

对早期多器官功能障碍综合征合并急性肾损伤患者行高容量血液滤过的疗效

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摘要 目的 探讨合并有急性肾损伤(AKI)的多器官功能障碍综合征(MODS)患者早期行高容量血液滤过(HVHF)治疗后对器官保护作用。方法 选择重症监护室于 2008 年 6-2012 年 1 月收治的 MODS 合并 AKI 并接受 HVHF 治疗的患者 86 例作为研究对象。根据 RIFLE 分级分为 Risk 组 10 例, Injury 组 17 例, Failure 组 59 例。记录患者 HVHF 治疗前后血肌酐 (SCr)、氧合指数 ($\text{PaO}_2/\text{FiO}_2$)、血管外肺水指数 (EVLWI)、动脉血乳酸(Lac)、凝血酶原时间(PT)、天冬氨酸转氨酶(AST)、急性生理学与慢性健康状况评分系统 II (APACHE II) 评分以及 28 天存活率。结果 :HVHF 治疗后, Failure 组 SCr、EVLWI、Lac、PT、AST、APACHEII 评分均显著高于 Risk 组和 Injury 组, $\text{PaO}_2/\text{FiO}_2$ 显著低于 Risk 组和 Injury 组, 差异有统计学意义($P<0.05$)。Risk 组和 Injury 组在 HVHF 治疗后各指标差异均无统计学意义($P>0.05$)。Risk 组 28 天存活率为 60.0%, Injury 组 64.71%, Failure 组存活率为 66.10%, 3 组间差异均无统计学意义($P>0.05$)。结论 早期 HVHF 治疗对 MODS 合并 AKI 患者的器官具有保护作用, 值得临床进一步研究。

关键词 高容量血液滤过 多器官功能障碍综合征 肾损伤 器官保护

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The Efficiency of Early High Volume Hemofiltration to Patients with Multiple Organ Dysfunction Syndrome Combined with Acute Kidney Injury

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ABSTRACT Objective: To investigate the efficiency of early high volume hemofiltration (HVHF) to patients with multiple organ dysfunction syndrome (MODS) combined with acute kidney injury (AKI). **Methods:** 86 patients with MODS combined with AKI and treated by HVHF in our hospital were involved into this study during June 2008-January 2012. They were divided into the Risk group with 10 cases, Injury group with 17 cases, and Failure group with 59 cases according to RIFLE. Serum creatinine (SCr), oxygenation index ($\text{PaO}_2/\text{FiO}_2$), extravascular lung water index (EVLWI), lactate (Lac), prothrombin time (PT), aspartate aminotransferase (AST), Acute Physiology And Chronic Health Evaluation System II (APACHE II) and 28-day survival rate before and after HVHF treatment were recorded. **Results:** SCr, EVLWI, Lac, PT, AST, APACHEII in the Failure group were significantly higher than those in the Risk group and Injury group after HVHF treatment. $\text{PaO}_2/\text{FiO}_2$ in the Failure group was significantly lower than the Risk Group and Injury group. The differences were statistically significant ($P<0.05$). The differences of indexes in the Risk Group and Injury group after HVHF treatment were not statistically significant the ($P>0.05$). The 28-day survival rate in the Risk Group was 60.0%. It was 64.71% in the Injury group, and 62.71% in the Failure group. The differences among the three groups were not statistically significant ($P>0.05$). **Conclusions:** HVHF treatment was effective to protect the organs of patients with early MODS combined with AKI. It was suggested to take further clinical studies.

