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Bi PAP 呼吸机无创通气联合氧气驱动雾化吸入 对慢阻肺合并呼吸衰竭的疗效*

孟浩¹ 杜永亮^{2Δ} 赵杰² 施萍² 杨莉³

(1 徐州医科大学第二附属医院呼吸内科 江苏 徐州 221006; 2 徐州医科大学第二附属医院呼吸科 江苏 徐州 221006;

3 同济大学附属上海市肺科医院内镜中心 上海 200433)

摘要 目的:研究 Bi PAP 呼吸机无创通气以及氧气驱动雾化吸入联用对慢性阻塞性肺疾病(慢阻肺)合并呼吸衰竭的疗效。**方法:**选择 2016 年 12 月~2018 年 12 月我院的 121 例慢阻肺合并呼吸衰竭患者,随机分为两组。对照组采用 Bi PAP 呼吸机无创通气疗法,观察组联合氧气驱动雾化吸入布氨溴索和地奈德混悬液。比较两组的呼吸频率、血气指标和心率;血清肺表面活性相关蛋白 D(Pulmonary surfactant related protein, SP-D)以及肺部活化调节趋化因子(PARC/CCL18)水平、肺功能。**结果:**观察组的有效率明显高于对照组($P<0.05$);治疗后,两组的呼吸频率、血气指标和心率明显改善($P<0.05$),且观察组的呼吸频率、血气指标和心率明显优于对照组($P<0.05$);治疗后,两组的血清 PARC/CCL18 以及 SP-D 水平均明显降低($P<0.05$),且观察组的血清 PARC/CCL18 以及 SP-D 水平明显低于对照组 ($P<0.05$);治疗后,两组的 FEV₁%、呼吸困难指数以及 FEV₁/FVC 明显改善 ($P<0.05$),且观察组的 FEV₁%、呼吸困难指数以及 FEV₁/FVC 明显优于对照组($P<0.05$)。**结论:**Bi PAP 呼吸机无创通气以及氧气驱动雾化吸入联用能改善慢阻肺合并呼吸衰竭的血气指标、生命体征和肺功能,降低血清 PARC/CCL18 以及 SP-D 水平。

关键词:氧气驱动雾化吸入;Bi PAP 呼吸机无创通气;慢阻肺;呼吸衰竭

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Effect of Bi PAP Ventilator Noninvasive Ventilation Combined with Oxygen Driven Atomization Inhalation on COPD with Respiratory Failure*

MENG Hao¹, DU Yong-liang^{2Δ}, ZHAO Jie², SHI Ping², YANG Li³

(1 Department of Respiratory Medicine, Second Affiliated Hospital of Xuzhou Medical University, Xuzhou, Jiangsu, 221006, China;

2 Department of Respiratory, Second Affiliated Hospital of Xuzhou Medical University, Xuzhou, Jiangsu, 221006, China;

3 Endoscopy Center of Shanghai Pulmonary Hospital, Tongji University, Shanghai, 200433, China)

ABSTRACT Objective: To study the effect of Bi PAP ventilator noninvasive ventilation combined with oxygen driven atomization inhalation on COPD with respiratory failure. **Methods:** Selected 121 cases of COPD patients with respiratory failure who were treated in our hospital from 2016 to December 2018, divided into two groups randomly. The control group used Bi PAP ventilator noninvasive ventilation therapy, the observation group combined with oxygen driven atomization inhalation of ambroxol and desnide suspension. The respiratory rate, blood gas index and heart rate, the level of SP-D, PARC / ccl18 and lung function were compared between the two groups. **Results:** The effective rate of the observation group was significantly higher than control group ($P<0.05$). After treatment, the respiratory rate, blood gas index and heart rate of the two groups were significantly improved ($P<0.05$), and the respiratory rate, blood gas index and heart rate of the observation group were significantly better than those of the control group ($P<0.05$). After treatment, the serum Parc / ccl18 and SP-D levels of the two groups were significantly lower($P<0.05$), and the serum Parc / ccl18 and SP-D levels of the observation group were significantly lower than those of the control group ($P<0.05$). After treatment, FEV₁%, dyspnea index and FEV₁/FVC of the two groups were significantly improved ($P<0.05$), and FEV₁%, dyspnea index and FEV₁/FVC of the observation group were significantly better than those of the control group ($P<0.05$). **Conclusion:** The combination of Bi PAP ventilator noninvasive ventilation and oxygen driven atomization inhalation can improve the blood gas index, vital signs and lung function of COPD with respiratory failure, and reduce the serum Parc / ccl18 and SP-D levels.

