丁胺联合使用后有着理想的治疗效果,能够改善患者心功能的同时,减少 ICU 患者发生心律失常的次数<sup>[9,10]</sup>。基于此,本研究分析了多巴酚丁胺和胺碘酮的药理作用,以了解二者联合应用对 ICU 心律失常患者的影响。

## 1 资料与方法

### 1.1 一般资料

抽取我院 2019 年 4 月至 2022 年 5 月收治的 72 例 ICU 中发生心律失常的患者,以平均法分为对照组和实验组,各 36 例。其中对照组男女患者分别有 20 例、16 例,年龄中位数( $67.3\pm 6.5$ )岁,心功能 III 级 22 例,IV 级 14 例;实验组男女患者分别有 19 例、17 例,年龄中位数( $68.1\pm 5.4$ )岁,心功能 III 级 18 例,IV 级 18 例。样本资料于组间比较后差值不大, ( $P>0.05$ )。

纳入标准:① 均存在不同程度器质性心脏病,可以收集患者完整的检查和病史资料;② 患者和家属了解研究目的后同意参与研究;③ 均为器质性心脏病时心肌收缩力下降引起的心力衰竭。

排除标准:① 使用其他抗心律失常药物者;② 其他影响本文研究的疾病者;③ 合并严重肝功能不全,或者其他影响本文研究的疾病者;④ 有外科手术史;⑤ 对研究用药有过敏反应。

### 1.2 治疗方法

两组均给予平衡酸碱度、电解质、吸氧、补液等常规治疗。

对照组静脉滴注 8-10 h 多巴酚丁胺注射液(浙江瑞新公司,规格:2 mL:20 mg,国药准字 H33020471)进行治疗,需将多巴酚丁胺溶于 5%葡萄糖液进行稀释,并维持  $2.5-10 \mu\text{g}/$

( $\text{kg}\cdot\text{min}$ )剂量,1 次/d,共治疗 5-6 d。

研究组予以多巴酚丁胺+盐酸胺碘酮方案进行治疗。前者治疗方法与对照组相同,后者盐酸胺碘酮片(赛诺菲公司,规格:0.2 g $\times$ 10 片/盒,国药准字 H19993254)初始剂量为 0.2 g/次,3 次/d,治疗 5 d 后改为 0.2 g/次,2 次/d,治疗 10 d 后改为 0.2 g/次/d 维持治疗。

因两种药物会产生不良反应,所以两组在治疗期间均需密切监测患者生命体征,同时由于患者治疗期间缺乏运动,机体基础代谢能力较差,所以需在患者病情稳定后指导患者进行抗阻训练,以便增强心肌功能,改善心肌缺血,降低心肌耗氧量,预防心律失常的发生。

### 1.3 评价标准

① 心功能指标<sup>[11,12]</sup>:评价两组治疗前后左心室射血分数(Left ventricular ejection fraction, LVEF)、左心室舒张末期内径(Left ventricular end diastolic diameter, LVEDD)、左心室收缩末期内径(Left ventricular end systolic diameter, LVESD)指标变化情况并进行对比。

② 脑钠肽和超敏 C 反应蛋白水平<sup>[13,14]</sup>:采集两组治疗前及治疗后空腹肘静脉血,应用化学发光法测定脑钠肽(Brain natriuretic peptide, BNP)水平,应用免疫散射比浊法测定超敏 C 反应蛋白(Hypersensitive C-reactive protein, hs-CRP)水平,实时记录后并对比分析。

③ 心律失常发生次数及心率变化情况:记录并对比两组治疗前后 48h 内心律失常发生次数,并记录两组治疗前及治疗后平均心率。

④ 临床疗效:心功能改善 2 级以上,不适症状基本消失即显效;改善 1 级以上,不适症状明显缓解即有效;无明显改善或恶化即无效。

⑤ 不良心血管事件与药物安全性:记录两组心力衰竭、恶性心律失常等不良心血管事件发生情况。同时记录并对比两组心悸、恶心、低血压、头痛等不良反应发生情况。

### 1.4 统计学方法

采用 SPSS28.0 分析,计量资料采用( $\bar{x}\pm s$ )表示,采用 t 检验;计数资料采用 n(%)表示,采用卡方检验( $\chi^2$ )或 Fisher 检验,  $P<0.05$  表示差异具有统计学意义。

## 2 结果

### 2.1 两组患者治疗前后心功能指标比较

治疗前两组患者的 LVEF、LVEDD、LVESD 水平无差异 ( $P>0.05$ ), 治疗后两组患者的 LVEF 水平升高, LVEDD、LVESD 水平均降低, 并且治疗后实验组患者的以上指标变化

幅度大于对照组( $P<0.05$ ),结果详见表 1。

表 1 治疗前后心功能指标比较( $\bar{x}\pm s$ )

