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肺泡灌洗技术对重症支原体肺炎患儿血清炎症因子及肺功能的影响 *

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摘要 目的:探讨支气管肺泡灌洗液(Bronchoalveolar Lavage Fluid, BALF)技术应用于儿科重症支原体肺炎(Severe Mycoplasma Pneumoniae Pneumonia, SMPP)对患儿的血清炎症因子表达影响及肺功能的变化,旨在为临床上 SMPP 的诊治提供科学参考。方法:回顾性选取我院收治的 SMPP 患儿 83 例,按照治疗方式不同,分为两组,对照组 41 例,静滴阿奇霉素,研究组 42 例,采用静滴阿奇霉素 3-5 天行 BALF 灌洗生理盐水+布地奈德治疗。于治疗 7 d 后对比两组治疗前后及组间肺功能和炎症指标的变化。结果:研究组 IL-2、IL-6、IL-10 表达水平平均较对照组显著降低,差异有统计学差异($P < 0.05$);研究组 mPAP、PAWP、PVR 均比对照组下降明显,差异有显著性意义($P < 0.05$)。结论: BALF 技术可明显改善患儿炎症因子表达,对促进患儿肺功能恢复正常有良好作用,适用于儿童 SMPP 的治疗。

关键词: 肺泡灌洗技术;重症支原体肺炎;炎症;肺功能

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Effects of Bronchoalveolar Lavage on Serum Levels of Inflammatory Factors and Pulmonary Functions in Children with Severe Mycoplasma Pneumonia*

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ABSTRACT Objective: To investigate the effect of Bronchoalveolar Lavage Fluid (BALF) on the expression of inflammatory cytokines and the changes of pulmonary function in children with severe mycoplasma pneumoniae (SMPP), so as to provide scientific references for the clinical diagnosis and treatment of SMPP. **Methods:** 83 patients with SMPP admitted in our hospital were retrospectively chosen. According to different treatment methods, they were divided into two groups. 41 patients in the control group were treated with azithromycin. 42 patients in the study group were taken with BALF lavage azithromycin treatment. The changes of pulmonary function and inflammation index were compared between the two groups before and after treatment. **Results:** The levels of IL-2, IL-6 and IL-10 in study group were significantly lower than those in control group ($P < 0.05$). The mPAP, PAWP and PVR in the study group were significantly lower than those in the control group ($P < 0.05$). **Conclusion:** BALF can significantly improve the expression of inflammatory factors in children, and has good effect on promoting the recovery of normal lung function in children, and it is suitable for the treatment of SMPP in children.

Key words: Bronchoalveolar lavage; Severe mycoplasma pneumonia; Inflammation; Pulmonary function

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前言

重症支原体肺炎(Severe Mycoplasma Pneumoniae Pneumonia, SMPP)为常见的社区获得性肺炎之一,其发病率有逐年递增趋势。SMPP 通常具有呼吸受阻、持续高热等症状,患儿肺部病变明显,部分患儿可产生数个肺外器官受损,最终造成多器官衰竭,乃至死亡^[1-4]。因而,对 SMPP 的早期诊治的探索有重要意义。炎性指标在多个机体器官病变里均有异常表达的现象,而肺功能指标则为呼吸道疾病常用指标,本研究以炎性指标和肺功能指标表达作为观察指标具有一定科学依据。而对于 SMPP 的治疗,当前临床上通常采取大环内酯类药物或 BALF

技术辅助常规对症治疗的方法进行,尽管有部分文献对这两种治疗方式做了分析^[5-9],证实 BALF 技术对促进肺炎患者恢复时间更短,但仍欠缺二者在治疗 SMPP 患儿炎症因子与肺功能指标方面的研究,基于此,开展了本次研究,旨在观察 BALF 技术是否在 SMPP 治疗中也具有良好效果。

1 资料与方法

1.1 一般资料

回顾选取我院 2015 年 8 月至 2016 年 2 月接诊的 SMPP 患儿作为研究样本,纳入标准^[10]:①达到《诸福棠实用儿科学》中涉及 SMPP 的诊断标准,患儿均经影像学检测和体征检查确