Key words: Oxygen Driven Atomization Inhalation; Bi PAP Ventilator Noninvasive Ventilation; COPD; Respiratory Failure

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作者简介:孟浩(1984-),男,硕士,主治医师,研究方向:呼吸内镜,超声支气管镜、慢阻肺、肺癌方面,

电话:18068732558, E-mail: mark841123@163.com

Δ 通讯作者:杜永亮(1981-),男,硕士,副主任医师,研究方向:呼吸危重症,机械通气,慢阻肺,肺癌方向,

电话:13813297523, E-mail: 13813297523@163.com

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前言

慢性阻塞性肺疾病(慢阻肺)是一类具有气流阻塞特征的慢性支气管炎或(和)肺气肿,能进一步发展成肺源性心脏病或者呼吸衰竭,多发于中老年人群,具有极高的致残率甚至致死率^[1-3]。该病的发病机理是当肺部发生感染后,痰液会随着病情的加重而不断阻塞气管,引起换气功能障碍,明显降低了肺部通气量,从而发展为慢阻肺^[4,5]。若未及时开展治疗,病情会进一步发展和加重,最终导致呼吸衰竭而引起死亡,严重影响疗效和预后^[6-8]。无创正压通气可以增加慢阻肺合并呼吸衰竭患者的吸气相压力,减轻气道阻力,但单纯应用易造成排痰困难、咽部干燥等^[9]。氧气驱动雾化吸入能有效改善症状,对患者呼吸道的的影响小,安全性较高^[10]。本研究将 Bi PAP 呼吸机无创通气以及氧气驱动雾化吸入联用,分析其对慢阻肺合并呼吸衰竭的疗效,报告如下。

1 资料与方法

1.1 一般资料

选择 2016 年 12 月~2018 年 12 月我院的 121 例慢阻肺合并呼吸衰竭患者,纳入标准:(1)患者可以正常的阅读、交流及听写;(2)均知情同意。排除标准:(1)有严重的肝肾功能障碍患者;(2)近期感染或者合并血液性疾病的患者;(3)对本研究中使用的治疗药物有禁忌证的患者;(4)合并上消化道出血或者上气道损伤的患者;(5)有气管插管史、肺叶切除史的患者;(6)患有机械通气的高危因素如呼吸浅速的患者;(7)具有机械通气禁忌证的患者;(8)近期使用过免疫抑制剂、糖皮质激素的患者。用抽签法随机分为两组。观察组 61 例,男 34 例,女 27 例;年龄 43~75 岁,平均 (58.14± 6.73) 岁;慢阻肺病程 5~16 年,平均 (9.73± 1.34) 年。对照组 60 例,男 33 例,女 27 例;年龄 43~75 岁,平均 (58.29± 7.14) 岁;慢阻肺病程 5~16 年,平均 (9.52± 1.27) 年。两组的基线资料具有可比性。

1.2 治疗方法

两组均给予抗感染、糖皮质激素、平喘、止咳、吸氧、营养支持和纠正电解质失衡等基础治疗。对照组在上述治疗的基础上,采用 Bi PAP 呼吸机无创通气疗法,使用 Bi PAP S/T 型无创正压呼吸机(德国万曼公司生产),呼气压力设置为 4~8 cm H₂O,呼吸频率设置为 16 次/min,吸气压力设置为 16~25 cm H₂O,按照慢阻肺合并呼吸衰竭患者的自主呼吸情况和氧合状态,随时对无创正压通气的的时间进行调整。观察组联合静脉注射氨溴索和雾化吸入用布地奈德混悬液。首先静脉注射盐酸氨溴索注射液(勃林格殷格翰药业有限公司),每次 10 mg/kg,1 次/8 h。吸入用布地奈德混悬液(国药准字 H20140475, AstraZeneca Pty Ltd)采用经面罩氧气驱动雾化吸入 2 mg,每次 20 min,每天 2 次。两组都连续治疗一周。