Table 1 Comparison of cardiac function indexes before and after treatment( $\bar{x}\pm s$ )

| Groups                      | LVEF(%)    |                | LVEDD(mm)  |                | LVESD(mm)  |                |
|-----------------------------|------------|----------------|------------|----------------|------------|----------------|
|                             | Pretherapy | Post-treatment | Pretherapy | Post-treatment | Pretherapy | Post-treatment |
| Matched group<br>(n=36)     | 50.52±4.63 | 57.13±3.66*    | 65.50±6.06 | 59.38±2.14*    | 50.52±5.18 | 45.71±2.09*    |
| Experimental<br>group(n=36) | 50.81±4.51 | 64.64±3.53*    | 65.16±6.15 | 54.25±2.09*    | 50.38±5.16 | 40.25±2.42*    |
| t                           | 0.269      | 8.861          | 0.236      | 10.289         | 0.114      | 10.245         |
| P                           | 0.788      | <0.001         | 0.813      | <0.001         | 0.908      | <0.001         |

Note: compared with that before treatment, \* $P<0.05$ , the same below.

2.2 两组患者治疗前后脑钠肽和超敏 C 反应蛋白水平比较 治疗后两组患者水平均降低,并且治疗后实验组 BNP、hs-CRP 治疗前两组患者的 BNP、hs-CRP 水平无差异 ( $P>0.05$ ), 水平均较对照组低( $P<0.05$ ),结果详见表 2。

表 2 治疗前后脑钠肽和超敏 C 反应蛋白水平比较( $\bar{x}\pm s$ )

Table 2 Comparison of brain natriuretic peptide and high-sensitivity C-reactive protein levels before and after treatment( $\bar{x}\pm s$ )

| Groups                   | BNP(pg/mL)     |                | hs-CRP( $\mu$ g/mL) |                |
|--------------------------|----------------|----------------|---------------------|----------------|
|                          | Pretherapy     | Post-treatment | Pretherapy          | Post-treatment |
| Matched group(n=36)      | 1374.93±461.36 | 585.68±82.14*  | 9.33±2.19           | 5.08±1.73*     |
| Experimental group(n=36) | 1435.87±459.41 | 362.25±70.57*  | 9.27±2.16           | 3.12±1.36*     |
| t                        | 0.561          | 12.379         | 0.117               | 5.344          |
| P                        | 0.576          | <0.001         | 0.907               | <0.001         |

2.3 两组患者治疗前后心律失常发生次数及平均心率比较 心率均降低, 并且治疗后实验组心律失常发生次数较对照组 治疗前两组患者的心律失常发生次数及平均心率差异无 少,平均心率较对照组低( $P<0.05$ ),结果详见表 3。  
差异( $P>0.05$ ),治疗后两组患者的心律失常发生次数及平均

表 3 治疗前后心律失常发生次数及平均心率比较( $\bar{x}\pm s$ )

Table 3 Comparison of arrhythmia frequency and average heart rate before and after treatment( $\bar{x}\pm s$ )

| Groups                   | Occurrence times(time/48h) |                 | Average heart rate(min/time) |                |
|--------------------------|----------------------------|-----------------|------------------------------|----------------|
|                          | Pretherapy                 | Post-treatment  | Pretherapy                   | Post-treatment |
| Matched group(n=36)      | 2141.50±189.64             | 1194.34±152.29* | 116.46±13.28                 | 92.67±8.43*    |
| Experimental group(n=36) | 2138.72±190.58             | 890.83±102.44*  | 118.23±15.31                 | 70.87±6.89*    |
| t                        | 0.062                      | 9.921           | 0.525                        | 12.013         |
| P                        | 0.950                      | <0.001          | 0.600                        | <0.001         |

2.4 两组患者临床治疗有效率比较 床治疗有效率为 69.44 %, 实验组患者临床治疗有效率高于对 实验组患者临床治疗有效率为 94.44 %, 对照组患者的临 照组( $P<0.05$ ),详细见表 4。

表 4 临床治疗有效率比较[n(%)]

Table 4 Comparison of clinical treatment effectiveness[n(%)]

| Groups                   | Remarkable effect | Valid     | Invalid   | Total efficiency(%) |
|--------------------------|-------------------|-----------|-----------|---------------------|
| Matched group(n=36)      | 8(22.22)          | 17(47.22) | 11(30.56) | 25(69.44)           |
| Experimental group(n=36) | 23(63.89)         | 11(30.55) | 2(5.56)   | 34(94.44)           |
| $\chi^2$                 | -                 | -         | -         | 6.008               |
| P                        | -                 | -         | -         | 0.014               |

## 2.5 两组患者不良心血管事件和安全性比较

对照组低( $P<0.05$ ),结果详见表5。

实验组不良心血管事件发生率和不良反应发生率均较对

表5 不良心血管事件和安全性对比[n(%)]