Key words: Highvolume hemofiltration; Multiple organ dysfunction syndrome; Renal injury; Organ protection

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连续性高容量血液滤过 (high volume hemofiltration, HVHF)是目前治疗合并有急性肾损伤(acute kidney injury, AKI)的多器官功能障碍综合征 (multiple organ dysfunction syndrome, MODS)患者的最佳方案^[1]。HVHF 治疗时机的选择决定了患者的生存率,然而目前临床上还没有一个统一的标准^[2]。为了探索 HVHF 治疗 MODS 合并 AKI 患者的最佳疗效,本研究通过分析重症监护室近 4 年来收治的合并有 AKI 的 MODS 患者在肾衰不同阶段行 HVHF 治疗的情况,旨在探索 HVHF 治

疗的最佳时机以改善患者的预后以及提高患者的生存率。

1 资料与方法

1.1 临床资料

选择重症监护室于 2008 年 6 月至 2012 年 1 月收治的 MODS 合并 AKI 并接受 HVHF 治疗的患者 86 例作为研究对象。其中男 49 例,女 37 例,年龄范围 23-74 岁,平均年龄 (48.35 ± 10.95) 岁。MODS 与 AKI 的诊断标准参照参考文献^[3]。根据 HVHF 治疗前的 RIFLE 分级标准,将患者分为 Risk 组 10 例, Injury 组 17 例以及 Failure 组 59 例。

1.2 HVHF 治疗方法

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常规股静脉穿刺、置双腔管,选择德国贝朗 Diapact CRRT 机, AV600 血滤器,使用改良的 Port 配位置换液。以 80 mL/kg·h 前稀释输入,流量 4000 mL/h,血流量 200-250 mL/min,根据患者的治疗量与生理需要制定超滤量。用肝素抗凝,若有出血倾向则用枸橼酸抗凝。

1.3 观察指标

观察 3 组患者 HVHF 治疗前后的血肌酐(SCr)、氧合指数(PaO₂/FiO₂)、血管外肺水指数(EVLWI)、动脉血乳酸(Lac)、凝血酶原时间(PT)、天冬氨酸转氨酶(AST)、急性生理学及慢性健康状况评分系统 II (APACHE II)评分以及 28 天存活率。

1.4 统计学处理

采用统计学分析软件 SPSS17.0 进行数据分析,计量资料用均数± 标准差,组间比较行方差检验,两两比较行 t 检验,计数资料用例数(百分率)表示,行 X² 检验,P<0.05 代表差异有统计学意义。

2 结果

表 1 HVHF 治疗前后患者主要功能指标与 APACHEII 评分

Table 1 Main function indicators and APACHEII score of patients before and after HVHF treatment

指标	Risk 组(10 例)		Injury 组(17 例)		Failure 组(59 例)	
	Risk Group (10 cases)		Injury Group (17 cases)		Failure Group (59cases)	
	治疗前(Before Treatment)	治疗后(After Treatment)	治疗前(Before Treatment)	治疗后(After Treatment)	治疗前(Before Treatment)	治疗后(After Treatment)
血肌酐 SCr (μmol/L)	151.21± 12.10	84.72± 20.06	231.68± 14.54 ^a	90.82± 22.70	351.92± 21.20 ^{ab}	261.61± 34.25 ^{ab}
氧合指数 PaO ₂ /FiO ₂ (mm Hg)	211.21± 25.24	246.35± 20.53	201.54± 23.47	251.74± 23.21	191.49± 31.54	203.91± 18.58 ^{ab}
血管外肺水指数 EVLWI (ml/kg)	13.55± 3.52	10.83± 1.34	12.81± 5.28	10.87± 1.52	12.92± 4.67	12.24± 2.48 ^{ab}
动脉血乳酸 Lac (mmol/L)	2.45± 0.52	1.69± 0.24	2.51± 0.32	1.79± 0.39	2.71± 0.53	2.51± 0.53 ^{ab}
凝血酶原时间 PT (s)	14.45± 2.13	12.73± 1.23	14.63± 3.15	12.68± 0.85	14.92± 2.31	14.03± 1.52 ^{ab}
天冬氨酸转氨酶 AST (U/L)	146.66± 20.58	46.58± 13.52	142.25± 25.47	53.68± 14.25	155.36± 31.25	95.36± 15.62 ^{ab}
急性生理学及慢性健康状况评分系统 II 评分 APACHEII Score(分)	22.48± 3.21	17.58± 2.54	23.62± 2.85	17.37± 2.63	22.53± 3.47	20.13± 2.74 ^{ab}

注 与 Risk 组比较,aP<0.05 与 Injury 组比较,bP<0.05。
Note: Compared with the Risk group, aP <0.05; Compared with the Injury group, bP <0.05.