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诊为 SMPP;②患儿信息完善,其监护人对本研究知情,均于治疗前签署知情同意书;③患儿无 BALF 技术禁忌症和无大环内酯类药物过敏史。剔除标准^[9]:①合并凝血系统、器质性病变、免疫系统等重大疾病者;②合并其他呼吸道疾病者。将 83 例入选病例分为两组,将 42 例采用 BALF 与生理盐水+布地奈德灌洗治疗的归为研究组,将 41 例采取阿奇霉素静脉滴注的归为对照组。研究组男童 28 例,女童 14 例,均龄(6.45±1.78)岁;对照组男童 26 例,女童 15 例,均龄(6.81±1.63)岁。两组患儿一般资料无明显差异(P>0.05)。

1.2 治疗方法

两组均予以对症止咳化痰及静点阿奇霉素注射液(企业:东北制药集团沈阳第一制药有限公司;国药准字:H2000197;批号:160911)治疗,对照组静滴阿奇霉素注射液:于餐前、后 3 h,根据患儿体重,按照 10 mg/kg 的比例兑入 250 mL 葡萄糖溶液中,单日一次。研究组在静点阿奇霉素第 3-5 天行 BALF 技术治疗。在局麻情况下,将纤维支气管镜置入气管,灌洗液为布地奈德 2 mL,再加入氯化钠溶液 10 mL,回收液 9 mL,通过负压引流装置,每个部位灌洗 2 次,将废液回收进硅质收集瓶中。两组均在持续 7 d 后比较疗效。

1.3 观察指标

比较治疗前后两组炎症指标和肺功能指标的变化。炎症指

标以双抗体夹心法测定,ELISA 试剂盒由 Innogenetics 公司提供,酶联免疫检测仪由南京华东电子集团提供,型号为 DG5031 型,测定患者空腹 8h 以上外周血中 IL-2(interleukin-2,白细胞介素-2)、IL-6 (interleukin-6,白细胞介素-6)、IL-10 (interleukin-10,白细胞介素-10)含量,均按照三复孔操作,计算平均值,降低实验误差率。肺功能以 Swan-Ganz 气囊漂浮导管进行检测,由 Edwards Lifesciences LLC 提供,观察指标有 PVR (Pulmonary Vascular Resistance,肺血管阻力)、PAWP (pulmonary artery wedge pressure,肺毛细血管楔压)和 mPAP (Mean pulmonary artery pressure,平均肺动脉压)。

1.4 统计学分析

使用统计程序 SPSS18.0 分析,计量结果表达为($\bar{x} \pm s$),组间及治疗前后差异行 t 检验;计数结果表达为百分率(%),组间差异行 χ^2 检验。P<0.05,有统计意义。

2 结果

2.1 两组炎症因子指标对比

两组治疗前 IL-2、IL-6、IL-10 无显著差异(P 均>0.05),治疗后炎症指标均改善显著(P 均<0.05)。研究组 IL-2、IL-6、IL-10 表达水平均较对照组明显降低,有显著差异性(P 均<0.05),见表 1。

表 1 两组炎症因子水平对比($\bar{x} \pm s$), pg/mL]

Table 1 Comparison of inflammatory factors between two groups [$\bar{x} \pm s$), pg/mL]

Factor		Study group (n=42)	Control group (n=41)	t	P
IL-2	Before treatment	13.83±1.19	12.79±1.21	1.874	>0.05
	After treatment	3.15±0.72 ^a	7.24±1.05 ^a	11.823	<0.05
IL-6	Before treatment	28.73±28.15	25.36±25.84	2.049	>0.05
	After treatment	6.83±10.56 ^a	11.71±10.63 ^a	12.836	<0.05
IL-10	Before treatment	19.74±2.53	19.46±2.45	2.163	>0.05
	After treatment	4.53±1.98 ^a	8.74±2.02 ^a	11.897	<0.05

Note: Compared with before treatment, ^aP<0.05

2.2 两组肺功能指标的比较

两组治疗前 mPAP、PAWP、PVR 无明显差异(P 均>0.05),治疗后肺功能指标均改善明显,有显著差异(P 均<0.05)。研究

组 mPAP、PAWP、PVR 表达明显低于对照组,有统计学意义(P 均<0.05),见表 2。

表 2 组间肺功能指标的比较($\bar{x} \pm s$)

Table 2 Comparison of pulmonary functions between two groups ($\bar{x} \pm s$)