Table 5 Comparison of adverse cardiovascular events and safety[n(%)]

| Groups                   | Adverse cardiovascular events |              | Adverse reactions |              |
|--------------------------|-------------------------------|--------------|-------------------|--------------|
|                          | Happen                        | Not occurred | Happen            | Not occurred |
| Matched group(n=36)      | 9(25.00)                      | 27(75.00)    | 10(27.78)         | 26(72.22)    |
| Experimental group(n=36) | 1(2.78)                       | 35(97.22)    | 2(5.56)           | 34(96.77)    |
| $\chi^2$                 | 7.432                         |              | 6.400             |              |
| $P$                      | 0.006                         |              | 0.011             |              |

## 3 讨论

ICU 患者极易发生心律失常,特别是部分高龄患者,因生理功能、组织结构明显减退,多合并慢性疾病,尤其是冠心病、高血压等器质性心脏病等,而且老年患者的药物代谢与其他年龄段患者不同,在多种因素的诱导下,当患者急性发病时,会因急性心力衰竭、缺氧、休克等情况而出现心律失常<sup>[15,16]</sup>。就急性心率衰竭而言,患者的器官、组织血液灌注量会因心室功能受损而降低,导致肺部循环、体循环出现淤血的情况,其治疗原则主要为改善急性泵衰竭、保证全身血液灌注正常。而对于心衰并发心律失常的患者,不仅其原本心肌受损的情况会加重,还会出现心脏积血现象,引发血栓栓塞等并发症,进而会增加病死率<sup>[17,18]</sup>。因此,临床在治疗 ICU 心律失常患者时应当遵循早发现、早治疗的原则,避免延误最佳的治疗时机,使得治疗难度增大。

研究结果显示,两组心功能指标、BNP 和 hs-CRP 水平、心律失常发生次数、心率、临床有效率、不良心血管事件与药物安全性等方面的指标均存在差异性, $P<0.05$ 。LVEF、LVEDD、LVESD 是评价心脏体积、形态、及结构心功能情况的重要指标。BNP 是一种肽类细胞因子,主要存储于心室肌内,其分泌量随心室充盈压的高低而变化,是临床上重要的心力衰竭标志物。当人体心功能出现异常时,心肌受压力刺激扩张会释放大量的 BNP 帮助改善心力衰竭,目前临床上通过检测 BNP 水平来评价心功能情况。当心室负荷过重或扩张时,BNP 分泌将会增加,是诊断反映患者心功能失代偿程度的重要指标,判断预后<sup>[19,20]</sup>;hs-CRP 在组织损伤及感染后急速升高,是人体内主要的急性期炎症蛋白之一,肝脏是其主要的合成与分泌部位。炎症因子在心室重构过程中发挥重要作用,其中 hs-CRP 可诱导心肌细胞凋亡,增加斑块不稳定性并促使其生长,为心血管事件预测因子<sup>[21-23]</sup>。多巴酚丁胺属于  $\beta_1$  受体激动剂,具有可选择性的特点,可以使心肌细胞的  $\beta$  受体受到兴奋传导,不仅可增加细胞内 cAMP 的含量,同时在腺苷酸环化酶活化的情况下钙离子的浓度也能被相应提高。因此患者在用药后其心肌收缩力可得到明显增强,同时也会增加心肌输出量,降低外周血管阻力,使心肌耗氧量较高<sup>[24,25]</sup>。因此,虽然多巴酚丁胺作为正性肌力药治疗心衰可以加强心肌收缩力,但是因其会增加心肌耗氧量会使得恶性心律失常的发生率升高,可能使本身患有心律失常的

患者病情加重,因此其整体的治疗效果不佳<sup>[26,27]</sup>。研究中所用的另一种药物--胺碘酮,属于三类抗心律失常药,能够对钾离子通道进行阻断,主要的成分为含碘咪唑衍生物<sup>[28]</sup>。应用胺碘酮治疗 ICU 心律失常能够有效减缓患者心率,减轻其心动过速的情况,同时也能够扩张冠状动脉,增加冠脉血流灌注量,减少心肌耗氧量,进而可以促使患者临床症状得以改善,对减少 ICU 心律失常患者心律失常的发生次数有良好作用<sup>[29,30]</sup>。实验组将多巴酚丁胺与胺碘酮联合一起使用,对于 ICU 心律失常患者的疗效显著,总体疗效比单用多巴酚丁胺的对照组更佳,能够将多巴酚丁胺改善心功能的作用和胺碘酮抗心律失常的作用发挥得淋漓尽致,实现相得益彰的效果,进而能够改善心功能,维持正常心率,减少不良心血管事件的发生。

综上所述,多巴酚丁胺联合胺碘酮治疗 ICU 心律失常的疗效确切,有利于显著改善患者的心功能,维持患者正常心率,控制心律失常的再次发生,同时用药安全线也较高,在临床中有着较为理想的应用价值。

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