3 讨论

MODS 合并 AKI 大部分是由感染性疾病如脓毒症、严重感染等急性因素引起的,导致其他器官继发受损,致病因素常与 MODS 的发生之间存在着一定时间的间隔,且受损器官呈序贯性^[4]。大部分情况下,机体器官在 MODS 发生前均保持基本健康,所以 MODS 对器官功能的损害是可逆的,大量文献报道,只要阻断 MODS 的发病机制并进行及时救治,患者器官的功能就有望得到康复,生存几率也得以提高^[5-10]。HVHF 通过输

HVHF 治疗前后患者主要功能指标与 APACHEII 评分见表 1 和图 1。HVHF 治疗前,PaO₂/FiO₂、EVLWI、Lac、PT、AST 和 APACHEII 评分在 3 组患者间的差异不明显,没有统计学意义 (P>0.05)。Injury 组 SCr 值显著高于 Risk 组, Failure 组 SCr 值显著高于 Injury 组与 Risk 组,差异均有统计学意义(P<0.05) (见图 1)。

HVHF 治疗后,Failure 组 SCr、EVLWI、Lac、PT、AST、A-PACHEII 评分均显著高于 Risk 组和 Injury 组,PaO₂/FiO₂ 显著低于 Risk 组和 Injury 组,差异有统计学意义(P<0.05)(见图 1)。Risk 组和 Injury 组在 HVHF 治疗后各指标差异均无统计学意义(P>0.05)。

Risk 组 28 天存活率为 60.0% (6/10),Injury 组 64.71% (11/17),Failure 组存活率为 66.10%(39/59),3 组间差异均无统计学意义(P>0.05)。提示早期 HVHF 能够对合并 AKI 的 MODS 患者的器官起到保护作用。

入置换液来清除患者体内的炎症介质,所以 HVHF 治疗可以在一定范围内改善患者的血流动力学状态^[11,12],是目前 MODS 合并 AKI 患者的最佳治疗方案^[1]。文献报道 HVHF 的治疗时机与患者的生存率密切相关,根据 2002 年急性透析质量倡议组 (ADQI)提出的 AKI 分级 RIFLE 标准,急性肾衰竭(ARF)可以分为危险(Risk)、损伤(Injury)和衰竭(Failure)3 期^[13-15]。且 Injury 期是 HVHF 治疗的最佳时期。有学者根据 RIFLE 标准在 Risk 期、Injury 期和 Failure 期均进行了 HVHF 治疗,发现 Risk 期和 Injury 期的病死率仅为 22%和 24%,而 Failure 期的病死率高达