Indicators		Study group (n=42)	Control group (n=41)	t	P
mPAP(mmHg)	Before treatment	36.54±12.47	34.79±12.14	1.458	>0.05
	After treatment	22.45±10.83 ^a	27.94±11.95 ^a	11.897	<0.05
PAWP(mmHg)	Before treatment	15.78±5.63	16.61±5.95	1.796	>0.05
	After treatment	8.13±1.65 ^a	12.07±3.18 ^a	12.812	<0.05
PVR(Wood 单位)	Before treatment	3.61±1.26	3.57±1.12	1.369	>0.05
	After treatment	1.52±0.81 ^a	2.24±0.66 ^a	11.823	<0.05

Note: compared with before treatment, ^aP<0.05.

3 讨论

SMPP 作为儿科呼吸道常见病,多是由肺炎支原体(Mycoplasma Pneumonia, MP)感染造成的。SMPP 的发病机制为患

儿遭到 MP 侵袭后,MP 尖端膜表面蛋白粘附于呼吸系统上皮细胞中的神经氨酸受体之上,开始生长、繁殖,期间以释放大量毒素的方式损害呼吸系统上皮细胞,阻滞呼吸系统正常纤毛运动,从而影响了患儿呼吸系统黏膜表面的完整性^[11-16]。除此,MP

还具有活化肥大细胞的功能,例如活化巨噬细胞、淋巴细胞等,这些因素造成了IL-2、IL-6、IL-10在患儿细胞中的浓度异常升高,由于炎症指标的异常表达,引发瀑布级联反应,这些反应又造成了SMPP的病情加重,不仅加大了治疗难度,还对预后造成不利影响。SMPP患儿呼吸道的主要症状为痰液增多、气道堵塞闭合、支气管黏膜充血水肿等,如病情继续恶化会造成肺不张、坏死性肺炎等并发症,或因免疫功能出现炎症诱发脑膜炎、心肌炎等器质性病变,对患儿造成生命威胁。因而,及早就诊、及早治疗对挽回SMPP患儿生命有重要价值^[17,18]。

以往临床上治疗SMPP的首选药物为滴注大环内酯类药物,其中阿奇霉素即为治疗SMPP的最常用新型大环内酯类抗生素之一。有研究表明,阿奇霉素血浆半衰期约为70h,可以较长时间发挥药效,且阿奇霉素具有良好的抗菌活性,应用于SMPP的治疗可起到抑制蛋白合成的功效,降低SMPP的代谢水平。随着医学科技发展,BALF技术逐渐应用于临床,BALF是在纤维支气管镜的可视操作环境下,在支气管患者肺泡内输注适量生理盐水进行临床检测,或辅助相关抗菌药物起到治疗呼吸系统疾病的目的^[19,20]。

本研究以阿奇霉素作为治疗SMPP的基础用药,对基础病情均较为严重的SMPP患儿进行治疗,检测其治疗前后肺功能及血清炎症因子表达加以研究,研究发现,治疗前后,两组均改善明显,有统计学意义(P 均 <0.05),研究组血清IL-2、IL-6、IL-10指标表达和肺功能指标mPAP、PAWP、PVR均明显低于对照组,有显著性差异(P 均 <0.05)。这可能与阿奇霉素对呼吸系统渗透性较好,具有一定抗感染能力,而BALF技术可在可视环境下准确找到病灶部位,及时清除患儿呼吸道淤积的食物残渣、部分MP、有毒代谢物、误吸进肺部的口腔分泌物和其他黏性物质等刺激性物质,降低了患儿呼吸道阻滞的情况,改善了患儿呼吸系统的内环境,患儿可较好的呼吸、换气,从而大幅度改善了患儿肺功能指标的表达。同时清除呼吸系统内有害物质,保持呼吸道的清洁,还可以改善局部炎症反应,由此明显提高了SMPP的治疗水平。但BALF技术对医院基础条件和医师操作水平均有一定要求,需在正规环境下操作,要求操作人员技术熟练,以免对患儿造成不良伤害。本研究虽取得一定效果,但仍在阿奇霉素的耐药性、BALF技术的最佳使用时间等方面存在不足,进一步研究需进行大样本分析。

综上所述,BALF技术对SMPP的治疗有一定促进作用,可较快恢复患儿肺功能水平,并对改善患儿血清炎症因子有重要价值。

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