1.3 观察指标

疗效标准:(1)显效:患者的紫绀和呼吸困难等症状全部缓解,肺功能和血气分析结果明显改善;(2)有效:患者的紫绀和呼吸困难等症状明显减轻,肺功能和血气分析结果有所改善;(3)无效:患者的紫绀和呼吸困难等症状没有减轻甚至加重,肺功能和血气分析结果没有改善甚至加重。

比较治疗前后动脉血氧分压、pH、二氧化碳分压、心率和呼吸频率;抽取 5 mL 静脉抽血,采用 ELISA 法检测血清 SP-D 以及 PARC/CCL18 水平,试剂盒购自上海邦景实业有限公司;记录第 1s 用力呼吸容积与预计值之间的比值(FEV₁%)/呼吸困难指数、FEV₁ 与用力肺活量的比值(FEV₁/FVC)。

1.4 统计学分析

采用 SPSS 20.0,两组间计量资料用 t 检验,计数资料用 χ^2 检验, $P<0.05$ 有统计学意义。

2 结果

2.1 疗效对比

观察组治疗的总有效率明显高于对照组($P<0.05$),见表 1。

表 1 疗效比较 [例(%)]

Table 1 Comparison of the clinical effect [n(%)]

Groups	n	Effective	Valid	Invalid	The total effect rate
Control group	60	24(40.00)	15(25.00)	21(35.00)	65.00
Observation group	61	31(50.82)	23(37.70)	7(11.47)	88.52*

Note: Compared with the control group, * $P<0.05$.

2.2 呼吸频率、血气指标和心率对比

治疗后,两组的呼吸频率、血气指标和心率明显改善($P<0.05$),且观察组更显著($P<0.05$),见表 2。

表 2 治疗前后的呼吸频率、血气指标和心率对比($\bar{x}\pm s$)

Table 2 Comparison of respiratory rate, blood gas index and heart rat before and after treatment($\bar{x}\pm s$)

Groups	n		PaO ₂ (mm Hg)	pH	PaCO ₂ (mm Hg)	Heart rate (times / min)	Respiratory rate (times / min)
Control group	60	Before treatment	44.23± 5.41	7.30± 0.11	82.39± 10.14	111.42± 12.29	30.53± 4.72
		After treatment	80.53± 9.76 [#]	7.35± 0.23 [#]	72.34± 7.65 [#]	101.34± 10.29 [#]	24.31± 3.65 [#]
Observation group	61	Before treatment	45.09± 6.23	7.29± 0.12	83.48± 11.25	112.75± 11.38	30.36± 4.15
		After treatment	87.42± 8.15 ^{*#}	7.39± 0.42 ^{*#}	61.48± 6.31 ^{*#}	90.41± 9.24 ^{*#}	20.24± 3.16 ^{*#}

Note: Compared with the control group, * $P<0.05$; compared with before treatment, [#] $P<0.05$.

2.3 血清 PARC/CCL18 以及 SP-D 水平对比

降低($P<0.05$),且观察组明显低于对照组($P<0.05$),见表 3。

治疗后,两组的血清 PARC/CCL18 以及 SP-D 水平均明显

表 3 血清 PARC/CCL18 以及 P-D 水平对比($\bar{x} \pm s$)Table 3 Comparison of serum ParC / ccl18 and P-D levels ($\bar{x} \pm s$)

Groups	n		PARC / CCL18 (ng/L)	SP-D (ng/mL)
Control group	60	Before treatment	119.73 $\pm$ 24.56	185.34 $\pm$ 29.73
		After treatment	103.42 $\pm$ 15.79 [#]	143.65 $\pm$ 21.63 ^{##}
Observation group	61	Before treatment	119.42 $\pm$ 25.73	184.22 $\pm$ 30.14
		After treatment	83.64 $\pm$ 11.25 ^{*#}	118.42 $\pm$ 15.34 ^{*#}