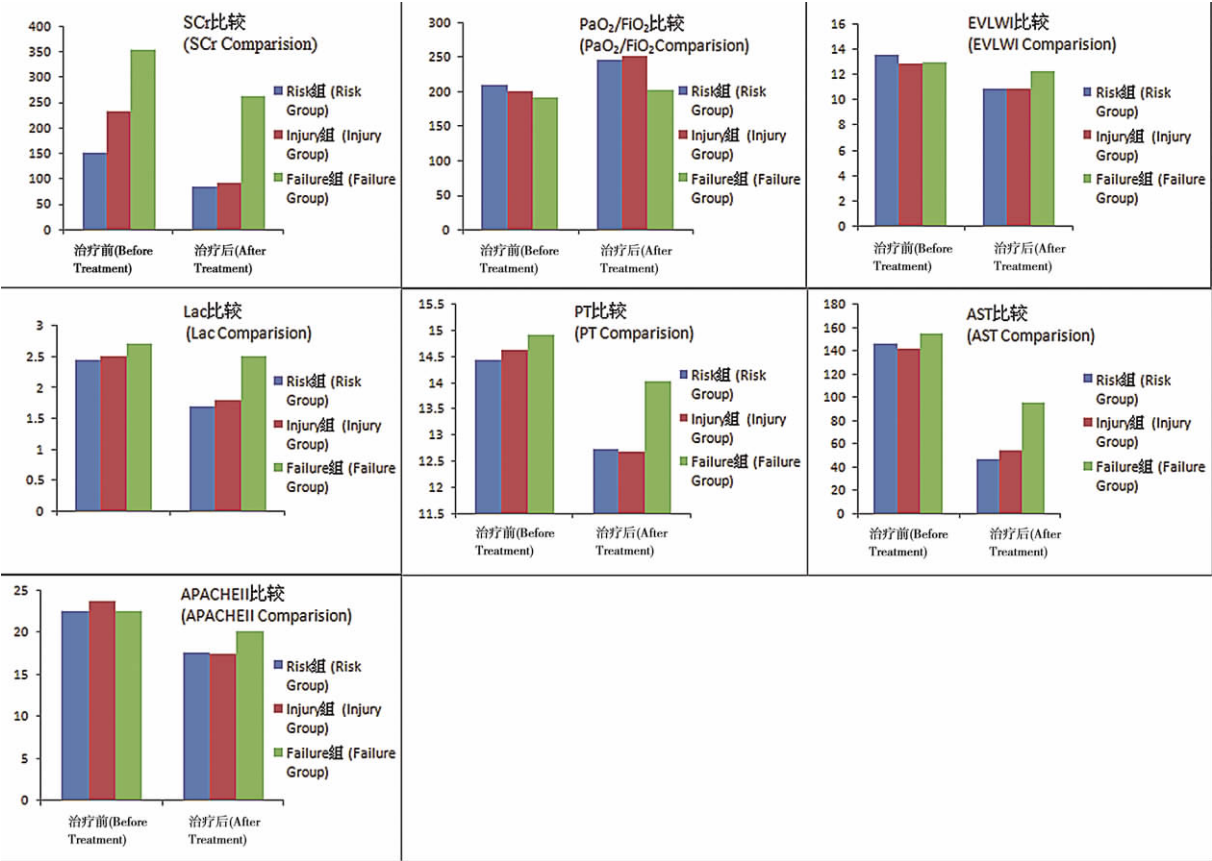


图 1 HVHF 治疗前后患者主要功能指标与 APACHEII 评分

Fig. 1 Main function indicators and APACHEII score of patients before and after HVHF treatment

58%^[16]。这说明在 AKI 的 Risk 期和 Injury 期进行 HVHF 治疗有望更有效地改善患者预后,提高患者的生存率^[17-19]。

为了探索 HVHF 治疗 MODS 合并 AKI 患者的最佳疗效,找到最佳治疗时机以改善患者的预后以及提高患者的生存率,本研究在患者的 Risk 期、Injury 期和 Failure 期均进行了 HVHF 治疗。本组研究资料显示, HVHF 治疗后, Risk 组和 Injury 组的 SCr、EVLWI、Lac、PT、AST、APACHEII 评分均显著低于 Failure 组, PaO₂/FiO₂ 显著高于 Failure 组 (P<0.05)。而 HVHF 治疗后 Risk 组和 Injury 组之间各指标差异均无统计学意义 (P>0.05)。提示在 Risk 期和 Injury 期行 HVHF 能够在 Failure 期起到更好的清除作用,更有效改善 MODS 合并 AKI 患者体内环境以及血流动力学状态,保护器官、改善循环状态的作用更明显。然而研究同时发现, Risk 组的 28 天存活率为 60.0%, Injury 组为 64.71%, Failure 组为 66.10%, 3 组存活率无明显差异 (P>0.05), 这可能是因为患者的预后除了与肾衰竭程度有关外,还和其他器官的损伤程度以及 MODS 的发病原因是否得到有效控制有关^[20-22]。

总之,对合并有 AKI 的 MODS 患者在肾衰竭早期行 HVHF 治疗能够有效改善患者体内环境,保护器官的作用更明显,但没有充分的证据证明早期 HVHF 治疗能够提高患者生存率,需要进一步研究。

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