2.4 FEV₁%、呼吸困难指数以及 FEV₁/FVC 对比显改善 ($P<0.05$), 且观察组的 FEV₁%、呼吸困难指数以及治疗后,两组的 FEV₁%、呼吸困难指数以及 FEV₁/FVC 明FEV₁/FVC 明显优于对照组($P<0.05$),见表 4。表 4 FEV₁%、呼吸困难指数以及 FEV₁/FVC 对比($\bar{x} \pm s$)Table 4 Comparison of FEV₁%, dyspnea index and FEV₁/FVC ($\bar{x} \pm s$)

Groups	n		FEV ₁ %	Dyspnea index	FEV ₁ /FVC
Control group	60	Before treatment	52.76 $\pm$ 11.45	4.63 $\pm$ 0.65	53.42 $\pm$ 10.19
		After treatment	65.39 $\pm$ 14.23 [#]	3.29 $\pm$ 0.57 [#]	59.74 $\pm$ 11.23 [#]
Observation group	61	Before treatment	53.84 $\pm$ 12.13	4.67 $\pm$ 0.63	54.17 $\pm$ 10.25
		After treatment	73.24 $\pm$ 16.75 ^{*#}	2.44 $\pm$ 0.39 ^{*#}	65.42 $\pm$ 13.76 ^{*#}

3 讨论

慢阻肺呈进行性、不完全可逆发展,细胞因子趋化炎症反应细胞造成肺组织迁移活化,释放出各种氧化产物和酶,导致肺功能不断恶化^[11,12]。慢阻肺属于慢性非特异性炎症,与长期吸入有害的颗粒相关^[13,14]。患者常常会伴有气道阻塞、呼吸道感染等并发症,严重者会合并有呼吸衰竭^[15]。常用的治疗包括:保持呼吸道通畅,控制感染,改善呼吸功能,控制心力衰竭^[16-18]。对于慢阻肺合并呼吸衰竭治疗的关键是改善通气功能,减轻呼吸困难^[19]。

Bi PAP 呼吸机无创正压通气能够抑制肺泡萎陷,增加呼气流,升高 PaO₂,有效减轻呼吸困难,改善呼吸功能障碍^[20-23]。但是会使患者出现咽部干燥疼痛、排痰困难等。为了改善上述的不适症状,还需要对患者辅以雾化吸入治疗^[24]。氧气驱动雾化疗法通过将氧气作为雾化吸入给药的动力,药物经过雾化后,会变成能直径大约为 5 μ m 的、可以直接吸入的微小颗粒,在无创呼吸机治疗的基础上联合氧气驱动雾化吸入,可以使患者在平静呼吸的情况下把药物吸入患者的呼吸道内,雾化后的药可以直接抵达靶器官,到达小气道以及肺泡内^[25-27]。与传统的给药途径相比,有见效快、吸收快等优点,能有效稀释痰液、减少炎性分泌物、减轻支气管痉挛和消除组织水肿^[28]。

多项研究认为,慢性炎症反应是慢阻肺最为主要的诱因。PARC /CCL18 主要由选择性活化的树突状细胞和肺巨噬细胞生成,能增加肿瘤坏死因子- α 和基质金属蛋白酶-2 等炎症反应因子的表达量,促进炎症反应的发生。有研究表明,慢阻肺和肺纤维化患者中均会出现 PARC /CCL18 水平异常升高^[29]。

SP-D 主要由细支气管上 II 型肺泡细胞和 clara 细胞生成,其表达水平可随肺部的生理和病理变化而发生改变。慢阻肺合并呼吸衰竭患者因为机体中的肺上皮细胞受损和肺泡表面减张能力受损,会使肺毛细血管的通透性增加,导致大量的血浆蛋白渗出,从而使 SP-D 水平异常升高^[30,31]。本研究发现,观察组治疗后的呼吸频率、血气指标、心率、肺功能、血气指标、血清 PARC/CCL18 以及 SP-D 水平改善情况都优于对照组,表明 Bi PAP 呼吸机无创通气以及氧气驱动雾化吸入联用能提高慢阻肺合并呼吸衰竭的疗效,在改善血气功能、生命体征、肺功能以及抑制血清 PARC/CCL18、SP-D 水平方面可发挥协同作用。

综上所述,Bi PAP 呼吸机无创通气以及氧气驱动雾化吸入联用能改善慢阻肺合并呼吸衰竭的血气指标、生命体征和肺功能,降低血清 PARC/CCL18 以及 SP-D 水平。

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